

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

THIRD DECLARATION OF MARGARET BARROLL, PH.D.

I, Dr. Margaret (Peggy) Barroll, pursuant to 28 U.S. C. § 1746, hereby declare as follows:

- 1) I am over 18 years of age and have personal knowledge of the facts stated herein.
- 2) I am the same Dr. Margaret Barroll who authored and signed the following:
 - a) Expert Report dated October 31, 2019, submitted to the Special Master as New Mexico exhibit “NM-EX 100” on November 5, 2020¹;
 - b) Rebuttal Expert Report dated June 15, 2020, submitted to the Special Master as New Mexico exhibit “NM-EX 101” on November 5, 2020;
 - c) Supplemental Rebuttal Expert Report dated July 15, 2020, submitted to the Special Master as New Mexico exhibit “NM-EX 102” on November 5, 2020; and
 - d) Supplemental Rebuttal Expert Report (2nd Edition), dated July 15, 2020, Revised September 15, 2020, submitted to the Special Master as New Mexico exhibit “NM-EX 103” on November 5, 2020.

¹ All exhibits designated “NM-EX __” in this Reply Brief are contained in the State of New Mexico’s Final Exhibit Compendium dated February 5, 2021 filed with New Mexico’s Reply Briefs.

- 3) I confirm and verify that these reports are the same reports submitted to all parties to this litigation on the dates indicated. I confirm that I authored these reports, they are based on my personal knowledge and are true and accurate based on the analysis and sources described in each report.
- 4) I am also the same Dr. Margaret Barroll who authored and signed the following:
 - a) Declaration dated November 4, 2020, submitted to the Special Master as New Mexico exhibit “NM-EX 001” on November 5, 2020; and
 - b) Second declaration dated December 22, 2020, submitted to the Special Master as New Mexico exhibit “NM-EX 006” on December 22, 2020.
- 5) In this Declaration, I refer to the New Mexico water district, Elephant Butte Irrigation District, as “EBID,” and the Texas water district, El Paso County Water Improvement District No. 1, as “EPCWID.” I refer to EBID and EPCWID, collectively, as the “Districts.” I refer to the Rio Grande Project as the “Project.”
- 6) In this Declaration I refer to:
 - a) Project Water or Project Supply, which is water available for diversion for Project purposes (including delivery to Mexico) below Caballo Dam, and which includes water released from storage and inflows and return flows occurring below Caballo Dam;
 - b) Project Allocation, which is the annual amount of Project Water each District is entitled to order for delivery to its canal headings, as determined by Reclamation. Prior to 2006, the division of Project Allocation between the Districts was pro rata, based on authorized acreage, 57% to EBID and 43% to EPCWID. Prior to 1979 this division was accomplished through the equal allotment of Project Water per acre, and from 1979 through 2005 this division was accomplished through the D1/D2 allocation method. The D1/D2 allocation

method determined how much water Reclamation needed to deliver to District canal headings so that the Districts could deliver a full supply to their members. Since 2008, Project Allocations have been determined using the 2008 Operating Agreement which incorporates the D3 Allocation method plus Carryover, and does not divide Project Allocation between the Districts 57:43. In 2006 and 2007 Project Allocations were determined by a procedure very similar to the method used 2008 Operating Agreement.

- c) Carryover, which is the amount of unused Project Allocation a District carries over into the next calendar year, under rules specified in the 2008 Project Operating Agreement.
 - d) Current-Year Allocation, which is the amount of water allocated to each District each year, excluding Carryover.
 - e) Total Allocation, which is the amount of water allocated to each District each year, which includes Carryover starting in 2007.
- 7) I have reviewed the declaration of Robert J. Brandes dated December 22, 2020 (“Brandes Declaration”). Dr. Brandes has made a number of incorrect or misleading statements that I rebut in this declaration.
 - 8) In Brandes Declaration paragraph 8, Dr. Brandes states that New Mexico identified the Subject Years 1985-2002, 2005 and 2007-2010 as “full supply” years for the Project. Dr. Brandes admits that he agrees with my identification of these years as full supply years, with one exception, 2007. For this single year, Dr. Brandes claims that the allocation for EPCWID was about 23,000 acre-feet less than a full supply allocation of 376,862 acre-feet. Dr. Brandes is incorrect in stating that EPCWID’s 2007 allocation was less than 376,862 acre-feet, and his associated figure 1 is also incorrect.
 - 9) As clearly stated in my November 4, 2020 Declaration, NM-EX 001, paragraph 31:

“the years 2007 through 2010 were also **full-supply years for EPCWID** because in each of those years EPCWID’s annual allocation (including carryover, which is permitted under the 2008 Operating Agreement) exceeded 376,862 AFY, the full-supply allocation amount determined by Reclamation in 1990, and also exceeded the higher full-supply allocation to EPCWID (388,192 AFY) under the 2008 OA².”

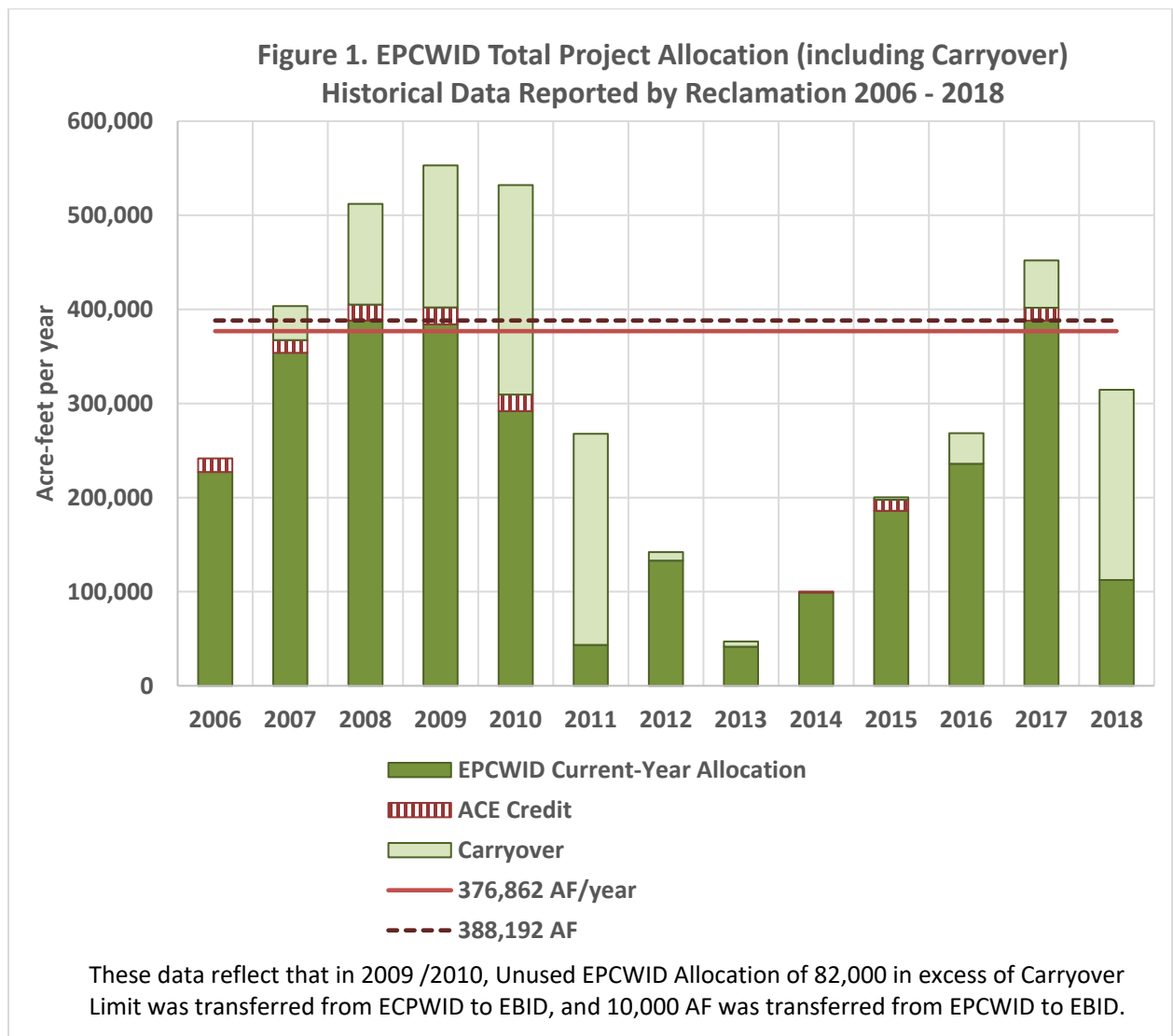
- 10) It can be debated whether the Project as a whole had a full supply for all of the years 2007 through 2010³. However, the point at issue is whether in each of the Subject Years EPCWID had a full supply available to it, because EPCWID’s total Project Allocation was equal to, or in excess of, the full-supply allocation amount defined by Reclamation. In fact, EPCWID’s Total Allocation in 2007 was 403,491 AF. NM-EX 100, Barroll Exp. Rep, Table A12. This amount exceeds EPCWID’s full-supply allocation as defined in Reclamation’s Water Supply Allocation Procedures document (circa 1990): 376,862 AF, and EPCWID’s full-supply allocation as defined by the 2008 Operating Agreement: 388,192 AF. Brandes Declaration Figure 1 (which is intended to refute my conclusion) is incomplete and misleading because the plot includes only the Current-Year Allocation part of EPCWID’s larger Total Allocation. Dr. Brandes’ Figure 1 omits EPCWID’s American Canal Extension Credit, which is added to its allocation, and EPCWID’s Carryover Allocation, which in some of these years exceeds 200,000 AF. In order to clarify the record, I provide a plot of EPCWID’s historical annual Total Allocation for the years 2006 through 2018 below in my Figure 1⁴, which clearly

² NM-EX 510, 2008 Rio Grande Project Operating Agreement (“2008 OA”).

³ See NM-EX 101, Barroll Rebuttal Rep. 2, n.4 (June 15, 2020). I define full-supply years for the Project as years in which the Water in Project Storage available for Project release exceeds 764,000 AF (as defined by Reclamation’s WSAP in approximately 1990), while Dr. Ian Ferguson of Reclamation defines full-supply years for the Project as years with Usable Water equal to or exceeding 790,000 AF, plus total District Carryover, plus any additional water needed to deliver such Carryover (as described in the 2008 OA).

⁴ Figure 1 is plot of data from Tables A.10, A.11, and A.13 from NM-EX 100, Barroll Rep. (Oct. 31, 2019), with the addition of a horizontal lines plotted at 376,862 AF and 388,192 AF, representing EPCWID’s full-supply allocations defined by Reclamation in its Project Water Supply Allocation Procedures document, and the 2008 OA, for reference.

demonstrates that in each of the years 2007 through 2010, EPCWID's Total Allocation exceeds 376,862 AF (or 388,192 AF) as I stated in my November 4, 2020 Declaration.



- 11) Starting in about 1980, Reclamation started making allocations to the District for diversion at District canal headings, and as part of this process Reclamation determined what the full-supply allocation was to each District. As this process evolved, a number of full-supply allocation values were used during the 1980's. In approximately 1990, Reclamation finalized the full-supply calculation, and determined that a canal diversion of 376,862 AF was sufficient

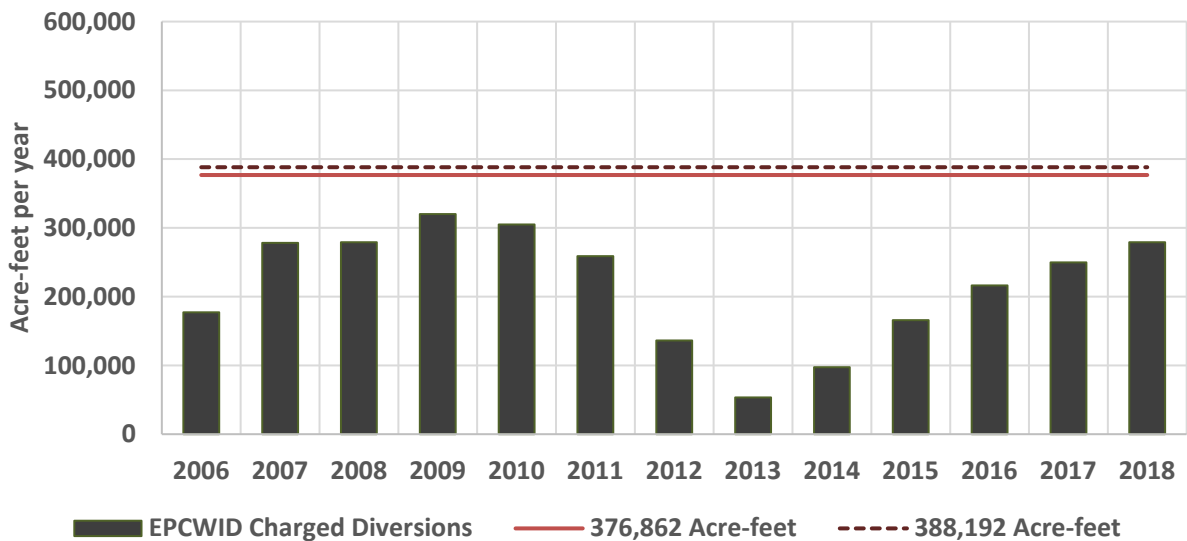
to provide a full supply farm delivery of Project water to EPCWID's lands. NM-EX 400, WSAP 4-5. Until the adoption of the D3 Allocation and Carryover in 2006, 376,862 AF was the maximum allocation that would be made to EPCWID, and the maximum amount of Project Water EPCWID could order. As part of normal Project operations, Reclamation would adjust reservoir releases to ensure that EPCWID received all water ordered, up to its total annual allocation. NM-EX 100, Barroll Rep. § 2.2 & Appx. B.

- 12) Since 2006, changes in Project Allocation methods have resulted in EPCWID having Total Allocations in some years that are far larger than its full-supply allocation. There is no evidence, however, that EPCWID's demand for Project Water has increased. Notably, in the years 2007 through 2010, EPCWID did not divert more than 320,000 AF of Project Water, as shown in Figure 2⁵, despite the fact that its total allocation was much higher in those years (shown in Figure 3⁶). As part of normal Project operations, Reclamation adjusts reservoir releases to ensure that EPCWID received all water ordered, up to its total annual allocation. NM-EX 100, Barroll Rep. § 2.2 & Appx. B.

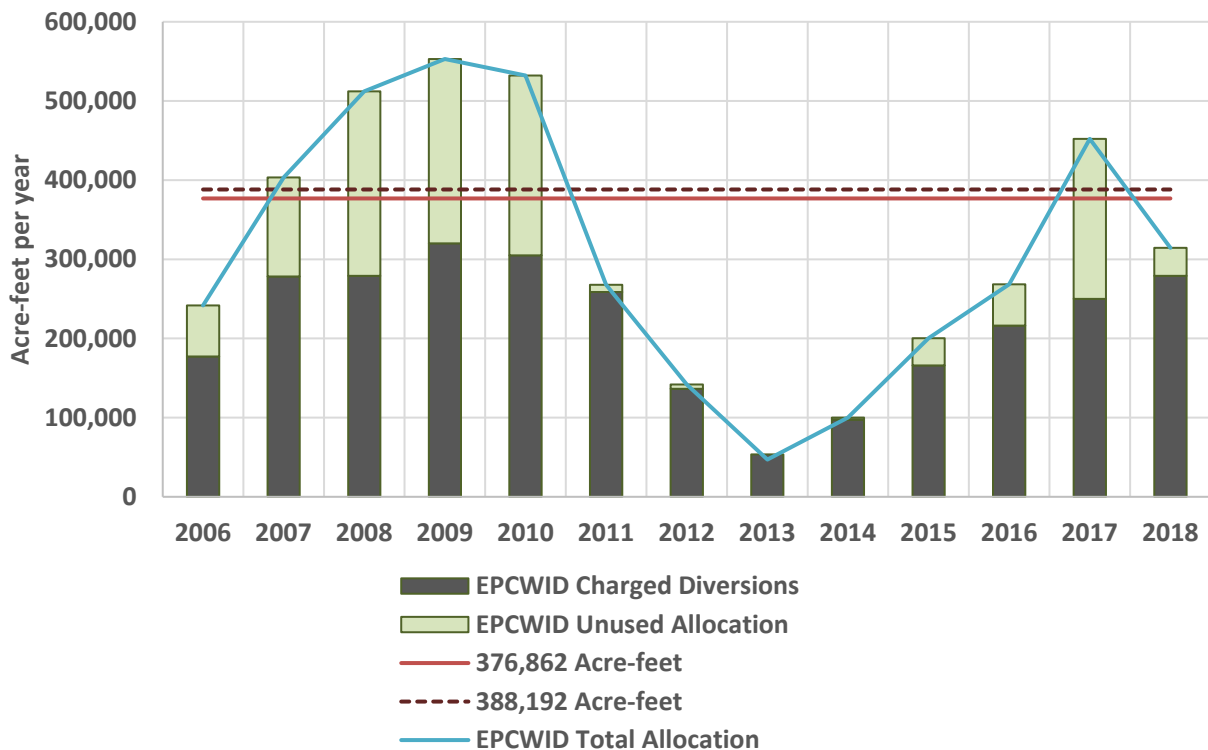
⁵ Figure 2 Figure 1 is plot of data from Table A.12 from NM-EX 100, Barroll Rep., with the addition of a horizontal line plotted at 376,862 AF and 388,192 AF, representing EPCWID's full-supply allocations defined by Reclamation in its Project Water Supply Allocation Procedures document, and the 2008 OA, for reference.

⁶ Figure 3 is plot of data from Table A.11 and Table A.12 from NM-EX 100, Barroll Rep., with the addition of a horizontal line plotted at 376,862 AF and 388,192 AF, representing EPCWID's full-supply allocations defined by Reclamation in its Project Water Supply Allocation Procedures document, and the 2008 OA, for reference.

**Figure 2. Total EPCWID Charged Diversions
Historical Data Reported by Reclamation 2006 - 2018**



**Figure 3. EPCWID Total Allocation and Charged Diversions
Historical Data Reported by Reclamation 2006 - 2018**

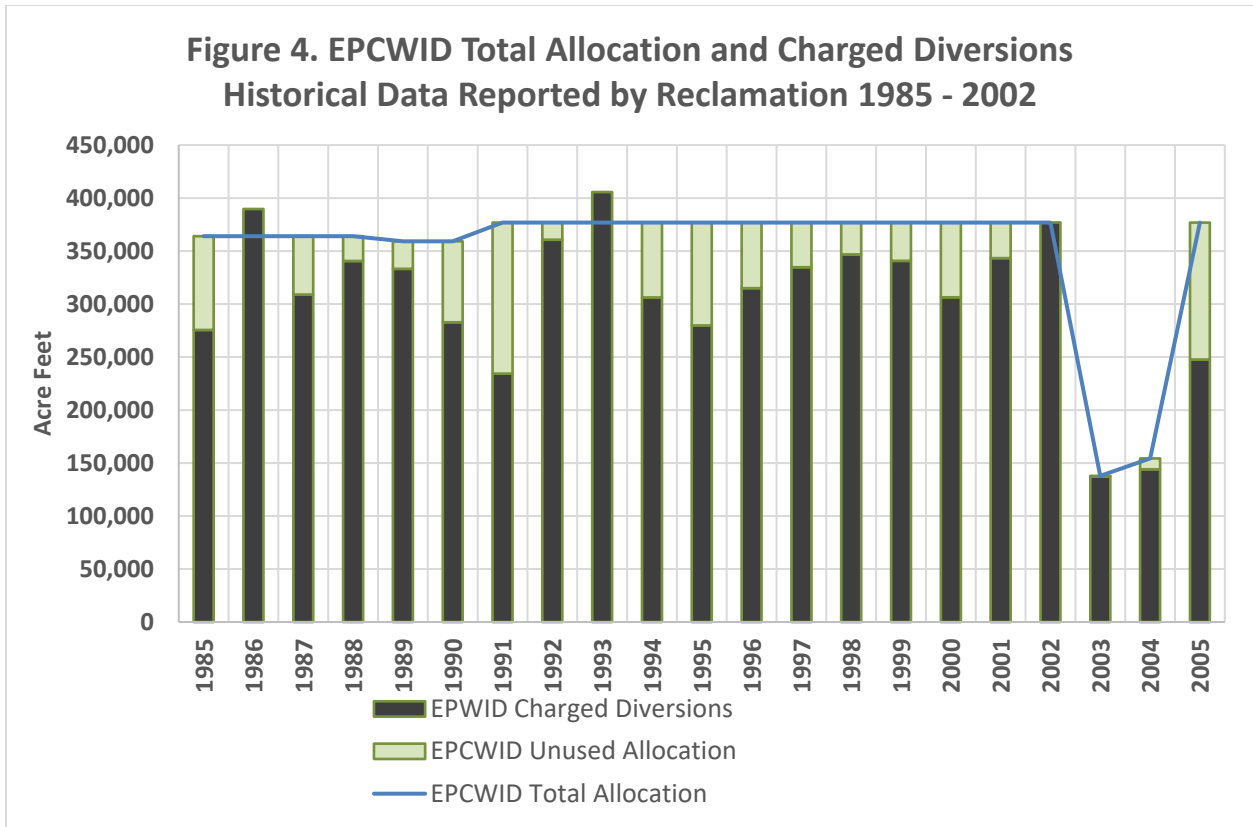


- 13) Furthermore, EPCWID's farmers have access to and are using additional sources of surface water that are no longer even counted as Project Water, and so are not included in Figure 2, such as substantial amounts of municipal effluent generated in the El Paso Valley largely from Project return flow. NM-EX 101, Barroll Reb. Rep., Table 5.
- 14) As Dr. Brandes and I agree, EPCWID was allocated a full supply of Project Water in each year from 1985 through 2002⁷. The full-supply amount is the maximum EPCWID could have been allocated during those years. The maximum amount of Project Water EPCWID can order or divert in a given year is limited to its annual allocation. In most of the years 1985 – 2002, EPCWID's charged diversions were considerably lower than its allocation, as shown in Figure 4⁸, indicating that EPCWID's demand was lower than its full-supply allocation⁹.

⁷ Full-supply allocation amounts varied prior to 1991 as allocation methodology was still being developed and finalized. NM-EX 001, Barroll Decl. ¶ 24.

⁸ Figure 4 is a plot of data from NM-EX 100, Barroll Rep., Tables A.4 and A.5.

⁹ There are 2 years in this period that show EPCWID diversions that exceed its allocation: 1986 and 1993. 1986 was a spill year, in which excess spill water was flowing throughout the Project. There are 2 contradictory sets of accounting records available for 1993, one of which reports diversions in excess of allocation (as plotted in Figure 4), and the other reports diversions 64,371 AF less than allocation.



15) In Brandes Declaration paragraph 9, Dr. Brandes states:

“Although the Subject Years may represent “full supply” for the Project, I disagree with New Mexico’s assertion that Texas did not suffer damages from failure to receive its entire Compact apportionment during those years.”

I disagree with Dr. Brandes. In any given year, EPCWID is only entitled to order and receive the amount of Project Water allocated to it by Reclamation. During the subject years (1985-2002, 2005, 2007-2010), EPCWID’s allocation was either at or above the full-supply level defined by Reclamation. The normal operations of the Project ensure that all Project allocation ordered by EPCWID is delivered. NM-EX 100, Barroll Rep. § 2.2 & Appx. B; NM-EX 006, Barroll 2nd Decl. ¶ 13. If EPCWID did not receive the water its water users required during those full supply years, it is because EPCWID did not order it. In most of these full-supply years, the amount of Project water EPCWID ordered and diverted was substantially less than

its Total Allocation in those years (shown in Figures 3 and 4 above), suggesting that a full-supply allocation was more than sufficient to meet EPCWID's demands.

- 16) Brandes Declaration paragraphs 10 and 11 argue that New Mexico's modeling results indicate injury to EPCWID in the years 2007 – 2010 caused by New Mexico pumping. Brandes argues this because the New Mexico model shows differences in allocation and orders in the years 2007 – 2010 depending on whether pumping is activated. However, for the issue at hand, which is damages occurring during years in which EPCWID was allocated a full supply, a review of the historical data is all that is needed. We know what EPCWID's allocations actually were in the years 2007-2010 (see Figure 1, above). We also know how much EPCWID actually ordered and diverted in those years, and that EPCWID did not take all the water it was allocated (Figure 3).
- 17) It is my opinion that in the years 1985 through 2002, 2005, and 2007 through 2010, there was no damage to EPCWID and Texas from lack of water caused by any action or inaction of New Mexico.
- 18) In Section B of the Brandes Declaration, Dr. Brandes describes and presents a plot (Brandes Declaration Figure 4) of historical Project release and Project diversion data associated with the D2 curve, and model-simulated Project releases and diversions from one of New Mexico's alternative model runs. Dr. Brandes uses the data in this plot to support conclusions concerning Project performance and the impact of New Mexico groundwater pumping on Project performance.
- 19) In paragraph 13, Dr. Brandes describes the D2 Curve inaccurately. To clarify the record, the D2 Curve was developed by Reclamation in the 1980's to describe the relationship between Project releases from Caballo Reservoir and the total diversions by EBID, EPCWID, and

Mexico at their canal headings for the period 1951 through 1978. During the 1951 – 1978 period, each Project acre was equally entitled to Project Water, and so EBID water users were entitled to a 88/155 share (or approximately 57%) of Project Supply (after subtraction of Mexico's part), and EPCWID water users were entitled to a 67/155 share, or approximately 43% of Project Supply (again after subtracting Mexico's part).

- 20) Reclamation Histories and historical documents relating to Project Allocation indicate that Reclamation considered that a full Project supply was achieved by delivery of a full-supply allotment of water to the authorized Project acreage, plus 60,000 AF to Mexico. This is best illustrated in a IBWC memo written in 1956 to memorialize a conversation between W. F. Resch (Rio Grande Project Manager) and J. F. Friedkin (IBWC Principal Engineer) and C.S. Kerr (IBWC Chief of Operations). NM-EX 452, J.F. Friedkin, Memorandum re: 1906 Treaty Deliveries to Mexico (1956) ("Friedkin 1956"). The memo defined a "Normal Delivery" allotment to Project lands as 3.024 acre-feet per acre (AF/A) which Resch calculated as the average farm delivery per acre during the years 1946 – 1950, based on actual farm deliveries during that period. NM-EX 452, Friedkin 1956 at 5. An excerpt from the Friedkin memo which shows this calculation is provided here as Figure 5. This memo equates amount (3.024 AF/A) to "full delivery to United States Project lands" which occurs when Mexico can obtain its' "full treaty allotment." NM-EX 452, Friedkin 1956 at 3.

Figure 5. Extracted from Page 5 of NM-EX 452, Friedkin 1956.
Reclamation's 1956 calculation of the average farm delivery (or "Water Charged to Farms" per irrigated acre for the years 1946 – 1950, which is used thereafter by Reclamation in defining full-supply deliveries and full-supply allocations to EPCWID and EBID.

RIO GRANDE PROJECT		
Water Charged to Farms, and Acres Irrigated		
1946 - 1950		
	Acre-Feet Charged To Farms	Project Lands Irrigated Acres
1946	498,960	156,899
1947	466,910	158,111
1948	451,750	155,809
1949	479,600	159,124
1950	<u>488,023</u>	<u>158,783</u>
Total	2,385,243	788,726
Average Charged to Farms $\frac{2,385,243}{788,726} = 3.0241$ feet		
$3.0241 \times 12 = 36.29$ inches		

- 21) The D2 Curve is a representation of Project performance during the 1951 – 1978 period, which incorporates the effects of groundwater pumping on the Rio Grande, as well as the effects of the Project water accounting system in place during that time and the use of drain flows and municipal effluent generated in the El Paso Valley.
- 22) In Reclamation's Water Supply Allocation Procedures (WSAP) document (circa 1990), Reclamation applied the D1 and D2 Curves to determine the reservoir release amount and

District allocation amounts associated with a full-supply delivery to Project lands and to Mexico through application of the D1 and D2 curves. NM-EX 400, WSAP 4-5. This analysis determined the reservoir release and canal diversion amounts necessary to deliver a full-supply farm delivery to 155,000 acres of Project land, plus 60,000 AF to Mexico. The full-supply farm delivery value used in this analysis is 3.024 acre-feet per acre (AF/A), the average farm delivery calculated for the years 1946 - 1950. NM-EX 452, Friedkin 1956 5.

- 23) Reclamation's analysis as documented in the WSAP applies the D1 Curve to calculate that a reservoir release of 763,842 AF would provide a full supply of water to Project lands and to Mexico. Likewise, application of the D2 Curve calculates that this full-supply reservoir release (763,842 AF) would provide 931,841 AF of water for diversion at Project canal headings and Mexico, of which 376,862 AF constitutes a full-supply allocation to EPCWID. NM-EX 400, WSAP 4-5. Thus, Reclamation's D1/D2 analysis provides for a full-supply allocation of 376,862 AF to EPCWID associated with a release of 763,842 AF in order to supply 3.024 AF/A to its full authorized acreage.
- 24) Under the 2008 OA, the definition of a full-supply release is changed from 763,842 AF to a release of 790,000 AF, and EPCWID's full-supply allocation is changed as well. NM-EX 510, 2008 Operating Agreement. The 2008 OA modifies the D2 Curve, extending it from 763,842 AF to 790,000 AF with a modified slope. *Id.* 6-8. The extended D2 curve is then used to calculate the full-supply allocation to EPCWID associated with the larger full-supply release of 790,000 AF. *Id.* Reclamation's allocation reports show that EPCWID's full-supply allocation is now 388,192 AF. NM-EX 500, EPCWID Water Allocation Records (2006-2016)
4. EBID's allocation, however, is calculated differently under the 2008 OA, so that EBID's allocation is reduced for all discrepancies from the D2 Curve. NM-EX 100, Barroll Rep. § 7.

The extension of the D2 Curve to a larger full-supply release may only serve to increase those discrepancies and reduce EBID's allocation even further. *Id.* § 6.3.

- 25) Annual Caballo release amounts are tabulated below, together with information on Reservoir Storage and Compact Spill occurrence, from 1985 – 2017. During the Subject Years (years of full supply for EPCWID: 1985 – 2002, 2005, 2007 – 2010) releases from Caballo have varied considerably, from 636,993 AF in 2007 to more than 1,000,000 AF in spill years such as 1986, 1987 and 1995. Most of the years in which releases exceed 790,000 were in fact spill years (1986 – 1988, 1994 and 1995), or occurred immediately preceding a spill year (1993). Releases also exceeded 790,000 AF in 1997 and 1998, a time reservoir storage level remained close to spill levels. The Caballo release in 2002 exceeded 790,000 AF. 2002 was the last full-supply year before the very low-supply years of 2003 and 2004. During this time, in the early 2000's, EPCWID was raising concerns that any of its allocation that it did not use would be partially (57%) reallocated to EBID the following year, so it is possible that the large release in this year resulted from these concerns of EPCWID farmers. In many of the Subject Years, releases from Caballo were much less than 790,000 AF, and in no year is there evidence that EPCWID complained that they were not delivered the Project water they were allocated or ordered.

Table 1. Caballo Release, Reservoir Storage and Compact Spills 1985 - 2017			
Year	Annual Release from Caballo *	End of Season (10/31) Total Reservoir Storage *	Rio Grande Compact Spill Year
	acre-feet	acre-feet	
1985	677,648	2,121,600	Spill
1986	1,396,122	2,290,800	Spill
1987	1,376,204	2,168,400	Spill
1988	837,001	2,060,100	Spill
1989	736,005	1,705,300	
1990	679,995	1,319,400	
1991	626,007	1,580,100	
1992	734,866	1,802,700	
1993	823,085	1,978,600	
1994	888,564	2,003,900	Spill
1995	1,095,934	2,083,100	Spill
1996	774,392	1,689,600	Spill
1997	798,814	1,815,000	
1998	808,861	1,636,900	
1999	735,415	1,658,800	
2000	751,294	1,243,900	
2001	786,889	856,900	
2002	800,935	323,200	
2003	364,528	171,600	
2004	399,519	128,100	
2005	676,031	362,100	
2006	434,228	436,900	
2007	636,993	346,200	
2008	675,337	599,600	
2009	693,880	479,900	
2010	660,549	390,900	
2011	396,739	218,200	
2012	371,515	120,000	
2013	168,603	231,100	
2014	306,107	214,778	
2015	435,512	208,193	
2016	545,475	144,862	
2017	623,080	333,462	
* Data from Sullivan and Welsh (2019) LRG SWDataset as documented in NM-EX-122. Values > 790,000 AF highlighted			

- 26) Brandes Declaration Figure 4 plots model-simulated reservoir release and diversion output from New Mexico's ILRG model, Run #2. Run #2 is a historical run of the ILRG model in which all groundwater pumping in Texas, New Mexico and Mexico have been turned off.

Therefore, the model results plotted are the releases and diversions simulated when no groundwater pumping occurs in Texas, New Mexico, or Mexico.

- 27) In Brandes Declaration paragraph 17 he suggests that the results from Run #2 plotted in his Figure 4 represent the “1938 Condition”. This is not accurate. A 1938 condition of the Rio Grande Project and the associated conveyance, allocation, and accounting system is not simulated throughout Run 2. Run 2 simulates Project operations without pumping using the historical Project infrastructure, conveyance systems, and allocation and accounting methods, all of which changed through time. For example, a 1938 condition would include diversion of Project return flows arising within the El Paso Valley at the Tornillo heading. Run 2, however, changes the Project infrastructure through time, eliminating the Tornillo heading, and reducing and eventually eliminating any diversion of drain flow at that location. Run 2 also includes the degradation of Project performance after 2005 because of the enactment of the D3 allocation method under the 2008 Operating Agreement, which starved the EBID portion of the Project of surface water, and which is not part of any 1938 condition.
- 28) Groundwater pumping in Texas, New Mexico, and Mexico during the D2 period (1951 – 1978) lowered groundwater levels, reduced drain flows and increased seepage loss from the Rio Grande, impacting Project delivery performance. However, groundwater pumping in Texas and New Mexico during this period was the reason the Project was able to continue to germinate crops and produce harvests during years of inadequate Project Supply. NM-EX 006, Barroll 2nd Decl. ¶ 19.
- 29) Reclamation’s Project Histories from the 1950’s describe in some detail the necessity for supplemental groundwater supplies. For example, the Operation and Maintenance of Irrigation System, Las Cruces Branch section of the 1954 Project History (NM-EX 420) states

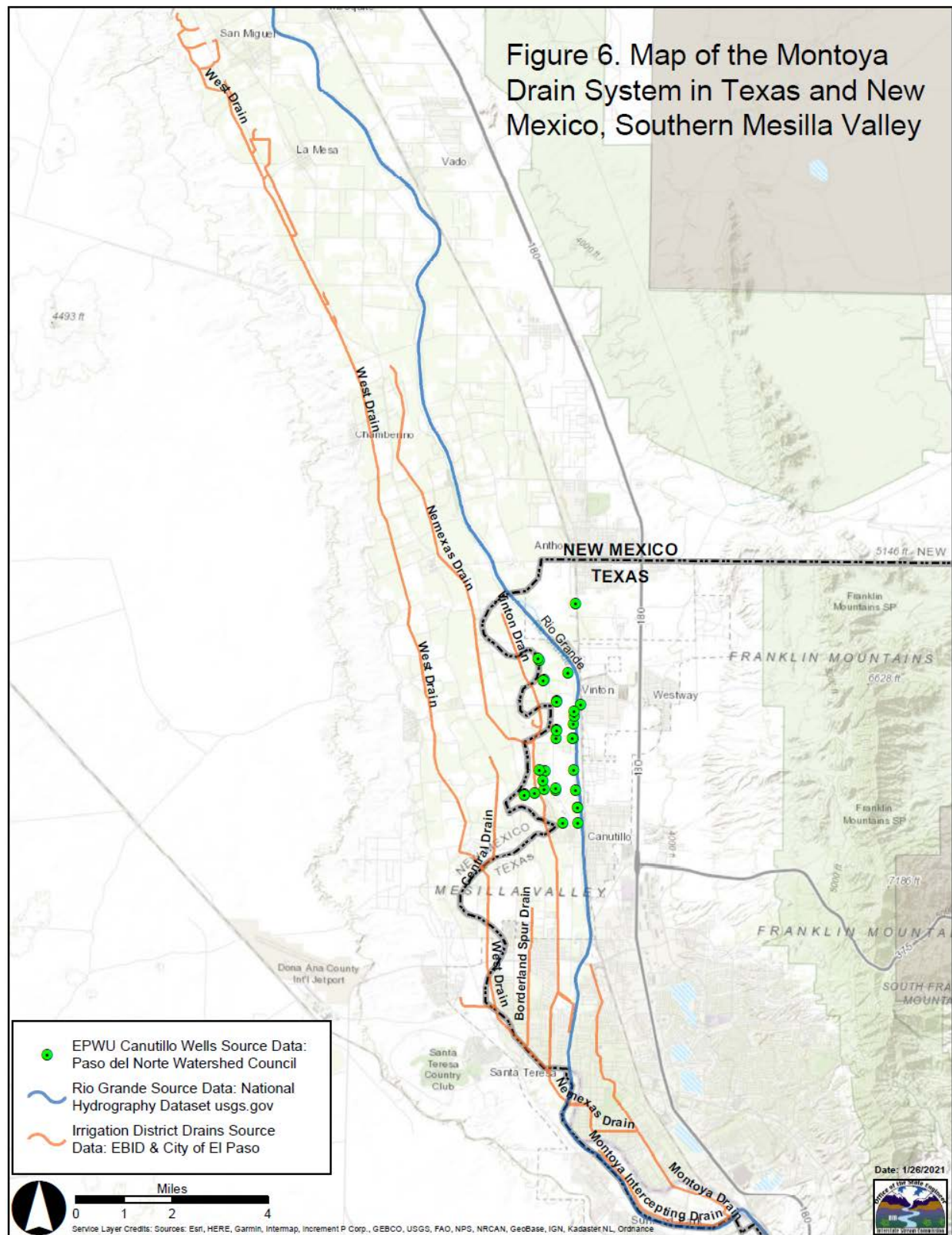
The water users and Bureau personnel again faced a severe year from the point of available water supply, in fact the storage water carryover was so limited that even the first irrigation had to be made with a combination of water pumped from farm wells and water from the storage supply.... So, with the limited storage water, water pumped from farm wells, and conveyed in part through the project canals and laterals and the summer showers, a combination that made possible the production of one of the best yielding crops ever produced by this Branch. [NM-EX 420, 84]

- 30) In four years during the D2 period¹⁰, Reclamation signed contracts for the Deferral of Construction Charges, which state that Project water users experienced “severe losses in recent years as a result of unprecedented drought conditions,” even with supplemental groundwater pumping. NM-EX 421, 1, 3, 5, 7.
- 31) Therefore, while groundwater pumping throughout the Project may have impacted Project performance during 1951 – 1978, that pumping was necessary in order to allow the Project itself to successfully operate during that time.
- 32) The statements in Sections C and D of the Brandes Declaration apply to groundwater pumping in Texas and Mexico, as well as in New Mexico. Brandes Declaration Figures 6 and 7 omit wells located in Mexico and in Texas.
- 33) Brandes Declaration Figure 8 represents the components of Project Supply reported in the Rio Grande Joint Investigation for the years 1930 – 1936 for various sections of the Project. The orange bars in this plot represent the percentage of “Drain Flow and Seepage”, or Project return flow, that comprises these diversions. This plot shows that the supply to the Lower El Paso Valley (the part of the Project supplied by the Tornillo Canal) is comprised of a higher percentage of return flow than the Upper El Paso Valley (supplied by the Franklin Canal). This demonstrates that at the time of the Rio Grande Compact, an important part of Project Supply in the El Paso Valley was return flow generated in the El Paso Valley. More recently, there

¹⁰ 1956, 1957, 1958, and 1964.

are not any records showing diversion by EPCWID of any drain flows generated within the El Paso Valley since 1980, and even if EPCWID does divert such drain flows, current Project accounting does not charge such diversions against EPCWID's allocation. NM-EX 100, Barroll Rep. App. C. This constitutes a reduction in Project Supply, and consequently a reduction in Project performance, that is in no way attributable to New Mexico. This and other changes to EPCWID plumbing and operations should be considered in any equitable assessment of Project allocations and deliveries. Currently, it is likely that the largest component of Project return flow generated within the El Paso Valley is municipal effluent discharged by the El Paso Water Utility into EPCWID conveyances. This diversion and use of this Project return flow is not charged to EPCWID as Project Water. NM-EX 101, Barroll Reb. Rep. 25-36.

- 34) Brandes Declaration Figure 9 shows the declining trend of discharge of the Montoya Drain. This drain and its tributary drains (including the NeMexas and West drains) are located in the southern Mesilla Basin, as shown in Figure 5, and they drain lands in Texas as well as in New Mexico, including the lands around El Paso's municipal Canutillo well field. Therefore, groundwater pumping in the Texas part of the Mesilla Basin (including approximately 24,000 AF/yr from the Canutillo well field), and urbanization in the Texas part of the Mesilla Basin, are important, if not dominant influences on the flows of the Montoya Drain.



- 35) Brandes Declaration paragraph 22 states that “Texas’ claims for damages arises primarily from the long-term effects of groundwater pumping in New Mexico, not effects that can be broken down in to an annual timestep.” Physically, most groundwater pumping in the Project area has a rapid impact on drain flows and groundwater levels. However, negative impacts associated with pumping (by both States and Mexico) may not impact EPCWID’s allocations and deliveries until years after the pumping has occurred. That is because groundwater pumping impacts on EPCWID’s water allocations and deliveries are largely limited to low-supply years when the combination of reservoir supplies plus available return flows are insufficient for a full-supply allocation. NM-EX 103, Barroll Suppl. Reb. Rep. (2nd Ed.) 3-4. In fact, under the 2008 Operating Agreement, negative impacts associated with groundwater pumping are immediately borne by EBID, because any reduction in Project performance, regardless of cause, is taken out of EBID’s allocation. NM-EX 100, Barroll Rep. 41-44.
- 36) Brandes Declaration paragraph 27 which states, “Project allocation made to respond to orders by the District water users...” is unclear and incorrect. Project allocation is not made “to respond to orders.” Project allocations are established before any orders are made, and constitute the limit that each District is entitled to order.
- 37) Brandes Declaration paragraph 28 provides an incorrect and misleading comparison of diversion percentages from my work (as summarized in Barroll Expert Report October 31, 2019, and Barroll 2nd Declaration) to that of Spronk’s work. Dr. Brandes does not specify from which of Spronk’s many data files he extracts the data that he is comparing to mine. In order to check whether Spronk’s diversion distribution actually differs greatly from mine, I looked at the diversion data by District from Spronk’s Canal and Farm Budget spreadsheet (2019-10-25 Rio Grande Project Canal and Farm Budget.xlsx, Tab: TablesAnn). To make this

comparison, I took the total “Surface Water Divers” data columns for EBID Total, corrected it for “El Paso Valley Carriage¹¹”, and then took the “Surface Water Divers” data column for EPCWID Total, again corrected for EPCWID’s share of El Paso Valley Carriage in the Mesilla Valley. The resulting percentage distributions from this Spronk data are close to the percentage distribution values I reported in my 2019 Expert Report. For the period 1938 – 1978, Spronk’s diversion data produces an average EPCWID share of 43.8%, compared with my value of 45.3% for that same period. For the period 1951 – 1978 Spronk’s data produces an average EPCWID share of 42.3% compared to my value of 43.8%. The discrepancy between my values and Spronk’s reflects slightly different assumptions regarding acreage distribution in the southern Mesilla Valley (as Dr. Brandes points out), and also the fact that Spronk’s analysis uses the sum of gaged diversions in the El Paso Valley, while I use Reclamation’s reported net surface water diversion from the Water Distribution Records for the El Paso Valley. Spronk’s District diversions, though calculated somewhat differently than mine, are consistent with my conclusion that prior to 1979, the distribution of Project Water between the Districts was consistent with a 57:43 split.

- 38) Brandes Declaration paragraph 29 states that the D1/D2 allocation method does not reflect Texas’s Compact apportionment, suggesting that since the hydrologic conditions during the D2 period reflect the effect of groundwater pumping not occurring at the time of the Compact. While the Project performance during the D2 period is different than that during the 1930’s, due to the impact of drought and groundwater pumping, the actual basis for the full-supply allocation amounts are the full-supply farm deliveries calculated using Project delivery data

¹¹ El Paso Valley Carriage is water diverted by EBID but delivered downstream to EPCWID in the El Paso Valley as part of a planned by-pass operation that is intended to minimize losses in the bed of Rio Grande in low supply years. As such, it is not considered part of EBID’s diversion.

from 1946-1950, before the onset of extensive supplemental groundwater pumping in Texas and New Mexico and Mexico. EPCWID's full-supply allocation as defined under the D1/D2 analysis is the canal diversion sufficient to deliver the full-supply farm delivery (3.024 AF/A) to its full authorized acreage. The relationship between EPCWID's canal diversions and its farm deliveries is controlled by EPCWID's internal conveyance efficiency (i.e., within Texas), not Project performance. NM-EX 532, J. Reyes, Water Conservation and Management Projects in El Paso County water Improvement District 12 (June 17, 2008), NM 00136471 ("Reyes Presentation").

- 39) In 2008 EPCWID's manager reported that the District's effective internal conveyance efficiency (the ratio of the water delivered to its users divided by the water diverted from the Rio Grande) has improved substantially since the mid-20th century¹² (despite the impacts of Texas groundwater pumping). This improvement means that EPCWID's full-supply allocation that was defined based on earlier conditions can now provide even more water to EPCWID end users. NM-EX 532, Reyes Presentation, 12. In addition, Texas water users can divert and make use of additional sources of supply, which used to be considered Project Water but now are not, such as El Paso Water Utility effluent and drain flows generated in the El Paso Valley. NM-EX 101, Barroll Reb. Rep. Table 5; NM-EX 103, Barroll Suppl. Reb. Rep. (2nd Ed.) Fig. 13. It is therefore unsurprising that when allocated a full-supply, EPCWID has chosen not to order its full allocation.

¹² The improvement of EPCWID's effective internal conveyance efficiency reflects improvement and lining of some canals, and the larger proportion of EPCWID water now being delivered to the City of El Paso which involves little conveyance loss. NM-EX 532, Reyes Presentation 12.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 5, 2021


Dr. Margaret (Peggy) Barroll, Ph.D.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**THIRD DECLARATION OF ESTEVAN R. LOPEZ, P.E., IN SUPPORT OF
THE STATE OF NEW MEXICO'S MOTIONS FOR PARTIAL SUMMARY
JUDGMENT AND BRIEFS IN SUPPORT**

Comes now Estevan R. Lopez, P.E., pursuant to 28 U.S.C. § 1746, and states as follows:

1. I am over 18 years of age and have personal knowledge of the facts stated herein.
2. I am the same Estevan Lopez who authored the following reports in this case: an Expert Report dated October 31, 2019 (NM-EX 107),¹ a Rebuttal Expert Report dated June 15, 2020 (NM-EX 108), a Supplemental Rebuttal Expert Report dated July 15, 2020 (NM-EX 109), and a Supplemental Rebuttal Expert Report (2nd Ed.) dated September 15, 2020 (NM-EX 110). I also submitted a declaration in support of New Mexico's motions for partial summary judgment on November 5, 2020 (NM-EX 003) and a second declaration in support of New Mexico's

¹ All exhibits designated "NM-EX __" in this Declaration are contained within the State of New Mexico's Exhibit Compendium filed with New Mexico's Partial Summary Judgment Motions on November 5, 2020, the State of New Mexico's Supplemental Exhibit Compendium dated December 22, 2020 filed with New Mexico's responses to Texas and United States motions for partial summary judgment, and in the State of New Mexico's Second Supplemental Exhibit Compendium Dated February 5, 2021 filed with New Mexico's Reply Briefs. Exhibits used by the United States and Texas in their motions for partial summary judgment are cited as in those briefs.

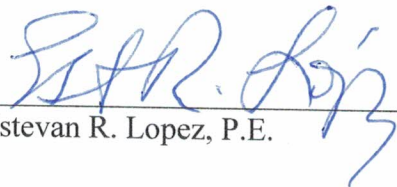
response briefs on December 22, 2020 (NM-EX 008). My credentials and background are discussed in my first declaration filed in this case on November 5, 2020. NM-EX 003 at ¶¶ 3-10.

3. I have been asked by Counsel for New Mexico to provide this declaration based on my knowledge, experience, and research relating to the Rio Grande Compact (the "Compact"), the Rio Grande Compact Commission ("RGCC"), the relationship between the Compact and the Rio Grande Project ("Project"), and their operations specifically in reference to the opposition to the state of New Mexico's motion for partial summary judgment to exclude Texas's claim for damages in certain years filed by Texas on December 22, 2020.

4. Based on my review of the historical records of the Rio Grande Compact Commission and my own experience as New Mexico's Engineer Adviser to the Rio Grande Compact Commission, I am unaware of Texas ever protesting Reclamation's determination of a full supply allocation to EPCWID or asserting that EPCWID's full supply allocation should be larger than the full supply amount allocated by Reclamation.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 4, 2021



Estevan R. Lopez, P.E.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**THIRD DECLARATION OF JENNIFER STEVENS, Ph.D.
IN SUPPORT OF NEW MEXICO’S MOTIONS
FOR PARTIAL SUMMARY JUDGMENT**

I, Jennifer Stevens, Ph.D., pursuant to 28 U.S. C. § 1746, hereby declare as follows:

1. I am over 18 years of age and have personal knowledge of the facts stated herein.
2. I am the same Dr. Jennifer Stevens who authored expert reports in this litigation (NM-EX 112 and 113) and my first and second declarations for New Mexico’s dispositive motions and responses filed November 5, 2020 (NM-EX 005) and December 22, 2020 (NM-EX 011).¹ My credentials and background are listed in my November 4, 2020 declaration. NM-EX 005 at ¶¶ 2-7.
3. I have reviewed and evaluated the following briefs and declarations in addition to items previously reviewed:
 - a. State of Texas’s Motion for Partial Summary Judgment, Memorandum in Support (11-5-2020);
 - b. Declaration of Scott Miltenberger (11-02-2020) and associated evidence;

¹ All exhibits designated “NM-EX” in this Declaration are contained within the State of New Mexico’s Exhibit Compendium/ Exhibits used by the United States and Texas in their dispositive motions and responses are cited as in those briefs.

- c. State of Texas's Opposition to the State of New Mexico's Motion for Partial Summary Judgment on Compact Apportionment and Brief in Support (12-22-2020);
- d. Declaration of Scott Miltenberger (12-21-2020) and associated evidence;
- e. State of Texas's Evidentiary Objections and Responses to the State of New Mexico's Facts (12-22-2021);
- f. United States of America's Response to New Mexico's Statements of Undisputed Material Facts.

The following paragraphs represent my expert opinions and responses to the Declaration of Scott Miltenberger dated December 22, 2020, TX_MSJ_007371-7450 and its attachments (TX_MSJ_007451-7566) ("Miltenberger"). I have referred to the paragraph (§) numbers from Miltenberger and the New Mexico Undisputed Material Fact numbers (NM UMF #x).

4. Miltenberger makes several new and/or incorrect statements and draws erroneous conclusions. I will address them in the order of his Declaration.

5. Miltenberger's § 11 challenge to NM UMF #8 is incorrect and immaterial. Miltenberger asserts that New Mexico mischaracterized House Document 1262, Fund for Reclamation of Arid Lands. He argues that the document's references to water volume were projections and estimates of "supply" not "expected release figures." The distinction is without a difference, since the document deploys the word "use" in discussing demand, and ultimately equates it with supply. The actual language of the document which lays out the justification for funding the Rio Grande Project reservoir is as follows:

The Reclamation Service has prepared service tables for the proposed Engle [Elephant Butte] Reservoir covering the period 1895 to 1909. One of these tables is based upon an annual use of water for irrigation of 750,000 acre-feet after 1896 and an annual evaporation on the reservoir of 7.07 feet. The other is based upon an annual use of water for irrigation of 800,000 acre-feet after 1896 and an annual evaporation on the reservoir of 5 feet.

The document continues that "with an assumed use [i.e. "release"] of 750,000 acre-feet" or "with an assumed use [i.e. "release"] of 800,000," there would have been corresponding deficiencies in the supply in certain past years. The document concludes, then, that "with a 20 per cent allowance

for [loss in transit], approximately 800,000 acre-feet of reservoir would be required....It, therefore, appears that the available supply accords closely with *the demand*.”² [Emphasis added.]

6. Miltenberger’s ¶ 13 challenge to NM UMF #15 should not be a challenge. The inadvertent omission of the word “of” before the word “Texas” in the second sentence would make clear that New Mexico was not attributing the statement to Texas. The second sentence of NM UMF #15 should read: “He wrote the New Mexico Governor that the exclusion of Texas ‘assumed’ that Reclamation would ‘protect[] the rights of the Project in negotiations, but this assumption proved false because ‘the Reclamation Service apparently decided to take no action...’”

7. Miltenberger’s ¶ 14 challenge to NM UMF #17 muddies the water and creates confusion where there need be none. Miltenberger misleadingly states that the National Resources Committee (NRC) Board of Review asserted that Middle Rio Grande Conservancy District’s project and “other proposed projects” above Elephant Butte “threatened the Rio Grande Project.” Miltenberger asserts that, “the proposal by the National Resources Committee (NRC) resulted from [that Board’s] assessment that the ‘water resources of the Rio Grande were fully appropriated.’” Although Miltenberger’s quote from the Board of Review’s assessment does appear as stated in the original document, Miltenberger takes liberties when stating that these words were the justification for the resulting Rio Grande Joint Investigation.

Instead, it had come to the Board of Review’s attention that the federal government had purchased bonds from the Middle Rio Grande Conservancy District (MRGCD) and were concerned that the government’s involvement there could “help to jeopardize much earlier investments of Federal funds in the Elephant Butte Reservoir.” The Board expressed concern over what it called “‘conflicts of Federal investments.’” The Board’s report also recognized that additional supplies to the Rio Grande basin were possible through trans-mountain diversions, and that “readjustments in [water] use, rather than new uses, are needed.” In sum, they opined, “to continue uncoordinated ‘development’ of the water resources of the valley could only intensify the existing conflict of interests, promote new discord, depress the standard of life in damaged areas, breed social insecurity and unrest, and perhaps preclude the adoption later of any effective and

² NM-EX 310, Congressional House Document 1262, 61st Congress, 3rd Session; Fund for Reclamation of Arid Lands, Board of Army Engineers Report in Relation to Reclamation Fund, 1911, 105-106.

equitable plan for the conservation of water and the welfare of the region.”³ It was this need for “coordinated” development that prompted the Rio Grande Joint Investigation.

8. Miltenberger’s ¶ 16 challenges NM UMF #20, arguing that New Mexico’s 1937 statement of the minimum conditions under which it was willing to negotiate for a compact was nothing more than a wish list. The meeting at which each state presented its minimum requirements was held in Santa Fe between September 27 and October 1, 1937. Miltenberger took liberties with the quote, excluding the parts that did not fit his theory. The quote which comes directly from the transcript states as follows: “New Mexico is willing to negotiate with Colorado and Texas for a permanent compact to equitably distribute the waters of the Rio Grande among the states on the basis of the following minimum requirements.” One of those minimum requirements was that “All existing rights to the use of water in the Rio Grande Basin in New Mexico shall be recognized as having the right to an adequate supply of water from said river system.”⁴ There is no evidence in the historical record that New Mexico was asked to abandon what it considered to be one of its minimum requirements, nor that New Mexico understood the final Compact not to recognize its citizens’ water rights.

9. Miltenberger’s ¶ 18 challenge to NM UMF #23 is incorrect and misleading. The precise reasons for the Compact Commission’s decision to revise Elephant Butte’s “actual release” figure from 800,000 acre-feet to 790,000 acre-feet are unknown. All we know for certain is that users below the dam wanted that figure to be higher, and those above it wanted it to be lower. In his original Expert Report, Miltenberger used the 1968 deposition transcript of Raymond Hill to speculate that the 790,000 may have been related to the fact that, “in recent years the Rio Grande Project had utilized closer to 730,000 af,” and the addition of 60,000 acre-feet for Treaty obligations would account for the 790,000 acre-feet figure.⁵ In his expert report, Miltenberger wrote:

In the *Texas v. New Mexico* original action, in the compact proceedings, and before his fellow engineering advisors, [Hill] was adamant that an 800,000 af release from Elephant Butte was essential to achieving a ‘salt balance.’ Broadly speaking, Hill argued that Texas

³ All cites to Report of Rio Grande Board of Review, September 13, 1935, TX_MSJ3765-66.

⁴ NM-EX 319, Rio Grande Compact Commission, Proceedings of the Meeting of the Rio Grande Compact Commission Held in Santa Fe, New Mexico, September 27, to October 1, 1937, 12-13.

⁵ NM-EX 128, Miltenberger Rep., 39.

required more water than it could use consumptively to ensure that little or no additional alkali salts were deposited as a result of irrigation on downstream lands to the detriment of those lands. The 800,000 af figure reflected his calculations of what was necessary to achieve what he called, ‘equivalent service.’...Texas’s acceptance of this reduction [to 790,000 af] and the compact indicates that 790,000 af was inclusive of the flows necessary to achieve Hill’s ‘equivalent service.’”⁶

Additionally, Miltenberger wrote:

At a meeting of the Lower Rio Grande Water Users Association, [Clayton] expressed his conviction that Texas had obtained ‘every drop of water originating in Colorado and New Mexico that she was entitled to’ above Ft. Quitman – a declaration that given his earlier statement would appear to be inclusive of the flows to ensure a sufficient quality of water. To Texas Governor W. Lee O’Daniel in November 1938, Clayton indicated the ‘engineers, attorneys, and other technical experts’ for Texas were similarly convinced. In their collective ‘judgment, the commissioner confidently predicted to the governor, the compact would ‘restore a feeling of security to the water users in Texas above Fort Quitman....’ Indeed, as noted above (and discussed in Opinion IV below), water users between the end of the Rio Grande Project and Ft. Quitman relied upon unused waters released through the project. These waters possessed a higher quality owing to Rio Grande Project operations intended to ensure a sufficient quality of water throughout the project.⁷

Now, in ¶ 18, Miltenberger asserts that the reduction from Texas’s preferred figure of 800,000 acre-feet can somehow be specifically tied to the MRGCD’s preferences and implied arm-twisting by MRGCD’s Neuffer. However, in his original Expert Report, Miltenberger acknowledged that between March 11 and March 17, 1938, several meetings were held in confidence with “no records of these meetings...kept.”⁸ It is undisputed that the historical record is silent on how this specific number was determined. Nevertheless, the historical record does make clear that Texas’s efforts to increase the release figure were related to its concerns over the quality of water that made it across the state line, and its efforts to ensure that lands situated furthest downstream in the Project received “equivalent service” with regard to their water delivery as those further upstream.⁹

In fact, it is Texas’s historian Scott Miltenberger who offers an incorrect understanding of the role played by H.C. Neuffer and the MRGCD in Compact negotiations. In its Compact negotiations, New Mexico represented the interests of *all* its citizens. New Mexico’s Compact Commissioner

⁶ NM-EX 128, Miltenberger Rep., 44.

⁷ NM-EX 128, Miltenberger Rep., 54.

⁸ NM-EX 128, Miltenberger Rep., 41.

⁹ NM-EX 112, Stevens Rep., 67.

Thomas McClure balanced the needs of the state's water users; MRGCD users, represented by Neuffer, were located north of Elephant Butte Dam, while Elephant Butte Irrigation District (EBID) users were located south of the dam. To obtain the New Mexico Legislature's support for ratifying the Compact, McClure had to ensure that both user groups supported the compromise.¹⁰ Let's not forget that Neuffer wanted the figure to be 700,000, so 790,000 was clearly New Mexico's attempt at balancing New Mexico's own needs.¹¹

10. Miltenberger uses eighteen (18) full paragraphs in his Declaration (Miltenberger ¶¶ 28-45) to devise completely new dissections of two 1938 letters from Texas Commissioner Frank Clayton, in order to challenge New Mexico's UMFs #45, 46, and 47. He argues that said letters clarify that the Compact gave Texas complete control over the water below Elephant Butte.

Despite Miltenberger's efforts to disclaim these letters' significance to the meaning of the Compact, both letters *must* be read in that context, since both letters were specifically related to and represent Texas's interpretation of the Compact. Miltenberger attempts to create a dispute over the intent of these letters when in fact none exists. The first letter cited by Miltenberger was written on October 4, 1938 by Clayton to Sawnie Smith, attorney for water users in the Lower Rio Grande below Fort Quitman, hereinafter the "Clayton-Smith 1938 Letter."¹² The second letter is from Clayton to C.S. Clark, Chairman of the Texas Board of Water Engineers written just two weeks later on October 16, 1938 and represents an effort by Clayton to clear the air between them as it related to Rio Grande Compact negotiations, hereinafter the "Clayton-Clark 1938 Letter."¹³ With regard to the Clayton-Smith 1938 letter, Miltenberger mischaracterizes the "question of the water released from Elephant Butte reservoir" as an issue "separate" from the Compact (Miltenberger ¶ 32); then, in reference to the Clayton-Clark 1938 Letter, he states that "the provided quotation" in UMF #47 "is not a description of Compact operation and fails to consider the context of Clayton's efforts to dispel opposition in Texas." (Miltenberger ¶ 45)

¹⁰ NM-EX 011, Stevens Decl. ¶¶ 8-9, 26-28.

¹¹ NM-EX 112, Stevens Rep., 67.

¹² NM-EX 328, Frank Clayton to Sawnie Smith (10-4-1938).

¹³ NM-EX 329, Frank Clayton to C.S. Clark (10-16-1938).

Both letters are indisputably related to the Compact, and neither supports a conclusion that New Mexico's apportionment was limited to lands above Elephant Butte.

- a. Miltenberger begins his substantive discussion of the Clayton-Smith 1938 Letter in ¶¶ 29-32. It is important to provide the *correct* context for this letter, which Miltenberger does only in part. The entirety of the Clayton-Smith 1938 Letter can *only* be read as a specific response to Smith's questions and concerns over the *Compact*, which was the subject of Smith's initial inquiry to Clayton dated September 29, 1938 in which he questioned the Compact division of water between the two lower states.¹⁴ Smith specifically asked about the Compact's omission of a specific delivery amount for Texas, and Clayton's letter must therefore be interpreted in a *Compact framework*. In his response, Clayton explained that the Compact negotiators recognized the impossibility of a New Mexico-Texas state line delivery, due to the U.S. Bureau of Reclamation's control of water at that geographical point through the Rio Grande Project and the multiple points of measurement that would be required. Thus, he assuaged Smith's concerns by pointing to the separate (but nevertheless recognized and inherent) contracts that assured Texas its share of water through the Compact's recognition of the Project, and by the Project's administration through the contracts.¹⁵ [See ¶ 14 below.]
- b. Substituting his own words for those of Clayton, Miltenberger claims the letter states that "Clayton sought to assure water users in Texas's lower Rio Grande and others that *Texas's delivery* was at Elephant Butte." [Emphasis added.] (Miltenberger ¶ 29) While it is true that a portion of the water delivered to Elephant Butte belonged to Texas, some of that water also belonged to New Mexico and Mexico. In response to Smith's inquiry regarding the absence of a state-line delivery for Texas in the Compact, Clayton's exact language in this letter was that the "*New Mexico's obligations* as expressed in the compact must be with reference to deliveries at Elephant Butte reservoir," because, he

¹⁴ NM-EX 353, Sawnie B. Smith letter to Frank B. Clayton (9-29-1938).

¹⁵ NM-EX 328, Clayton-Smith 1938 Letter.

continued, “the Rio Grande Project...is operated as an administrative unit.”¹⁶ [Emphasis added.] While it seems to be splitting hairs, it is critical to parse this language clearly, since Clayton never says or implies that New Mexico gave up rights to water within its own boundaries below the dam, merely that the state of New Mexico did not legally control *Project* water. (“The reservoir is under the control of an entirely independent agency: the Bureau of Reclamation.”¹⁷)

11. The Rio Grande Project, which releases water for irrigation districts situated in both New Mexico (Elephant Butte Irrigation District - EBID) as well as Texas (El Paso Conservation Water and Irrigation District #1 - EPCWID) is in fact administered as a unit. However, I have discovered nothing in the historical record which would lead to me to conclude that either Texas or New Mexico believed that choosing the Project reservoir as New Mexico’s delivery point equated to New Mexico giving up rights to water within its legal boundaries, sacrificing use of its own Compact apportionment below said reservoir, or abandoning its own water supply anywhere within the legal boundaries of New Mexico. Further, Miltenberger’s new position on Compact apportionment begs comparison with his other testimony. In discussing that during Compact negotiation the Project was operated as a unit and that this circumstance “shaped the Compact,”¹⁸ Miltenberger states: “Texas contemplated asking for a state-line delivery in the 1930s, but decided against it because of the Project.”¹⁹ Texas now urges the Court to believe that because Texas chose not to ask for state-line delivery, New Mexico lost its Compact apportionment below Elephant Butte. Historically, it’s clear that the New Mexico Compact negotiators could not have had that result in mind.

However, Miltenberger’s logic is significant if carried to its ultimate conclusion. He suggests that “Project” is synonymous with “Texas.” However, the Rio Grande Project is situated in both Texas *and New Mexico*. Furthermore, the 790,000 acre-feet “normal release” *from* this reservoir was to be utilized on lands in both states. Even Miltenberger agrees on this fact.

¹⁶ NM-EX 328, Clayton-Smith 1938 Letter.

¹⁷ NM-EX 329, Clayton-Clark 1938 Letter, 7.

¹⁸ Miltenberger Nov. Decl., ¶¶ 30-31.

¹⁹ Miltenberger Nov. Decl., ¶ 32.

- c. An event occurred just a few years after Compact ratification which provides further support for the fact that New Mexico's apportionment extends to its southern border. In 1944, the City of El Paso, Texas attempted to purchase land and related water rights in EBID. As the negotiations progressed, the New Mexico State Engineer interceded. Thomas McClure – who had been New Mexico's Compact Commissioner and was serving as the New Mexico State Engineer in the 1940s – intervened to prevent the “drying up of lands in New Mexico” to benefit a city in Texas. His intervention demonstrates that New Mexico believed it maintained control over water within its legal boundaries below Elephant Butte Dam. Texas – in these early years of Compact implementation – did not argue otherwise.²⁰
- d. Additionally, the Clayton-Smith 1938 Letter – again, written in response to questions specifically related to the Compact – features Clayton assuring Smith that the Downstream Contracts (the subject of UMF #57, Miltenberger's ¶¶ 54-59, addressed in my ¶ 12 below) helped to assure Texas's water supply: “the question of the division of water released from Elephant Butte reservoir is taken care of by contracts between the districts under the Rio Grande Project and the Bureau of Reclamation.”²¹
- e. Clayton wrote the Clayton-Clark 1938 Letter just a few weeks later, although Miltenberger failed to address or discuss this document in either his Expert or Rebuttal Reports. In the letter, Clayton made it clear that he understood that the Compact – by virtue of protecting the Project – included the Downstream Contracts: “Also, by contract between the New Mexico interests and the Texas interests in the Rio Grande Project, all the lands in the Project have equal rights, and the acreage to be irrigated is practically frozen at its present figure, with a three per cent ‘cushion.’”²² Although he acknowledged that the contracts were not specifically called out in the Compact, his language makes clear that the contracts formed the basis for the Compact negotiations.

²⁰ See NM-EX 112, Stevens Rep., 83-87.

²¹ NM-EX 328, Clayton-Smith 1938 Letter.

²² NM-EX 329, Clayton-Clark 1938 Letter,

- f. Furthermore, Clayton's language in the Clayton-Clark 1938 Letter makes clear that New Mexico's apportionment extended below Elephant Butte Dam:
- "Moreover, since the source of supply for all the lands above Fort Quitman and below Elephant Butte reservoir, whether in Texas or New Mexico, is the reservoir itself, it could hardly be expected of Colorado and New Mexico that they should guarantee a certain amount of water to pass the Texas line, since this amount is wholly dependent upon the releases from the reservoir and the reservoir is under the control of an entirely independent agency: the Bureau of Reclamation."²³
- g. Using the Clayton-Clark 1938 Letter, Miltenberger challenges NM UMF #47 in Miltenberger ¶ 41. He quotes Clayton: "no allocation of waters as between different sections of the same State was possible in an interstate compact, and none was attempted."²⁴ This statement referred to Texas but must also hold true for New Mexico. Just as it was not possible in Texas, no allocation between different users in New Mexico was possible, and short of a clear statement otherwise, it must be presumed that New Mexico's apportionment extended to its southern border. The historical record is clear that the Compact equitably apportioned the waters between New Mexico and Texas, and that the Project is the delivery mechanism for some of that apportionment. Although the Compact extends in Texas to Fort Quitman, the delivery mechanism is the Project only insofar as the Warren Contracts remain in place and the Project operates as efficiently as possible.²⁵ There is no specific allocation of water to the bottom third of the Texas Compact area -- Hudspeth. By the same logic, lands below Elephant Butte Dam in New Mexico are not specifically called out yet they remain part of the state's overall allocation. It is preposterous to assert that the Compact did not protect water rights and protected only uses. New Mexico would not have agreed to a Compact that, for instance, protected the contemporaneous Warren Act use of water by Hudspeth County users – whose water rights were only for any unavoidable waste, waste which New Mexico fought the Bureau of

²³ NM-EX 329, Clayton-Clark 1938 Letter.

²⁴ NM-EX 329, Clayton-Clark 1938 Letter.

²⁵ See NM-EX 112, Stevens Rep. 29-33.

Reclamation to address and which channel rectification also addressed – against prior rights of New Mexico water users. EBID and EP1 would not have agreed to that, either.

11. Language in the Compact itself demonstrates that New Mexico did not cede control of the water below Elephant Butte. Article VIII states that “The Commissioner for New Mexico may demand of Colorado, the release of water from storage reservoirs constructed after 1929 to the amount of the accrued debits of Colorado and New Mexico...sufficient to bring the quantity of usable water in project storage to 600,000 acre feet by March first.”²⁶ If the Compact intended to deprive New Mexico of its right to water below Elephant Butte, it is impossible to understand the purpose of this Article.
12. In 1938, New Mexico Compact Commissioner John Bliss interpreted the language in Article VIII specifically to mean “Elephant Butte” water. Paraphrasing the Compact Article, Bliss wrote: “the Commissioner from Texas or from New Mexico may, on or near the first of January, call for the release of Elephant Butte water in storage in upstream reservoirs in amounts sufficient to bring project storage up to 600,000 acre feet by the first of March.”²⁷ New Mexico clearly understood the Compact to give it the right to control water for lands within its boundaries. This stance was consistent with New Mexico’s position since early in the century, when its congressional delegate, B.S. Rodey, testified in 1904 to the 12th Irrigation Congress regarding construction of a dam in New Mexico: “We have been scared to death for about ten years by Brother Stevens [the Texas congressional delegate]. I believe the whole matter can be settled now, but we have never given up our rights to the waters that fall in our dishpan. We are good citizens and liberal, but we don’t give up the waters we need.”²⁸
13. Miltenberger disputes NM UMF #48 in his ¶¶ 46 – 51. Some of the points in these paragraphs have been addressed above, including the question of how 790,000 acre-feet was agreed, addressed above in my ¶ 5. However, the “context” Miltenberger aims to provide in these paragraphs does nothing to elucidate or change the quote in NM UMF

²⁶ Rio Grande Compact, Article VIII, May 31, 1939.

²⁷ John Bliss, “Provisions of the Rio Grande Compact,” April 2, 1938, TX_MSJ_005347-5360, quote at 5352-53.

²⁸ NM-EX 303, Official Proceedings of the Twelfth National Irrigation Congress (1904), 291.

#48. Instead, Miltenberger's efforts to clarify certain things again only serve to further confuse the key issues.

- a. In his ¶ 48, Miltenberger provides two block quotes from Raymond A. Hill's 1968 Development of the Rio Grande Compact of 1938.²⁹ The quotes themselves are not at issue here; what *is at issue* is Miltenberger's inaccurate written interpretation of them. In his introduction to the two block quotes, Miltenberger states that "[Hill] and his fellow advisors were directed to preserve the hydrological 'status quo' of the Upper Rio Grande Basin in formulating the basis for the Compact." There is simply no support for this statement in the historical record or frankly in the 1968 document. All of Hill's specific references to the 1929 Compact (which can be found on pages 5, 6, 20, 34, 39, 46, 62-63 of NM-EX 401) are vague and relate to efforts to maintain consistency in the language used (not the substance) between the two documents. The few substantive statements of Hill's – such as the directive he claims was given to the Engineer Advisers to maintain the relationship between inflow and outflow that existed in 1929³⁰ – are unsupported in the historical record and unsubstantiated by Hill in this document.
- b. Methodologically, the use of a 1968 document to explain intent behind the creation of a 1938 document is problematic, even when written by an actor who was present during the original event. Thirty-year old memory is significantly less historically reliable than documents created at the time of the event itself. A disparate weighting of such documents is fundamental historical methodology. **If** a secondary source document such as this 1968 Hill paper is to be relied upon, a historian is obliged to review the context in which the document originated.

In this case, Hill's 1968 document had been requested by the Texas Attorney General for use by Texas in litigation.³¹ The document, therefore, merely

²⁹ Also provided as NM-EX 401, Raymond Hill.

³⁰ NM-EX 401, Raymond Hill (1968).

³¹ NM-EX 451, Raymond A. Hill Dep., State of Texas and State of New Mexico v. State of Colorado, Original Action No. 29 in the Supreme Court of the United States (12-4-1968), 3:8-5:11.

represents Texas's interpretation of events, and served as an advocacy document, written on behalf of and for the state of Texas, representing Texas's view only of the 1938 Compact development.

- c. Additionally, Hill asserted in closing that: "The Rio Grande Compact of 1938 should thus be looked upon as an expansion of the Compact of 1929, designed to provide for the maximum beneficial use of water in the basin of Rio Grande above Fort Quitman without impairment of any supplies beneficially used under the conditions prevailing in 1929." Put simply, however, this document cannot supplant the myriad other documents which make clear the temporary nature of the 1929 Compact. While the 1938 language may have mirrored the 1929 language for the sake of simplicity and consistency, it is flat wrong not to recognize the two as wholly separate documents.³²
14. In ¶ 23, Miltenberger disputes NM UMF #39 and states that "existing uses, circa 1938, not rights were to be protected by the Compact." In several other places throughout his declaration, he repeats this new opinion that the Compact "privileged" uses over rights. This is a gross misstatement of the historical record, and he is using it to distract from the real record, in which the facts – and the documents – make it clear that Compact negotiators considered both uses *and* rights to craft their solution. All states' representatives regularly discussed and were protective of their water rights; to suggest that each walked away from those rights in favor of the uses frozen in one specific historical moment is contrary to any logic and certainly to the existing record. In fact, the Downstream Contracts themselves explicitly protected "the *right* of project land owners to such *water rights* as may be or become appurtenant to their lands under Federal Reclamation Laws and under the original contracts entered into between the original water users' association on this Project and the United States."³³

³² See NM-EX 112, Stevens Rep., 35-39.

³³ See NM-EX 320, Nov. 9, 1937 Contract between the United States and the Elephant Butte Irrigation District ("1937 EBID Contract"), quote at 12, and NM-EX 321 Nov. 10, 1937 Contract between the United States and the El Paso County Water Improvement District No. 1 ("1937 EPCWID1Contract").

15. Finally, in ¶¶54 through 59, Miltenberger challenges NM UMF #57. He asserts that the Downstream Contracts were not intended to be part of the 1938 Compact because they were not explicitly mentioned or referenced in the Compact language. He states that the “Downstream Contracts are less about water deliveries than they are about the repayment obligations of the districts to the federal government for the Project,” and concludes that “none of these contracts were incorporated by reference or in the language of the Compact.” Miltenberger ¶ 59. In Miltenberger’s Expert Report, these same contracts are noted under and within Opinion IV, which states in full: “Deliver of watery by New Mexico to San Marcial, under the terms of the 1938 Rio Grande Compact, constituted the delivery of water to serve lands in Texas within the Rio Grande Project as well as downstream to Fort Quitman.”³⁴ In footnote 217, which begins on page 98 of the Miltenberger report, he provides lengthy quotes from the contract, but says nothing of what he now claims is their insignificance to the Compact. Furthermore, the implication of this discussion’s placement within Opinion IV is logical and makes sense; these contracts were part of the Project, and the Project facilitated delivery of the apportionments. His original report did not emphasize or state that these contracts were limited in their significance or that they were not considered in the negotiation or ratification of the Compact.³⁵
16. Reclamation projects, based on Reclamation law, are structured such that the farmers who benefit from the infrastructure gradually reimburse the federal government for the cost of project construction. These new contracts were intended to provide relief and financial credit to the irrigation districts for ancillary power generation benefits at Elephant Butte Dam. Thus, there is no dispute over the fact that the Downstream Contracts were related to repayment nor that any specific reference to them is absent in the 1938 Compact. However, it is critical to note that each contract states that it is for “Adjustment of Project Construction Charges and other Purposes.” Furthermore, there is no dispute that the Compact is intended in part to protect the Rio Grande Project. Representatives of the three compacting states believed that the Downstream Contracts³⁶ were inherently part of the

³⁴ NM-EX 128, Miltenberger Rep., 84.

³⁵ NM-EX 128, Miltenberger Rep., 98-100.

³⁶ This includes the 1938 Inter-District Contract. Whether or not it had Congressional authorization is completely irrelevant to its importance to the Compacting parties. Further, Miltenberger’s current position on this seems to contradict his earlier statement: “The 1938

Project and therefore, by protecting the Project, the Compact inherently incorporated the day-to-day functioning of the Project. In fact, the written record demonstrates that Texas’s representatives, in particular, expected the Downstream Contracts to protect that state’s apportionment.³⁷ The Project relied upon the language of these Downstream Contracts and their provisions, one of which was in fact “equal rights to water” based on the acreage division laid out in the 1938 contract: 57% in New Mexico, and 43% in Texas. The fact that Clayton cited the contracts at least twice in writing in the months following the Compact’s signing leaves no doubt as to their significant role in Compact negotiations and their foundational role in the compromise.³⁸

- a. As noted above in ¶10, ¶10a, ¶10b, ¶10d, ¶10e, and ¶10g, both letters related specifically to the Compact, and both expressed clear understanding that the provisions in the Contracts formed the foundation for understanding the states’ apportionments.
- b. The 1938 Contract, which Miltenberger suggests was less significant because it was signed between two “private parties,” was nonetheless dependent upon the 1937 contracts that were authorized by Congress: “This contract to be effective only during the period when the proposed contracts under Public No. 249, Seventy-fifth Congress, 1st Session, between (1) the United States and Elephant Butte Irrigation District and (2) the United States and El Paso County Water Improvement District no. 1 are in force, and if either or both of said contracts should terminate after both have become effective, this contract is also to terminate.” Additionally, this contract – “between private parties” – was signed by Secretary of the Interior Oscar Chapman.³⁹
- c. Validating this construction of the significance of the Downstream Contracts, the U.S. Supreme Court has determined that: “...by way of another rough analogy, the

contract executed between the two districts, *and approved by the United States*, memorialized the historical distribution of repayment costs for storage and general project features between EBID and EP#1 on the basis of the respective irrigated acreages ...” Miltenberger Nov. Decl., , TX_MSJ_001610, ¶ 45. (Emphasis added.)

³⁷ See NM-EX 328, Clayton-Smith 1938 Letter, and NM-EX 329, Clayton-Clark 1938 Letter.

³⁸ See NM-EX 328, Clayton-Smith 1938 Letter, and NM-EX 329, Clayton-Clark 1938 Letter.

³⁹ NM-EX 326, Contract between Elephant Butte Irrigation District and El Paso County Water Improvement District No. 1, February 16, 1938.

Compact could be thought implicitly to incorporate the Downstream Contracts by reference.” (138 S.Ct. 954, 959 (2018).)

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 3, 2021.

A handwritten signature in black ink, appearing to read "Jennifer Stevens", with a stylized flourish at the end.

Dr. Jennifer Stevens, Ph.D.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

SECOND DECLARATION OF GREGORY SULLIVAN, P.E.

**IN REBUTTAL TO THE DECLARATION OF ROBERT J. BRANDES, P.E., PH.D. IN
SUPPORT OF THE STATE OF TEXAS'S OPPOSITIONS TO THE STATE OF NEW
MEXICO'S MOTIONS FOR PARTIAL SUMMARY JUDGMENT AND BRIEFS IN
SUPPORT**

I, Gregory K. Sullivan, P.E., hereby declare as follows:

1. I am over 18 years of age and have personal knowledge of the information stated herein.
2. I have authored two expert reports in this case including an Expert Report dated October 31, 2019 (revised July 15, 2020) ("Spronk Report") (NM-EX 122)¹ and a Rebuttal Expert Report dated July 15, 2020 (revised September 15, 2020) ("Spronk Rebuttal Report") (NM-EX 123).
3. I authored a December 21, 2020 Declaration in support of the State of New Mexico's Partial Summary Judgment Motion that was identified as New Mexico exhibit "NM-EX-012" ("First Sullivan Declaration").
4. I have been deposed three (3) times in this case in conjunction with the opinions I expressed in my expert reports.
5. An overview of my education, professional experience, and work in the Lower Rio Grande in New Mexico and Texas is provided in NM-EX 012, the First Sullivan Declaration.

¹ All exhibits designated "NM-EX __" in this Reply Brief are contained in the State of New Mexico's Final Exhibit Compendium dated February 5, 2021 filed with New Mexico's Reply Briefs.

Second Declaration of Gregory K. Sullivan, P.E.

6. My curriculum vitae, list of expert testimony during the past four years, and list of expert reports during the past five years can be found in my October 31, 2019 Expert Report at 326-334, NM-EX 122.

Background

7. In this Declaration, I refer to the New Mexico water district, Elephant Butte Irrigation District as “EBID,” and the Texas water district, El Paso County Water Improvement District No. 1, as “EPCWID.” I refer to EBID and EPCWID collectively, as the “Districts.” I refer to the United States Bureau of Reclamation as “Reclamation.”
8. Texas previously disclosed the Expert Report of Robert J. Brandes Texas dated May 31, 2019 (“Brandes Report”).
9. As part of its November 5, 2020 Motion for Partial Summary Judgment, Texas submitted the Declaration of Robert J. Brandes, P.E., Ph.D. dated November 5, 2020 (“First Brandes Declaration”). Portions of the First Sullivan Declaration responded to statements in the First Brandes Declaration.
10. On December 22, 2020 Texas submitted the Declaration of Robert J. Brandes, P.E., Ph.D. in Support of the State of Texas’s Oppositions to the State of New Mexico’s Motions of Partial Summary Judgment and Briefs in Support (“Second Brandes Declaration”).
11. I was asked by legal counsel for New Mexico to review the Second Brandes Declaration and assess whether any of the statements in the Second Brandes Declaration are inaccurate, disputed, incomplete, and/or are new opinions.

Response to Second Brandes Declaration

12. The Second Brandes Declaration includes substantial new and previously undisclosed technical opinions. Among these are new opinions on the following subjects:
 - New Mexico’s ILRG Model.
 - Interpretations and responses to selected simulation runs of the ILRG Model that were originally submitted and described in the Spronk Report and updated in the Spronk Rebuttal Report.
 - Characterization of the “1938 Condition” of the Rio Grande Project and its water supply at the time of the Rio Grande Compact.
13. Texas provided no backup data, spreadsheets, or other documentation to support the new opinions included in the Second Brandes Declaration. Without this backup information, it is not possible to thoroughly review the bases for these new opinions. Lacking the backup information, I have attempted as best I can to respond to the opinions in the Second Brandes Declaration. However, I reserve the right to supplement my response if and when additional backup information is provided.
14. *In paragraph 10 of his Second Declaration, Dr. Brandes states, “Figure 2 presents a bar graph showing annual allocations to EP#1 from 1980 through 2017 as simulated with New*

Second Declaration of Gregory K. Sullivan, P.E.

Mexico's ILRG model under historical conditions with groundwater pumping (Run 1, green bars). The orange bars above the green bars represent the additional allocation EP#1 would have received as simulated with the New Mexico model for a hypothetical condition without groundwater pumping by New Mexico (referred to as Run 3). The blue dots at the top of the graph signify full supply years as identified by New Mexico. As shown, additional allocations were simulated for 2007, 2009, and 2010 without New Mexico groundwater pumping, all designated as full supply years by New Mexico. The same is also true with respect to 2017, also a full supply year according to the Barroll Report. With more water allocated during these full supply years, EP#1 very likely would have benefitted, suggesting that EP#1 very likely suffered damages historically due to New Mexico's groundwater pumping."

The simulated annual EPCWID allocations shown in Figure 2 of the Second Brandes Declaration for the years after 2007 are incorrect and misleading because they represent only a portion of the simulated total allocation available to EPCWID. The allocations after 2007 do not include the unused allocation from the prior year that was carried over and available for use in the current year pursuant to the carryover provision of the 2008 OA. The simulated total annual EPCWID allocations in Run 1 (Historical Base Run) and Run 3 (No New Mexico Pumping Run) for the years 2008 – 2017 are illustrated in **Figure 1**. NM-EX 123, Spronk Reb. Rep. 359. The bars depict the annual allocations made to EPCWID in each year and the lines show the total allocation, including carryover from the prior year that is available to EPCWID in each year. The full supply threshold specified by Reclamation for EPCWID under the 2008 OA is shown as a horizontal black line.

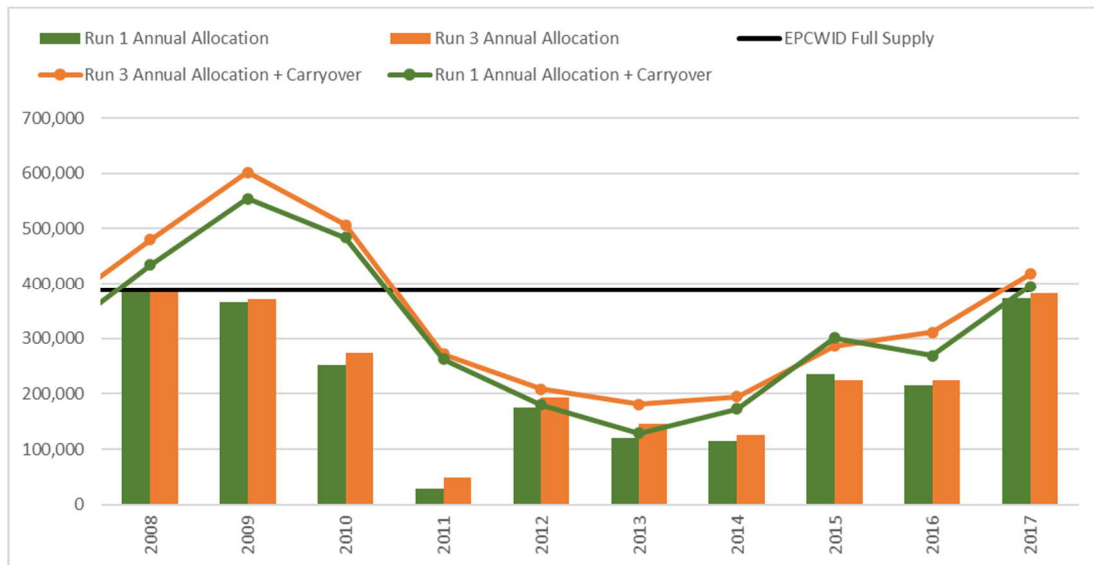
Dr. Brandes identified four full-supply years (2007, 2009, 2010, and 2017) in which the ILRG Model results showed increased allocations to EPCWID when New Mexico pumping was turned off. As shown in **Figure 1**, 2009, 2010, and 2017 were full supply years for EPCWID in Run 1 and Run 3 based on the total allocation including carryover. As for 2007, historical data show that EPCWID received an annual allocation of 403,491 AF which exceeded the 2008 OA full supply allocation of approximately 388,000 AF. NM-EX-100, Barroll Rep. 63.

Further, the historical Project accounting data show that EPCWID took delivery of less than its total allocation in each of the four years highlighted by Dr. Brandes as shown in **Table 1**. NM-EX 122, Spronk Rep. 318:

Table 1. EPCWID Allocation and Charge Diversion in Select Years.

Year	Total Allocation	Charged Diversion	Unused Allocation
2007	403,491	278,252	125,239
2009	552,997	320,083	232,914
2010	532,158	304,937	227,221
2017	452,021	249,919	202,102

It is unreasonable for Texas to claim injury from New Mexico pumping in 2007, 2009, 2010, and 2017 given that EPCWID left substantial portions of its allocations unused in these years. NM-EX 123, Spronk Reb. Rep. 30, 31, 157.



Note: Ace Credit is reflected in the carryover portion of allocation. EPCWID full supply for 2008-2017 is 388,192 AF as determined by Reclamation under the 2008 operating agreement.

Figure 1. EPCWID Total Allocation (Annual Allocation + Carryover), ILRG Model Runs 1 and 3, (acre-feet), D3+Carryover Period (2008-2017).

15. In paragraph 11 of his Second Declaration, Dr. Brandes states, “The diversions of Project water simulated with the New Mexico model for these same Run 1 and Run 3 conditions further demonstrate that EP#1 could have experienced increased Project water supplies during the full supply years but for New Mexico’s groundwater pumping. Figure 3 presents a graph using the same format as that in Figure 2, but here annual diversions are plotted instead of allocations, with these results extending from 1980 to 2017. Again, the extended orange bars for some of the years, as simulated with New Mexico’s Run 3 model, indicate additional diversions by EP#1 without New Mexico groundwater pumping, and many of these years are full supply years as they coincide with the blue dots at the top of the graph. This is further evidence based on New Mexico’s own modeling that damages to EP#1 could have occurred due to limited Project water supplies during full supply years.”

The simulated increases in annual EPCWID diversions in Run 3 compared to Run 1 are shown as orange bars in Second Brandes Declaration Figure 3. In some years, some or all of the increased diversions represent increased diversions of irrigation return flows during the winter when there are no releases of Project water occurring. NM-EX 123, Spronk Reb. Rep. 354. Increased winter diversions are not charged as Project water. *Id.* 69. Other increases in annual diversions in Figure 3 result from minor changes in simulated water demands in EPCWID between Run 3 and Run 1 (e.g., due to variations in soil moisture carryover from one-year to the next). NM-EX 122, Spronk Rep. 87. Any increase in simulated diversions in Run 3 compared to Run 1 should not be considered injurious if the increased diversion occurred in full supply years in which there is a significant volume of unordered and unused EPCWID allocation remaining at the end of the year.

16. In paragraph 16 of his Second Declaration, Dr. Brandes states, “During the years 1951 - 1978, New Mexico groundwater pumping was continuous from year to year, ranging from about 50,000 acre-feet/year up to 250,000 acre-feet per year and averaging about 140,000

acre-feet per year, as shown in Figure 5. Significant pumping occurred even in the full-supply years identified by New Mexico.”

There were no measurements of irrigation pumping in New Mexico (or Texas) during 1951 – 1978. NM-EX 122, Spronk Rep. 308. The experts for New Mexico and Texas estimated irrigation pumping in the Rincon and Mesilla basins (and in the El Paso Valley) based on the unmet irrigation demand after considering deliveries of Project water. The basis for Dr. Brandes’ estimates of New Mexico pumping from 1951-1978 is unknown since the pumping estimates developed by Montgomery and Associates (“M&A”), experts for Texas, were for total pumping in the Rincon and Mesilla basins, including pumping by Texas users in the Mesilla basin. As discussed at length in the Spronk Report, the M&A irrigation pumping estimates for the Rincon and Mesilla basins are unreliable because they were developed based on disputed analyses of irrigated area, cropping pattern, crop irrigation requirements, and a faulty soil-water balance model. NM-EX 122, Spronk Rep. 12-13. Further, while the Texas estimates of irrigation pumping in the Rincon and Mesilla basins are disputed, pumping by New Mexico could not have injured Texas in years that Texas either received a full allocation or left a significant volume of its annual allocation unordered and unused. NM-EX 123. Spronk Reb. Rep. 31.

17. *In paragraph 17 of his Second Declaration, Dr. Brandes states, “By contrast, the blue line and “x” data points plotted on attached Figure 4 reflect the same delivery relationship as the D2 Curve but are based on depletion conditions in 1938 when there was very little groundwater pumping in the Rincon and Mesilla Valleys of New Mexico. The data corresponding to the blue “x” data points shown on Figure 4 are from Run 2 of New Mexico’s model with all groundwater pumping in New Mexico and Texas turned off, which is essentially the 1938 condition. And as illustrated, the 1938 Condition representation of the D2 Curve lies considerably above the 1951 - 1978 D2 Curve, obviously indicating that groundwater pumping that began in the early 1950s reduced annual diversions (deliveries) of Project water relative to Caballo releases.”*

Dr. Brandes plotted the simulated annual diversions versus the simulated annual Caballo Reservoir releases from Run 2 of the ILRG Model in Figure 4 of his declaration and characterized these results as a “1938 Condition.” In Run 2 of the ILRG Model, all pumping in New Mexico, Texas, and Mexico was turned off. Therefore, Texas’s 1938 Condition would eliminate all pumping in Texas. NM-EX 123, Spronk Reb. Rep. 83.

The blue x’s in Figure 4 of the Second Brandes Declaration appear to be the sum of the simulated diversions of Project water in New Mexico, Texas, and Mexico in Run 2 of the ILRG Model. The ILRG Model results for Run 2 do not represent a 1938 Condition because they reflect the simulated historical changes through time of the following:

- Project infrastructure
- Irrigated area and crops
- Municipal use of Project water by El Paso Water (“EPW”)
- EPW WWTP discharges from use of Project water for irrigation
- Project allocation procedures, including implementation of the 2008 OA

- Project accounting

18. In paragraph 18 of his Second Declaration, Dr. Brandes states, “Figures 6 and 7 show overall change in the number of wells in the Lower Rio Grande below Caballo between 1938 and 2020. Based on Figure 6 there were very few wells and very little groundwater pumping in 1938, in contrast to the numerous wells in place along the Rio Grande in 2020 shown in Figure 7.”

The maps of ground water wells along the Rio Grande presented in Figure 6 (1938) and Figure 7 (2020) of the Second Brandes Declaration are incomplete and misleading because they do not show the extensive well development in the Texas portion of the Mesilla basin and in the Hueco Bolson in the El Paso/Juarez area. NM-EX-117, LRG Wells and Groundwater Level Drawdowns.

Figure 2, shown below, shows the modest well development that existed in Texas and Mexico in 1938 compared to the extensive well development that occurred after 1938. Further, as shown in **Figure 3**, the impacts of groundwater pumping on ground water levels has been substantially greater in the Hueco Bolson in the El Paso/Juarez area than it has in the Rincon and Mesilla basins in New Mexico. NM-EX-117, LRG Wells and Groundwater Level Drawdowns.

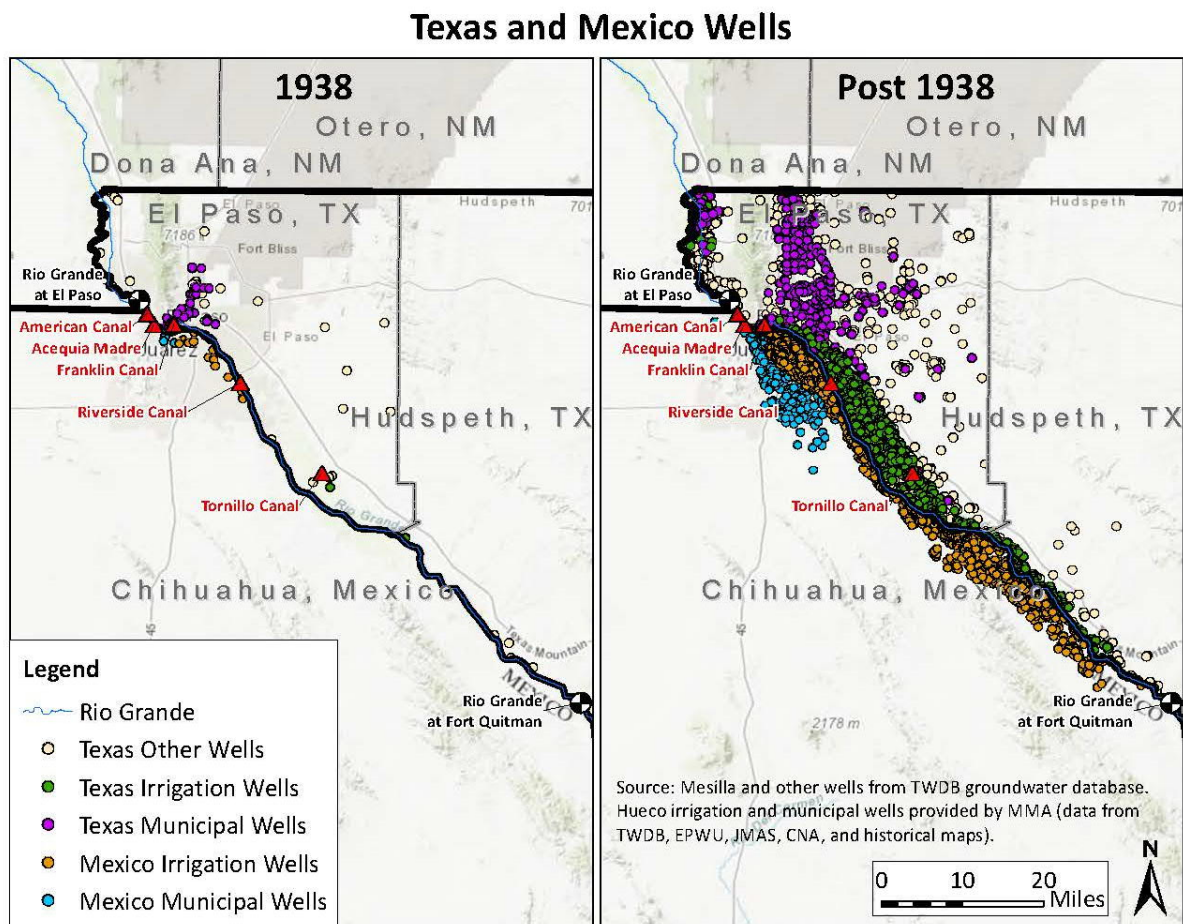


Figure 2. Well Development in Texas and Mexico.

LRG Wells and Groundwater Level Drawdowns

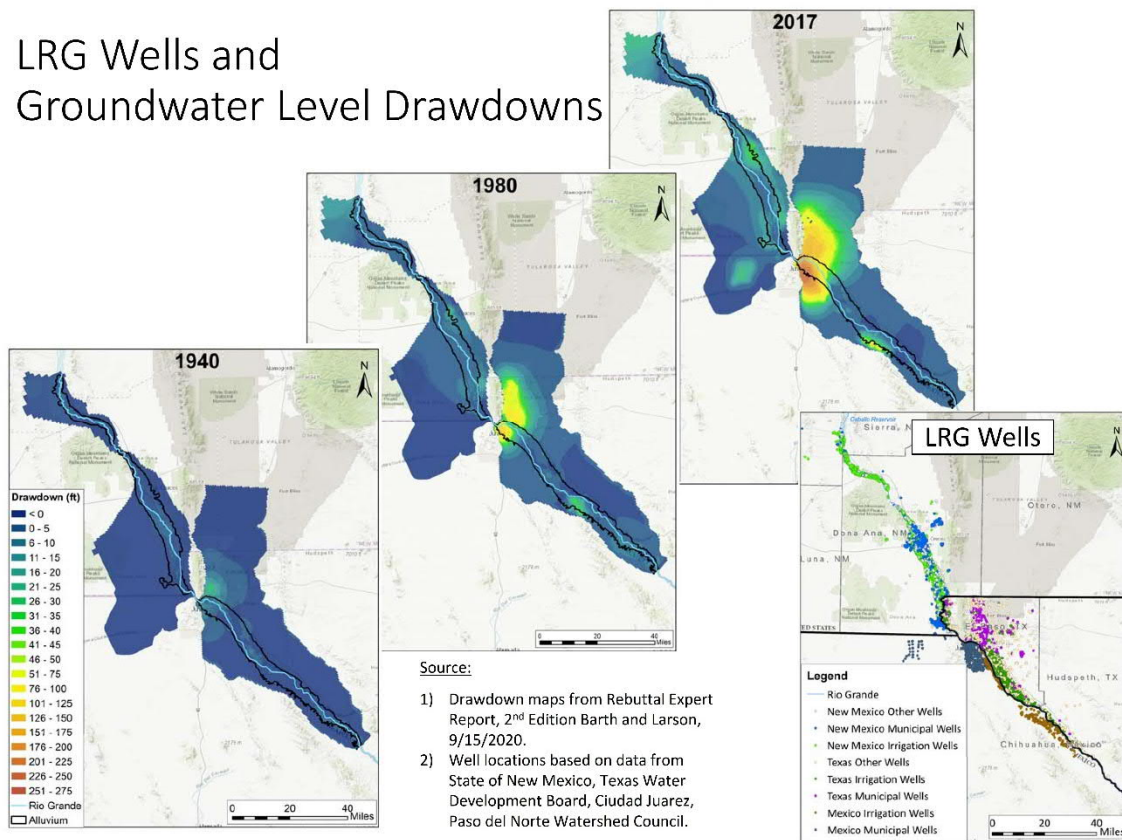


Figure 3. LRG Wells and Groundwater Level Drawdowns, NM-EX 117.

19. In paragraph 19 of his Second Declaration, Dr. Brandes states, “Based on work by William Hutchison using his Texas model and Shane Coors’ assessment of New Mexico’s model, groundwater pumping withdrawals beginning in the early 1950s in the Rincon and Mesilla basins caused groundwater levels to fall from conditions in 1938 at the time of the Compact. Expert Report of William Hutchison, Ph.D., P.E., P.G. (May 31, 2019) (Hutchison 2019 Report) and Expert Report (Supplemental Rebuttal Report) of Adolph (Shane) Coors V, M.E., P.E. (May 6, 2020) (Coors 2020 Report).”

The statement in paragraph 19 of the Second Brandes Declaration is vague and unsupported by specific citations to information contained in the referenced expert reports by Hutchison and Coors.

As shown in **Attachment 1** ground water levels in the Rincon and Mesilla basins declined during dry periods with low Project deliveries and increased pumping and recovered during average and wet periods with normal Project deliveries. By contrast as shown in **Attachment 2**, ground water levels in Hueco Bolson in the El Paso and Juarez area have declined through time and have not recovered.

20. *In paragraph 21 of his Second Declaration, Dr. Brandes states, “Based on the long-term volumes of groundwater pumping in the Rincon and Mesilla Valleys and the resulting lowered groundwater levels, the Lower Rio Grande basin experiences significantly reduced drain inflows to the Rio Grande due to:*

- a. infiltration of excess irrigation water from the fields directly to the subsurface rather to the drains;*
- b. increased seepage losses from the drains to the subsurface due to the lowered groundwater levels; and*
- c. increased seepage losses from the Rio Grande to the subsurface due to the lowered groundwater levels.*

An illustration of how drain flows have been reduced since significant groundwater pumping began in the early 1950s is shown on the graph in Figure 9.”

After the mid-1930s, deliveries of Project water were not limited by annual allotments until 1951, and this contributed to the relatively high Project water deliveries and relatively high drain flows during the late 1930s and 1940s. NM-EX 122, Spronk Rep. 21-22, 35, 108. As shown in **Attachment 3**, drain flows in the Rincon Valley and Mesilla Valley declined in dry years with low Project deliveries and recovered in average and wet years with full Project water allotments and allocations. NM-EX 123, Spronk Reb. Rep. 170-171.

The extent to which drain flows are impacted by pumping in the Rincon Valley, the Mesilla Valley, and the El Paso Valley is immaterial to Project deliveries provided that sufficient reservoir water is available to make up for a decline in drain flow contributions. This largely explains why the results of the ILRG Model runs presented in the Spronk Rebuttal Report show that impacts on Project water deliveries from pumping in New Mexico, Texas, and Mexico are largely limited to dry years with less than full Project water allocations. *Id.* 118.

In addition, Dr. Brandes previously stated that improvements in irrigation efficiency contributed to the reduction in drain flows. NM-EX 131, Brandes Rep. 21. In addition to improvements in irrigation efficiency, there are other factors that may have contributed to the reduction in drain flows. The factors that may have contributed to reductions in Rio Grande flows at El Paso that are listed below in paragraph 23 in the response to paragraph 24 of the Second Brandes Declaration may have also contributed to the reduction in Mesilla Valley drain flows.

21. *In paragraph 22 of his Declaration, Dr. Brandes states, “Texas’ claims for damages arises primarily from the long-term effects of groundwater pumping by New Mexico, not effects that can be broken into an annual timestep.”*

Contrary to Dr. Brandes’ assertion, Project allocations and deliveries *are* made on an annual basis, and it is the alleged impacts to these annual allocations and deliveries that form the basis for Texas’s damages claims. NM-EX 122, Spronk Rep. 23. As described in paragraph 20 above, impacts on Project water deliveries from pumping in New Mexico, Texas, and Mexico are largely limited to dry years when the combination of reservoir supplies plus available return flows are insufficient to make a full allocation of Project water.

22. *In paragraph 23 of his Declaration, Dr. Brandes states, “These changes in the hydrologic system are not readily apparent when viewed from year to year, but when examined over long periods of time, they become quite evident. The effects of sustained groundwater pumping*

translate to long-term changes in hydrologic conditions that can extend the adverse effects of groundwater pumping over many years. Coors 2020 Report.”

Contrary to the assertion in paragraph 23 of the Second Brandes Declaration, the effects of ground water pumping in the Rincon and Mesilla basins on drain flows and ground water levels are readily apparent on a short-term basis. NM-EX 123, Spronk Reb. Rep. 57. As shown in **Attachment 3**, drain flows in the Rincon and Mesilla basins vary seasonally in response to net recharge (canal seepage plus on farm deep percolation minus pumping) and recover following droughts. The information in **Attachment 3** show that drain flows historically recovered after the dry periods in the 1950s, 1960s, and 1970s.

Similar to drain flows, ground water levels in the Rincon and Mesilla basins have also fluctuated seasonally and recovered following droughts. Examples of ground water level hydrographs for monitoring wells in the Rincon and Mesilla basins are shown in **Attachment 1**.

23. *In paragraph 24 of his Second Declaration, Dr. Brandes states, “The prolonged effects of groundwater pumping in terms of reduced drain flows, increased seepage losses from the Rio Grande, and lower Rio Grande flows at El Paso continued from year to year with or without full Project water supplies. These prolonged effects have been demonstrated by plotting historical cumulative flows in the Rio Grande at El Paso versus historical cumulative releases from Caballo Reservoir. Expert Report of Robert J. Brandes, May 31, 2019; see Figure 10. On this plot, the distinct break in slope of the historical data around the early 1950s supports the conclusion that groundwater pumping in the Rincon and Mesilla basins, which significantly increased about that time in response to drought conditions, was the cause of the reduced river flows. These conclusions are confirmed by the simulated model results with (historical) and without (hypothetical) groundwater pumping as produced by Hutchison 2019 Report based on his Texas model and by Coors 2020 Report based on his analysis of results from New Mexico’s model.”*

Dr. Brandes presumes that the break in slope in the plot of cumulative El Paso flows versus cumulative Caballo Reservoir releases around 1950 shown in Figure 10 of his declaration was caused solely by ground water pumping in the Rincon and Mesilla basins. As described in the Spronk Report, there are many other factors that may have contributed to the change in the slope of the double-mass curve in Figure 10, including the following:

- Pumping in Texas Mesilla – Well pumping in the Texas portion of the Mesilla basin including irrigation well pumping, municipal well pumping by EPW at the Canutillo wellfield, and other non-irrigation pumping.
- Pumping in El Paso Valley and Juarez Valley – Well pumping in the El Paso Valley and the Juarez Valley that depleted deliveries of Project water and caused additional water to have to be released from Project storage to deliver water to EPCWID farms.
- Reduction in Reservoir Releases – Generally lower reservoir releases after 1950 coupled with the reduced Project delivery efficiency that exists at lower flows as shown in Figure 5.1 of the Brandes Report, NM-EX 131.
- Reduction in Diversions and FHG Deliveries – Reductions in surface water diversions and farm headgate deliveries as a result of the reduced reservoir releases that occurred after 1950.

Second Declaration of Gregory K. Sullivan, P.E.

- Increased Project Operating Efficiency – Increases in Project operating efficiency (enactment of annual water allotments, reduced waste, etc.) that occurred after the first Project water shortages in the early 1950s.
- Increased On-Farm Irrigation Efficiency – Increases in on-farm irrigation efficiency resulting from land-leveling, lateral lining, increased use of level basin irrigation, soil moisture monitoring, education, and other factors that led to reduced irrigation return flows.
- Reduced Irrigated Area – Reduction in irrigated area in New Mexico and especially in Texas that led to reduced water demands. Increasingly, EPCWID did not take delivery of its full annual allocation.
- Changes in Crops – Changes to crops that consume more water and return less water to the stream.
- Implementation of 2008 OA – Implementation of the 2008 OA accounting starting in 2006 that reduced the overall delivery efficiency of the Project through reduced deliveries to EBID and reduced drain flow returns to the Rio Grande.

NM-EX 122, Spronk Rep. 111.

It is also important to note that the cumulative Rio Grande at El Paso flows plotted in Figure 10 of the Second Brandes Declaration are year-round flows, including flows during the winter period that are not considered a part of the Project water supply. Review of the Brandes analysis indicates that an average of about 16,000 AF/y of the deviation in El Paso flows from the pre-1950 line is represented by changes in flows during the non-irrigation season. Since there are no Project releases during the non-irrigation season, flows during that time are not charged as Project water. *Id.* 112.

For the reasons listed above, it is improper to conclude that pumping in New Mexico was the sole cause of reduced flows in the Rio Grande at El Paso after 1950. While the double-mass curve analysis presented in Figure 10 in the Second Brandes Declaration does show there was a reduction in flow relative to the releases from Project storage, it provides no information or evidence for what caused the reduction in flow. *Id.* 112.

In addition, changes in flow at the El Paso gage are irrelevant to this case, to the Compact, and to the Project operations. What is relevant is that the Project has always operated as a unit, and prior to the 2008 OA, it operated to allocate and deliver equal amounts of water to each farm acre based on the D1/D2 procedure. To understand whether pumping anywhere within the Project area has impacted the historical Project deliveries, it is necessary to develop and apply a robust simulation model of the entire Project. As described previously, the simulation model must be capable of simulating the full dynamic response of the Project operations to changes in supply. The simple double-mass curve analyses presented in the Second Brandes Declaration are not useful for determining the impact of New Mexico pumping on Texas water deliveries. *Id.*

The ILRG Modeling results presented in the Spronk Rebuttal Report show that substantial portions of the impacts of pumping in the Rincon and Mesilla basins on El Paso flows occur during the winter and during periods of reservoir spills. More specifically, the following is a

summary of the changes in average annual El Paso gage flows during 1951-2017 between Run 1 (Historical Base Run) and Run 6 (No Rincon-Mesilla Pumping Run).

Reservoir Spills	18,400 AF/y (25.1%)
Nov-Feb Flows	28,500 AF/y (35.8%)
<u>Mar-Oct Flows</u>	<u>32,800 AF/y (41.1%)</u>
Total	79,700 AF/y (100%)

NM-EX 123, Spronk Reb. Rep. 418.

Impacts to Project operations and deliveries during the March – October irrigation season when Project operations and deliveries occur are what is most relevant for assessing impacts from pumping. Impacts during the winter when Project water is not being delivered or during spills are of little or no importance in assessing the claims and counterclaims in this case. *Id.* 60.

24. *In paragraph 28 of his Second Declaration, Dr. Brandes states, “28. New Mexico’s own data as reported in the underlying files of the Spronk Report are inconsistent with the diversion percentages reported in paragraph 65 of NM MSJ on Apportionment and attributed in paragraph 65 to the work of New Mexico’s other expert, Peggy Barroll. In paragraph 65, New Mexico states that from 1931 to 1979, diversions by EP#1 totaled 45.5 percent of total diversions, but the Spronk data show only 41.7 percent, slightly less than the 43 percent allocation. Similarly, for 1951 to 1979, in paragraph 65 New Mexico reports that EP#1 diverted 43.8 percent of the total diversions, whereas the Spronk data show that EP#1 diverted only 38.5 percent. Methods used by Peggy Barroll and those described in the underlying data of the Spronk Report also differ in how the distributions of diversions by EP#1 in Mesilla Valley were made, with Barroll assuming 20 percent and Spronk an average of 14 percent.”*

In paragraph 28 of his Second Declaration, Dr. Brandes compares EBID and EPCWID percentages of total Project diversions developed by Dr. Barroll to comparable percentages that Dr. Brandes allegedly derived from data reported by SWE. It appears that Dr. Brandes misinterpreted the SWE data in computing the District diversion percentages that he presented in paragraph 28 of his Second Declaration. I have reviewed the response to paragraph 28 of the Second Brandes Declaration contained in the Fourth Declaration of Dr. Barroll and agree with her response. This includes agreement with Dr. Barroll’s conclusion that the SWE data show that EPCWID’s share of total Project diversions averaged 43.8% during 1938-1978 and 42.3% during 1951-1978.

25. *In paragraph 31 of his Declaration, Dr. Brandes states, “In fact, under the Operating Agreement New Mexico has received more water than it otherwise should have based solely on the D2 Curve prior to implementation of the Operating Agreement. This is demonstrated by the graph in Figure 11. The blue x’s show total Project surface water diversions between 2008 and 2016; the black x’s show the total amount of diversions, including groundwater pumping by New Mexico, for the same period.”*

Figure 11 of the Second Brandes Declaration appears to show the historical total annual combined diversions of Project water by EBID, EPCWID, and Mexico versus the annual Caballo Reservoir releases for two historical periods. Data for the 1951-1978 D1/D2 period are shown as red dots and data for the period from 2008-2016 are shown as blue triangles.

Also shown in Figure 11 in black x's are the total combined annual diversions by New Mexico, Texas, and Mexico PLUS the simulated annual New Mexico irrigation pumping from the historical calibration run of the ILRG Model (Run 0).

Dr. Brandes appears to conclude that New Mexico received more water during 2008-2016 than it would have received under the D2 accounting because the black x's plot above the red line. However, the black x's do not represent the combined New Mexico irrigation supply from Project deliveries and ground water pumping, but rather the New Mexico irrigation supply PLUS Project diversions by Texas and New Mexico. Therefore, it is not possible to conclude anything about the New Mexico irrigation supply during 2008-2016 from the black x's plotted in Figure 11.

It also noteworthy that Dr. Brandes neglected to plot the Project diversion data for the period between 1979 and 2007 in Figure 11. **Figure 4** is a plot of the combined Project diversions by New Mexico, Texas, and Mexico versus Caballo Reservoir releases for ALL years from 1938 – 2017 with the data color coded for different data periods as follows:

- 1938-1950 (blue diamonds) – Wet period prior to the D1/D2 data period during which Reclamation issued no annual allotments to limit deliveries to Project water users.
- 1951-1978 (red dots) – D1/D2 data period with the data points that fall above and below the D2 curve (red line)
- 1979-2005 (purple x's) – D1/D2 allocation period with data points that fall above and below the D2 curve (red line) showing the Project delivery performance was comparable to that during the 1951-1978 D1/D2 data period.
- 2006-2017 (blue asterisks) – D3 allocation period that was implemented as part of the 2008 OA. The data points generally fall below the D2 Curve reflecting the reduction in Project delivery performance that occurred because of the substantial reduction in allocation and delivery of Project water to EBID farmers.

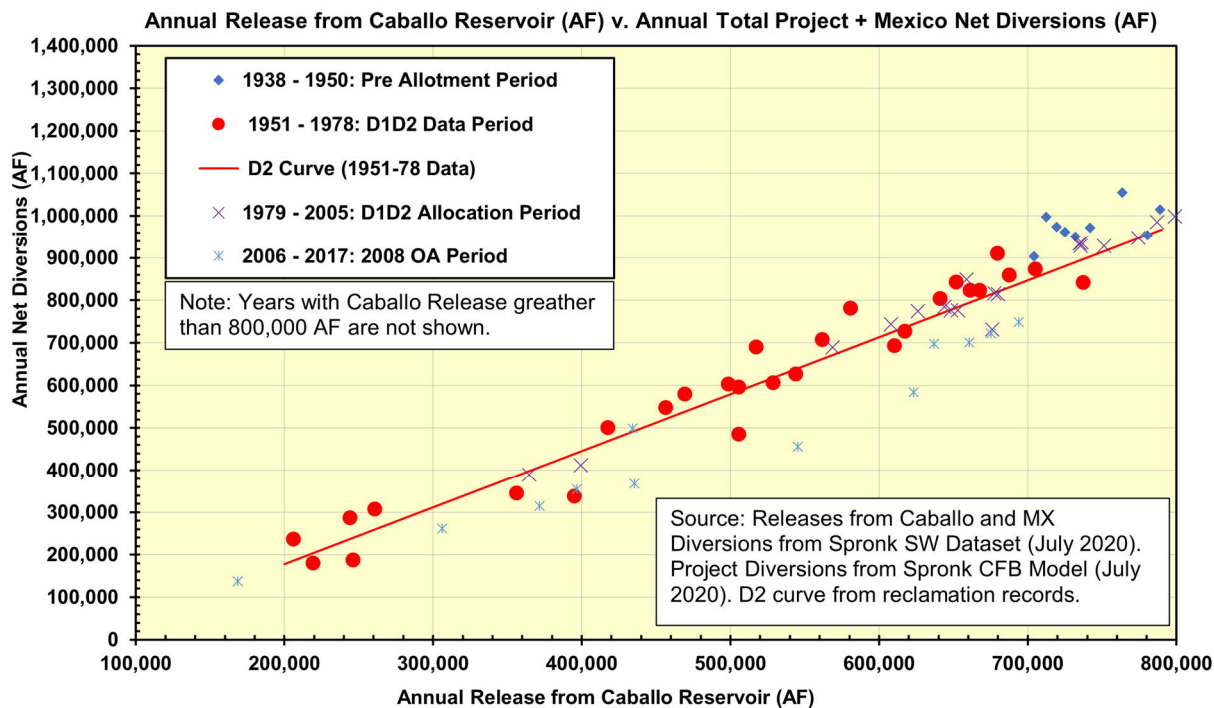


Figure 4. Annual Release from Caballo Reservoir (AF) v. Annual Total Project + Mexico Net Diversions (AF).

26. In paragraph 32 of his Declaration, Dr. Brandes states, “As stated in paragraph 83, the use of the D1/D2 method produces 376,000 acre-feet for EP1. However, as I have said elsewhere in my declaration, the D1/D2 method does not reflect 1938 conditions and does not represent Texas’s Compact apportionment.”

The full supply allocation for EPCWID varied slightly following Reclamation’s implementation of the D1/D2 allocation procedure, but by the early 1990s was set at 376,862 AFY and then increased to 388,192 AFY after implementation of the 2008 OA. Since 1979, however, EPCWID has rarely taken delivery of its full allocation as evidenced by its diversion charges typically being much less than its total annual allocations as shown in **Figure 5**. NM-EX 122, Spronk Rep. 179.

Second Declaration of Gregory K. Sullivan, P.E.

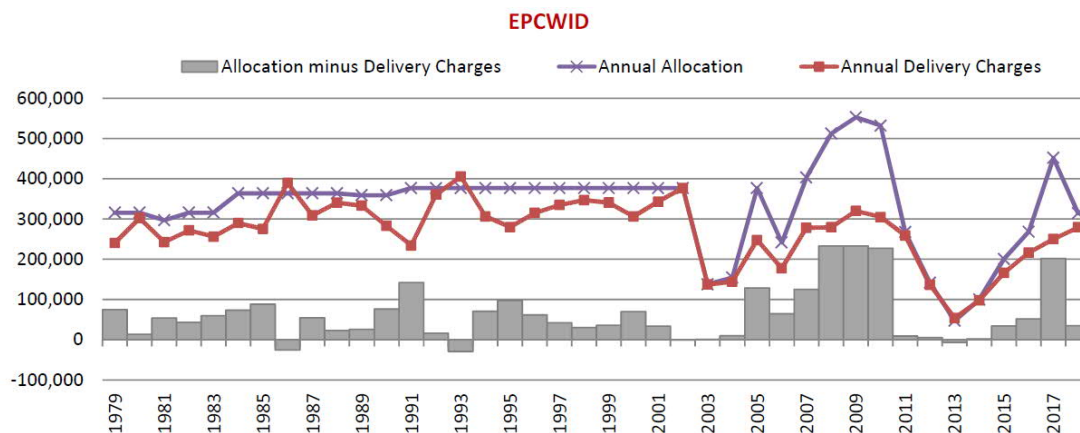


Figure 5. Annual Allocation and Delivery Charges for EPCWID, Rio Grande Project Accounting, 1979-2018.

It is unclear what volume of water Dr. Brandes believes represents Texas's Compact apportionment. Table 6.2 in the Brandes Report, NM-EX 131, shows a net annual EPCWID Compact diversion totaling 336,427 AF (sum of Total Diversions of Rio Grande Project Water for EPCWID in the Mesilla Valley [52,931 AF] and El Paso Valley [283,496 AF]). The total Brandes EPCWID Compact diversion is approximately 40,400 AF less than the full supply allocation to EPCWID under the D1/D2 accounting procedure after 1990 (376,862 AF).

I declare under penalty of perjury that the foregoing is true and correct.

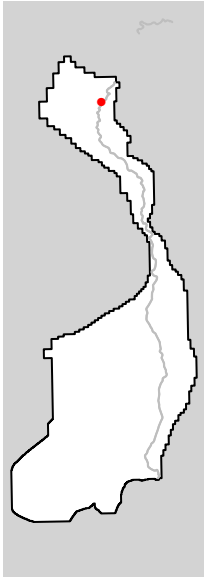
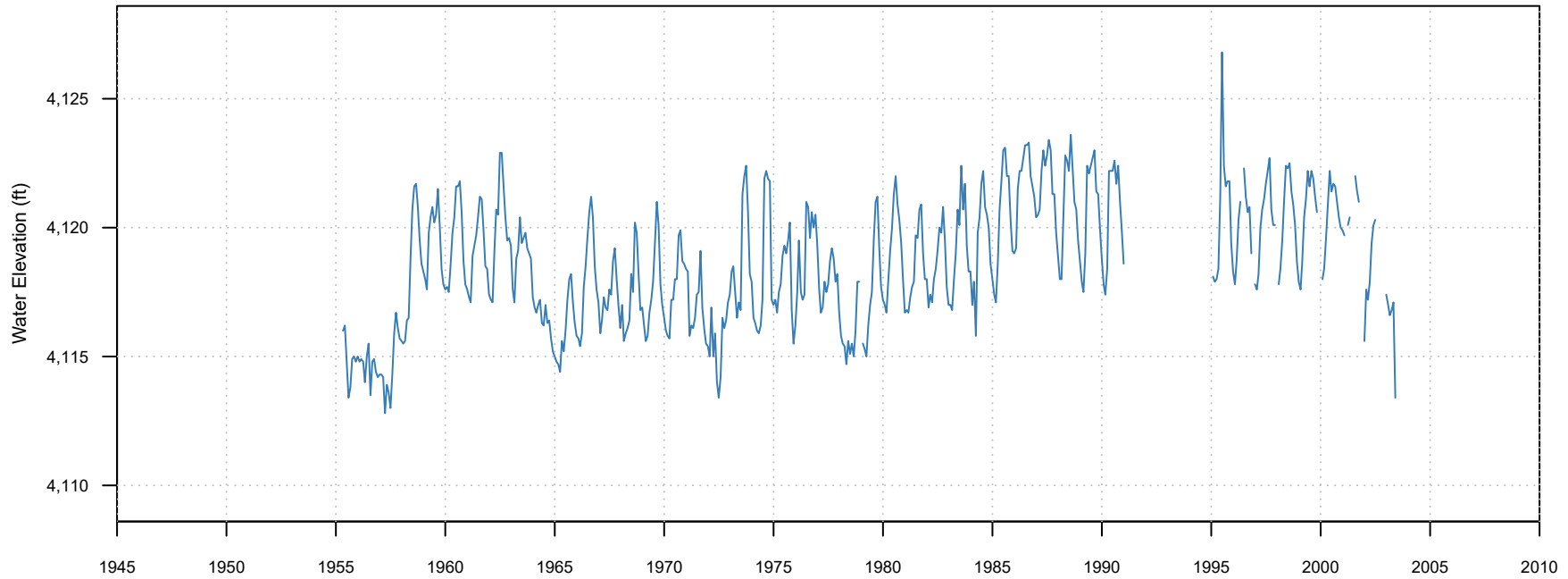
Executed on February 5, 2021

Gregory K. Sullivan, P.E.

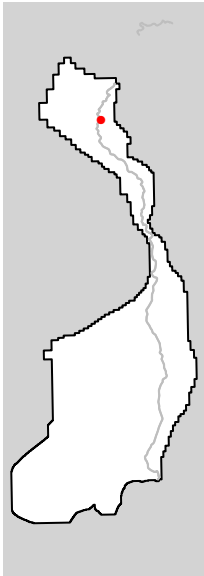
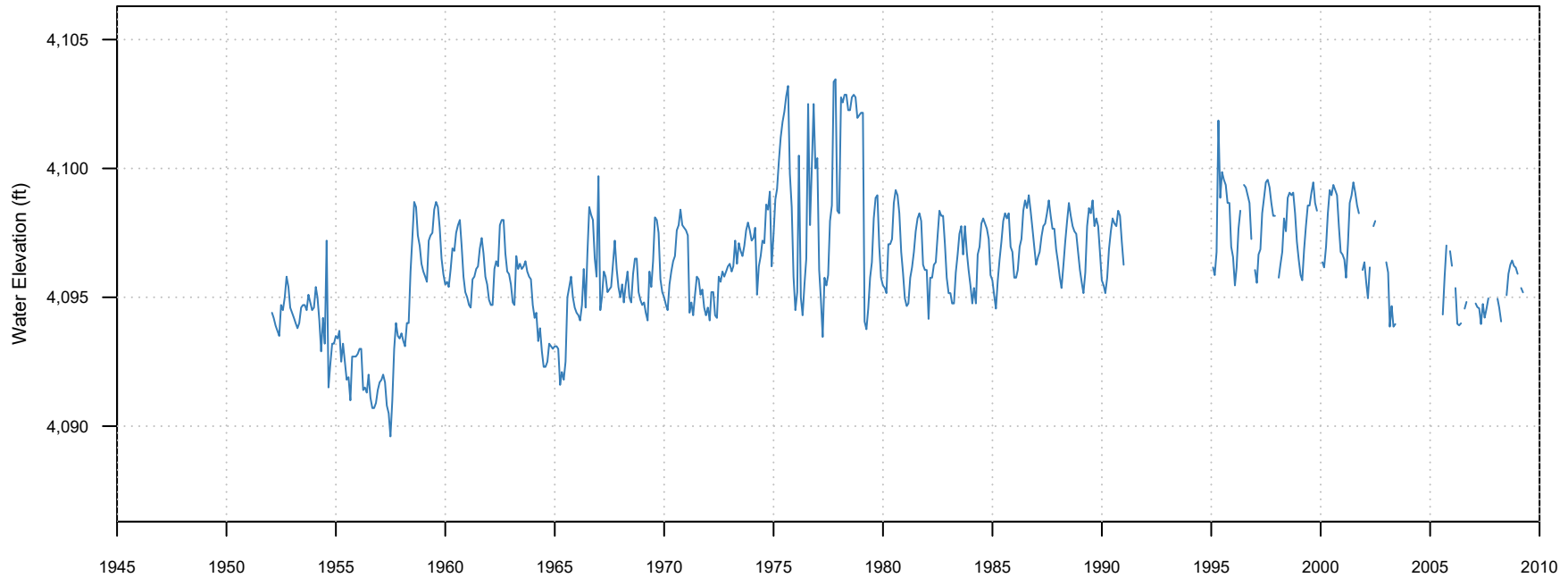
Attachment 1

Illustrative Observed Groundwater Level Hydrographs Rincon and Mesilla Basins

RIN10 / RINUSBR10 / headsm016 / Depth 20.4 ft / Layer 1



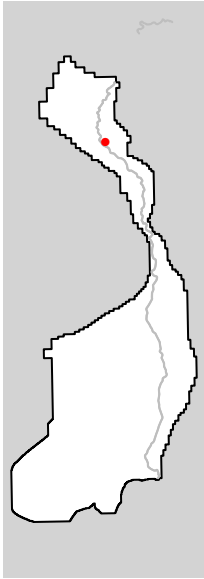
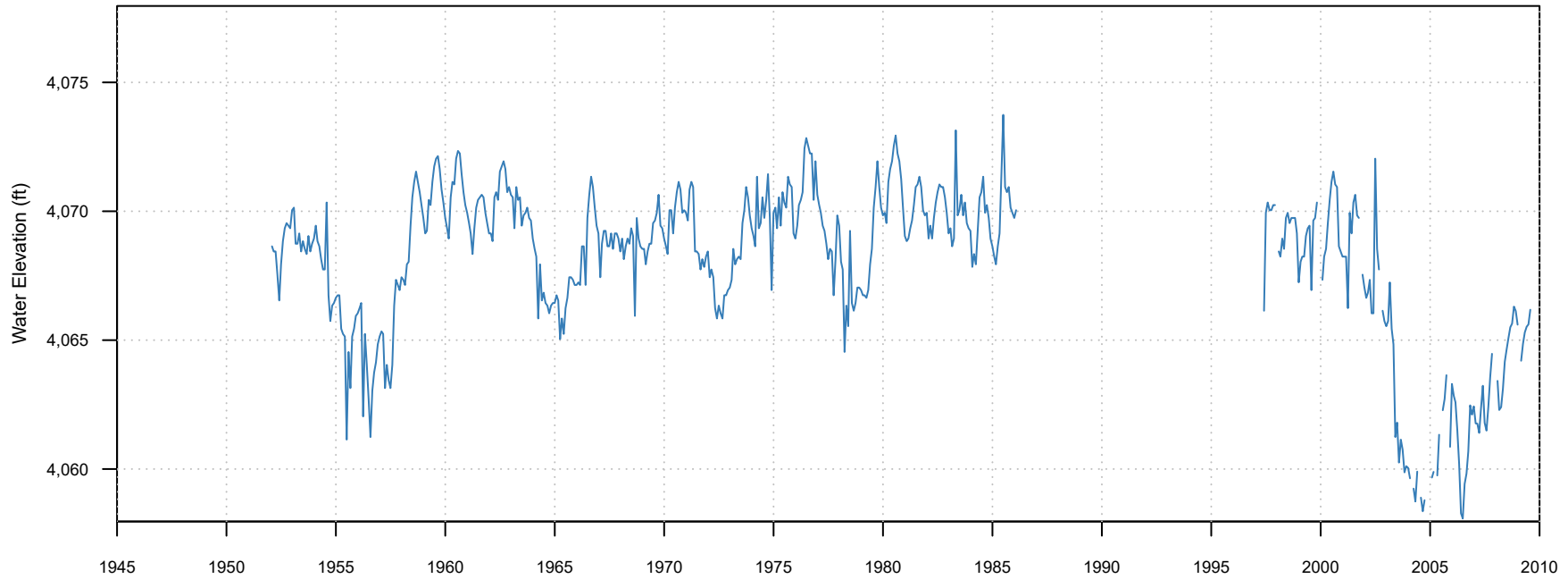
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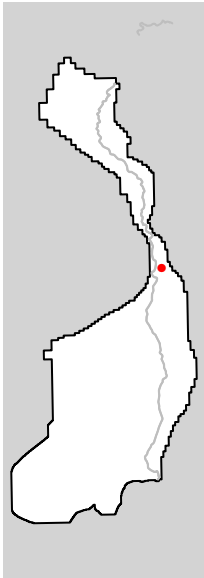
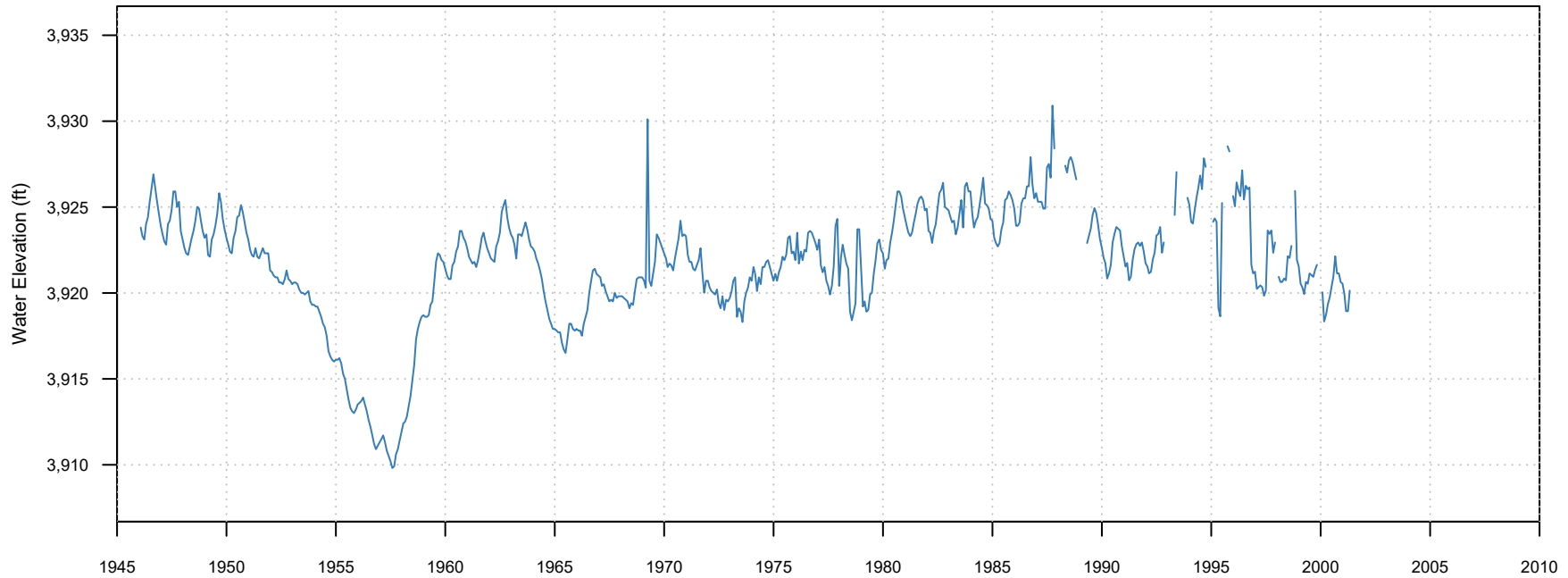
Illustrative Observed Groundwater Level Hydrographs, Rincon and Mesilla Basins*

*Appendix B, Barth Expert Report (9/15/2020)

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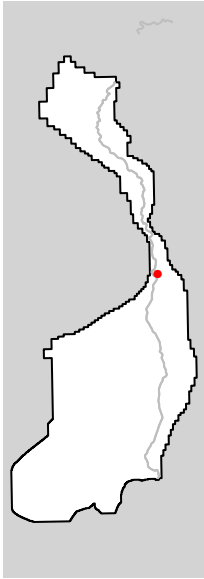
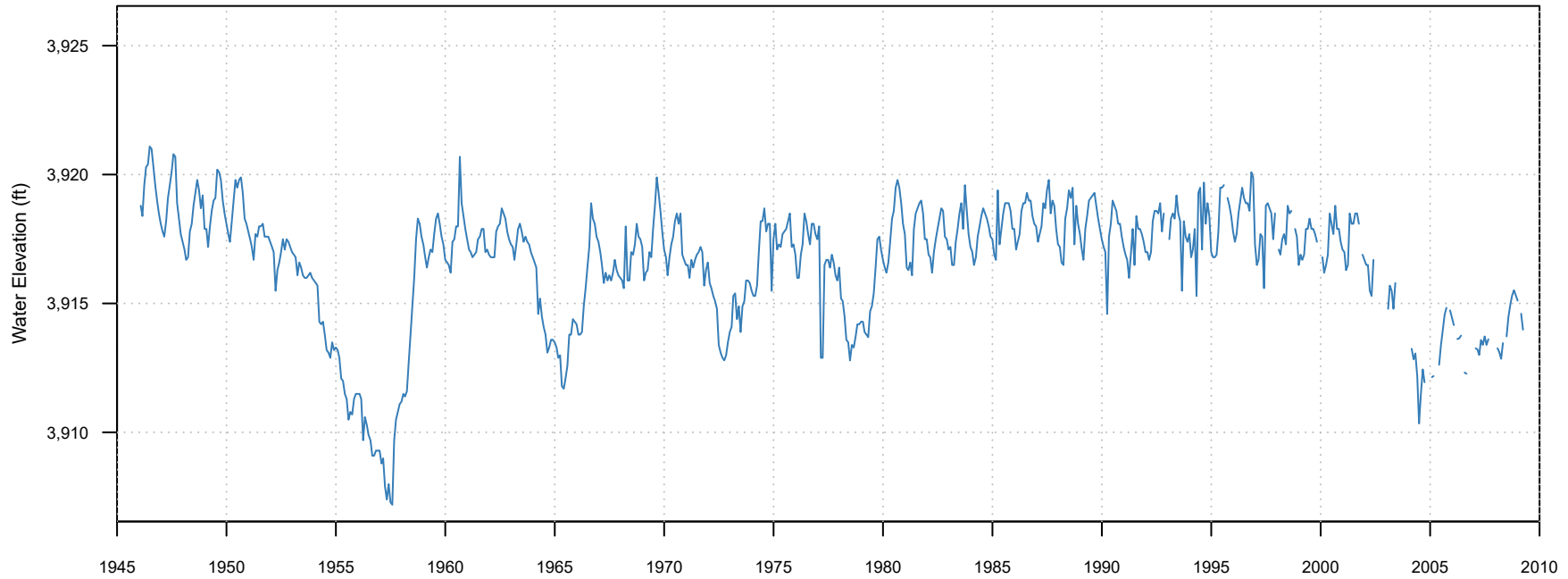
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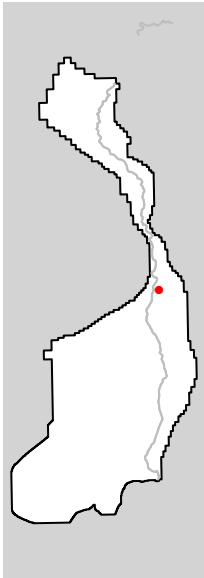
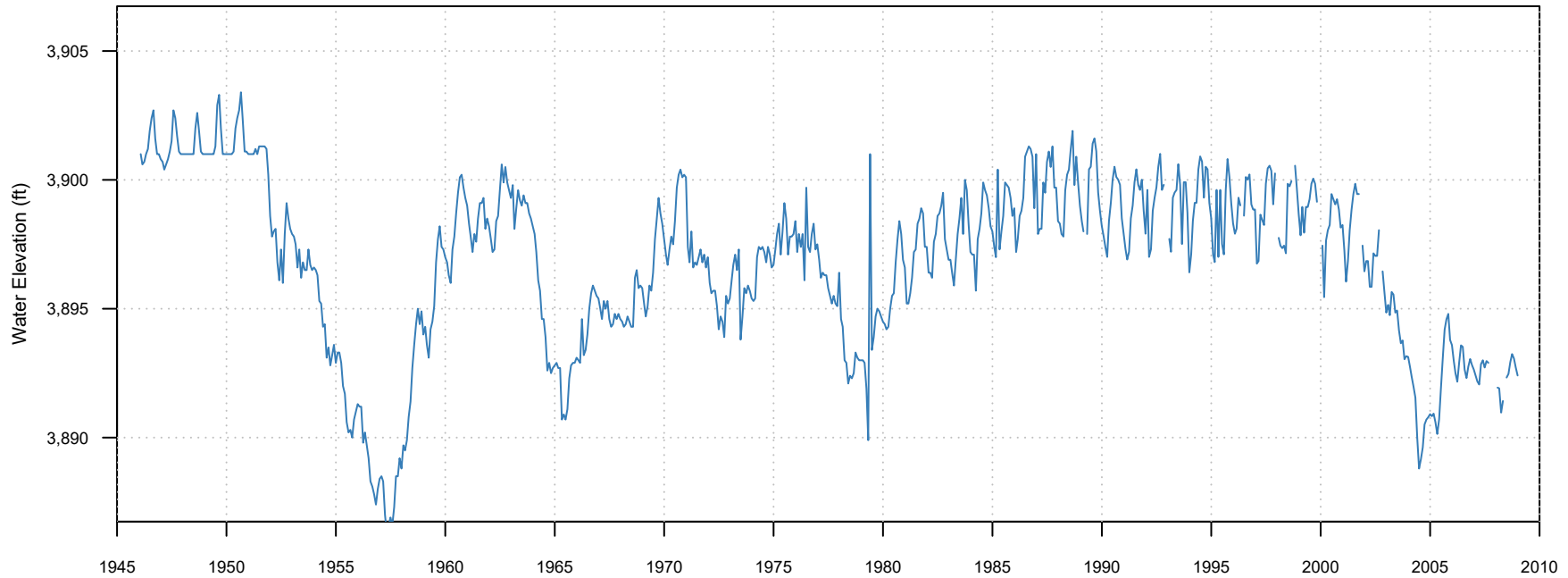
Illustrative Observed Groundwater Level Hydrographs, Rincon and Mesilla Basins*

*Appendix B, Barth Expert Report (9/15/2020)

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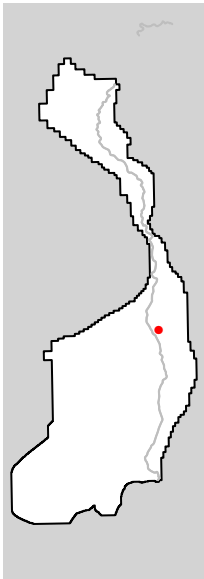
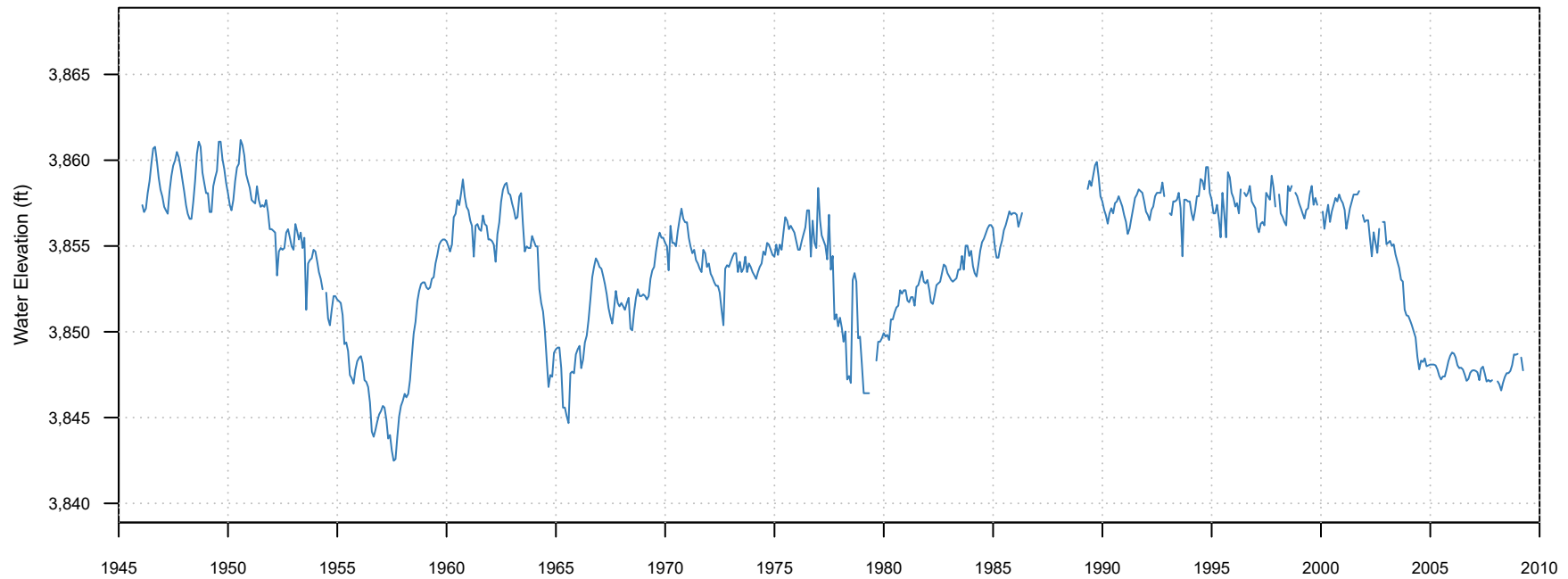
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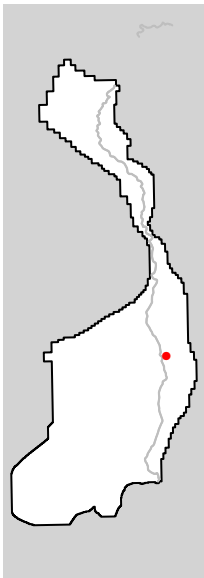
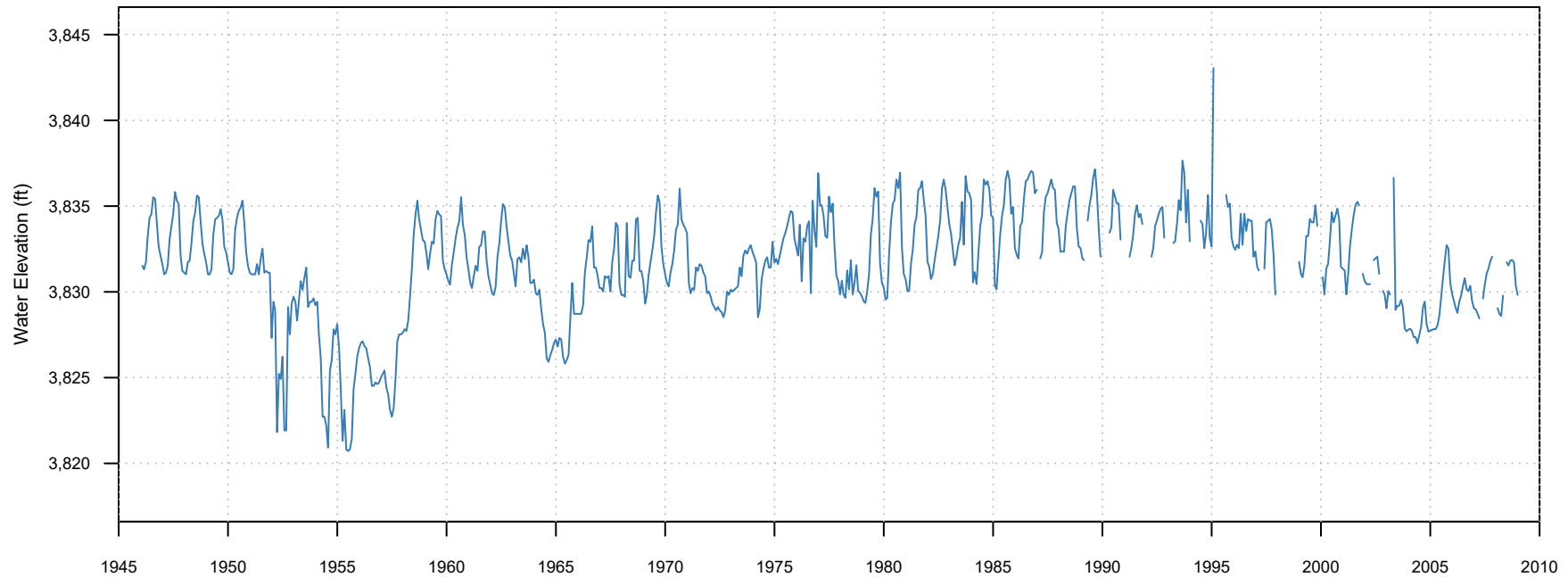
Illustrative Observed Groundwater Level Hydrographs, Rincon and Mesilla Basins*

*Appendix B, Barth Expert Report (9/15/2020)

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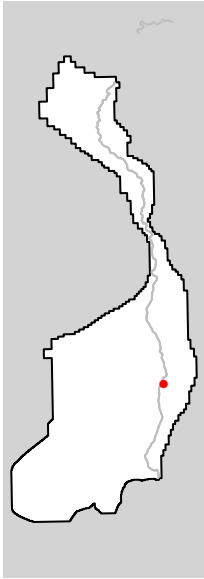
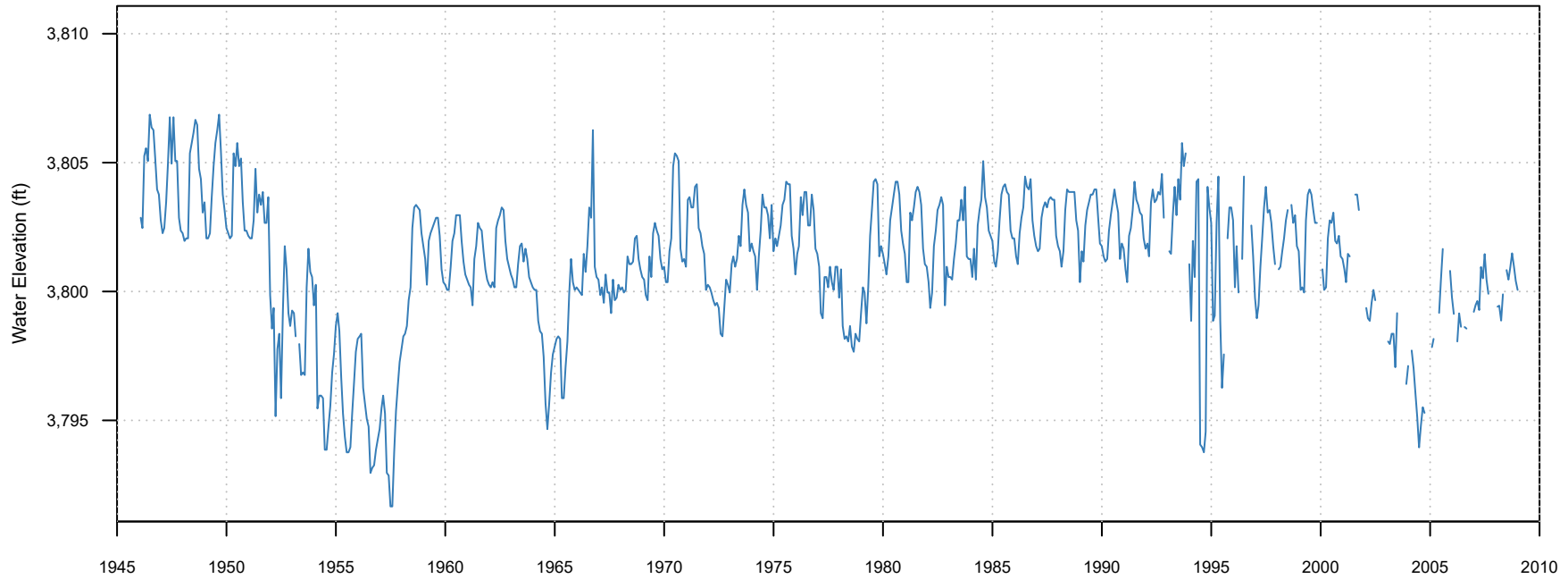
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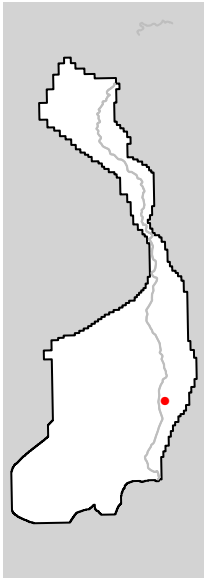
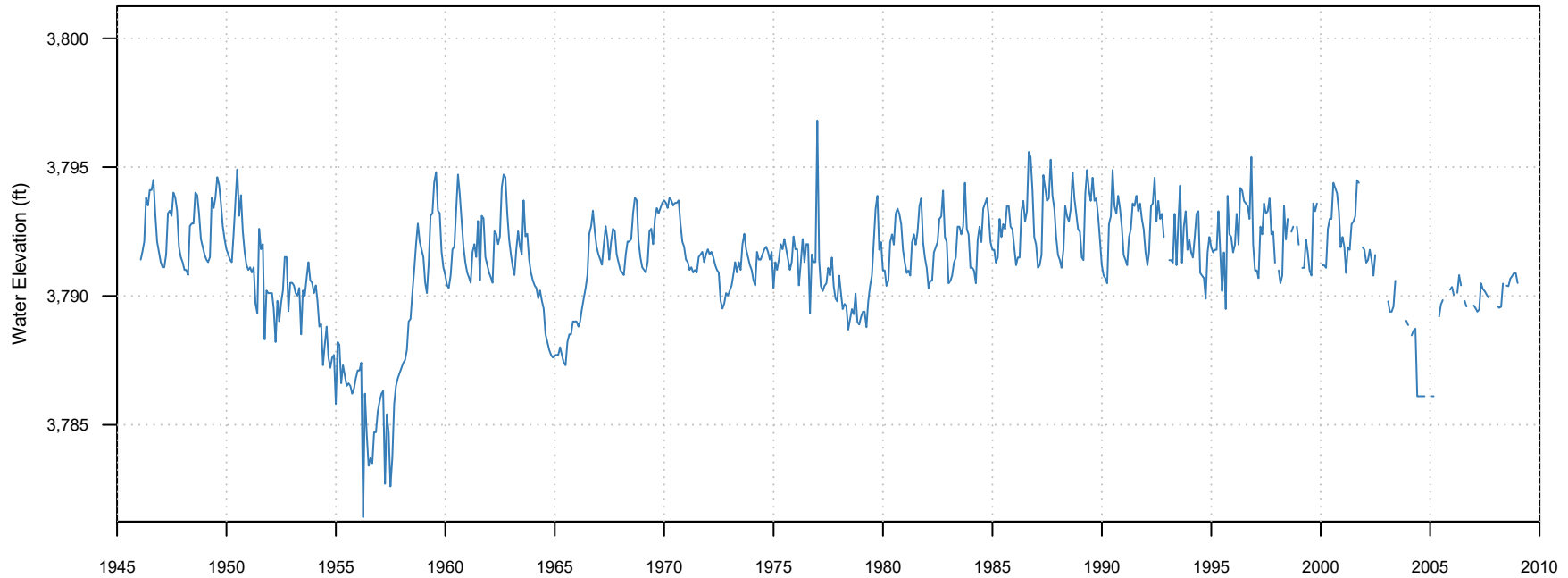
Illustrative Observed Groundwater Level Hydrographs, Rincon and Mesilla Basins*

**Appendix B, Barth Expert Report (9/15/2020)*

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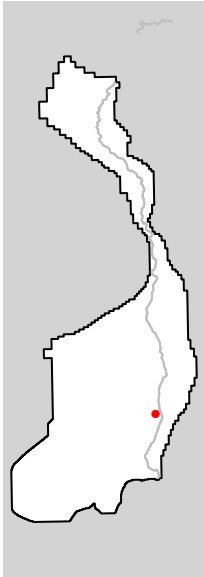
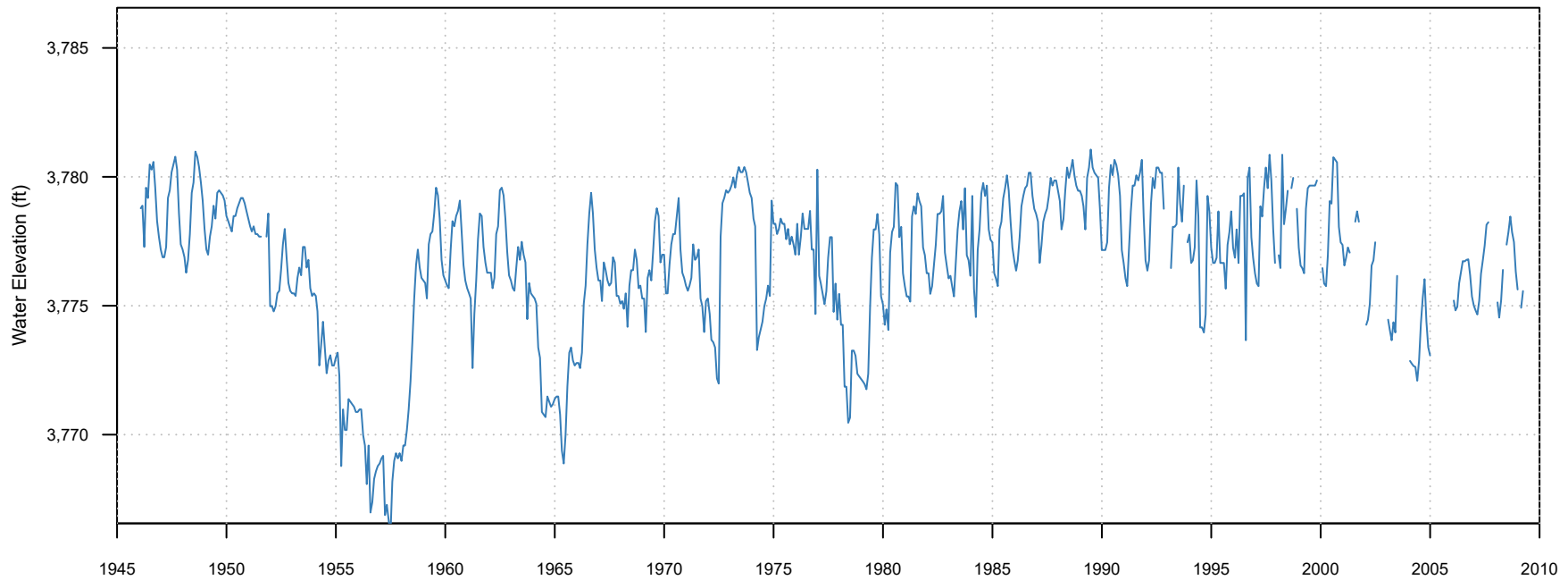
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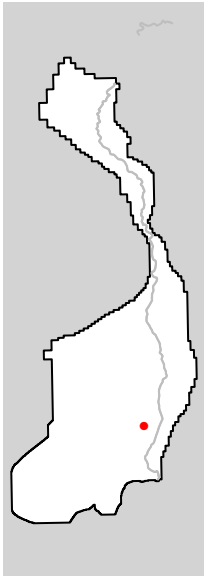
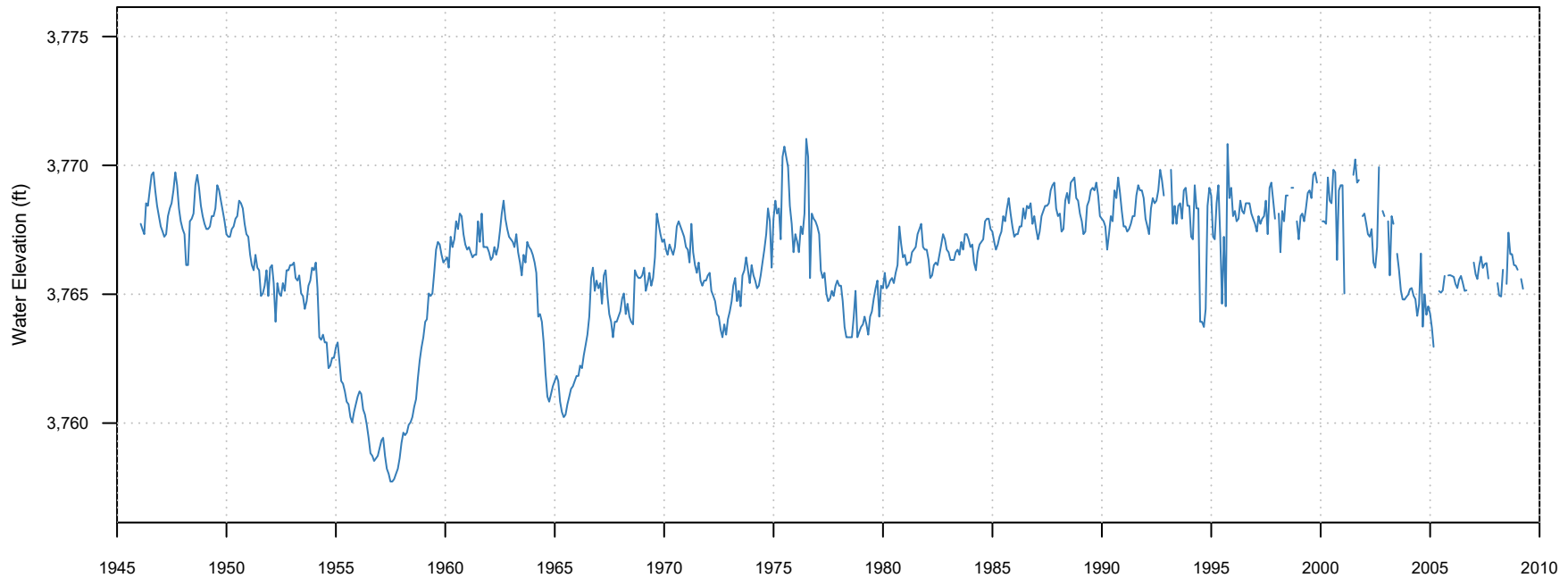
Illustrative Observed Groundwater Level Hydrographs, Rincon and Mesilla Basins*

*Appendix B, Barth Expert Report (9/15/2020)

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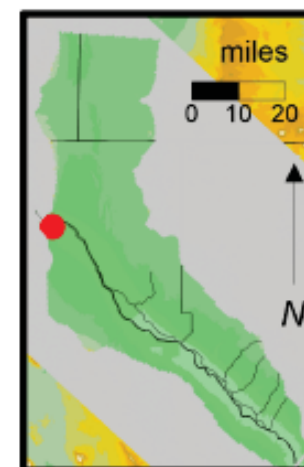
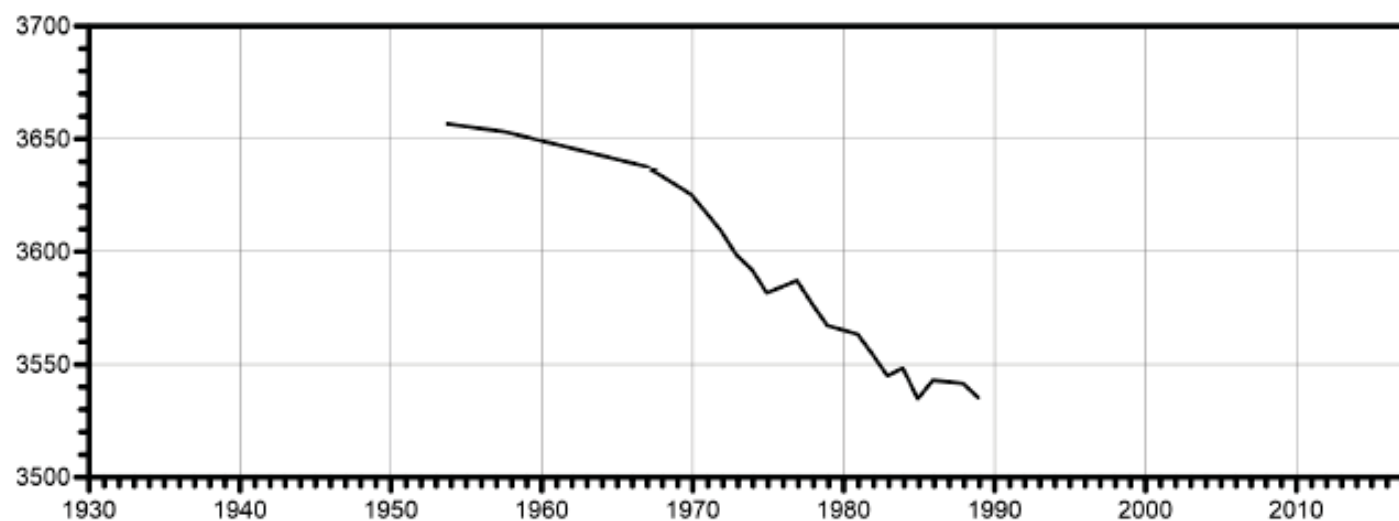
Illustrative Observed Groundwater Level Hydrographs, Rincon and Mesilla Basins*

*Appendix B, Barth Expert Report (9/15/2020)

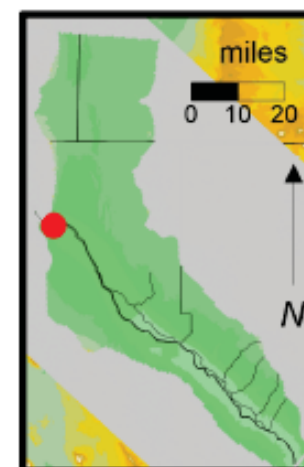
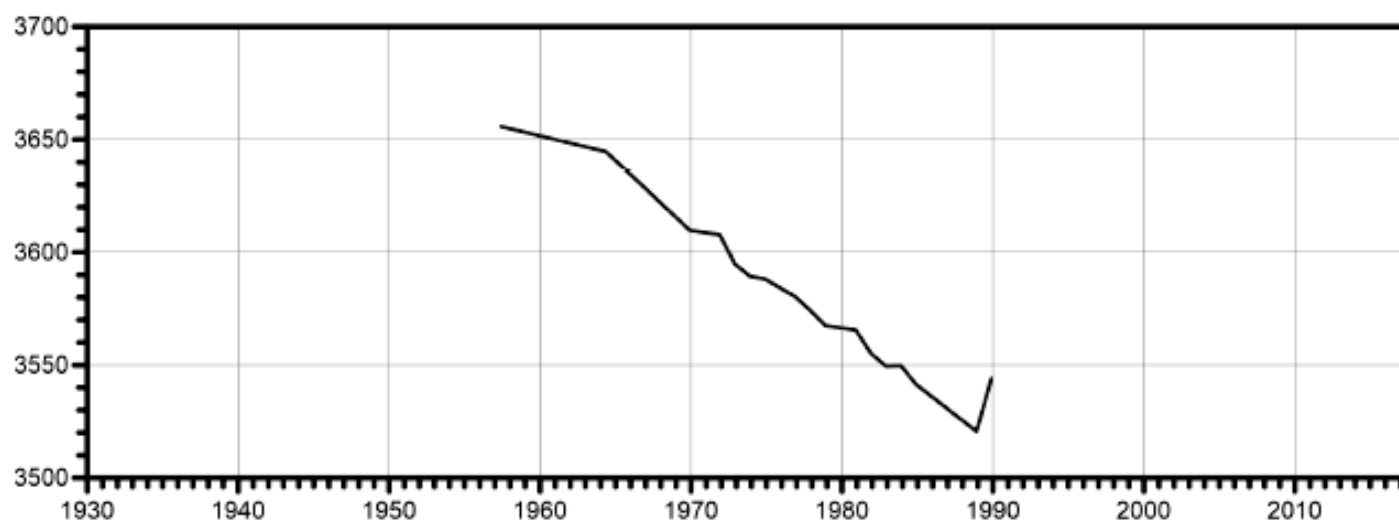
Attachment 2

Illustrative Groundwater Level Hydrographs Hueco Bolson

Hydrograph and location for well JMAS4R

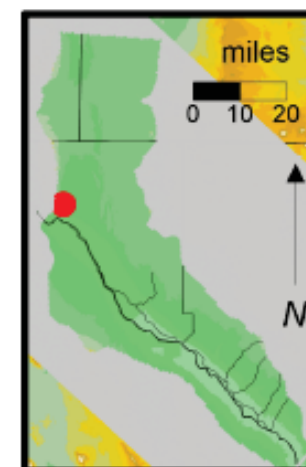
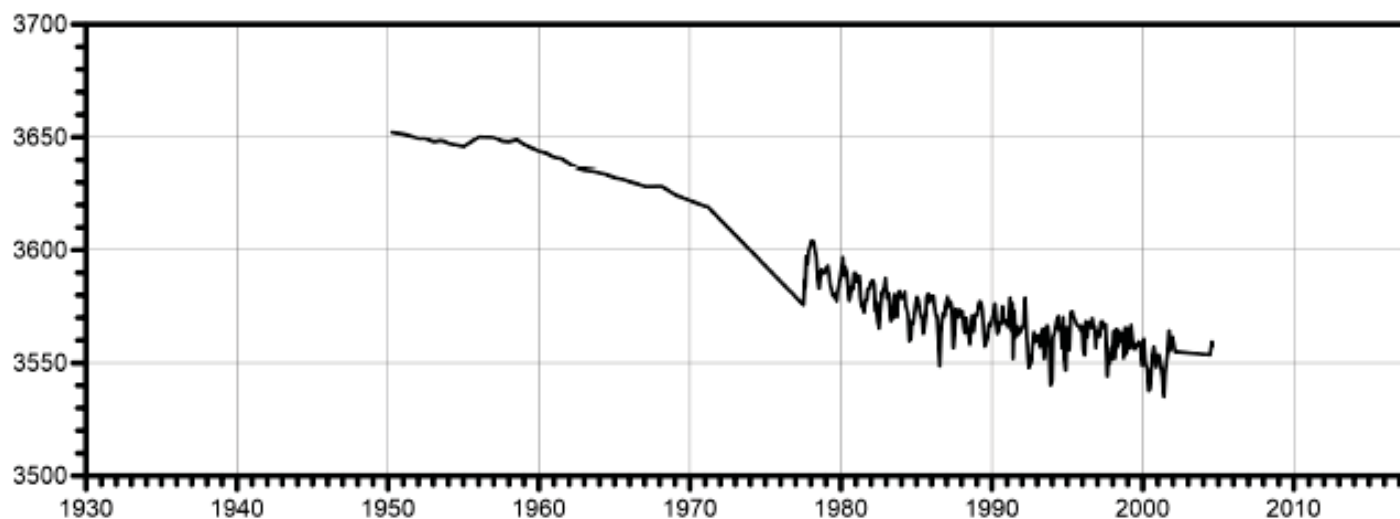


Hydrograph and location for well JMAS10R

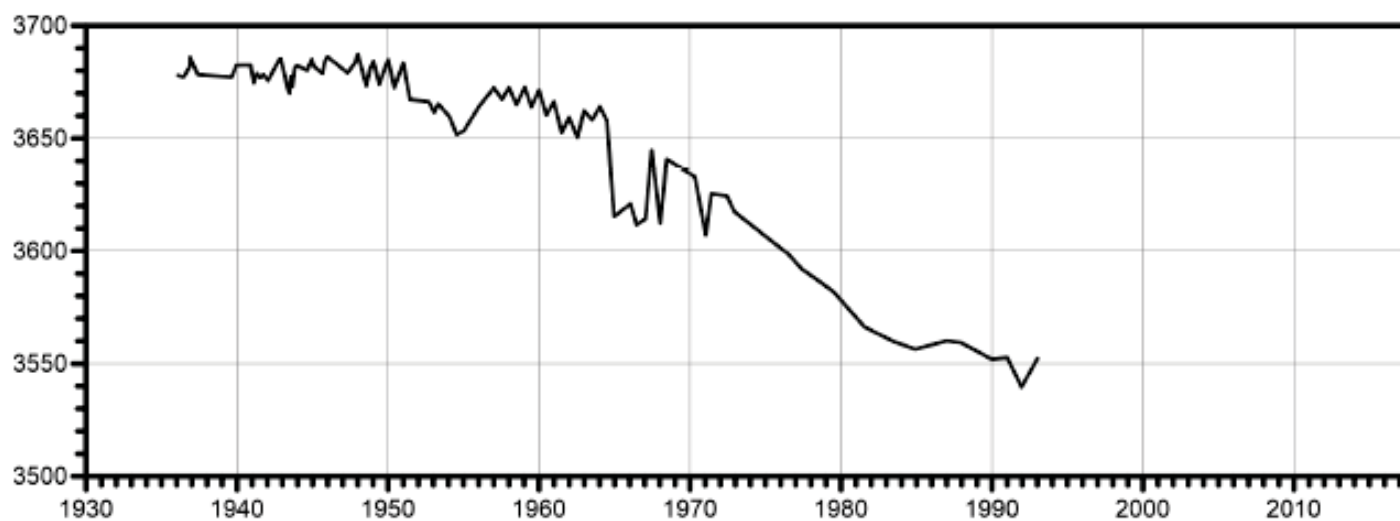


For Data Sources, see Spalding and Morrissey (2020), Appendix E

Hydrograph and location for well 4913506

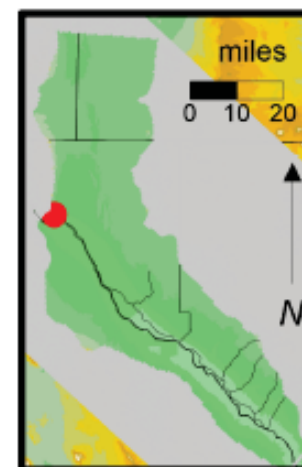
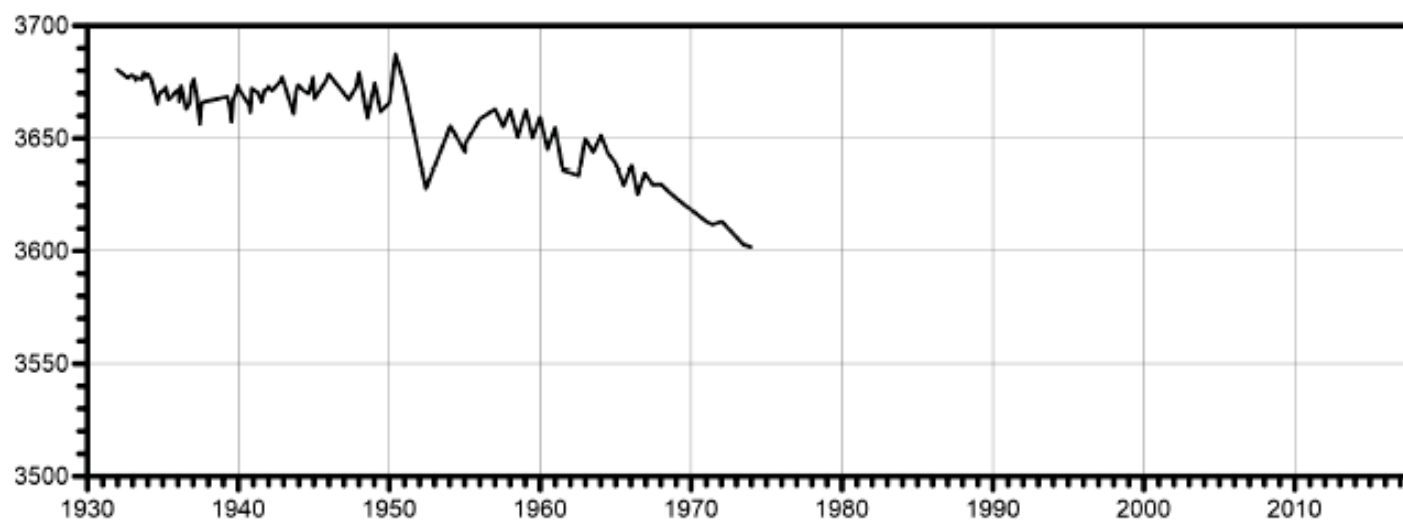


Hydrograph and location for well 4913702

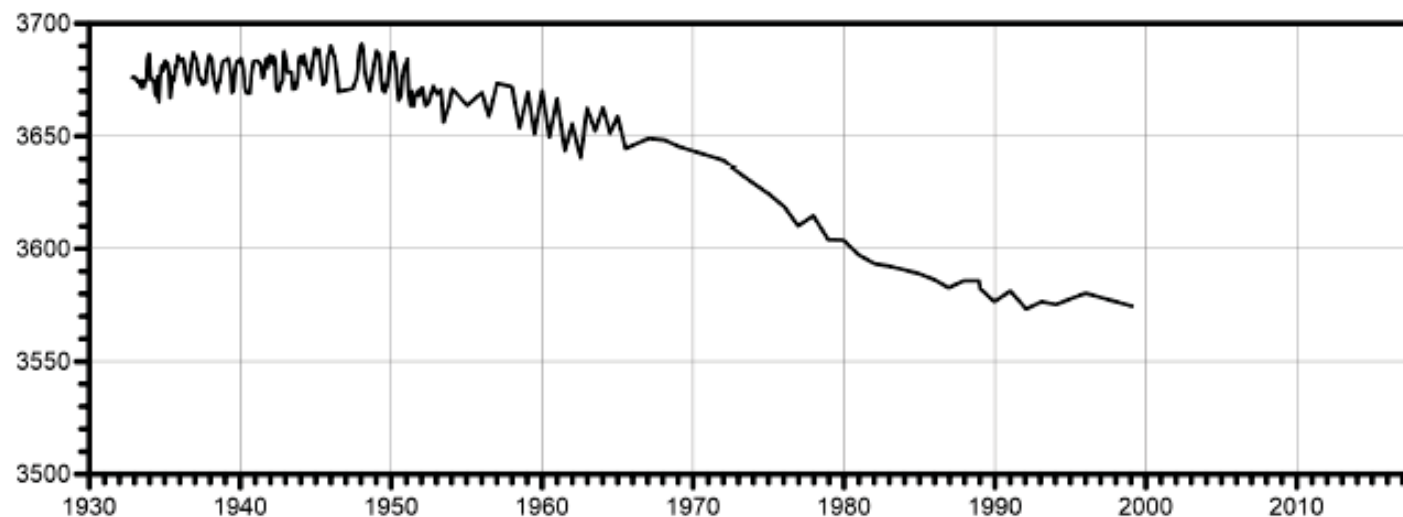


For Data Sources, see Spalding and Morrissey (2020), Appendix E

Hydrograph and location for well 4913801

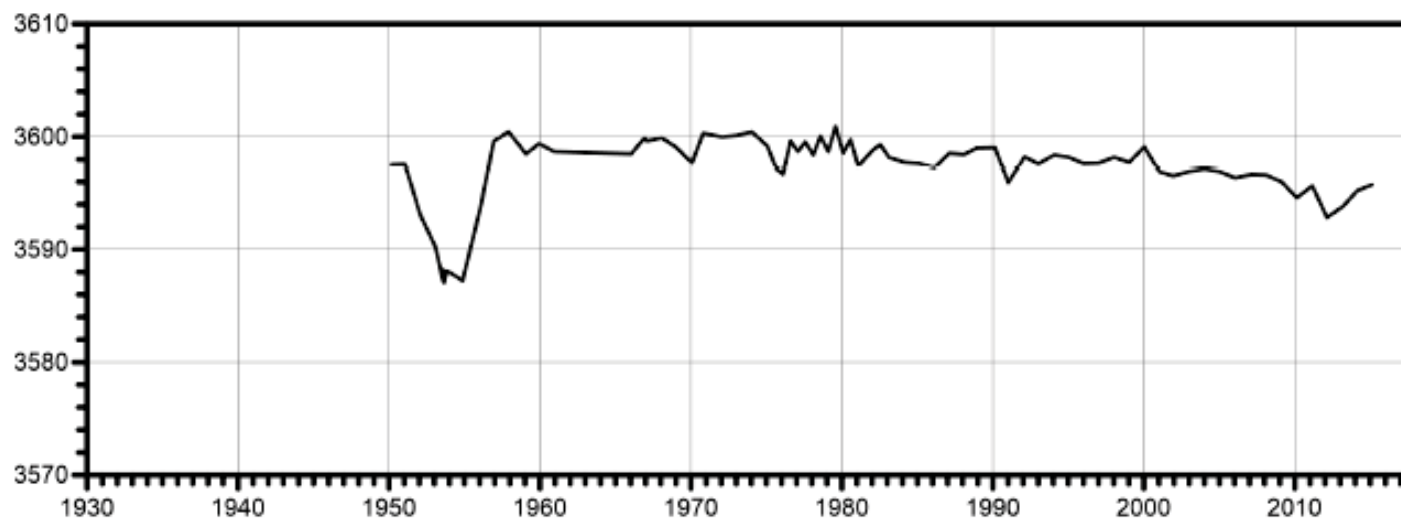


Hydrograph and location for well 4913807

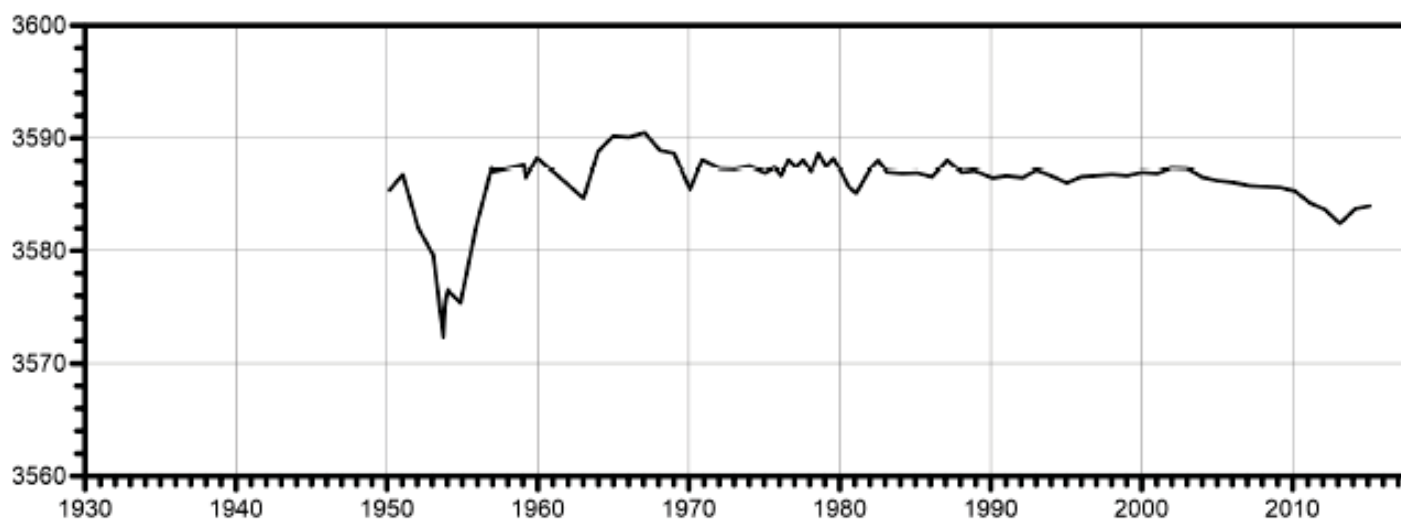


For Data Sources, see Spalding and Morrissey (2020), Appendix E

Hydrograph and location for well 4939204

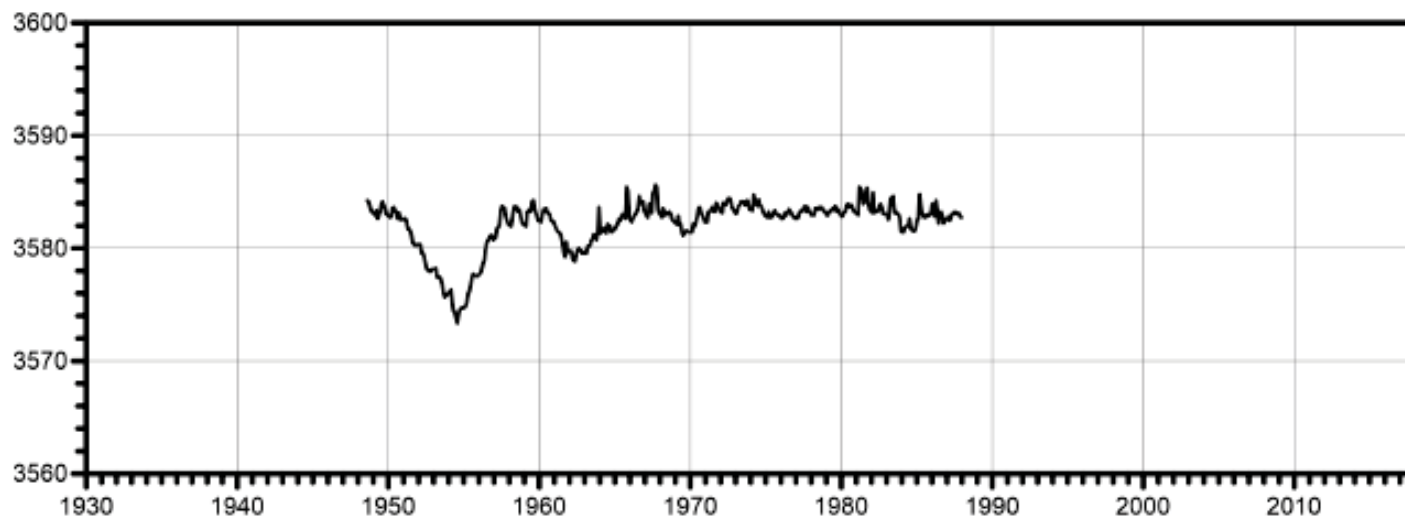


Hydrograph and location for well 4939334

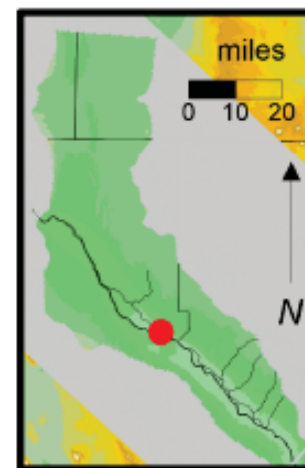
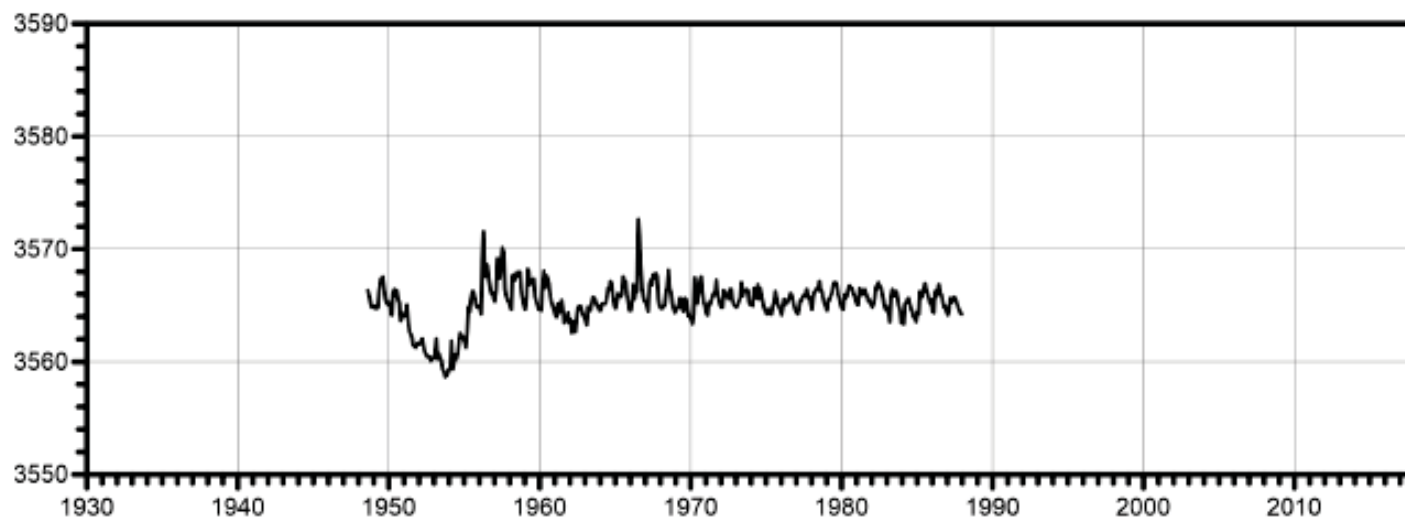


For Data Sources, see Spalding and Morrissey (2020), Appendix E

Hydrograph and location for well 4940103

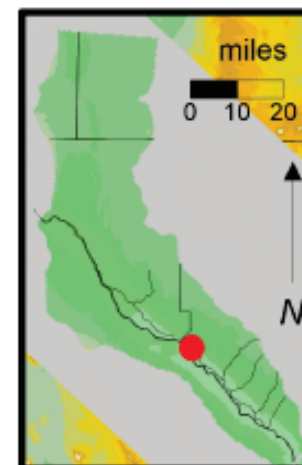
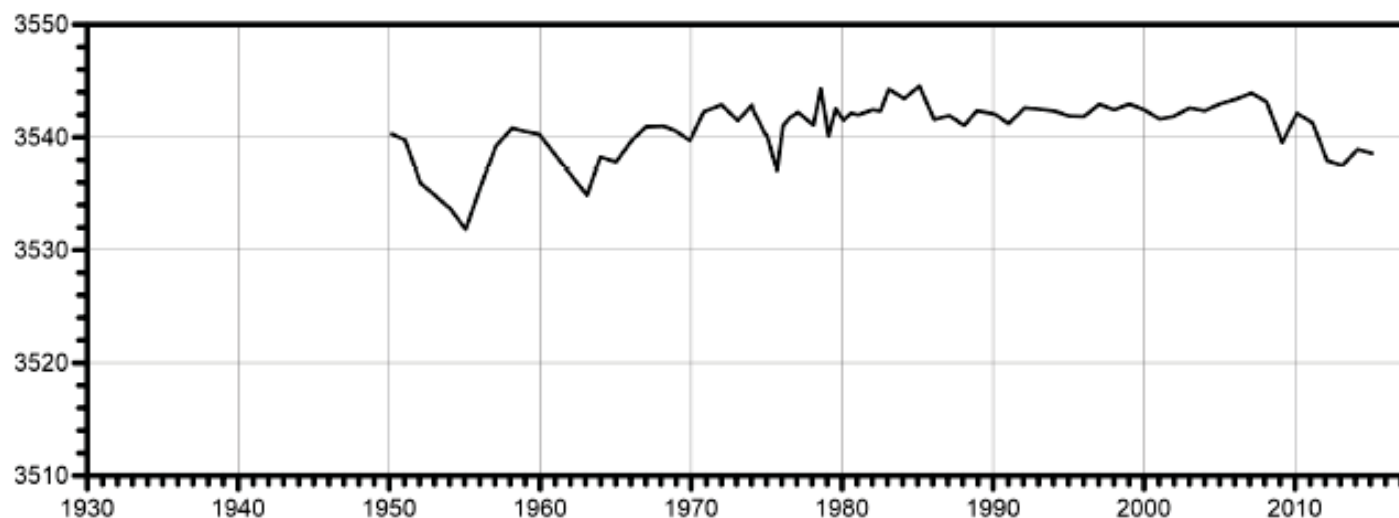


Hydrograph and location for well 4940802

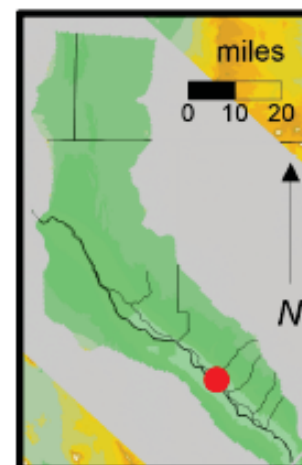
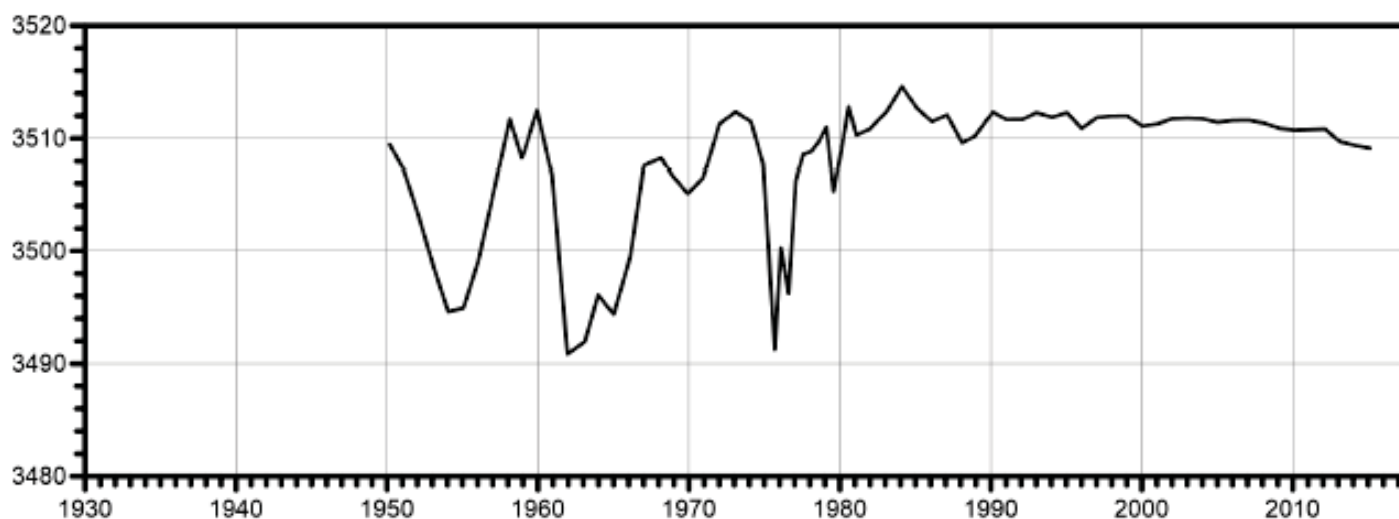


For Data Sources, see Spalding and Morrissey (2020), Appendix E

Hydrograph and location for well 4841202



Hydrograph and location for well 4842701

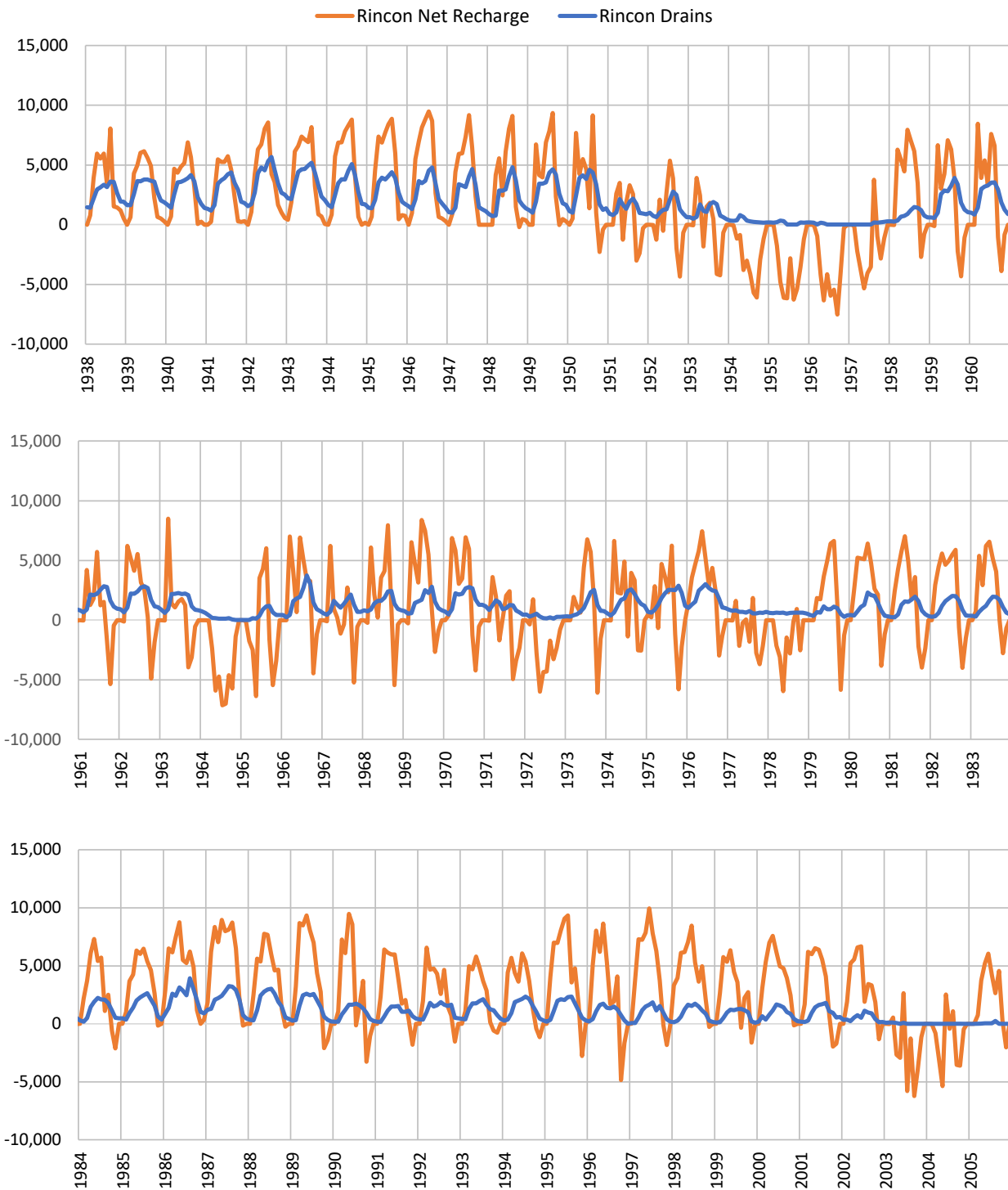


For Data Sources, see Spalding and Morrissey (2020), Appendix E

Attachment 3

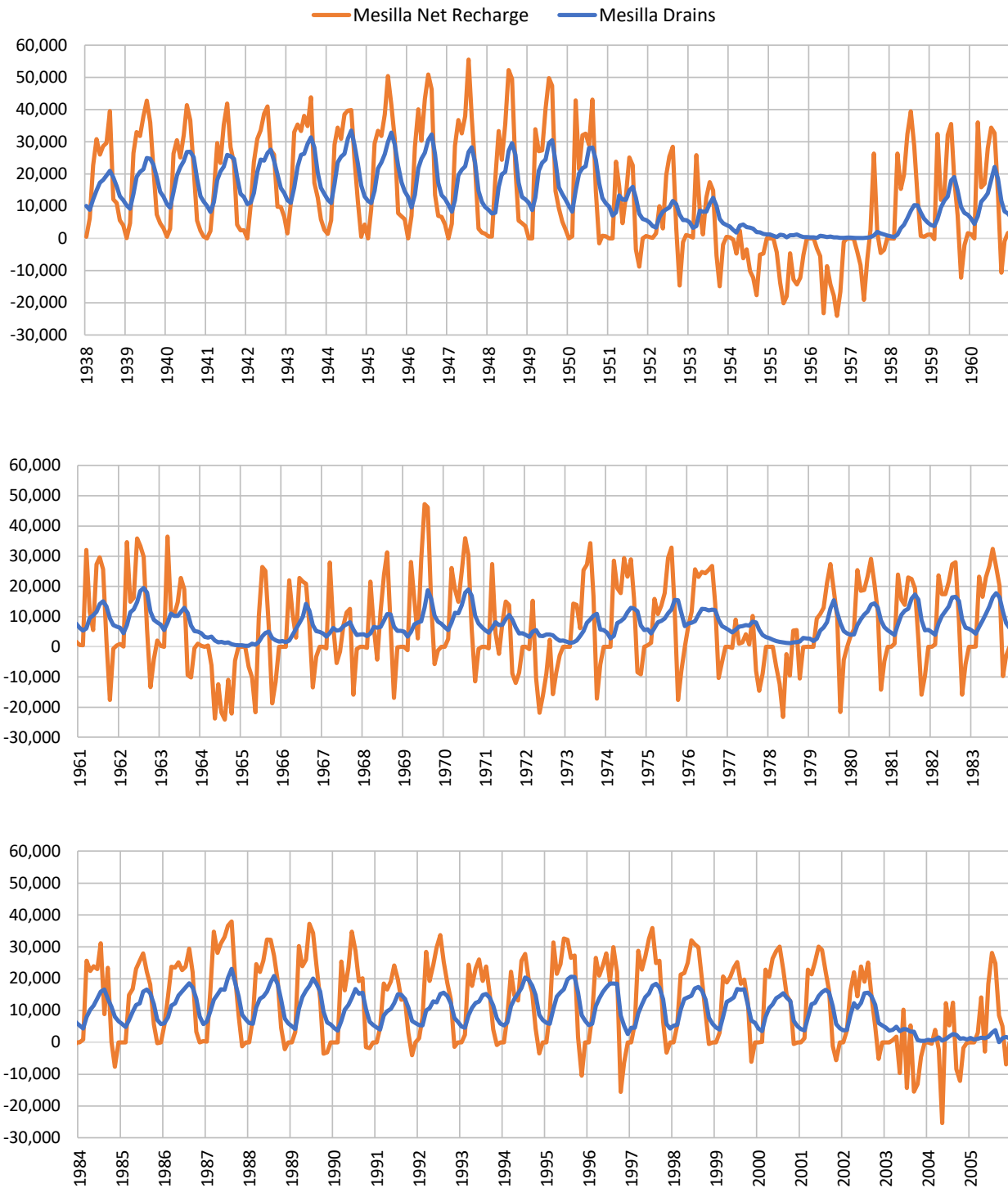
Monthly Net Recharge vs. Drain Flow Rincon Valley and Mesilla Valley

Monthly Net Recharge vs. Drain Flow **Rincon Valley** 1938 - 2005 (acre-feet)



Notes: Net recharge computed as canal seepage + on farm deep percolation minus pumping from the SWE Canal and Farm Budget Model of the Rincon Valley.
 Drain flows are the sum of the reported flows of the Rincon Valley drains.
 Angostrata drain data is unavailable from 1983-2005.
 Rincon drain data is unavailable from 2006-2017.

Monthly Net Recharge vs. Drain Flow **Mesilla Valley** 1938 - 2005 (acre-feet)



Notes: Net recharge computed as canal seepage + on farm deep percolation minus pumping from the SWE Canal and Farm Budget Model of the Leasburg-Mesilla Valley (NM + TX).
 Drain flows are the sum of the reported flows of the Mesilla Valley drains.
 Drain data availability varies by drain.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**DECLARATION OF MARGARET BARROLL, PH.D.
FOR AUTHENTICATION OF MATERIALS**

I, Dr. Margaret (Peggy) Barroll, pursuant to 28 U.S. C. § 1746, hereby declare as follows:

- 1) I am over 18 years of age and have personal knowledge of the facts stated herein.
- 2) I am the same Dr. Margaret Barroll who authored and signed the following:
 - a) Expert Report dated October 31, 2019, submitted to the Special Master as New Mexico exhibit “NM-EX 100” on November 5, 2020;
 - b) Rebuttal Expert Report dated June 15, 2020, submitted to the Special Master as New Mexico exhibit “NM-EX 101” on November 5, 2020;
 - c) Supplemental Rebuttal Expert Report dated July 15, 2020, submitted to the Special Master as New Mexico exhibit “NM-EX 102” on November 5, 2020; and
 - d) Supplemental Rebuttal Expert Report (2nd Edition), dated July 15, 2020, Revised September 15, 2020, submitted to the Special Master as New Mexico exhibit “NM-EX 103” on November 5, 2020.

TX v. NM # 141

New Mexico Exhibit

NM_EX-018

- 3) I confirm and verify that the exhibits listed above are true and correct copies of the reports submitted to all parties to this litigation on the dates indicated.
- 4) I confirm that I authored these reports, and that all parts of the reports were compiled by me or under my direct supervision. The reports are based on my personal, technical, and specialized knowledge and research.
- 5) My background and curriculum vitae establishing my competency as to the issues addressed in my reports and declarations can be found in my October 31, 2019 Expert Report, NM-EX 100, pages 106-111.
- 6) I have been deposed by Texas and the United States five (5) times since September 2019. These depositions explored my competency as an expert, the substance of my expert opinions, and my years of professional involvement in New Mexico hydrology (and specifically Rio Grande hydrology) and Rio Grande Project operations.
- 7) If I am called to testify at trial, my testimony will be consistent with the substance of my reports.
- 8) Texas has specifically challenged my competency to discuss the issues in my first declaration (NM-EX 001) at ¶¶ 15, 16, 17. See Texas Evidentiary Objections, Objection #5. I am competent to testify about the Rio Grande Compact (“Compact”) terminology in ¶¶ 15, 16, and 17 of my November 4, 2020 declaration because my understanding is based on a plain reading of the Compact and associated documents integral to Rio Grande Project operations, and my expert opinions relating to the Project. The concepts addressed in those paragraphs are fundamental to any discussion or analysis of Rio Grande Project operations. In addition to the citations in my declaration, *see, for example*, the following: NM-EX 529, Bureau of Reclamation, Final Environmental Impact Statement using and describing “Project Supply”

at pages 310, 312, 417, “Usable Water” at page 6, “Project Storage” at page 61; *see also* NM-EX 510, 2008 Operating Agreement, describing “Normal Annual Release” at ¶ 1.1, “Project Storage” at ¶ 1.3, “usable water” at ¶ 1.6.

- 9) I created the graphic exhibit NM-EX 118, “Effect of 2008 OA on New Mexico: A Vicious Cycle”, submitted on December 22, 2020, based upon many years of analysis of the impacts of the 2008 Operating Agreement on Project performance. I have publicly discussed the “vicious cycle” and prepared various versions of this graphic since 2010. For example:
- a) NM-EX 100, Barroll Expert Report (Oct. 31, 2019), § 9: Effects of 2008 OA Reduction in EBID Allocation. “This reduction in Diversion Ratio then causes a further reduction in EBID’s allocation under D3 Allocation. In effect, D3 Allocation and the 2008 OA have created a “vicious cycle”, in which the response to reduced Project performance (i.e. reduction in EBID’s allocation) causes further degradation of Project performance.” NM-EX 100, § 9.7, page 78.
 - b) NM-EX 101, Barroll Expert Rebuttal Report (June 15, 2020), § R12: Quantification of D3 Reallocation. “This process is the flip side of the “vicious cycle” I describe in Barroll (2019) Section 9.7, and also the flip side of the “double whammy” and “positive feedback effect” that Dr. King describes in his 2019 rebuttal on page 11 and 12. ***In summary, any improvement to EBID’s Allocation will help start a “virtuous” cycle, in which greater surface water supplies to EBID improve the Project delivery performance, leading to a greater total Project Supply.***” NM-EX 101, §R12, page 47 (emphasis in original). *See also* NM-EX 101, Appx. A, slide 24, identifying the net effect of the 2008 Operating Agreement on EBID and New Mexico as a “vicious cycle.”

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 2, 2021.


Dr. Margaret (Peggy) Barroll, Ph.D.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**DECLARATION OF GILBERT BARTH, Ph.D.
FOR AUTHENTICATION OF EXPERT REPORTS**

I, Gilbert Barth, Ph.D., pursuant to 28 U.S.C. § 1746, hereby declare as follows:

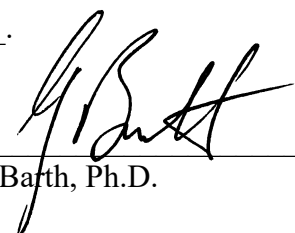
- 1) I am over 18 years of age and have personal knowledge of the facts stated herein.
- 2) I am the same Dr. Gilbert Barth who authored and signed the following:
 - a) Expert Report, Third Edition, dated and produced to all parties on September 15, 2020, portions of which were submitted to the Special Master as New Mexico exhibit “NM-EX 116” on December 22, 2020; and
 - b) Rebuttal Expert Report, Second Edition, co-authored with Steven Larson, dated and produced to all parties on September 15, 2020, portions of which were submitted to the Special Master as New Mexico “NM-EX 127” on December 22, 2020.
- 3) I confirm and verify that the exhibits listed above are true and correct copies of the reports, or portions thereof, originally submitted to all parties to this litigation on the dates indicated.
- 4) I confirm that I authored these reports, along with the co-author identified, and that all parts of the report were compiled under my direct supervision, including but not limited to figures,

tables, attachments, appendices, and supporting materials. The reports are based on my personal, technical, and specialized knowledge and research.

- 5) If I am called to testify at trial, my testimony will be consistent with the contents of my reports.
- 6) My background and curriculum vitae establishing my qualifications as an expert on the issues addressed in my reports and declarations can be found in my September 15, 2020 Expert Report, Third Edition, pages 2-1 to 2-2 and 13-1 to 13-8, and attached hereto.
- 7) I was deposed by Texas and the United States on August 18th, 19th, and October 22nd, 2020. The deposition explored my qualifications as an expert and the substance and reliability of my expert opinions.
- 8) I helped create the graphic exhibit NM-EX 117, “LRG Wells and Groundwater Level Drawdowns”, submitted on December 22, 2020, which is based in part upon the analysis and other information contained in my Rebuttal Expert Report, Second Edition, co-authored with Steven Larson, dated and produced to all parties on September 15, 2020.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 3rd, 2021 at Boulder, Colorado.



Gilbert Barth, Ph.D.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**DECLARATION OF JOHN CARRON, Ph.D.
FOR AUTHENTICATION OF EXPERT REPORT**

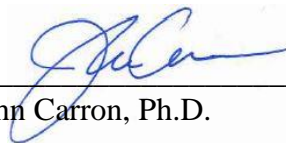
I, John Carron, Ph.D., pursuant to 28 U.S. C. § 1746, hereby declare as follows:

- 1) I am over 18 years of age and have personal knowledge of the facts stated herein.
- 2) I am the same Dr. John Carron who authored and signed the following: Expert Report, Third Edition, co-authored with Steven Setzer, dated and produced to all parties on September 15, 2020, portions of which were submitted to the Special Master as New Mexico exhibit “NM-EX 125” on December 22, 2020.
- 3) I confirm and verify that the exhibit listed above is a true and correct copy of the report, or portions thereof, originally submitted to all parties to this litigation on the date indicated.
- 4) I confirm that I authored this report, along with Steven Setzer, and that all parts of the report were compiled under my direct supervision, including but not limited to figures, tables, attachments, appendices, and supporting materials. The report is based on my personal, technical, and specialized knowledge and research.
- 5) If I am called to testify at trial, my testimony will be consistent with the contents of my report.

- 6) My statement of qualifications and professional resume establishing my qualifications as an expert on the issues addressed in my report can be found in my September 15, 2020 Expert Report, Third Edition, pages 1-2 and Appendix G, and attached hereto.
- 7) I was deposed by Texas and the United States on January 23, 24, and August 24, 2020. The deposition explored my qualifications as an expert and the substance and reliability of my expert opinions.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February _3____, 2021 at Boulder, Colorado



John Carron, Ph.D.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**DECLARATION OF JOHN R. D'ANTONIO, JR.
FOR AUTHENTICATION OF MATERIALS**

I, John R. D'Antonio, Jr., P.E., pursuant to 28 U.S.C. § 1746, hereby declare as follows:

1. I am over 18 years of age and have personal knowledge of the facts stated herein.
2. I am the same John R. D'Antonio, P.E. who submitted two declarations in support of New Mexico's dispositive motions and responses. They were provided as NM-EX 002 (11-04-2020) and NM-EX 007 (12-22-2020). My credentials and background are discussed at NM-EX 002, Declaration of John R. D'Antonio, Jr. at ¶¶ 2-8.¹
3. I have reviewed the documents listed below, which are historic documents included on the State of New Mexico's Exhibit Compendium and referenced within the New Mexico dispositive motions and responses and replies. The documents included in the list below

¹ All exhibits designated "NM-EX" in this Declaration are contained in the State of New Mexico's Exhibit Compendium as provided and updated with dispositive motion briefing on November 5, 2020, December 22, 2020, and February 5, 2021.

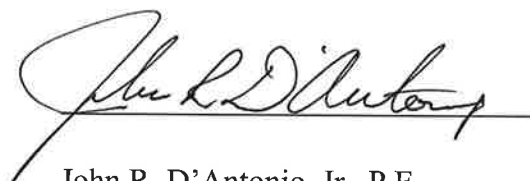
are true and correct copies of documents that I reviewed and/or authored and/or relied upon in the course of my professional duties as State Engineer for the State of New Mexico and/or Rio Grande Compact Commissioner for the State of New Mexico. They have been maintained in my own files, or the general files of the New Mexico Office of the State Engineer. I have, in the course of making statements and providing testimony in this litigation, reasonably relied upon these documents.

NM-EX #	DOCUMENT DESCRIPTION	DATE	BATES NUMBER
413	Resolution of the Rio Grande Compact Commission Concerning Federal Agency Operations of Their Water-Related Facilities on the Rio Grande Compact Accounting	03/25/2004	TX_00292976-77
414	Report of the Engineer Advisers to the Rio Grande Compact Commission	03/04/2005	NM_00016912-930
426	Rio Grande Compact Commission Resolution	1974	CO - 016957 - CO - 016960
427	State Engineer Order #126: In the Matter of State Engineer Special Order No. 126 Declaring the Lower Rio Grande Underground Water Basin in Dona Ana County (LRG Basin Declaration)	09/11/1980	TX_00175935 - TX_00175942
428	State Engineer Order #135: In the Matter of State Engineer Special Order No. 135 Declaring an Extension of the Lower Rio Grande Underground Water Basin in Dona Ana, Grant and Sierra Counties	09/17/1982	NM_00283188 - NM_00283190
429	State Engineer Order #169: In the Matter of the Creation of the Lower Rio Grande Water Master District for the Administration of Rights to the Use of Ground Water From the Lower Rio Grande Groundwater Basin of New Mexico ("Water Master Order")	12/03/2004	NM_00018298 - NM_00018301
430	State Engineer Order #168: In the Matter of the Requirements for Metering Groundwater Withdrawals in the Lower Rio Grande Watermaster District, New Mexico (1 st Metering Order)	12/03/2004	NM_00075344 - NM_00075347
436	State Engineer Order #172: In the Matter of the Requirements for Metering Groundwater Withdrawals in the Lower Rio Grande Water Master District, New Mexico (2 nd Metering Order)	12/20/2005	NM_00018302 - NM_00018306
442	Transcript of Proceedings from 43rd Annual Meeting of the Rio Grande Compact Commission	03/25/1982	NM_00011802-915

501	Report of the Rio Grande Compact Commission 2005	03/23/2006	NM_00005643-82
510	2008 Operating Agreement	03/10/2008	US0108795-818
512 and 516	United States Bureau of Reclamation, Calendar Year 2009 Report to the Rio Grande Compact Commission	2009	EBID 154459, 154526-34
517	Letter from John D'Antonio, State Engineer, State of New Mexico to Michael Connor, Commissioner, United States Bureau of Reclamation	03/04/2010	NM_00253700-11
518	Rio Grande Compact Commission, Transcript of the 72nd Annual Meeting (94th Meeting)	03/30/2011	NM_00016508-669
528	Resolution of the Rio Grande Compact Commission Regarding Temporary Modification of Operations at El Vado Reservoir in New Mexico during April, May, and June 2015	03/24/2015	NM_00433778-79
533	State Engineer Supplemental Order #180: In the Matter of the Requirements for Metering Groundwater Withdrawals in the Lower Rio Grande Watermaster District, New Mexico (Final Metering Order)	03/28/2007	NM_00077646 - NM_00077648
538	Proposed Rules and Regulations Providing for Active Water Resources Administration of the Waters of the Lower Rio Grande Water Master District - First Public Draft	06/28/2006	NM_00075441 - NM_00075500
539	Proposed Rules and Regulations Providing for Active Water Resources Administration of the Waters of the Lower Rio Grande Water Master District - Second Public Draft released by the Office of the State Engineer	11/14/2006	NM_00075708 - NM_00075783
540	Office of the State Engineer, Lower Rio Grande Water Master Annual Report 2018 Accounting Year	09/04/2019	NM_00467431 - NM_00467457
545	<i>In the Matter of the Permit of the City of Eunice, NM to Transport Water for Use Outside the State of New Mexico-LEA County Underground Water Basin; Permit No. L-4920, Amended Authorization to Transport Water for Use Outside New Mexico</i>	08/30/2011	No Bates

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 2nd, 2021



John R. D'Antonio, Jr., P.E.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**DECLARATION OF STEVEN LARSON
FOR AUTHENTICATION OF EXPERT REPORT**

I, Steven Larson, pursuant to 28 U.S.C. § 1746, hereby declare as follows:

- 1) I am over 18 years of age and have personal knowledge of the facts stated herein.
- 2) I am the same Steven Larson who authored and signed the following: Rebuttal Expert Report, Second Edition, co-authored with Dr. Gilbert Barth, dated and produced to all parties on September 15, 2020, a portion of which was submitted to the Special Master as New Mexico exhibit "NM-EX 127" on December 22, 2020.
- 3) I confirm and verify that the exhibit listed above is a true and correct copy of the report, or portions thereof, originally submitted to all parties to this litigation on the dates indicated.
- 4) I confirm that I co-authored this report, along with Dr. Gilbert Barth, and that all parts of the report were compiled under his direct supervision, including but not limited to figures, tables, attachments, appendices, and supporting materials. The report is based on our personal, technical, and specialized knowledge and research.

TX v. NM # 141

New Mexico Exhibit

NM_EX-022

- 5) If I am called to testify at trial, my testimony will be consistent with the contents of the report.
- 6) My background and curriculum vitae establishing my qualifications as an expert on the issues addressed in my report can be found in Technical Appendix E to my September 15, 2020 Rebuttal Report, Second Edition, and attached hereto.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 3, 2021 at Reston, Virginia


Steven Larson

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**DECLARATION OF ESTEVAN R. LOPEZ, P.E.
FOR AUTHENTICATION OF MATERIALS**

I, Estevan R. Lopez, P.E., pursuant to 28 U.S. C. § 1746, hereby declare as follows:

- 1) I am over 18 years of age and have personal knowledge of the facts stated herein.
- 2) I am the same Estevan R. Lopez who authored and signed the following:
 - a) Expert Report dated October 31, 2019, submitted to the Special Master as New Mexico exhibit "NM-EX 107" on November 5, 2020 (note: the appendices to my Expert Report inadvertently not included on November 5 are now submitted as NM-EX 107A);
 - b) Rebuttal Report dated June 15, 2020, submitted to the Special Master as New Mexico exhibit "NM-EX 108" on November 5, 2020;
 - c) Supplemental Rebuttal Report dated July 15, 2020, submitted to the Special Master as New Mexico exhibit "NM-EX 109" on November 5, 2020; and
 - d) Supplemental Rebuttal Report (2nd Edition), dated September 15, 2020, submitted to the Special Master as New Mexico exhibit "NM-EX 110" on November 5, 2020.

- 3) I confirm and verify the exhibits listed above are true and correct copies of the reports originally submitted to all parties to this litigation on the dates indicated.
- 4) I confirm that I authored these reports, that all parts of the reports were compiled by me or under my direct supervision. The reports are based on my personal, technical, and specialized knowledge and research.
- 5) My background and curriculum vitae establishing my competency as to the issues addressed in my reports and declarations can be found in my October 31, 2019 Expert Report, NM-EX 107, pages 1-4 and NM-EX 107A, Appx. 1.
- 6) I have been deposed by Texas and the United States six (6) times since May 2019. These depositions explored my competency as an expert, the substance of my expert opinions, and my years of professional involvement in water administration and management, compact administration in New Mexico, and water policy, administration and management in the western United States. As I testified, I do not claim to have expertise as a historian. As the Director for the New Mexico Interstate Stream Commission (“ISC”) and the Commissioner of the Bureau of Reclamation, “I routinely reviewed historic precedent of things and background to understand the context in which I was working. That’s common for a water administrator.” NM-EX 263, Lopez Dep. (2-26-2020), 10:18-25. Further, I do not purport to express legal opinions; my opinions are from the perspective of a water manager and administrator. In my water administrator positions it was not unusual for me to review legal documents and become familiar with their requirements; that was particularly important as ISC Director and dealing with administration of the compacts under my purview. *See id.* at 11:7-12:5.

- 7) Texas has specifically objected to my competency to discuss the issues in my first declaration (NM-EX 003) at ¶¶ 4, 7, 12-15, 17, 19-28. *See* Texas Evidentiary Objections, Objection #6. I will address these challenges in turn:
- a) ¶¶ 4, 7 – these paragraphs address my roles and duties as Commissioner for the United States Bureau of Reclamation and as Director of the ISC, and are based on my personal knowledge and experience. Texas’s challenge to this information is unclear.
 - b) ¶ 12 – this is a direct quote from the Rio Grande Compact (“Compact”).
 - c) ¶¶ 13-15 – these paragraphs are based on my personal knowledge and experience as the New Mexico Engineer Advisor to the Rio Grande Compact Commission (“RGCC”) and as the Director of the ISC deeply involved in Compact issues. They also contain direct quotes from official RGCC documents. Texas’s challenge to this information is unclear.
 - d) ¶ 17 – this paragraph relates to the historic position of New Mexico as to the 57/43 division of Rio Grande Project water supply. I have personal knowledge of this fact. Texas’s challenge to this information is unclear.
 - e) ¶¶ 19-28 – these paragraphs are summaries of information presented in my four (4) expert reports. (*See* ¶¶ 2-3 and 5-6 of this declaration, above.)
- 8) I understand Texas denies that the notes depicted in NM-EX 519 were “talking points that represented Texas’s position on the Rio Grande Compact” at the May 2011 meeting between representatives of Texas and New Mexico. In fact, they were. I briefly described the meeting and the use of the notes in my Declaration submitted on November 5, 2020, at ¶ 18. I have specific recollection of this meeting and the notes on an easel. NM-EX 519 is a true and correct copy of those notes. Additionally, in light of Patrick Gordon’s denials about these notes, the substance of the May 2011 meeting, and his current position that the Compact does

not incorporate the Project, I went through old notebooks and found my contemporaneous notes from that meeting. NM-EX 552, Lopez notes from "5-9-2011 Mtg w/ TX." I confirm that these notes are a true and correct copy of the notes I jotted down at the referenced meeting and accurately reflect what occurred, although briefly. These notes substantiate my memory.

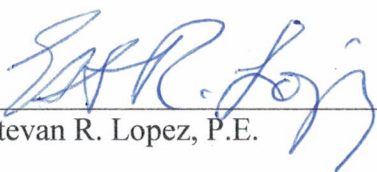
- a) At the May 2011 meeting in El Paso, the notes on an easel were used by the Texas representatives as talking points during the meeting; the red text was added during the meeting. At some point during or after the meeting, Rolf Schmidt-Petersen took a photo of them. I do not know who wrote the notes and have not stated that Pat Gordon wrote the notes.
- b) The meeting was intended to discuss New Mexico's concerns with the 2008 Operating Agreement. *See* NM-EX 552, Lopez notes from "5-9-2011 Mtg w/ TX." Texas representatives were Pat Gordon, Texas Rio Grande Compact Commissioner; Herman Settemeyer, Engineer Advisor to the Texas Rio Grande Compact Commissioner; Carlos Rubenstein, a Commissioner of the Texas Commission on Environmental Quality ("TCEQ"); and Curtis Seaton, Executive Assistant to Commissioner, TCEQ. New Mexico representatives were John D'Antonio, New Mexico State Engineer and New Mexico Rio Grande Compact Commissioner; Rolf Schmidt-Petersen, Engineer Advisor to the New Mexico Rio Grande Compact Commissioner; and me, then Director of the New Mexico Interstate Stream Commission. That is, the primary Compact representatives from New Mexico and Texas were in attendance.
- c) The Texans used the notes on the easel as talking points to explain why Texas felt compelled to make an adjustment to Project deliveries. Among the issues discussed, Pat

Gordon specifically discussed “what did TX get under the Compact.” *Id.* He stated: “[The] Intent [of the 2008 Operating Agreement] was not to reallocate Compact water it was only an agreement to reallocate Project water”. *Id.* Gordon also stated his belief that “Total Pumping in NM from EB [Elephant Butte] to SL [state line] average 80K AF”. *Id.* Herman Settemeyer stated they wanted to “Agree on an equity point for TX deliveries.” *Id.*

- d) As in every such conversation about Project operations with Texas in which I was involved, New Mexico confirmed it was willing to discuss all Project issues if Texas would discuss the impacts to the Project of Texas actions in the El Paso Valley.
 - e) When we returned to New Mexico and debriefed about the Texas meeting with others, we used the photos taken by Rolf Schmidt-Petersen (NM-EX 519) to discuss the Texas positions as reflected in the notes and as discussed by the Texas representatives at the meeting, including Pat Gordon.
 - f) As I stated in my earlier declaration, Texas expressed its position that the Compact apportions the water below Elephant Butte between New Mexico and Texas “based on [Project] acreage” existing in each State. Texas further explained its position that under the Compact, the State of Texas is entitled to 43% of Project supply and the State of New Mexico is entitled to 57% of Project supply.
- 9) If I am called to testify at trial, my testimony will be consistent with the substance of my reports and declarations.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 4, 2021.



Estevan R. Lopez, P.E.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**DECLARATION OF DANIEL MORRISSEY, P.G.
FOR AUTHENTICATION OF EXPERT REPORT**

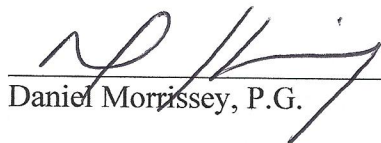
I, Daniel Morrissey, P.G., pursuant to 28 U.S. C. § 1746, hereby declare as follows:

- 1) I am over 18 years of age and have personal knowledge of the facts stated herein.
- 2) I am the same Daniel Morrissey who authored and signed the following: Expert Report, Third Edition, co-authored with Charles Spalding, dated September 14, 2020 and produced to all parties on September 15, 2020, portions of which were submitted to the Special Master as New Mexico exhibit "NM-EX 121" on December 22, 2020. Note that New Mexico's Supplemental Exhibit Compendium Index, filed December 22, 2020, incorrectly listed my Expert Report as "Expert Report/Rebuttal" and incorrectly dated my expert report July 15, 2020, whereas the correct title is Expert Report, Third Edition and the correct date is September 14, 2020. Also note that NM-EX 121 inadvertently contained an outdated version of Figure 5.4. The correct Figure 5.4 is submitted contemporaneously as NM-EX 121A.
- 3) I confirm and verify that the exhibit listed above is a true and correct copy of the report, or portions thereof, originally submitted to all parties to this litigation on the date indicated.

- 4) I confirm that I authored this report, along with Charles Spalding, and that all parts of the report were compiled under my direct supervision, including but not limited to figures, tables, attachments, appendices, and supporting materials. The report is based on my personal, technical, and specialized knowledge and research.
- 5) If I am called to testify at trial, my testimony will be consistent with the contents of my report.
- 6) My statement of qualifications establishing my qualifications as an expert on the issues addressed in my report can be found in my Expert Report, Third Edition dated September 14, 2020, at pages 18-19, and in the expert report at Appendix A, and attached hereto.
- 7) I was deposed by Texas and the United States on December 9 and 10, 2019 and on August 20, 2020. The deposition explored my qualifications as an expert and the substance and reliability of my expert opinions.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 3, 2021 at Hopkinton, New Hampshire


Daniel Morrissey, P.G.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**DECLARATION OF STEVEN SETZER, P.E.
FOR AUTHENTICATION OF EXPERT REPORT**

I, Steven Setzer, P.E., pursuant to 28 U.S. C. § 1746, hereby declare as follows:

- 1) I am over 18 years of age and have personal knowledge of the facts stated herein.
- 2) I am the same Steven Setzer who authored and signed the following: Expert Report, Third Edition, co-authored with John Carron, dated and produced to all parties on September 15, 2020, portions of which were submitted to the Special Master as New Mexico exhibit "NM-EX 125" on December 22, 2020.
- 3) I confirm and verify that the exhibit listed above is a true and correct copy of this report, or portions thereof, originally submitted to all parties to this litigation on the date indicated.
- 4) I confirm that I authored this report, along with Dr. John Carron, and that all parts of the report were compiled under my direct supervision, including but not limited to figures, tables, attachments, appendices, and supporting materials. The report is based on my personal, technical, and specialized knowledge and research.
- 5) If I am called to testify at trial, my testimony will be consistent with the contents of my report.

- 6) My statement of qualifications and professional resume establishing my qualifications as an expert on the issues addressed in my report can be found in my September 15, 2020 Expert Report, Third Edition, pages 2-3 and Appendix G, and attached hereto.
- 7) I was deposed by Texas and the United States on January 22, 23, August 27, and October 22, 2020. The deposition explored my qualifications as an expert and the substance and reliability of my expert opinions.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 3rd, 2021 at Lafayette, CO



Steven Setzer, P.E.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**DECLARATION OF CHARLES SPALDING, P.G.
FOR AUTHENTICATION OF EXPERT REPORT**

I, Charles Spalding, P.G., pursuant to 28 U.S. C. § 1746, hereby declare as follows:

- 1) I am over 18 years of age and have personal knowledge of the facts stated herein.
- 2) I am the same Charles Spalding who authored and signed the following: Expert Report, Third Edition, co-authored with Daniel Morrissey, dated September 14, 2020 and produced to all parties on September 15, 2020, portions of which were submitted to the Special Master as New Mexico exhibit "NM-EX 121" on December 22, 2020. Note that New Mexico's Supplemental Exhibit Compendium Index, filed December 22, 2020, incorrectly listed my Expert Report as "Expert Report/Rebuttal" and incorrectly dated my expert report July 15, 2020, whereas the correct title is Expert Report, Third Edition and the correct date is September 14, 2020. Also note that NM-EX 121 inadvertently contained an outdated version of Figure 5.4. The correct Figure 5.4 is submitted contemporaneously as NM-EX 121A.
- 3) I confirm and verify that the exhibit listed above is a true and correct copy of the report, or portions thereof, originally submitted to all parties to this litigation on the date indicated.

- 4) I confirm that I authored this report, along with Daniel Morrissey, and that all parts of the report were compiled under my direct supervision, including but not limited to figures, tables, attachments, appendices, and supporting materials. The report is based on my personal, technical, and specialized knowledge and research.
- 5) If I am called to testify at trial, my testimony will be consistent with the contents of my report.
- 6) My statement of qualifications establishing my qualifications as an expert on the issues addressed in my report can be found in my Expert Report, Third Edition dated September 14, 2020, at pages 17-18, and my resume is included in the expert report Appendix A attached hereto.
- 7) I was deposed by Texas and the United States on August 11, 12, and October 22, 2020. The deposition explored my qualifications as an expert and the substance and reliability of my expert opinions.
- 8) I helped create the graphic exhibit NM-EX 117, "LRG Wells and Groundwater Level Drawdowns", submitted on December 22, 2020, based upon the analysis and other information contained in my Expert Report, Third Edition, co-authored with Daniel Morrissey, dated September 14, 2020 and produced to all parties on September 15, 2020.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 3, 2021 at Hopkinton, NH



Charles Spalding, P.G.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**DECLARATION OF JENNIFER STEVENS, Ph.D.
FOR AUTHENTICATION OF MATERIALS**

I, Jennifer Stevens, Ph.D., pursuant to 28 U.S. C. § 1746, hereby declare as follows:

- 1) I am over 18 years of age and have personal knowledge of the facts stated herein.
- 2) I am the same Dr. Jennifer Stevens who authored and signed the following:
 - a) My expert report entitled “The History of Interstate Water Use on the Rio Grande: 1890-1955”, dated October 28, 2019 (produced to all parties on October 31, 2019), submitted to the Special Master as New Mexico exhibit “NM-EX 112” on November 5, 2020; and
 - b) My Rebuttal Report dated and produced to all parties on June 15, 2020, submitted to the Special Master as New Mexico exhibit “NM-EX 113” on November 5, 2020.
- 3) I confirm and verify that the exhibits listed above are true and correct copies of the reports originally submitted to all parties to this litigation on the dates indicated.
- 4) I confirm that I authored these reports, and that all parts of the reports were compiled by me or under my direct supervision. The reports are based on my personal, technical, and specialized knowledge and research.

- 5) My background and curriculum vitae establishing my competency as to the issues addressed in my reports and declarations can be found in my October 28, 2019 Expert Report, NM-EX 112, pages 7-10, and in in my first declaration, NM-EX 005, at ¶¶ 2-6.
- 6) I was deposed by Texas and the United States on July 27, 2020. The deposition explored my competency as an expert and the substance and reliability of my expert opinions.
- 7) If I am called to testify at trial, my testimony will be consistent with the substance of my reports.
- 8) I have reviewed the documents listed below, which are historic primary documents included on the State of New Mexico's Exhibit Compendium and referenced within the New Mexico dispositive motions and responses and replies. The documents listed as exhibits NM-EX 332- NM-EX 353¹ are documents that I reviewed in the course of my historical research that, in my opinion, are appropriate primary documents for the purposes of historical research and were located in appropriate locations to assure their legitimacy. I have, in the course of reaching my conclusions in this matter, reasonably relied upon such primary documents to complete my historical research.

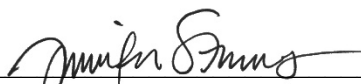
NM-EX #	DOCUMENT DESCRIPTION	DATE	BATES NUMBER
332	John J. Vernon and Francis E. Lester, <i>Pumping for Irrigation from Wells</i> , Bulletin No. 45, State College, N.M.: New Mexico College of Agriculture and Mechanic Arts, Agricultural Experiment Station, April 1903	1903	NM_00151688 - NM_00151754
333	E.P. Osgood, <i>Comments on Compact Negotiations</i> (undated, c. 1929)	1929	NM_00101878 - NM_00101886
334	Rio Grande Project Histories (Water Announcements), Bureau of Reclamation	1946-1950	Various NM bates numbers.
335	Rio Grande Project Histories (Future Work), Bureau of Reclamation	1950	NM_00029079 – NM_00029080
337	Exhibit Omitted		

¹ Excepting document 350.

336	Willis T. Lee, <i>Water Resources of the Rio Grande Valley in New Mexico</i>	1907	NM_00180395 – NM_00180467
338	<i>Rio Grande Compact</i> by Francis W. Wilson, Compact Commissioner	1929	NM_00118535 – NM_00118546
339	Letter from J.W. Taylor, President and Manager, to Mr. D.C. Henny, February 7, 1927	02/07/1927	NM_00117911- 7912
340	E.P. Osgood, <i>Preliminary Report Upon the Use, Control & Disposition of the Rio Grande and Its Tributaries Above Fort Quitman, Texas</i> , March 31, 1928.	03/31/1928	NM_00118318 - NM_00118334
341	Raymond A. Hill to Mr. Clayton, Memorandum In re Meeting of Committee of Engineers, at Santa Fe, November 22 to 24, 1937, November 26, 1937	11/22- 24/1937	TX_00002921- 2924
342	Charles S. Slichter, <i>Observations on the Ground Waters of Rio Grande Valley</i> , U.S. Geological Survey Water-Supply and Irrigation Paper No. 141 (Washington, D.C.: Government Printing Office, 1905)	1905	NM_00166701 - NM_00166788
343	C.S. Conover, <i>Preliminary Memorandum on Groundwater Supplies for Elephant Butte Irrigation District, New Mexico</i> , September 1947	1947	NM_00154110 - NM_00154137
344	1929 (Temporary) Rio Grande Compact	02/12/1929	NM_00464042 – NM_00464057
345	Letter from Raymond A. Hill, Engineer Advisor, State of Texas, to Frank B. Clayton, Rio Grande Compact Commissioner, State of Texas (Jan. 27, 1936)	01/27/1936	US0186530-35
346	Letter from Frank B. Clayton, Rio Grande Compact Commissioner, State of Texas, to National Resources Committee	02/01/1936	NM_00056304- 11
347	E.L. Barrows, <i>Report of Seepage Study on Rio Grande Between Elephant Butte Dam and Leasburg Dam</i>	11/26- 28/1928	NM_00112806- 13
348	D.C. Henny, Board of Engineers, report to Bureau of Reclamation: <i>Rio Grande Project, Report on Water Supply and Project Area High Line Canal Construction Power Development and City Water Supplies</i>	11/1919	NM_00103166- 305
349	Harold Conkling, Extract of report to Bureau of Reclamation: <i>Water Supply of the Rio Grande River (extract)</i>	06/18/1919	TX_00182093- 135
351	W.F. Resch, Bureau of Reclamation, <i>Statement of Water Supply</i>	06/20/1950	US0183515
352	1939-1940 - First and Second Annual Report of the Rio Grande Compact Commission (Compact Rules)	1939- 1940	NM_00003841; NM_00003849 - NM_00003851
353	Letter from Sawnie B. Smith to Frank B. Clayton	9/29/38	No bates

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 03, 2021



 Jennifer Stevens, Ph.D.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**DECLARATION OF GREGORY K. SULLIVAN, P.E.
FOR AUTHENTICATION OF EXPERT REPORTS**

I, Gregory K. Sullivan, P.E., pursuant to 28 U.S.C. § 1746, hereby declare as follows:


- 1) I am over 18 years of age and have personal knowledge of the facts stated herein.
- 2) I am the same Greg Sullivan who authored and signed the following:
 - a) Expert Report, Second Edition, co-authored with Heidi Welsh, dated and produced to all parties on July 15, 2020, submitted to the Special Master as New Mexico exhibit "NM-EX 122" on December 22, 2020; and
 - b) Rebuttal Expert Report, Second Edition, co-authored with Heidi Welsh, dated and produced to all parties on September 15, 2020, submitted to the Special Master as New Mexico exhibit "NM-EX 123" on December 22, 2020.
- 3) I confirm and verify that the exhibits listed above are true and correct copies of the reports originally submitted to all parties to this litigation on the date indicated.
- 4) I confirm that I authored these reports, along with Heidi Welsh, and that all parts of the report were compiled under my direct supervision, including but not limited to figures, tables,

attachments, appendices, and supporting materials. The reports are based on my personal, technical, and specialized knowledge and research.

- 5) If I am called to testify at trial, my testimony will be consistent with the contents of my reports.
- 6) My statement of qualifications and professional resume establishing my qualifications as an expert on the issues addressed in my reports can be found in my Expert Report, Second Edition, dated July 15, 2020, at pages 1-2 and in Appendix 1A, included in NM-EX 122.
- 7) I was deposed by Texas and the United States on February 10, 11, August 13, 14, and October 22, 2020. These depositions explored my qualifications as an expert and the substance and reliability of my expert opinions.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 3, 2021 at Denver, Colorado



Gregory K. Sullivan, P.E.

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff

v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

**DECLARATION OF HEIDI WELSH
FOR AUTHENTICATION OF EXPERT REPORTS**

I, Adelheid (“Heidi”) M. Welsh., pursuant to 28 U.S. C. § 1746, hereby declare as follows:


- 1) I am over 18 years of age and have personal knowledge of the facts stated herein.
- 2) I am the same Heidi Welsh who authored and signed the following:
 - a) Expert Report, Second Edition, co-authored with Greg Sullivan, dated and produced to all parties on July 15, 2020, submitted to the Special Master as New Mexico exhibit “NM-EX 122” on December 22, 2020; and
 - b) Rebuttal Expert Report, Second Edition, co-authored with Greg Sullivan, dated and produced to all parties on September 15, 2020, submitted to the Special Master as New Mexico exhibit “NM-EX 123” on December 22, 2020.
- 3) I confirm and verify that these exhibits listed above are true and correct copies of the reports originally submitted to all parties to this litigation on the date indicated.
- 4) I confirm that I authored these reports, along with Greg Sullivan, and that all parts of the report were compiled under my direct supervision, including but not limited to figures, tables,

attachments, appendices, and supporting materials. The reports are based on my personal, technical, and specialized knowledge and research.

- 5) If I am called to testify at trial, my testimony will be consistent with the contents of my reports.
- 6) My statement of qualifications and professional resume establishing my qualifications as an expert on the issues addressed in my report can be found in my Expert Report, Second Edition, dated July 15, 2020, at page 2 and in Appendix 1B, included in NM-EX 122.
- 7) I was deposed by Texas and the United States on February 11, 2020. The deposition explored my qualifications as an expert and the substance and reliability of my expert opinions.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 3, 2021 at Denver, Colorado.



Heidi Welsh

Appendix 1

TX v. NM # 141

New Mexico Exhibit

NM_EX-107A

Estevan R. López, P.E.
Estevan López Consulting, LLC
PO Box 302
Peñasco, NM 87553

EDUCATION

New Mexico Institute of Mining and Technology; Socorro, NM
Bachelor of Science Degree – Petroleum Engineering; 12/79
Bachelor of Science Degree – Chemistry; 12/79
Graduated with Highest Honors

PROFESSIONAL LICENSURE

State of New Mexico Board of Registration for Professional Engineers and Surveyors
Professional Engineer, Certificate No. 12237 (attached)

PROFESSIONAL EXPERIENCE

May 2019 to Present Estevan Lopez Consulting, LLC

I am under contract to the New Mexico Office of the Attorney General to provide expert services related to Texas v New Mexico, Original 141.

Apr 2018 to Apr 2019 ***Senior Engineer, Stantec Consulting Services Inc. (Stantec)***

I worked as a Senior Engineer providing consulting engineering and water management and policy advice to private and governmental entities. Stantec is a large Engineering and Technical Services Company with offices around the world.

May 2017 to Apr 2018 ***Senior Engineer, Occam Engineers Inc. (Occam)***

I worked as a Senior Engineer providing consulting engineering and water management and policy advice to private and governmental entities. Occam was a small 55 person engineering consulting company with office in several New Mexico communities. In April 2018, Occam was acquired by Stantec.

Oct 2014 to Jan 2017 ***Commissioner, United States Bureau of Reclamation
(Reclamation)***

I directed all aspects of Reclamation business managing water throughout 17 western states. I led a staff of about 5200 employees in those 17 states and was responsible for an annual appropriated budget of approximately \$1.25 billion. Reclamation had an estimated \$100 billion of water infrastructure under its ownership, management and operation. Reclamation is the largest wholesale water supplier in the nation, operating 338 reservoirs with a total capacity of 140 million acre-feet. It provides water to 1 out of 5 (about 140,000) Western farmers with irrigation supply and delivers water to more than 31 million people each year. Reclamation is also the second largest producer of hydropower in

the nation, operating 53 hydropower plants that produce about 40 billion kilowatt-hours/year.

Reclamation is one of the primary agencies charged with development and implementation of water policy and water planning in the western United States. I interacted with Congress both formally in Committee and Sub-committee hearings, and informally helping craft water policy and management legislation, providing informational briefings and responding to requests for information. I also interacted extensively with Mexico, Native American tribes, municipal water utilities and irrigation entities including as related to development, operations and management of water project infrastructure, and Indian water settlements. To the extent that such interactions related to water in an interstate river system it was imperative to be cognizant of any underlying interstate stream compacts that might apply.

I worked closely with both the United States and Mexican Sections of the International Boundary and Waters Commission on implementation of Minutes 318 and 319 to the 1944 Treaty between the United States and Mexico for the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande ("1944 Treaty"). Although it was not approved until after my tenure as Commissioner was over, I played a lead role in the negotiation of Minute 323 to the same 1944 Colorado River Treaty. These Minutes (i.e., 318, 319 and 323) provide for: investments by United States entities on conservation efforts in Mexico in exchange for some portion of the conserved water; storage of conserved water in Lake Mead to preserve reservoir elevation during the drought; environmental flows in the Mexican portion of the Colorado River; drought and scarcity contingency plans; and plans for sharing of potential future surplus flows.

I led negotiations among Reclamation and the major Lower Colorado River Contractors in Arizona, California and Nevada that ultimately led to a recently approved Lower Colorado River Drought Contingency Plan. To a lesser extent I also participated in the discussions among Reclamation, the Upper Colorado River Commission and the States of Colorado, New Mexico, Utah and Wyoming that led to an Upper Colorado River Drought Contingency Plan.

Negotiation and implementation of the above described Treaty Minutes and Drought Contingency Plans required inclusion of the Colorado River Basin states and careful adherence to the international and interstate apportionments of the 1944 Treaty, the Colorado River Compact of 1922, the Upper Colorado River Compact of 1948 and *Arizona v California*, 373 U.S. 546 (1963).

I participated extensively on California drought planning and legislation and infrastructure planning intended to enhance California's long-term water security.

I led implement efforts for several Indian Water Rights Settlements and several large-scale rural water supply projects. Each of these involved multi-year infrastructure construction projects with authorized construction costs ranging from several hundred million to over a billion dollars.

Jan 2003 to Oct 2014

***Director, New Mexico Interstate Stream Commission (NMISC),
Deputy New Mexico State Engineer***

I supervised and directed all aspects of NMISC business under the general policy direction of its nine member Commission. The NMISC is authorized by New Mexico Statutes to:

[N]egotiate compacts with other states to settle interstate controversies or looking toward an equitable distribution and division of waters in interstate stream systems, subject, in all cases, to final approval by the legislature of New Mexico; to match appropriations made by the congress of the United States for investigations looking to the development of interstate streams originating in or flowing through the state of New Mexico; to investigate water supply, to develop, to conserve, to protect and to do any and all other things necessary to protect, conserve and develop the waters and stream systems of this state, interstate or otherwise; to institute or cause to be instituted in the name of the state of New Mexico any and all negotiations and/or legal proceedings as in its judgment are necessary to carry out the provisions of this act. . . .

While at the NMISC, I also served as Deputy New Mexico State Engineer. The State Engineer is charged, under New Mexico Statutes, with “general supervision of waters of the state and of measurement, appropriation, distribution thereof, and such other duties as required.”

New Mexico is party to eight interstate stream compacts that apportion water with neighboring states. As Director, I led the agency responsible for understanding New Mexico’s rights and obligations relative to other compacting states, overseeing New Mexico’s compliance with relevant Supreme Court decrees, confirming that compact accounting, supervising intrastate actions to comply with compacts and decrees, and interacting with other compacting states. I served as:

- New Mexico Engineer Adviser to the Rio Grande Compact Commission;
- New Mexico Governor’s Representative to the Colorado River Compact;
- New Mexico Compact Commissioner for the Upper Colorado River Basin Compact; and
- New Mexico Compact Commissioner for the Canadian River Compact.

I also supervised New Mexico’s actions on the four other interstate stream compacts to which New Mexico is a party, namely the Pecos River Compact, the Costilla Creek Compact, the La Plata River Compact, and the Animas-La Plata Project Compact.

I led NMISC implementation of the Pecos River Compact Compliance Program, acquiring land and water rights to assure compliance with the United States

Supreme Court Decree in Texas v New Mexico (1988) 485 U.S. 388. Since that implementation, New Mexico has remained in compliance with the Decree.

I led New Mexico's efforts on planning and authorization of the Eastern New Mexico Water Supply System to put to use New Mexico's water under the Canadian River Compact.

I served as the Non-Federal Co-chair to the Rio Grande Endangered Species Collaborative Program. New Mexico participation in this Program was largely to assure that compliance with Endangered Species Act mandates would not interfere with New Mexico's benefits and obligations under the Rio Grande Compact.

Dec 2001 to Jan 2003 ***County Manager, Santa Fe County***

I supervised and directed all aspects of Santa Fe County government under the policy direction of the Board of County Commissioners. At the time, Santa Fe County government had an overall budget of \$90 million and was comprised of nine departments and six offices of elected officials totaling approximately 475 employees.

Jan 2000 to Dec 2001 ***Land Use & Utilities Department Director, Santa Fe County***

In 2000, the County merged the Utilities and Land Use Departments. Thereafter, in addition to the Utility Department duties (described below), I directed Land Use planning and zoning, development review, and code enforcement. I was responsible for administering the County's Land Development Code.

Dec 1998 to Jan 2000 ***Utilities Department Director, Santa Fe County***

I directed the development and implementation of policies and procedures for the County water and wastewater utilities and County water issues in general. I developed a water rights acquisition strategy and drafted 40-year water plan. I negotiated all County water-related agreements. I served as Chairman of the Jemez y Sangre Regional Water Planning Council from its inception until 2000.

Sep 1997 to Dec 1998 ***Utilities Division Deputy Director, Santa Fe County***

I developed and implemented policies and procedures for a new County water utility. I negotiated and drafted water rights purchase contracts, water service contracts, and construction contracts and monitored contractual performance. I reviewed and approved engineering design for all County-owned water facilities and conducted all activities necessary for the creation of a new sewer utility.

Oct 1990 to Sep 1997 ***Public Utility Engineer, New Mexico Public Utility Commission***

I evaluated and analyzed all evidence submitted by or collected from assigned jurisdictional water, gas and sewer utilities requesting rate relief, certificates of public

convenience and necessity, variances from Public Utility Commission (PUC) orders or any other requests requiring PUC action. I prepared written testimony in support of the PUC staff's position on assigned issues and presented oral testimony as an expert engineering witness in support and defense of written testimony.

May 1984 to Aug 1985 ***Well Work Supervisor, Arco Alaska Inc.***

I conducted remedial and surveillance work on both reservoir and mechanical aspects of oil, gas and water wells. I developed procedures; coordinated logistics; supervised contract crews; maintained data quality; assured project safety; tracked costs and prepared reports detailing the work performed.

Jul 1980 to May 1984 ***Operations Engineer, Arco Alaska Inc.***

I analyzed available oil well data to develop production strategies, made production forecasts, diagnosed problems and planned remedial work. I wrote recommendations, conducted economic evaluations and developed procedures for well logs, perforations, mechanical repairs and reservoir stimulation. I led a team of engineers and computer programmers in development and implementation of a complex computer program for real-time allocation of field-wide oil, gas and water production from common metering facilities back to individual wells and instructed engineering and production personnel on the use of the program.

OTHER EXPERIENCE/APPOINTMENTS

2012 to 2014 NM Commissioner – Upper Colorado River Compact Commission

2012 to 2014 NM Governor's Representative – Colorado River Compact

2003 to 2011 Alt. NM Commissioner – Upper Colorado River Compact Commission

2003 to 2011 Alt. NM Governor's Representative – Colorado River Compact

2010 to 2012 NM Commissioner – Canadian River Compact Commission

2003 to 2010 NM Engineer Advisor – Rio Grande Compact

2007 to 2010 NM Water Cabinet, Chairman

2003 to 2010 NM/Chihuahua Border Commission - Water Committee Member

2003 to 2014 Border Governors Conference - Water Committee Member

LANGUAGE SKILLS

Bilingual, English-Spanish

State of New Mexico
The New Mexico Board of Licensure for
Professional Engineers & Professional Surveyors

Santa Fe, New Mexico



This is certify that

Estevan R. Lopez

License No.: 12237

*Having given evidence of the necessary qualification, as required by Sections 61-23-1 through 61-23-33 NMSA (1978),
has been duly licensed and is hereby authorized to practice in the State of New Mexico as a*

Professional Engineer

Issue Date: 10/08/1993

Expiration Date: 12/31/2019

THIS CERTIFICATE IS FOR DISPLAY PURPOSES ONLY.

Appendix 2

West's New Mexico Statutes Annotated
Chapter 72. Water Law (Refs & Annos)
Article 15. Interstate Compacts

N. M. S. A. 1978, § 72-15-23

§ 72-15-23. Rio Grande Compact

Currentness

The state of New Mexico does hereby ratify, approve and adopt the compact aforesaid, which is as follows:

RIO GRANDE COMPACT

Signed at Santa Fe, New Mexico, March 18, 1938.

The state of Colorado, the state of New Mexico and the state of Texas, desiring to remove all causes of present and future controversy among these states and between citizens of one of these states and citizens of another state with respect to the use of the waters of the Rio Grande above Fort Quitman, Texas, and being moved by considerations of interstate comity, and for the purpose of effecting an equitable apportionment of such waters, have resolved to conclude a compact for the attainment of these purposes, and to that end, through their respective governors, have named as their respective commissioners:

for the state of Colorado-M. C. Hinderlider

for the state of New Mexico-Thomas M. McClure

for the state of Texas-Frank B. Clayton

who, after negotiations participated in by S. O. Harper, appointed by the president as the representative of the United States of America, have agreed upon the following articles, to wit:

ARTICLE I

(a) The state of Colorado, the state of New Mexico, the state of Texas and the United States of America, are hereinafter designated "Colorado," "New Mexico," "Texas" and the "United States," respectively.

(b) "The commission" means the agency created by this compact [this section] for the administration thereof.

(c) The term "Rio Grande basin" means all of the territory drained by the Rio Grande and its tributaries in Colorado, in New Mexico and in Texas above Fort Quitman, including the closed basin in Colorado.

(d) The "closed basin" means that part of the Rio Grande basin in Colorado where the streams drain into the San Luis lakes and adjacent territory, and do not normally contribute to the flow of the Rio Grande.

- (e) The term “tributary” means any stream which naturally contributes to the flow of the Rio Grande.
- (f) “Transmountain diversion” is water imported into the drainage basin of the Rio Grande from any stream system outside of the Rio Grande basin, exclusive of the closed basin.
- (g) “Annual debits” are the amounts by which actual deliveries in any calendar year fall below scheduled deliveries.
- (h) “Annual credits” are the amounts by which actual deliveries in any calendar year exceed scheduled deliveries.
- (i) “Accrued debits” are the amounts by which the sum of all annual debits exceeds the sum of all annual credits over any common period of time.
- (j) “Accrued credits” are the amounts by which the sum of all annual credits exceeds the sum of all annual debits over any common period of time.
- (k) “Project storage” is the combined capacity of Elephant Butte reservoir and all other reservoirs actually available for the storage of usable water below Elephant Butte and above the first diversion to lands of the Rio Grande project, but not more than a total of 2,638,860 acre-feet.
- (l) “Usable water” is all water, exclusive of credit water, which is in project storage and which is available for release in accordance with irrigation demands, including deliveries in Mexico.
- (m) “Credit water” is that amount of water in project storage which is equal to the accrued credit of Colorado, or New Mexico, or both.
- (n) “Unfilled capacity” is the difference between the total physical capacity of project storage and the amount of usable water then in storage.
- (o) “Actual release” is the amount of usable water released in any calendar year from the lowest reservoir comprising project storage.
- (p) “Actual spill” is all water which is actually spilled from Elephant Butte reservoir, or is released therefrom for flood control, in excess of the current demand on project storage and which does not become usable water by storage in another reservoir; provided, that actual spill of usable water cannot occur until all credit water shall have been spilled.
- (q) “Hypothetical spill” is the time in any year at which usable water would have spilled from project storage if 790,000 acre-feet had been released therefrom at rates proportional to the actual release in every year from the starting date to the end of the year in which hypothetical spill occurs; in computing hypothetical spill the initial condition shall be the amount of usable water in project storage at the beginning of the calendar year following the effective date of this compact, and thereafter the initial condition shall be the amount of usable water in project storage at the beginning of the calendar year following each actual spill.

ARTICLE II

The commission shall cause to be maintained and operated a stream-gaging station equipped with an automatic water-stage recorder at each of the following points, to wit:

- (a) on the Rio Grande near Del Norte above the principal points of diversion to the San Luis valley;
- (b) on the Conejos river near Mogote;
- (c) on the Los Pinos river near Ortiz;
- (d) on the San Antonio river at Ortiz;
- (e) on the Conejos river at its mouth near Los Sauces;
- (f) on the Rio Grande near Lobatos;
- (g) on the Rio Chama below El Vado reservoir;
- (h) on the Rio Grande at Otowi bridge near San Ildefonso;
- (i) on the Rio Grande near San Acacio;
- (j) on the Rio Grande at San Marcial;
- (k) on the Rio Grande below Elephant Butte reservoir;
- (l) on the Rio Grande below Caballo reservoir.

Similar gaging stations shall be maintained and operated below any other reservoir constructed after 1929, and at such other points as may be necessary for the securing of records required for the carrying out of the compact; and automatic water-stage recorders shall be maintained and operated on each of the reservoirs mentioned, and on all others constructed after 1929.

Such gaging stations shall be equipped, maintained and operated by the commission directly or in cooperation with an appropriate federal or state agency, and the equipment, method and frequency of measurement at such stations shall be such as to produce reliable records at all times.

ARTICLE III

The obligation of Colorado to deliver water in the Rio Grande at the Colorado-New Mexico state line, measured at or near Lobatos, in each calendar year, shall be ten thousand acre-feet less than the sum of those quantities set forth in the two following tabulations of relationship, which correspond to the quantities at the upper index stations:

DISCHARGE OF CONEJOS RIVER

Quantities in thousands of acre-feet

Conejos index supply (1)	Conejos river at mouths (2)
100	0
150	20
200	45
250	75
300	109
350	147
400	188
450	232
500	278
550	326
600	376
650	426
700	476

Intermediate quantities shall be computed by proportional parts.

(1) Conejos index supply is the natural flow of Conejos river at the U.S.G.S. gaging station near Mogote during the calendar year, plus the natural flow of Los Pinos river at the U.S.G.S. gaging station near Ortiz and the natural flow of San Antonio river at the U.S.G.S. gaging station at Ortiz, both during the months of April to October, inclusive.

(2) Conejos river at mouths is the combined discharge of branches of this river at the U.S.G.S. gaging stations near Los Sauces during the calendar year.

DISCHARGE OF RIO GRANDE EXCLUSIVE OF CONEJOS RIVER

Quantities in thousands of acre-feet

Rio Grande at Del Norte (3)	Rio Grande at Lobatos Less Conejos at mouths (4)
-----------------------------	---

200	60
250	65
300	75
350	86
400	98
450	112
500	127
550	144
600	162
650	182
700	204
750	229
800	257
850	292
900	335
950	380
1,000	430
1,100	540
1,200	640
1,300	740
1,400	840

Intermediate quantities shall be computed by proportional parts.

(3) Rio Grande at Del Norte is the recorded flow of the Rio Grande at the U.S.G.S. gaging station near Del Norte during the calendar year (measured above all principal points of diversion to San Luis valley) corrected for the operation of reservoirs constructed after 1937.

(4) Rio Grande at Lobatos less Conejos at mouths is the total flow of the Rio Grande at the U.S.G.S. gaging station near Lobatos, less the discharge of Conejos river at its mouths, during the calendar year.

The application of these schedules shall be subject to the provisions hereinafter set forth and appropriate adjustments shall be made for (a) any change in location of gaging stations; (b) any new or increased depletion of the runoff above inflow index gaging stations; and (c) any transmountain diversions into the drainage basin of the Rio Grande above Lobatos.

In event any works are constructed after 1937 for the purpose of delivering water into the Rio Grande from the closed basin, Colorado shall not be credited with the amount of such water delivered, unless the proportion of sodium ions shall be less than forty-five percent of the total positive ions in that water when the total dissolved solids in such water exceeds three hundred fifty parts per million.

ARTICLE IV

The obligation of New Mexico to deliver water in the Rio Grande at San Marcial, during each calendar year, exclusive of the months of July, August and September shall be that quantity set forth in the following tabulation of relationship, which corresponds to the quantity at the upper index station:

DISCHARGE OF RIO GRANDE AT OTOWI BRIDGE AND AT SAN MARCIAL EXCLUSIVE OF JULY, AUGUST AND SEPTEMBER

Quantities in thousands of acre-feet

Otowi index supply (5)	San Marcial index supply (6)
100	0
200	65
300	141
400	219
500	300
600	383
700	469
800	557
900	648
1,000	742
1,100	839
1,200	939
1,300	1,042
1,400	1,148
1,500	1,257
1,600	1,370

1,700	1,489
1,800	1,608
1,900	1,730
2,000	1,856
2,100	1,985
2,200	2,117
2,300	2,253

Intermediate quantities shall be computed by proportional parts.

(5) The Otowi index supply is the recorded flow of the Rio Grande at the U.S.G.S. gaging station at Otowi bridge near San Ildefonso (formerly station near Buckman) during the calendar year, exclusive of the flow during the months of July, August and September, corrected for the operation of reservoirs constructed after 1929 in the drainage basin of the Rio Grande between Lobatos and Otowi bridge.

(6) San Marcial index supply is the recorded flow of the Rio Grande at the gaging station at San Marcial during the calendar year exclusive of the flow during the months of July, August and September.

The application of this schedule shall be subject to the provisions hereinafter set forth and appropriate adjustments shall be made for (a) any change in location of gaging stations; (b) depletion after 1929 in New Mexico at any time of the year of the natural runoff at Otowi bridge; (c) depletion of the runoff during July, August and September of tributaries between Otowi bridge and San Marcial, by works constructed after 1937; and (d) any transmountain diversions into the Rio Grande between Lobatos and San Marcial.

Concurrent records shall be kept of the flow of the Rio Grande at San Marcial, near San Acacio, and of the release from Elephant Butte reservoir, to the end that the records at these three stations may be correlated.

ARTICLE V

If at any time it should be the unanimous finding and determination of the commission that because of changed physical conditions, or for any other reasons, reliable records are not obtainable, or cannot be obtained, at any of the stream-gaging stations herein referred to, such stations may, with the unanimous approval of the commission, be abandoned, and with such approval another station, or other stations, shall be established and new measurements shall be substituted which, in the unanimous opinion of the commission, will result in substantially the same results, so far as the rights and obligations to deliver water are concerned, as would have existed if such substitution of stations and measurements had not been so made.

ARTICLE VI

Commencing with the year following the effective date of this compact, all credits and debits of Colorado and New Mexico shall be computed for each calendar year; provided, that in a year of actual spill no annual credits nor annual debits shall be computed for that year.

In the case of Colorado, no annual debit nor accrued debit shall exceed 100,000 acre-feet, except as either or both may be caused by holdover storage of water in reservoirs constructed after 1937 in the drainage basin of the Rio Grande above Lobatos. Within the physical limitations of storage capacity in such reservoirs, Colorado shall retain water in storage at all times to the extent of its accrued debit.

In the case of New Mexico, the accrued debit shall not exceed 200,000 acre-feet at any time, except as such debit may be caused by holdover storage of water in reservoirs constructed after 1929 in the drainage basin of the Rio Grande between Lobatos and San Marcial. Within the physical limitations of storage capacity in such reservoirs, New Mexico shall retain water in storage at all times to the extent of its accrued debit. In computing the magnitude of accrued credits or debits, New Mexico shall not be charged with any greater debit in any one year than the sum of 150,000 acre-feet and all gains in the quantity of water in storage in such year.

The commission by unanimous action may authorize the release from storage of any amount of water which is then being held in storage by reason of accrued debits of Colorado or New Mexico; provided, that such water shall be replaced at the first opportunity thereafter.

In computing the amount of accrued credits and accrued debits of Colorado or New Mexico, any annual credits in excess of 150,000 acre-feet shall be taken as equal to that amount.

In any year in which actual spill occurs, the accrued credits of Colorado, or New Mexico, or both, at the beginning of the year shall be reduced in proportion to their respective credits by the amount of such actual spill; provided, that the amount of actual spill shall be deemed to be increased by the aggregate gain in the amount of water in storage, prior to the time of spill, in reservoirs above San Marcial constructed after 1929; provided, further, that if the commissioners for the states having accrued credits authorized the release of part, or all, of such credits in advance of spill, the amount so released shall be deemed to constitute actual spill.

In any year in which there is actual spill of usable water, or at the time of hypothetical spill thereof, all accrued debits of Colorado, or New Mexico, or both, at the beginning of the year shall be canceled.

In any year in which the aggregate of accrued debits of Colorado and New Mexico exceeds the minimum unfilled capacity of project storage, such debits shall be reduced proportionally to an aggregate amount equal to such minimum unfilled capacity.

To the extent that accrued credits are impounded in reservoirs between San Marcial and Courchesne, and to the extent that accrued debits are impounded in reservoirs above San Marcial, such credits and debits shall be reduced annually to compensate for evaporation losses in the proportion that such credits or debits bore to the total amount of water in such reservoirs during the year.

ARTICLE VII

Neither Colorado nor New Mexico shall increase the amount of water in storage in reservoirs constructed after 1929 whenever there is less than 400,000 acre-feet of usable water in project storage; provided, that if the actual releases of usable water from the beginning of the calendar year following the effective date of this compact, or from the beginning of the calendar year following actual spill, have aggregated more than an average of 790,000 acre-feet per annum, the time at which such minimum stage is reached shall be adjusted to compensate for the difference between the total actual release and releases at such average rate; provided, further, that Colorado or New Mexico, or both, may relinquish accrued credits at any time, and Texas may accept such relinquished water, and in such event the state, or states, so relinquishing shall be entitled to store water in the amount of the water so relinquished.

ARTICLE VIII

During the month of January of any year the commissioner for Texas may demand of Colorado and New Mexico, and the commissioner for New Mexico may demand of Colorado, the release of water from storage reservoirs constructed after 1929 to the amount of the accrued debits of Colorado and New Mexico, respectively, and such releases shall be made by each at the greatest rate practicable under the conditions then prevailing, and in proportion to the total debit of each, and in amounts, limited by their accrued debits, sufficient to bring the quantity of usable water in project storage to 600,000 acre-feet by March first and to maintain this quantity in storage until April thirtieth, to the end that a normal release of 790,000 acre-feet may be made from project storage in that year.

ARTICLE IX

Colorado agrees with New Mexico that in event the United States or the state of New Mexico decides to construct the necessary works for diverting the waters of the San Juan river, or any of its tributaries, into the Rio Grande, Colorado hereby consents to the construction of said works and the diversion of waters from the San Juan river, or the tributaries thereof, into the Rio Grande in New Mexico, provided the present and prospective uses of water in Colorado by other diversions from the San Juan river, or its tributaries, are protected.

ARTICLE X

In the event water from another drainage basin shall be imported into the Rio Grande basin by the United States or Colorado or New Mexico, or any of them jointly, the state having the right to the use of such water shall be given proper credit therefor in the application of the schedules.

ARTICLE XI

New Mexico and Texas agree that upon the effective date of this compact [this section] all controversies between said states relative to the quantity or quality of the water of the Rio Grande are composed and settled; however, nothing herein shall be interpreted to prevent recourse by a signatory state to the supreme court of the United States for redress should the character or quality of the water, at the point of delivery, be changed hereafter by one signatory state to the injury of another. Nothing herein shall be construed as an admission by any signatory state that the use of water for irrigation causes increase of salinity for which the user is responsible in law.

ARTICLE XII

To administer the provisions of this compact there shall be constituted a commission composed of one representative from each state, to be known as the Rio Grande Compact commission. The state engineer of Colorado shall be ex-officio the Rio Grande Compact commissioner for Colorado. The state engineer of New Mexico shall be ex-officio the Rio Grande Compact commissioner for New Mexico. The Rio Grande Compact commissioner for Texas shall be appointed by the governor of Texas. The president of the United States shall be requested to designate a representative of the United States to sit with such commission, and such representative of the United States, if so designated by the president, shall act as chairman of the commission without vote.

The salaries and personal expenses of the Rio Grande Compact commissioners for the three states shall be paid by their respective states, and all other expenses incident to the administration of this compact, not borne by the United States, shall be borne equally by the three states.

There shall be established and maintained a fund, to be known as the Rio Grande Compact fund, and all expenses incident to the administration of the compact, other than the salaries and personal expenses of the commissioners, shall be paid out of this fund on order of the commission. Each of the three states shall deposit the sum of five thousand (\$5,000.00) dollars in the Rio Grande Compact fund and each state shall reimburse this fund quarterly upon presentation of claims by the commission setting forth in reasonable detail the expenses paid by the commission from this fund.

In addition to the powers and duties hereinbefore specifically conferred upon such commission, and the members thereof, the jurisdiction of such commission shall extend only to the collection, correlation and presentation of factual data and the maintenance of records having a bearing upon the administration of this compact, and, by unanimous action, to the making of recommendations to the respective states upon matters connected with the administration of this compact. In connection therewith, the commission may employ such engineering and clerical aid as may be reasonably necessary within the limit of funds provided for that purpose by the respective states. Annual reports compiled for each calendar year shall be made by the commission and transmitted to the governors of the signatory states on or before March first following the year covered by the report. The commission may, by unanimous action, adopt rules and regulations consistent with the provisions of this compact to govern their proceedings.

The findings of the commission shall not be conclusive in any court or tribunal which may be called upon to interpret or enforce this compact.

ARTICLE XIII

At the expiration of every five-year period after the effective date of this compact, the commission may, by unanimous consent, review any provisions hereof which are not substantive in character and which do not affect the basic principles upon which the compact is founded, and shall meet for the consideration of such questions on the request of any member of the commission; provided, however, that the provisions hereof shall remain in full force and effect until changed and amended within the intent of the compact by unanimous action of the commissioners, and until any changes in this compact are ratified by the legislatures of the respective states and consented to by the congress, in the same manner as this compact is required to be ratified to become effective.

ARTICLE XIV

The schedules herein contained and the quantities of water herein allocated shall never be increased nor diminished by reason of any increase or diminution in the delivery or loss of water to Mexico.

ARTICLE XV

The physical and other conditions characteristic of the Rio Grande and peculiar to the territory drained and served thereby, and to the development thereof, have actuated this compact and none of the signatory states admits that any provisions herein contained establishes any general principle or precedent applicable to other interstate streams.

ARTICLE XVI

Nothing in this compact shall be construed as affecting the obligations of the United States of America to Mexico under existing treaties, or to the Indian tribes, or as impairing the rights of the Indian tribes.

ARTICLE XVII

This compact shall become effective when ratified by the legislatures of each of the signatory states and consented to by the congress of the United States. Notice of ratification shall be given by the governor of each state to the governors of the other states and to the president of the United States, and the president of the United States is requested to give notice to the governors of each of the signatory states of the consent of the congress of the United States.

In witness whereof, the commissioners have signed this compact in quadruplicate original, one of which shall be deposited in the archives of the department of state of the United States of America and shall be deemed the authoritative original, and of which a duly certified copy shall be forwarded to the governor of each of the signatory states.

Done at the city of Santa Fe, in the state of New Mexico, on the 18th day of March, in the year of Our Lord, one thousand nine hundred and thirty-eight.

(Sgd.) M.C. Hinderlider.

(Sgd.) Thomas M. McClure.

(Sgd.) Frank B. Clayton.

APPROVED:

(Sgd.) S.O. Harper.

Credits

L. 1939, Ch. 33, § 1; L. 1945, Ch. 60, § 1.

Notes of Decisions (10)

NMSA 1978, § 72-15-23, NM ST § 72-15-23

Current through the end of the First Regular Session of the 54th Legislature (2019).

End of Document

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Appendix 3

RESOLUTION ADOPTED BY RIO GRANDE COMPACT
COMMISSION AT THE ANNUAL MEETING HELD AT
EL PASO, TEXAS, FEBRUARY 22-24, 1948,
CHANGING GAGING STATIONS AND MEASUREMENTS
OF DELIVERIES BY NEW MEXICO

R E S O L U T I O N

Whereas, at the Annual Meeting of the Rio Grande Compact Commission in the year 1945, the question was raised as to whether or not a schedule for delivery of water by New Mexico during the entire year could be worked out, and

Whereas, at said meeting the question was referred to the Engineering Advisers for their study, recommendations and report, and

Whereas, said Engineering Advisers have met, studied the problems and under date of February 24, 1947, did submit their Report, which said Report contains the findings of said Engineering Advisers and their recommendations, and

Whereas, The Compact Commission has examined said Report and finds that the matters and things therein found and recommended are proper and within the terms of the Rio Grande Compact, and

Whereas, the Commission has considered said Engineering Advisers' Report and all available evidence, information and material and is fully advised:

Now, Therefore, Be it Resolved:

The Commission finds as follows:

- (a) That because of change of physical conditions, reliable records of the amount of water passing San Marcial are no longer obtainable at the stream gaging station at San Marcial and that the same should be abandoned for Compact purposes.
- (b) That the need for concurrent records at San Marcial and San Acacia no longer exists and that the gaging station at San Acacia should be abandoned for Compact purposes.

- (c) That it is desirable and necessary that the obligations of New Mexico under the Compact to deliver water in the months of July, August, September should be scheduled.
- (d) That the change in gaging stations and substitution of the new measurements as hereinafter set forth will result in substantially the same results so far as the rights and obligations to deliver water are concerned, and would have existed if such substitution of stations and measurements had not been so made.

Be it Further Resolved:

That the following measurements and schedule thereof shall be substituted for the measurements and schedule thereof as now set forth in Article IV of the Compact:

"The obligation of New Mexico to deliver water in the Rio Grande into Elephant Butte Reservoir during each calendar year shall be measured by that quantity set forth in the following tabulation of relationship which corresponds to the quantity at the upper index station:

DISCHARGE OF RIO GRANDE AT OTOWI BRIDGE
AND ELEPHANT BUTTE EFFECTIVE SUPPLY

Quantities in thousands of acre-feet

Otowi Index Supply (5)	Elephant Butte Effective Index Supply (6)
100	57
200	114
300	171
400	228
500	286
600	345
700	406
800	471
900	542
1000	621
1100	707
1200	800
1300	897
1400	996
1500	1095
1600	1195

DISCHARGE OF RIO GRANDE AT OTOWI BRIDGE
AND ELEPHANT BUTTE EFFECTIVE SUPPLY

Quantities in thousands of acre-feet

Otowi Index Supply (5)	Elephant Butte Effective Index Supply (6)
1700	1295
1800	1395
1900	1495
2000	1595
2100	1695
2200	1795
2300	1895
2400	1995
2500	2095
2600	2195
2700	2295
2800	2395
2900	2495
3000	2595

Intermediate quantities shall be computed by proportional parts.

- (5) The Otowi Index Supply is the recorded flow of the Rio Grande at the U. S. G. S. gaging station at Otowi Bridge near San Ildefonso (formerly station near Buckman) during the calendar year, corrected for the operation of reservoirs constructed after 1929 in the drainage basin of the Rio Grande between Lobatos and Otowi Bridge.
- (6) Elephant Butte Effective Index Supply is the recorded flow of the Rio Grande at the gaging station below Elephant Butte Dam during the calendar year plus the net gain in storage in Elephant Butte Reservoir during the same year or minus the net loss in storage in said reservoir, as the case may be.

The application of this schedule shall be subject to the provisions hereinafter set forth and appropriate adjustments shall be made for
(a) any change in location of gaging stations;

(b) Depletion after 1929 in New Mexico of the natural runoff at Otowi Bridge; and (c) any transmountain diversions into the Rio Grande between Lobatos and Elephant Butte Reservoir."

Be it Further Resolved:

That the gaging stations at San Acacia and San Marcial be and the same are hereby abandoned for Compact purposes.

Be it Further Resolved:

That this Resolution has been passed unanimously and shall be effective January 1, 1949, if within 120 days from this date the Commissioner for each State shall have received from the Attorney General of the State represented by him, an opinion approving this Resolution, and shall have so advised the Chairman of the Commission, otherwise, to be of no force and effect.

(Note: The following paragraph appears in the Minutes of the Annual Meeting of the Commission held at Denver, Colorado, February 14-16, 1949:

"The Chairman announced that he had received, pursuant to the Resolution adopted by the Commission at the Ninth Annual Meeting on February 24, 1948, opinions from the Attorneys General of Colorado, New Mexico and Texas that the substitution of stations and measurements of deliveries by New Mexico set forth in said resolution was within the powers of the Commission").

Appendix 4

RULES AND REGULATIONS FOR ADMINISTRATION OF
THE RIO GRANDE COMPACT

A Compact, known as the Rio Grande Compact, between the States of Colorado, New Mexico and Texas, having become effective on May 31, 1939 by consent of the Congress of the United States, which equitably apportions the waters of the Rio Grande above Fort Quitman and permits each State to develop its water resources at will, subject only to its obligations to deliver water in accordance with the schedules set forth in the Compact, the following Rules and Regulations have been adopted for its administration by the Rio Grande Compact Commission; to be and remain in force and effect only so long as the same may be satisfactory to each and all members of the Commission, and provided always that on the objection of any member of the Commission, in writing, to the remaining two members of the Commission after a period of sixty days from the date of such objection, the sentence, paragraph or any portion or all of these rules to which any such objection shall be made, shall stand abrogated and shall thereafter have no further force and effect; it being the intent and purpose of the Commission to permit these rules to obtain and be effective only so long as the same may be satisfactory to each and all of the Commissioners.

(1) GAGING STATIONS 1, 2

Responsibility for the equipping, maintenance and operation of the stream gaging stations and reservoir gaging stations required by the provisions of Article II of the Compact shall be divided among the signatory States as follows:

(a) Gaging stations on streams and reservoirs in the Rio Grande Basin above the Colorado-New Mexico boundary shall be equipped, maintained, and operated by Colorado in cooperation with the U.S. Geological Survey.

(b) Gaging stations on streams and reservoirs in the Rio Grande Basin below Lobatos and above Caballo Reservoir shall be equipped, maintained and operated by New Mexico in cooperation with the U.S. Geological Survey to the extent that such stations are not maintained and operated by some other Federal agency.

(c) Gaging stations on Elephant Butte Reservoir and on Caballo Reservoir, and the stream gaging station on the Rio Grande below Caballo Reservoir shall be equipped, maintained and operated by or on behalf of Texas through the agency of the U.S. Bureau of Reclamation.

The equipment, method and frequency of measurements at each compact stream gaging station shall be sufficient to obtain stream flow records at least equal in accuracy to those classified as "good" by the U.S. Geological Survey. The stream flow records for each compact stream gaging station shall be reviewed annually by the U.S. Geological Survey to ensure accuracy. Water-stage recorders on the reservoirs specifically named in Article II of the Compact shall have sufficient range below maximum reservoir level to record major fluctuations in storage. Staff gages may be used to determine fluctuations below the range of the water-stage recorders on these and other large reservoirs, and staff gages may be used upon approval of the Commission in lieu of water-stage recorders on small reservoirs, provided that the frequency of observation is sufficient in each case to establish any material changes in water levels in such reservoirs.

1 Amended at Eleventh Annual Meeting, February 23, 1950.

2 Amended at Seventy-Seventh Annual Meeting, March 31, 2016.

RULES AND REGULATIONS

(2) RESERVOIR CAPACITIES /1

Colorado shall file with the Commission a table of areas and capacities for each reservoir in the Rio Grande Basin above Lobatos constructed after 1937; New Mexico shall file with the Commission a table of areas and capacities for each reservoir in the Rio Grande Basin between Lobatos and San Marcial constructed after 1929; and Texas shall file with the Commission tables of areas and capacities for Elephant Butte Reservoir and for all other reservoirs actually available for the storage of water between Elephant Butte and the first diversion to lands under the Rio Grande Project.

Whenever it shall appear that any table of areas and capacities is in error by more than five per cent, the Commission shall use its best efforts to have a re-survey made and a corrected table of areas and capacities to be substituted as soon as practicable. To the end that the Elephant Butte effective supply may be computed accurately, the Commission shall use its best efforts to have the rate of accumulation and the place of deposition of silt in Elephant Butte Reservoir checked at least every three years.

(3) ACTUAL SPILL /2, /3, /4, /6

(a) Water released from Elephant Butte in excess of Project requirements, which is currently passed through Caballo Reservoir, prior to the time of spill, shall be deemed to have been Usable Water released in anticipation of spill, or Credit Water if such release shall have been authorized.

(b) Excess releases from Elephant Butte Reservoir, as defined in (a) above, shall be added to the quantity of water actually in storage in that reservoir, and Actual Spill shall be deemed to have commenced when this sum equals the total capacity of that reservoir to the level of the uncontrolled spillway less capacity reserved for flood purposes, i.e., 1,999,600 acre-feet in the months of October through March inclusive, and 1,974,600 acre-feet in the months of April through September, inclusive, as determined from the 2009 area-capacity table or successor area-capacity tables and flood control storage reservation of 50,000 acre-feet from April through September and 25,000 acre-feet from October through March.

(c) All water actually spilled at Elephant Butte Reservoir, or released therefrom, in excess of Project requirements, which is currently passed through Caballo Reservoir, after the time of spill, shall be considered as Actual Spill, provided that the total quantity of water then in storage in Elephant Butte Reservoir exceeds the physical capacity of that reservoir at the level of the sill of the spillway gates, i.e. -1,830,000 acre-ft in 1942.

(d) Water released from Caballo Reservoir in excess of Project requirements and in excess of water currently released from Elephant Butte Reservoir, shall be deemed Usable Water released, excepting only flood water entering Caballo Reservoir from tributaries below Elephant Butte Reservoir.

(4) DEPARTURES FROM NORMAL RELEASES /5

For the purpose of computing the time of Hypothetical Spill required by Article VI and for the purpose of the adjustment set forth in Article VII, no allowance shall be made for the difference between Actual and Hypothetical Evaporation, and any under-release of usable water from Project Storage in excess of 150,000 acre-ft in any year shall be taken as equal to that amount.

/1 Amended at Eleventh Annual Meeting, February 23, 1950.

/2 Adopted at Fourth Annual Meeting, February 24, 1943.

/3 Amended September 9, 1998.

/4 Amended March 22, 2001; made effective January 1, 2001.

/5 Adopted June 2, 1959; made effective January 1, 1952.

/6 Adopted March 31, 2009; made effective January 1, 2010.

RULES AND REGULATIONS

(5) EVAPORATION LOSSES /6, /7, /8

The Commission shall encourage the equipping, maintenance and operation, in cooperation with the U.S. Weather Bureau or other appropriate agency, of evaporation stations at Elephant Butte Reservoir and at or near each major reservoir in the Rio Grande Basin within Colorado constructed after 1937 and in New Mexico constructed after 1929. The net loss by evaporation from a reservoir surface shall be taken as the difference between the actual evaporation loss and the evapo-transpiration losses which would have occurred naturally, prior to the construction of such reservoir. Changes in evapo-transpiration losses along stream channels below reservoirs may be disregarded.

Net losses by evaporation, as defined above, shall be used in correcting Index Supplies for the operation of reservoirs upstream from Index Gaging Stations as required by the provisions of Article III and Article IV of the Compact.

In the application of the provisions of the last unnumbered paragraph of Article VI of the Compact:

(a) Evaporation losses for which accrued credits shall be reduced shall be taken as the difference between the gross evaporation from the water surface of Elephant Butte Reservoir and rainfall on the same surface.

(b) Evaporation losses for which accrued debits shall be reduced shall be taken as the net loss by evaporation as defined in the first paragraph.

(6) ADJUSTMENT OF RECORDS

The Commission shall keep a record of the location, and description of each gaging station and evaporation station, and, in the event of change in location of any stream gaging station for any reason, it shall ascertain the increment in flow or decrease in flow between such locations for all stages. Wherever practicable, concurrent records shall be obtained for one year before abandonment of the previous station.

(7) NEW OR INCREASED DEPLETIONS

In the event any works are constructed which alter or may be expected to alter the flow at any of the Index Gaging Stations mentioned in the Compact, or which may otherwise necessitate adjustments in the application of the schedules set forth in the Compact, it shall be the duty of the Commissioner specifically concerned to file with the Commission all available information pertaining thereto, and appropriate adjustments shall be made in accordance with the terms of the Compact; provided, however, that any such adjustments shall in no way increase the burden imposed upon Colorado or New Mexico under the schedules of deliveries established by the Compact.

(8) TRANSMOUNTAIN DIVERSIONS

In the event any works are constructed for the delivery of waters into the drainage basin of the Rio Grande from any stream system outside of the Rio Grande Basin, such waters shall be measured at the point of delivery into the Rio Grande Basin and proper allowances shall be made for losses in transit from such points to the Index Gaging Station on the stream with which the imported waters are comingled.

/6 Amended at Tenth Annual Meeting, February 15, 1949.

/7 Amended at Twelfth Annual Meeting, February 24, 1951.

/8 Amended June 2, 1959.

RULES AND REGULATIONS

(9) QUALITY OF WATER

In the event that delivery of water is made from the Closed Basin into the Rio Grande, sufficient samples of such water shall be analyzed to ascertain whether the quality thereof is within the limits established by the Compact.

(10) SECRETARY /8, /9, /10

The Commission may, on a yearly basis, employ appropriate entities to render such engineering and clerical aid as may reasonably be necessary for administration of the Compact. The entities may be employed to:

(1) Collect and correlate all factual data and other records having a material bearing on the administration of the Compact and keep each Commissioner advised thereof.

(2) Inspect all gaging stations required for administration of the Compact and make recommendations to the Commission as to any changes or improvements in methods of measurement or facilities for measurement which may be needed to insure that reliable records be obtained.

(3) Report to each Commissioner in writing within thirty days after the end of each quarter a summary of all hydrographic data then available for the current year - on forms prescribed by the Commission - pertaining to:

- (a) Deliveries by Colorado
- (b) Deliveries by New Mexico
- (c) Operation of Project Storage

(4) Make such investigations as may be requested by the Commission in aid of its administration of the Compact.

(5) Act as Secretary to the Commission and submit to the Commission at its regular meeting a report on its activities and a summary of all data needed for determination of debits and credits and other matters pertaining to administration of the Compact.

(11) COSTS /1, /2, /3

At its annual meeting, the Commission shall adopt a budget for the ensuing fiscal year beginning July first.

Such budget shall set forth the total cost of maintenance and operating of gaging stations, of evaporation stations, the cost of engineering and clerical aid, and all other necessary expenses excepting the salaries and personal expenses of the Rio Grande Compact Commissioners.

Contributions made directly by the United States and the cost of services rendered by the United States without cost shall be deducted from the total budget amount; the remainder shall then be allocated equally to Colorado, New Mexico and Texas.

/8 The substitution of this section for the section titled "Reports to Commissioners" was adopted at Ninth Annual Meeting, February 22, 1948.

/9 Amended March 31, 2009.

/10 Amended at Seventy-Seventh Annual Meeting, March 31, 2016.

/1 Amended at Eleventh Annual Meeting, February 23, 1950.

/2 Amended March 31, 2009.

/3 Amended at Seventy-Seventh Annual Meeting, March 31, 2016.

RULES AND REGULATIONS

Expenditures made directly by any State for purposes set forth in the budget shall be credited to that State; contributions in cash or in services by any State under a cooperative agreement with any federal agency shall be credited to such State, but the amount of the federal contribution shall not so be credited; in event any State, through contractual relationships, causes work to be done in the interest of the Commission, such State shall be credited with the cost thereof, unless such cost is borne by the United States.

Costs incurred by the Commission under any cooperative agreement between the Commission and any U.S. Government Agency, not borne by the United States, shall be apportioned equally to each State, and each Commissioner shall arrange for the prompt payment of one-third thereof by his State.

The Commissioner of each State shall report at the annual meeting each year the amount of money expended during the year by the State that the Commissioner represents, as well as the portion thereof contributed by all cooperating federal agencies, and the Commission shall arrange for such proper reimbursement in cash or credits between States as may be necessary to equalize the contributions made by each State in the equipment, maintenance and operation of all gaging stations authorized by the Commission and established under the terms of the Compact.

It shall be the duty of each Commissioner to endeavor to secure from the Legislature of the State represented by the Commissioner an appropriation of sufficient funds with which to meet the obligations of that State, as provided by the Compact.

(12) MEETING OF COMMISSION /1, /10, /11

The Commission shall meet each year for the consideration and adoption of the annual report for the calendar year preceding, and for the transaction of any other business consistent with its authority. Other meetings as may be deemed necessary shall be held at any time and place set by mutual agreement, for the consideration of data collected and for the transaction of any business consistent with its authority.

No action of the Commission shall be effective until approved by the Commissioner from each of the three signatory States.

(Signed) M. C. HINDERLIDER

M. C. Hinderlider

Commissioner for Colorado

(Signed) THOMAS M. McCLURE

Thomas M. McClure

Commissioner for New Mexico

(Signed) JULIAN P. HARRISON

Julian P. Harrison

Commissioner for Texas

Adopted December 19, 1939.

/1 Amended at Eleventh Annual Meeting, February 23, 1950.

/10 Amended at Thirteenth Annual Meeting, February 25, 1952.

/11 Amended at Seventy-Seventh Annual Meeting, March 31, 2016.

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Rio Grande Compact Accounting

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ATTACHMENT – 2018 Compact Accounting Sheets

Rio Grande Compact Accounting

1.0 Basic Principles

The Rio Grande Compact was executed by the Compact Commissioners for the states of Colorado, New Mexico and Texas and approved by the federal representative in 1938, ratified by each state's respective legislature in 1939, and passed by Congress as Public Act No. 96 of the 76th Congress and signed by the President in 1939. The accounting of water deliveries and releases specified in the Compact commenced with calendar year 1940.

Article XII of the Compact established the Rio Grande Compact Commission ("RGCC" or "Commission"), comprised of one Commissioner each from Colorado, New Mexico and Texas, plus a representative of the United States appointed by the President. If so designated by the President, the federal representative acts as Chairman of the RGCC without vote. Rules and Regulations specifying how Compact accounting procedures are to be conducted were adopted by the RGCC in 1939 and have been amended subsequently several times.

A series of ledger sheets, one per state, were developed as bookkeeping constructs designed to record and convey information about each state's obligations and performance pursuant to Compact obligations and requirements. The ledger sheets were initially developed for calendar year 1940 and have evolved through time as they became more comprehensive or were amended due to changing conditions and reservoir operations, and as interpretation of the language of the Compact evolved..¹

1.1 Authorities

1.1.1 Rio Grande Compact

The Rio Grande Compact is the ultimate authority for how Compact accounting is to be performed.

1.1.2 Rules and Regulation for Administration of the Rio Grande Compact

Rules and Regulations for Administration of the Rio Grande Compact ("Rules" or "Compact Rules") were first adopted by unanimous consent of the RGCC in 1939

¹ For example, the 1940 ledger sheet for Colorado contained 16 columns. The most recent Colorado ledger sheet (calendar year 2018) contained 23 columns. As a further example, the minutes of the Fifth Annual Meeting of the RGCC document that the RGCC amended then Column 12 of the Colorado ledger sheet to show the entire amount of water held in storage in Colorado subject to the Compact. Previous versions of the Colorado ledger sheet showed just that amount of water in storage above the Rio Grande near Del Norte gaging station.

in accordance with Article XII of the Compact, and have been modified many times since, either by resolution or by motion of the RGCC.

The Rules provide precise procedures for how Compact accounting of the debits and credits of Colorado and New Mexico and the release and spill of water stored in Rio Grande Project Storage² are to be conducted. A copy of the Rules may be found in each annual Report of the RGCC.

1.2 Role of the Secretary

The original 1939 Compact Rules, in the section entitled “Secretary” mandated the Commission employ a registered professional engineer, or a Corporate Member of the American Society of Civil Engineers, experienced in irrigation, agricultural or hydraulic engineering to serve as Secretary to the Commission. The primary duty of the Secretary was to collect and correlate all factual data and other records having a bearing upon the administration of the Compact. The Secretary was required to report to each Commissioner periodically a summary of all hydrographic data then available for the current year on forms prescribed by the Commission (the ledger sheets described in detail below) pertaining to deliveries by Colorado at State Line, deliveries by New Mexico at San Marcial, and release and spill from Rio Grande Project Storage.

This section of the Compact Rules entitled “Secretary” has been amended from time to time, primarily to clarify the duties of the Secretary and to require the Compact Commission to enter into a cooperative agreement with the U.S. Geological Survey (“USGS”) on an annual basis to employ the USGS to act as Secretary to the Commission. The current Compact Rules do not require the Commission contract with the USGS. However, the Compact Commission has continued to employ the USGS as Secretary for at least the last few decades.

In simple terms, the Secretary compiles the data (streamflow, reservoir storage, etc.) necessary to conduct the Compact accounting and complete the annual accounting ledger sheets. The Secretary also prepares drafts of the ledger sheets for subsequent review and approval by the Engineer Advisers, and final approval by the Commission.

1.3 Role of the Engineer Advisers

The Engineer Advisers to the Rio Grande Compact Commission (minimum of one per state) review and approve each year’s annual Compact accounting based upon the data compiled by the Secretary as described above. This process is usually done by in-person meeting a few weeks prior to the annual meeting of the RGCC, which is typically held in early spring of each year. The Engineer Advisers then transmit the results of the Compact accounting to the RGCC via the annual Report of the Engineer Advisers to the Rio Grande Compact Commission. Supplemental reports of the Engineer Advisers are transmitted to the RGCC to correct errors or omissions to the Compact accounting as necessary throughout the course of the year. The

² Article I(k) defines (Rio Grande) “Project Storage” as the combined capacity of Elephant Butte Reservoir and all other reservoirs actually available for the storage of Usable Water below Elephant Butte and above the first diversion to lands of the Rio Grande Project, but not more than a total of 2,638,860 acre-feet.

practice of the Engineer Advisers formally approving the Compact accounting by initialing each ledger sheet commenced with the 2001 accounting.

1.4 Role of the Rio Grande Compact Commission

The RGCC adopts Rules and Regulations directing how Compact accounting is to be conducted and provides ultimate approval of each year's accounting as compiled and reported by the Secretary and the Engineer Advisers. The final accounting results for each calendar year are transmitted to the Governors of each signatory state by the RGCC as part of an annual report. The Secretary then transmits the annual report to the President.

2.0 Data Sources

Since 1940, data necessary for compilation of Compact accounting has been collected by numerous federal, state, and local agencies and cooperatively provided to the RGCC through the Secretary. Four such agencies currently collect and provide the bulk of the data necessary to conduct Compact accounting. These are the USGS, the U.S. Bureau of Reclamation ("Reclamation"), the U.S. Army Corps of Engineers ("Corps") and the Colorado Office of the State Engineer ("Colorado OSE").

The Compact Rules require that measurement stations on streams and reservoirs in the Rio Grande Basin³ above the Colorado-New Mexico state line be operated by Colorado in cooperation with the USGS; that stations below Lobatos and above Caballo Reservoir be operated by New Mexico in cooperation with the USGS to the extent that such stations are not operated by some other Federal agencies; and that stations on Elephant Butte and Caballo Reservoirs and the station below Caballo Reservoir be operated by or on behalf of Texas by Reclamation.⁴ The Rules require that the stream flow records at each Compact station be equivalent in accuracy to those classified as "good" by the USGS.⁵

2.1 U.S. Geological Survey

The USGS operates gaging stations and collects streamflow data at several locations in New Mexico necessary for Compact accounting, including on the Rio Grande at Otowi Bridge (in cooperation with the New Mexico Interstate Stream Commission ("NMISC")) and on the Rio Grande below Elephant Butte Reservoir. The USGS also collects reservoir storage data for Nambe Falls Reservoir (in cooperation with Reclamation) on the Rio Nambe, and for McClure and Nichols Reservoirs (in cooperation with the NMISC) on the Santa Fe River.

³ Article I(c) of the Compact defines the term "Rio Grande Basin" as all of the territory drained by the Rio Grande and its tributaries in Colorado, in New Mexico, and in Texas above Fort Quitman, including the Closed Basin in Colorado.

⁴ Prior to March 31, 2016, the Rules specified that Texas was also responsible for operating the station below Elephant Butte Reservoir through the agency of Reclamation.

⁵ The USGS rates the degree of accuracy of the streamflow records it produces as either "excellent", "good", "fair", or "poor". "Excellent" indicates that about 95 percent of the daily discharges are within 5 percent of the true value; "good" within 10 percent; and "fair," within 15 percent. "Poor" indicates that daily discharges have less than "fair" accuracy.

2.2 U.S. Bureau of Reclamation

Reclamation operates gaging stations and collects streamflow data at several locations in New Mexico necessary for Compact accounting, including at the Azotea Tunnel⁶ outlet works for the San Juan-Chama Project and on the Rio Grande below Caballo Reservoir. Reclamation also collects reservoir storage data for Heron Reservoir⁷ on Willow Creek, El Vado Reservoir on the Rio Chama, and Elephant Butte and Caballo Reservoirs on the Rio Grande.

2.3 U.S. Army Corps of Engineers

The Corps collects reservoir storage data for Abiquiu Reservoir on the Rio Chama, and for Cochiti Reservoir on the Rio Grande.

2.4 Colorado Office of the State Engineer

The Colorado OSE collects streamflow data at several locations in Colorado necessary for Compact accounting, including on the Rio Grande near Del Norte, the Conejos River near Mogote, the Los Pinos River near Ortiz, the San Antonio River near Ortiz, the Conejos River near Lasauces and the Rio Grande near Lobatos.

3.0 Ledger Sheets

3.1 Deliveries by Colorado at State Line

The ledger sheet use to track the accounting required by the Compact of deliveries by Colorado of waters of the Rio Grande Basin to New Mexico is entitled “Deliveries by Colorado at State Line”. It consists of four major sections: the “Conejos Index Supply”, the “Rio Grande Index Supply”, “Deliveries”, and “Summary of Debits and Credits”. There is also a section labeled “Remarks” for recording clarifying notes.

3.1.1 Conejos Index Supply

The Conejos Index Supply is defined in Article III(1) of the Compact as the natural flow of the Conejos River at the USGS gaging station near Mogote during the calendar year, plus the natural flow of the Los Pinos River at the USGS gaging station near Ortiz and the natural flow of the San Antonio River at the USGS gaging station near Ortiz, both during the months of April through October.

Adjustments to the natural flow of the three gaging stations used to determine the Conejos Index Supply are made in accordance with the section entitled “New or Increased Depletions” of the Compact Rules.

Measured Flow

⁶ Azotea Tunnel transmits San Juan-Chama Project water from the Colorado River Basin to the Rio Grande Basin in northern New Mexico. The tunnel outlet is on Willow Creek upstream of Heron Reservoir. Willow Creek is tributary to the Rio Chama.

⁷ Heron Reservoir, with a capacity of roughly 400,000 acre-feet, is the terminal storage of the San-Juan Chama Project. San Juan-Chama Project water is not subject to the delivery schedules of the Compact per Article X.

The gaging stations described below are operated by the Colorado Division of Water Resources in cooperation with the USGS in accordance with Paragraph (a) of the section entitled “Gaging Stations” of the Compact Rules.

Conejos River at Mogote (Column 2)⁸

This gaging station was first established in 1904. A continuous record from 1912 on is available. Station records are rated good, except for winter months, which are fair. Flow at the station has been partly regulated by Platoro Reservoir since 1951.

Los Pinos near Ortiz (Column 3)

This gaging station was first established in 1915. A continuous record from 1925 thereafter is available. Station records are rated good, except for winter months, which are fair.

San Antonio at Ortiz (Column 4)

This gaging station was established in 1941 with continuous record thereafter. Station records are rated good.

Total (Column 5)

This column is the total flow of the three upstream Conejos Index stations: Conejos River at Mogote (Column 2), Los Pinos near Ortiz (Column 3) and San Antonio at Ortiz (Column 4).

Adjustments

Adjustments for new or increased depletions resulting from constructed works which alter, or may be expected to alter, the flow at the gaging stations used to calculate the Conejos Index Supply is made in accordance with the section entitled “New or Increased Depletions” of the Compact Rules.

⁸ The column numbers referenced throughout this document correspond to those found in the 2018 accounting ledger sheets.

Storage at End of Month (Column 6)⁹

Reservoir storage affecting the Conejos Index Supply consists of Platoro Reservoir on the Conejos River, which has a capacity of 59,600 acre-feet, primarily for irrigation and flood control. The reservoir contains some amount of Transmountain Water¹⁰ stored by exchange from the Colorado River Basin, which is not subject to the Compact per Article X and hence is not included in the Compact accounting.

Change in Storage (Column 7)

This column shows the change (increase or decrease) in reservoir storage affecting the Conejos Index Supply on a monthly basis.

Other Adjustments (Column 8)

Other adjustments to the Conejos Index Supply consist primarily of net evaporation on Rio Grande water stored in Platoro Reservoir. "Net evaporation" is defined in the Compact Rules for Colorado reservoirs constructed after 1937 as the actual loss from the reservoir surface less the evapotranspiration losses which would have occurred naturally prior to construction of such reservoirs.

Some other miscellaneous and minor adjustments also occur from time to time as reported by Colorado.

Net Adjustments (Column 9)

This column is the sum of Columns 7 and 8.

Supply

This section tabulates the Conejos Index Supply on a monthly basis and as an accumulated total throughout the year.

Supply in Month (Column 10)

⁹ The RGCC has acted several times to exempt numerous small reservoirs within both Colorado and New Mexico from being subject to Compact administration. For example, by Resolution in 1962, the RGCC exempted eight such reservoirs in New Mexico with storage capacity ranging from 35 to 254 acre-feet and totaling 665 acre-feet, and four such reservoirs in Colorado with storage capacity ranging from 38 to 913 acre-feet and totaling 1,400 acre-feet. By Resolution of 1975, the RGCC resolved that Nambe Falls Reservoir may be operated as if the water stored therein were all San Juan-Chama Project water, thus Nambe Falls Reservoir storage is not subject to Compact administration. In 2000, the RGCC exempted Acomita Reservoir, on San Fidel Arroyo off of the Rio San Jose in New Mexico, from Compact administration.

¹⁰ Article I(f) of the Compact defines "Transmountain Diversion" as water imported into the drainage basin of the Rio Grande from any stream system outside of the Rio Grande Basin, exclusive of the Closed Basin. The Compact Rules require that any such water be measured at the point of delivery into the Rio Grande Basin and proper allowance made for transit or conveyance losses from such points to the Index Gaging Station on the stream with which the imported waters are comingled. The term "Transmountain Water" as used in this report is synonymous with Transmountain Diversion.

The Conejos Index Supply for the month is the total measured flow at the Conejos River at Mogote, the Los Pinos near Ortiz and the San Antonio at Ortiz plus the net adjustments from Column 9.

Accumulated Total (Column 11)

The accumulated Conejos Index Supply is the accrued total throughout the year.

3.1.2 Rio Grande Index Supply

The term “Rio Grande Index Supply” is not formally defined in the Compact. The original (1940) Colorado ledger sheet used the term “Rio Grande Supply”. The term “Rio Grande Index Supply” came into use with the 1949 Colorado ledger sheet. It is based on the gaged flow of the Rio Grande near Del Norte as adjusted for upstream reservoir storage and other adjustments made in accordance with the section entitled “New or Increased Depletions” of the Compact Rules.

Recorded Flow near Del Norte (Column 12)

This gaging station was established in 1890. Station records are rated good, except for winter months, which are fair. The station is operated by the Colorado Division of Water Resources. Records are collected and computed by the Colorado Division of Water Resources and reviewed by the USGS. Flow in the Rio Grande above the station is regulated by four reservoirs with a combined capacity of about 126,000 acre-feet constructed prior to 1929 and thus not subject to Compact accounting.¹¹ There are also nine additional much smaller reservoirs above the Del Norte station, seven of which are subject to Compact accounting and two which are not.. Six transmountain diversions import water from the Colorado River Basin into the Rio Grande Basin above the station.

Adjustments

Adjustments for new or increased depletions resulting from constructed works which alter, or may be expected to alter, the flow at the Rio Grande near Del Norte gaging station is made in accordance with the section entitled “New or Increased Depletions” of the Compact Rules.

Reservoir Storage (Column 13)

Reservoir storage affecting the Rio Grande Index Supply and subject to Compact accounting (constructed or enlarged after 1937) currently consists of seven small reservoirs above the Rio Grande near Del Norte gaging station ranging in size from between 43 and 2,437 acre-feet in

¹¹ Beaver Creek Reservoir constructed in 1910, Santa Maria Reservoir in 1912, Rio Grande Reservoir in 1912, and Continental Reservoir in 1925.

capacity. Most of these reservoirs contain Transmountain Water by exchange, which is not subject to the Compact per Article X and hence is not included in the Compact accounting. Two other reservoirs above the Del Norte gage constructed after 1937 were omitted from Compact accounting by the Compact Commission in 1962 (Troutvale No. 2 with a capacity of 257 acre-feet, and Jumper Creek Reservoir with a capacity of 38 acre-feet).

Change in Storage (Column 14)

This column shows the change (increase or decrease) in reservoir storage affecting the Rio Grande Index Supply on a monthly basis.

Trans-Mountain Diversions (Column 15)

Article X of the Compact exempts water diverted from another basin and transported into the Rio Grande Basin (Transmountain Water) from the delivery requirements of the Compact. As discussed above, the Compact Rules (section entitled “Transmountain Diversions”) require that all Transmountain Water imported into the Rio Grande Basin be measured at its point of delivery into the basin and that proper allowances be made for conveyance losses from such points to the Index Gaging Station on the stream with which the imported waters are commingled.

Data for this column is provided by the Colorado Division of Water Resources. Historical notes compiled by the Secretary to the Commission indicate that the total amount of Transmountain Water diverted into the Rio Grande Basin above Lobatos is traditionally entered in Column 15 as a single value in the month of July.

Other Adjustments (Column 16)

Other adjustments to the Rio Grande Index Supply consist primarily of net evaporation on Rio Grande water stored in seven small reservoirs above the Rio Grande near Del Norte gaging station ranging in size from between 43 and 2,437 acre-feet in capacity. Most of these reservoirs contain Transmountain Water by exchange, which is not subject to the Compact per Article X, therefore the evaporation of such water is not included in the Compact accounting.

Net Adjustments (Column 17)

This column is the sum of Columns 14 through 16.

Supply

This section tabulates the Rio Grande Index Supply on a monthly basis and as an accumulated total throughout the year.

Supply in Month (Column 18)

The Rio Grande Index Supply for the month is the total measured flow at the Rio Grande near Del Norte plus the net adjustments from Column 17.

Accumulated Total (Column 19)

The accumulated The Rio Grande Index Supply is the accrued total throughout the year.

3.1.3 Deliveries

This section tabulates actual deliveries by Colorado to the Colorado-New Mexico state line.

Conejos River at Mouths near Lasasuses (Column 20)

This column tabulates the combined flow of the Conejos River just about its confluence with the Rio Grande. The Conejos River bifurcates above the confluence, and the combined discharge is recorded at two separate stream gages, collectively considered as one gaging station (Conejos River near Lasasuses).

This gaging station was established in 1922. Station records are rated good. Flow at the station has been partly regulated by Platoro Reservoir since 1951. Records are collected and computed by the Colorado Division of Water Resources and reviewed by the USGS.

Rio Grande less Conejos River (Column 21)

This column tabulates the quantity of flow recorded at the Rio Grande at Lobatos, less the flow recorded in the Conejos River at Mouths near Lasasuses.

Rio Grande at Lobatos (Column 22)

This column tabulates the flow of the Rio Grande at Lobatos, which is located about 5.7 miles north of the Colorado-New Mexico state line. This gaging station was established in 1899. Station records are rated good. Records are collected and computed by the Colorado Division of Water Resources and reviewed by the USGS.

The last paragraph of Article III of the Compact mandates that Colorado not receive credit for any amount of water delivered from works constructed after

1937 to the Rio Grande from the Closed Basin¹² if such water is of insufficient quality.¹³ In such cases, the gaged flow in this column is reduced by the non-creditable amount, and a note of the amount and relevant month(s) included in the “Remarks” section.

Accumulated Total at Lobatos

The accumulated Delivery is the accrued total throughout the year.

3.1.4 Summary of (Colorado) Debits and Credits

Balance at Beginning of Calendar Year (Line C1)

This is the accrued balance at the end of the previous calendar year, either a debit or a credit.

Scheduled Delivery from Conejos River (Line C2)

This is the amount of flow required by the Compact to pass the gaging station Conejos River near Lasasues. It is calculated pursuant to the schedule entitled “Discharge of Conejos River” in Article III of the Compact, using the year end accumulated total of the Conejos Index Supply from Column 10. The resulting value is entered as a debit.

Scheduled Delivery from Rio Grande (Line C3)

This is the amount of flow required by the Compact to pass the gaging station Rio Grande near Lobatos. It is calculated pursuant to the schedule entitled “Discharge of Rio Grande Exclusive of Conejos River” in Article III of the Compact, using the year end accumulated total of the Rio Grande Index Supply from Column 18. The resulting value is entered as a debit.

Actual Delivery at Lobatos plus 10,000 Acre-Feet (Line C4)

This is the actual amount of flow recorded for the calendar by the gaging station Rio Grande near Lobatos (Column 22). Per Article III of the Compact, the obligation of Colorado to deliver water in the Rio Grande at the Colorado-New Mexico state line, in each calendar year, is 10,000 acre-feet less than the scheduled delivery. The 10,000 acre-feet is added as a credit to the calendar year total from Column 22, and the resulting sum is entered as a credit on Line C4).

Reduction of Debits on account of Evaporation (Line C5)

¹² Article I(d) of the Compact defines the “Closed Basin” as that part of the Rio Grande Basin in Colorado where the streams drain into the San Luis Lakes and adjacent territory, and do not normally contribute to the flow of the Rio Grande.

¹³ No credit is received for water in which the proportion of sodium ions exceeds 45 percent of the total positive ions in that water when the total dissolved solids of such water exceeds 350 parts per million.

This is amount of evaporation that occurs on debit water¹⁴ stored pursuant to the second paragraph of Article VI of the Compact. This debit evaporation loss is entered as a credit on Line C5 pursuant to the Compact Rules (section entitled “Evaporation Loses”).

Reduction of Credits on account of Evaporation (Line C6)

This is the amount of evaporation that occurs on Colorado Credit Water¹⁵ stored in Rio Grande Project Storage. It is entered as a debit on Line C6.

Line C7

This line is used for miscellaneous accounting entries such as a relinquishment of Accrued Credits to Rio Grande Project Storage, miscellaneous revisions or corrections to the accounting of previous years, or any other adjustment resulting in a credit or debit to deliveries by Colorado to the state line. Article I(j) of the Compact defines “Accrued Credits” as the amounts by which the sum of all Annual Credits¹⁶ exceeds the sum of all Annual Debits over any common period of time.

Balance at End of Calendar Year (Line C8)

This line sums the various Annual Debits¹⁷ and credits entered on Lines C2 through C7, plus the balance at the beginning of the year from Line C1. A credit balance at the end of the year indicates that Colorado is in an Accrued Credit accounting status.

A debit balance at the end of the year indicates that Colorado is in an Accrued Debit accounting status. Article I(i) of the Compact defines “Accrued Debits” as the amounts by which the sum of all Annual Debits exceeds the sum of all Annual Credits over any common period of time.

Remarks

This section is used to record miscellaneous notes meant to document and explain certain accounting entries.

Approvals

¹⁴ The second paragraph of Article VI requires Colorado to retain in storage in reservoirs constructed after 1937 in the Rio Grande Basin upstream of Lobatos an amount of water equivalent to that of its Accrued Debit, for so long as it remains in such accounting status. This stored water is termed “debit water” or “debit storage”. This storage is tracked by summing the amount of storage shown in Columns 6 and 13.

¹⁵ Credit Water is defined in Article I(m) of the Compact as the amount of water in Rio Grande Project Storage which is equal to the Accrued Credit of Colorado, or New Mexico, or both.

¹⁶ Article I(h) of the Compact defines “Annual Credits” as the amount by which actual deliveries in any calendar year exceed scheduled deliveries.

¹⁷ Article I(g) of the Compact defines “Annual Debits” as the amount by which actual deliveries in any calendar year exceed scheduled deliveries.

A section of the ledger sheets for the Engineer Advisers to initial and date the accounting indicating their approval was added commencing with the 2001 accounting.

3.2 Deliveries by New Mexico at Elephant Butte Reservoir

The ledger sheet use to track the accounting required by the Compact of deliveries by New Mexico of waters of the Rio Grande Basin to Elephant Butte Reservoir is entitled “Deliveries by New Mexico at Elephant Butte”. It consists of three major sections: the “Otowi Index Supply”, the “Elephant Butte Effective Supply”, and “Summary of Debits and Credits”. There is also a minor section entitled “Total Water Stored in New Mexico Above San Marcial at End of Month”, and a section labeled “Remarks” for recording clarifying notes.

3.2.1 Otowi Index Supply

The Otowi Index Supply is defined in Article IV(5) of the Compact¹⁸ as the recorded flow of the Rio Grande at the USGS gaging station at Otowi Bridge near San Ildefonso during the calendar year, corrected for the operation of reservoirs constructed after 1929 in the drainage basin of the Rio Grande between Lobatos and Otowi Bridge.

Adjustments to the natural flow of the Rio Grande measured at Otowi Bridge are made in accordance with the section entitled “New or Increased Depletions” of the Compact Rules.

Recorded Flow at Otowi Bridge (Column 2)

This gaging station was first established in 1895, with continuous record from 1905 thereafter. Station records are rated fair. Flow at the station is regulated by Heron, El Vado and Abiquiu Reservoirs in the Rio Chama Basin upstream of Otowi Bridge. The station is operated by the USGS in cooperation with the NMISC.

Adjustments

Adjustments for new or increased depletions resulting from constructed works which alter, or may be expected to alter, the flow at the Rio Grande at Otowi Bridge is made in accordance with the section entitled “New or Increased Depletions” of the Compact Rules.

Reservoir: Lobatos to Otowi

¹⁸ The Compact originally defined the Otowi Index Supply as the recorded flow at the Otowi Bridge gaging station for the calendar year exclusive of the months of July, August, and September. The Commission, by Resolution in 1948 essentially amended Article IV by revising the Otowi Index Supply and associated delivery schedule (and by replacing the San Marcial Index Supply with the Elephant Butte Index Supply). The 1948 Resolution required that in order for the Resolution to take effect, the Attorneys General of Colorado, New Mexico and Texas must issue opinions approving the Resolution within 120 days of its passage. Such opinions were issued.

Storage at End of Month (Column 3)

Reservoir storage currently¹⁹ affecting the Otowi Index Supply and subject to Compact accounting (constructed or enlarged after 1929) include Heron Reservoir on Willow Creek (in the Rio Chama Basin above El Vado Reservoir), and El Vado and Abiquiu Reservoirs. Heron Reservoir (401,000 acre-feet capacity) is not authorized to store native Rio Grande Basin water, and any such storage captured in the reservoir is generally released on a monthly basis. El Vado (186,250 acre-feet capacity) and Abiquiu (1,192,800 acre-feet capacity) Reservoirs store both Rio Grande Basin water and Transmountain Water diverted from the Colorado River Basin to the Rio Grande Basin by the San Juan-Chama Project. San Juan-Chama Project Transmountain Water is not subject to the Compact per Article X and hence is not included in the Compact accounting. El Vado reservoir is owned by the Middle Rio Grande Conservancy District and operated by the U.S. Bureau of Reclamation. Abiquiu Reservoir is owned and operated by the U.S. Army Corps of Engineers.

Change in Storage (Column 4)

This column shows the change (increase or decrease) in reservoir storage affecting the Otowi Index Supply on a monthly basis.

Reservoir Evaporation (Column 5)

This column shows the net evaporation on Rio Grande water stored in El Vado and Abiquiu Reservoirs. "Net evaporation" is defined in the Compact Rules for New Mexico reservoirs constructed after 1929 as the actual loss from the reservoir surface less the evapotranspiration losses which would have occurred naturally prior to construction of such reservoirs.

Other Adjustments (Column 6)

Other miscellaneous and minor adjustments which occur from time to time as reported by New Mexico are recorded in this column.

¹⁹ See note 8 supra.

Trans-Mountain Diversions (Column 7)

This column is the amount of San Juan-Chama Project water accounted as having passed by and recorded at the Otowi Bridge gaging station. Data for this column is provided by the U.S. Bureau of Reclamation, which prepares annual reports for submission to the Engineer Advisers accounting for all San Juan-Chama Project operations²⁰ in New Mexico. The accounting rules for San Juan-Chama Project water were established by the 1963 “Green Book”²¹.

Net Adjustments (Column 8)

This column is the sum of Columns 4, 5, 6 and 7.

Index Supply

This section tabulates the Otowi Index Supply on a monthly basis and as an accumulated total throughout the year.

During Month (Column 9)

The Otowi Index Supply for the month is the measured flow at the Otowi Bridge gaging station (Column 2) plus the net adjustments from Column 8.

Accumulated Total (Column 10)

The accumulated Otowi Index Supply is the accrued total throughout the year.

3.2.2 Total Water Stored in New Mexico above San Marcial at End of Month (Column 11)

This column shows the total amount of Rio Grande water in storage in reservoirs in New Mexico constructed after 1929 in the Rio Grande Basin between Lobatos and San Marcial subject to the Compact. This data is used to track the requirement in the third paragraph of Article VI that New Mexico retain in storage an amount of water

²⁰ As used herein, the term “operations” refers to San Juan-Chama Project diversions in Colorado, conveyance to New Mexico, storage in Heron Reservoir and other reservoirs throughout the Rio Grande Basin, conveyance to San Juan-Chama Project contractors’ individual points of diversion within New Mexico, and all such diversions. It does not include estimates of consumptive use of San Juan-Chama Project water. San Juan-Chama Project water has been stored at various times in Heron, El Vado and Abiquiu Reservoirs in the Rio Chama Basin; Nambe Falls Reservoir on the Rio Nambe; McClure and Nichols Reservoirs on the Santa Fe River; Jemez Canyon Reservoir on the Jemez River; and Cochiti and Elephant Butte Reservoirs on the Rio Grande.

²¹ “Accounting of Water, San Juan-Chama Project, Colorado-New Mexico”, U.S. Bureau of Reclamation, 1963. The Green Book was prepared pursuant to Paragraph 8(e) of PL 83-483, the authorizing legislation for the San Juan-Chama Project, which required that details for the accounting of San Juan-Chama Project water be developed through joint efforts of the RGCC, the Upper Colorado River Commission, the project contractors, and the appropriate agencies of the United States and of Colorado, New Mexico and Texas.

equivalent to its Accrued Debit in such reservoirs at all times. Transmountain Water is not included in such storage.

3.2.3 Elephant Butte Effective Index Supply

The Elephant Butte Effective Index Supply is defined in the Compact (in the 1948 RGCC Resolution which amended Article IV) as the recorded flow of the Rio Grande at the gaging station below Elephant Butte Dam during the calendar year plus the net gain in storage in Elephant Butte Reservoir during the same year or minus the net loss in storage in said reservoir, as the case may be.

Storage in Elephant Butte Reservoir (Column 12)

This column shows the amount of water in storage in Elephant Butte Reservoir, excluding any San Juan-Chama Project Transmountain Water. Elephant Butte Reservoir was constructed in 1915 and has a current storage capacity of 2,024,600 acre-feet.²² Congress authorized the creation of a permanent 50,000 acre-feet recreation pool consisting of San Juan-Chama Project water in the reservoir in 1974²³. In 1979 the New Mexico Legislature authorized the State Park and Recreation Division of the Natural Resources Department to purchase water rights above Elephant Butte Reservoir for use to offset the annual evaporative loss from the recreation pool authorized by P.L. 93-493. In 1981 Congress (P.L. 97-140) authorized the Secretary of the Interior to enter into contracts with the San Juan-Chama Project contractors to store San Juan-Chama Project water in the reservoir.²⁴

Change in Storage (Column 13)

This column shows the change (increase or decrease) in Elephant Butte Reservoir storage.

Recorded Flow below Elephant Butte Dam (Column 14)

This gaging station (Rio Grande below Elephant Butte Dam) was established in 1915, located about one mile below Elephant Butte Dam. Station records since

²² Current storage capacity as determined from the 2007 Elephant Butte Reservoir sediment survey conducted by Reclamation. Original capacity at the completion of construction and commencement of storage in 1915 was 2,638,900 acre-ft. The reservoir has lost over 600,000 acre-feet of storage space since its construction due to sediment inflow.

²³ Title XIV of P.L. 93-493 authorized the Secretary of the Interior to establish a minimum recreation pool in Elephant Butte Reservoir of 50,000 acre-feet, to be filled with a one-time release of San Juan-Chama Project water from Heron Reservoir.

²⁴ In response to P.L. 93-493, P.L. 97-140, and the New Mexico Legislative actions the RGCC passed three Resolutions in 1974, 1979 and 1981 which require that Usable Water defined in Article I(l) not include any San Juan-Chama Project water stored in Elephant Butte Reservoir, that neither the spill of Credit Water nor Actual Spill shall occur until all San Juan-Chama Project stored in the reservoir has spilled, and specify how evaporation of San Juan-Chama Project water stored in Elephant Butte Reservoir is to be accounted.

2014 are rated good. Flow at the station is regulated by Elephant Butte Reservoir.

Effective Supply

This section tabulates the Elephant Butte Effective Supply on a monthly basis and as an accumulated total throughout the year.

During Month (Column 15)

The Elephant Butte Effective Supply for the month is the net change in storage (excluding any San Juan-Chama Project Transmountain Water) in Elephant Butte Reservoir (Column 13) plus the recorded flow below Elephant Butte Dam for the month (Column 15).

Accumulated Total (Column 16)

The Elephant Butte Effective Supply accumulated total is the accrued total throughout the year.

3.2.4 New Mexico Debits and Credits

Balance at Beginning of Calendar Year (Line NM1)

This is the accrued balance at the end of the previous calendar year, either a debit or a credit.

Scheduled Delivery at Elephant Butte Reservoir (Line NM2)

This is the amount of water required by the Compact to be delivered to Elephant Butte Reservoir. It is calculated pursuant to the schedule entitled “Discharge of Rio Grande at Otowi Bridge and Elephant Butte Effective Supply” in Article IV (as amended by the Commission’s 1948 Resolution), using the year end accumulated total of the Otowi Index Supply from Column 10. The resulting value is entered as a debit.

Actual Elephant Butte Effective Supply (Line NM3)

This is the actual delivery to Elephant Butte Reservoir for the calendar year as measured by the change in reservoir storage plus the flow recorded by the gaging station Rio Grande below Elephant Butte Dam (Column 15). It is entered as a credit.

Reduction of Debits on Account of Evaporation (Line NM4)

This is amount of evaporation that occurs on debit water²⁵ stored pursuant to the third paragraph of Article VI of the Compact. This debit evaporation loss is

²⁵ The third paragraph of Article VI requires New Mexico to retain in storage in reservoirs constructed after 1929 in the Rio Grande Basin between Lobatos and San Marcial an amount of water equivalent to that of its Accrued Debit,

entered as a credit on Line NM4 pursuant to the Compact Rules (section entitled “Evaporation Loses”).

Reduction of Credits on account of Evaporation and Spill (Line NM5)

This is the amount of evaporation that occurs on New Mexico Credit Water stored in Rio Grande Project Storage, if any, plus the amount of spill of New Mexico Credit Water stored in Elephant Butte Reservoir, if any.²⁶ It is entered as a debit on Line NM5.

Line NM6 and NM7

These lines are used for miscellaneous accounting entries such as a relinquishment of Accrued Credits to Rio Grande Project Storage, miscellaneous revisions or corrections to the accounting of previous years, or any other adjustment resulting in a credit or debit to deliveries by New Mexico at Elephant Butte Reservoir.

Balance at End of Calendar Year (Line NM8)

This line sums the various Annual Debits and credits entered on Lines NM2 through NM7, plus the balance at the beginning of the year from Line NM1.

A credit balance at the end of the year indicates that New Mexico is in an Accrued Credit accounting status. Article I(j) of the Compact defines Accrued Credits as the amounts by which the sum of all Annual Credits exceeds the sum of all Annual Debits over any common period of time.

A debit balance at the end of the year indicates that New Mexico is in an Accrued Debit accounting status. Article I(i) of the Compact defines Accrued Debits as the amounts by which the sum of all Annual Debits exceeds the sum of all Annual Credits over any common period of time.

for so long as it remains in such accounting status. This stored water is termed “debit water” or “debit storage”. This storage is tracked by summing the amount of storage shown in Columns 6 and 13.

²⁶ On a side note, New Mexico has been charged twice for the evaporation of water from its Accrued Credits stored in Elephant Butte Reservoir since the 1948 RGCC resolution changing New Mexico point of delivery under the Compact. New Mexico’s delivery to Elephant Butte Reservoir is accounted as the change in storage within the reservoir plus the release of water from the reservoir as recorded by the gaging station below the dam. Change in reservoir storage is a function of inflows and outflows, precipitation on the reservoir surface, seepage losses, and evaporation from the reservoir surface. Therefore, all the evaporation that physically occurs is included within Column 13 of the New Mexico ledger sheet. Subtraction of evaporation from New Mexico’s Accrued Credits on Line NM4 thus results of double accounting of that evaporation. Furthermore, the evaporation from Colorado’s Accrued Credits and any San Juan-Chama Project water stored in Elephant Butte Reservoir is also double accounted.

Remarks

This section is used to record miscellaneous notes to document and explain certain accounting entries.

Approvals

The section for the Engineer Advisers to initial and date the accounting ledger sheets was added commencing with the 2001 accounting.

3.3 Release and Spill from Rio Grande Project Storage

The ledger sheet use to track the accounting of water after it has been delivered to Elephant Butte Reservoir is entitled "Release and Spill from Project Storage". It consists of four major sections: "Usable Water in Storage", "Credit Water in Storage", and "Rio Grande below Caballo Dam", and "Summary of Debits and Credits". There are also four separate columns recording miscellaneous storage quantities and a section labeled "Remarks" for recording clarifying notes.

3.3.1 Total Rio Grande Project Storage Capacity Available at End of Month (Column 2)

This column records the amount of storage space within the Rio Grande Project²⁷ available for storage of Rio Grande Project water. Commencing in 1998 the Compact Commission began reserving a portion of the available storage space in Elephant Butte Reservoir for flood control purposes.²⁸ This resulted in a reduction in the amount of storage space available for Rio Grande Project Storage.

The Compact Rules (in the section entitled "Reservoir Capacities") require that the area and capacity of each reservoir in the Rio Grande Basin which stores water subject to the Compact be resurveyed whenever it appears that the tables of area and capacity are in error by more than five percent.

3.3.2 Usable Water in Storage

Usable Water is defined at Article I(l) of the Compact as all water, exclusive of Credit Water, which is in Rio Grande Project Storage and which is available for release in accordance with irrigation demands, including deliveries to New Mexico. The 1974

²⁷ The Rio Grande Project was authorized by the Newlands Reclamation Act of 1902 (P.L. 57-161). As noted earlier, the Compact defines Rio Grande Project Storage as the combined capacity of Elephant Butte Reservoir and all other reservoirs actually available for the storage of Usable Water below Elephant Butte and above the first diversions to lands of the Rio Grande Project, but not more than a total of 2,638,860 acre-feet (which is the original capacity of Elephant Butte Reservoir when constructed in 1915). The total capacity of Rio Grande Project Storage has been substantially reduced since that time due to the sediment inflow into Elephant Butte Reservoir. Total capacity of Rio Grande Project Storage is currently 1,974,600 acre-feet (April through September) and 1,999,600 acre-feet (October through March) as adopted by the RGCC in 2009 with reservation for flood control storage at Elephant Butte Reservoir of 50,000 acre-feet from April through September and 25,000 acre-feet from October through March.

²⁸ The 1998 Resolution of the Commission reserved 50,000 acre-feet of storage space for flood control purposes for the months of April through September, and 25,000 acre-feet for the months of October through March.

Resolution of the Compact Commission exempted any San Juan-Chama Project water stored in Elephant Butte from being accounted as Usable Water.

Elephant Butte Reservoir (Column 3)

This column shows the amount of water in storage in Elephant Butte Reservoir, excluding any San Juan-Chama Project Transmountain Water and excluding the Accrued Credits of Colorado and New Mexico.

Caballo Reservoir (Column 4)

This column shows the amount of water in storage in Caballo Reservoir, excluding any Accrued Credits of Colorado and New Mexico.²⁹

Total at End of Month (Column 5)

This column shows the total amount of Usable Water in Rio Grande Project Storage at the end of each month. It consists of the sum of Columns 3 and 4.

3.3.3 Unfilled Capacity of Rio Grande Project Storage at End of Month (Column 6)

This column shows the amount of space in Rio Grande Project reservoirs (Unfilled Capacity) available to store additional Usable Water. Article I(n) of the Compact defines “Unfilled Capacity” as the difference between the total physical capacity of Rio Grande Project Storage and the amount of Usable Water in Rio Grande Project Storage. Unfilled Capacity is tracked for purposes of the eighth paragraph of Article VI, which requires that in any year in which the sum of the Accrued Debits of Colorado and New Mexico exceed the minimum Unfilled Capacity of Rio Grande Project Storage, such debits shall be reduced proportionally to an aggregate amount equal to such minimum Unfilled Capacity.

3.3.4 Credit Water in Storage

This section tracks the amount of Accrued Credits of New Mexico and Colorado in Rio Grande Project Storage.

Colorado Credit Water (Column 7)

This column records the amount of Accrued Credits of Colorado in Rio Grande Project Storage.

²⁹ The last paragraph of Article VI of the Compact states that Accrued Credits are stored in reservoirs between San Marcial and Courchesne. Courchesne is located on the Rio Grande a few miles north of El Paso, Texas just east of Sunland Park, New Mexico. Accrued Credits are generally stored in Elephant Butte Reservoir, unless spilled and subsequently captured in Caballo Reservoir.

New Mexico Credit Water (Column 8)

This column records the amount of Accrued Credits of New Mexico in Rio Grande Project Storage.

Total at End of Month (Column 9)

This column records the total amount of Accrued Credits in Rio Grande Project Storage.

3.3.5 Flood Water in Storage at Caballo Reservoir at End of Month (Column 10)

This column tracks and records the amount of flood water stored in Caballo Reservoir at the end of the month. Such storage consists of either flood flows entering the reservoir from tributaries below Elephant Butte Reservoir, or Actual Spill³⁰ from Elephant Butte Reservoir retained in Caballo Reservoir for downstream flood control purposes.

3.3.6 Total Water in Rio Grande Project Storage at End of Month (Column 11)

This column tracks the total amount of water of all types (Usable Water, San Juan-Chama Project Water, Accrued Credits and flood water) monthly.

3.3.7 Rio Grande below Caballo Dam

This section tracks the amount and types of water released from Caballo Reservoir.

Measured Flow at Caballo Gaging Station (Column 12)

This gaging station was first established in 1938. Station records are rated good. Flow at the station is regulated by Elephant Butte and Caballo Reservoirs. The station is located about 4,200 feet downstream of Caballo Dam.

Intervening Diversions to Canals (Column 13)

This column records the amount of water diverted directly from Caballo Reservoir by the Bonita Lateral.

³⁰ Actual Spill is defined in Article I(p) of the Compact as water actually spilled from Elephant Butte Reservoir or water which is released from the reservoir for flood control purposes in excess of current demand on Rio Grande Project Storage and which does not become Usable Water by storage in another reservoir. Credit water in Rio Grande Project Storage spills first, and all such Credit Water must spill before Actual Spill of Usable Water occurs. In 1998, the RGCC resolved that Actual Spill would occur if the volume of water in the reservoir exceeded the total capacity of the reservoir less 25,000 acre-feet reserved for flood control purposes during the months of October through March inclusive and less 50,000 acre-feet for the months of April through September inclusive or when the sum of the amount of water released in excess of Rio Grande Project requirement plus storage exceeds the reservoir capacity less the capacity reserved for flood control purposes.

Total Release and Spill (Column 14)

This column is the sum of the flow measured at the Caballo Gaging Station (Column 12) plus diversion into the Bonito Lateral (Column 13).

3.3.8 Spill from Storage**Caballo Flood Water (Column 15)**

This column records any flood water entering Caballo Reservoir from tributaries below Elephant Butte Reservoir and subsequently lost to spill below Caballo Dam. Such water is not counted as release or Actual Spill of Usable Water.

Credit Water (Column 16)

This column records any Credit Water lost to spill below Caballo Dam.

Usable Water (Column 17)

This column records the amount of Usable Water lost to spill below Caballo Dam.

3.3.9 Usable Release**Net During Month (Column 18)**

This column records all water released from Caballo Reservoir, excepting only flood water entering the reservoir from tributaries below Elephant Butte Reservoir. It is the sum of Columns 14 (Total Release and Spill), 16 (Credit Water Spilled from Storage) and 17 (Usable Water Spilled from Storage).

Accumulated Total (Column 19)

This column records the total usable release below Caballo Dam throughout the course of the year.

3.3.10 Accrued Departure from Normal Release³¹**Accrued Departure at Beginning of Year (Line P1)**

This is the accrued departure from normal release at the end of the previous calendar year, either a debit or a credit.

Actual Release during Year (Line P2)

Article I(o) of the Compact defines "Actual Release" as the amount of Usable Water released in any calendar year from the lower-most reservoir comprising Project Storage. This is the accounted as the amount of Usable Water released

³¹ The term Normal Release is not formally defined in the Compact. However, Article VIII of the Compact does include the phrase "to the end that a normal release of 790,000 acre-feet may be made from Project Storage in that year."

from Rio Grande Project Storage below Caballo Dam, equal to the year-end total of Column 18.

Normal Release for Year (Line P3)

This is a constant value of 790,000 acre-feet per year.

Under Release in Excess of 150,000 Acre-Feet (Line P4)³²

This line is used to implement that section of the Compact Rules (entitled “Departures from Normal Releases”) which cap the under release of water from Rio Grande Project Storage at 150,000 acre-feet.

Accrued Departure at End of Year (Line P5)

This line sums the various Annual Debits and credits entered on Lines P2 through P7, plus the balance at the beginning of the year from Line P1.

3.3.11 Time of Hypothetical Spill³³

This section of the Release and Spill from Project Storage ledger sheet records the date a Hypothetical Spill was calculated to have occurred.

3.4 Approvals

The section for the Engineer Advisers to initial and date the accounting ledger sheets was added commencing with the 2001 accounting.

4.0 Accounting of Miscellaneous Provisions of Articles VI, VII and VIII

There are a number of miscellaneous provisions affecting Compact accounting in Article VI, VII and VIII of the Compact which are not readily captured in the ledger sheets. If and when such provisions are applied, they appear as one-time debits or credits to one or more of the ledger sheets. Typically, they are factored into the accounting as line items in the “Summary of Debits and Credits” section in the “Deliveries by Colorado at State Line” and “Deliveries by New Mexico at Elephant Butte” ledger sheets or the “Accrued Departure from Normal Release” section in the “Release and Spill from Project Storage” ledger sheet. A note or notes explaining such line items is usually provided in the “Remarks” section of the respective ledger sheet. Discussion of the quantification of the amount of the debit or credit and the event or events which resulted in

³² In accordance with the section of the Compact Rules entitled “Departure from Normal Releases” (adopted by the Compact Commission June 2, 1959; made effective January 1, 1952), the difference between the actual release from Rio Grande Project Storage and the normal release of 790,000 is limited to a maximum value of 150,000 acre-feet.

³³ Article I(q) defines Hypothetical Spill as the Actual Spill that would have occurred had water in excess of Rio Grande Project requirements (an average of 790,000 acre-feet per year) not been released from Project Storage. Per Compact Rules, no allowance is made for the difference between Actual and Hypothetical evaporation. Also, the Rules cap the amount of under-release of Usable Water at 150,000 acre-feet, as noted above. To date, Hypothetical Spill has not occurred.

their implementation is typically provided in the annual report of the Engineer Advisers to the RGCC.

4.1 Article VI Limitations on Annual and Accrued Debits of Colorado

Article VI of the Compact limits the amount of debit that Colorado may incur in any given year, either annual or accrued total, to 100,000 acre-feet, unless water is retained in storage in reservoirs constructed after 1937 in the Rio Grande basin above Lobatos (“post-1937 reservoirs”) thereby causing that value to be exceeded. Additionally, Article VI requires Colorado to retain in storage within the physical capacity of such reservoirs an amount of water equivalent to its Accrued Debit at all times (“Colorado debit storage”).

It must be noted that the Article VI debit restrictions applicable to Colorado’s delivery obligations under the Compact are mandated limitations. The restrictions are not accounting caps and can and have been exceeded by Colorado in the past. The restrictions do not change or factor into Colorado’s Annual or Accrued Debit or Credit status and do not appear as separate accounting entries in the portion of the ledger sheets entitled “Deliveries by Colorado at State Line”. The only accounting related to these debit limitations is the tabulation of storage in post-1937 reservoirs, which is provided in Columns 6 and 13 of those ledger sheets. The purpose of such tabulation is to document compliance with this portion of Article VI of the Compact.

4.2 Article VI Limitations on Annual and Accrued Debits of New Mexico

Article VI of the Compact limits the amount of debit that New Mexico may incur in any given year to 150,000 acre-feet plus the increased amount of storage in reservoirs constructed after 1929 in the drainage basin of the Rio Grande between Lobatos and San Marcial (“post-1929 reservoirs”), if any. This is an accounting cap which truncates any excessive debits, and which appears as an accounting entry in the portion of the “Deliveries by New Mexico at Elephant Butte” ledger sheets as a line item in the section entitled “Summary of Debits and Credits” when such conditions occur.

Article VI of the Compact also limits the amount of Accrued Debit that New Mexico may incur in any given year to 200,000 acre-feet, unless water is retained in post-1929 reservoirs, thereby causing that value to be exceeded. Additionally, Article VI requires New Mexico to retain in storage within the physical capacity of such reservoirs an amount of water equivalent to its Accrued Debit at all times (“New Mexico debit storage”). The only accounting related to this debit limitations is the tabulation of storage in post-1929 reservoirs, which is provided in Column 11 of the “Deliveries by New Mexico at Elephant Butte” ledger sheets. The purpose of such tabulation is to document compliance with this portion of Article VI of the Compact.

4.3 Article VI Cap on Annual Credits of Colorado and New Mexico

Article VI of the Compact caps or limits the annual credit that either Colorado or New Mexico may accrue in any given year to 150,000 acre-feet. This is an accounting cap which truncates any excessive credits, and which appears as an accounting entry in that portion of either the “Deliveries by Colorado at State Line” or “Deliveries by New Mexico at Elephant Butte” ledger

sheets as a line item in the section entitled “Summary of Debits and Credits” when such conditions occur.

There is no limitation on the total amount of Accrued Credit for either state.

4.4 Article VI Reduction of Accrued Credits of Colorado and New Mexico Due to Actual Spill

In any year in which an Actual Spill of water from Elephant Butte Reservoir occurs, the Accrued Credits as of the beginning of the year of Colorado, or New Mexico, or both, are reduced in proportion to their respective credits by the amount of such Actual Spill. Any increase in storage in reservoirs constructed after 1929 in the Rio Grande basin above San Marcial is added to the amount of Actual Spill. An Actual Spill greater in volume than the amount of Accrued Credit storage has the effect of reducing such Accrued Credits to zero. Additionally, any Credit Water authorized for release by the Commissioner for the states having Credit Water in Project Storage in advance of spill is to be accounted as Actual Spill.

The accounting of any reduction in Accrued Credits appears as an accounting entry in that portion of either the “Deliveries by Colorado at State Line” or “Deliveries by New Mexico at Elephant Butte” ledger sheets as a line item in the section entitled “Summary of Debits and Credits” when such conditions occur.

No Annual Credits are accounted for Colorado and New Mexico in a year in which Actual Spill occurs.

4.5 Article VI Cancellation of Accrued Debits of Colorado and New Mexico Due to Actual or Hypothetical Spill of Usable Water

In any year in which an actual or Hypothetical Spill of Usable Water occurs, the Accrued Debits as of the beginning of the year of Colorado, or New Mexico, or both are cancelled. The accounting of any reduction in Accrued Debits appears as an accounting entry in that portion of either the “Deliveries by Colorado at State Line” or “Deliveries by New Mexico at Elephant Butte” ledger sheets as a line item in the section entitled “Summary of Debits and Credits” when such conditions occur. Additionally, a portion of the “Release and Spill from Project Storage” ledger sheet is used to record the date on which a Hypothetical Spill was calculated to have occurred.

No Annual Debits are accounted for Colorado and New Mexico in a year in which Actual Spill occurs.

4.6 Article VI Reduction of Accrued Debits of Colorado and New Mexico when Such Debits Exceed the Minimum Unfilled Capacity of Rio Grande Project Storage

The Accrued Debits of Colorado and New Mexico are reduced proportionally to an amount equal to the amount of Unfilled Capacity in Rio Grande Project Storage in those years in which the amount of Unfilled Capacity is less than the sum of such Accrued Debits.

The accounting of any reduction in Accrued Debits appears as an accounting entry in that portion of either the “Deliveries by Colorado at State Line” or “Deliveries by New Mexico at Elephant Butte” ledger sheets as a line item in the section entitled “Summary of Debits and Credits” when such conditions occur. Additionally, clarifying notes should be added to the “Remarks” section of each of the three ledger sheets.

4.7 Article VI Reduction of Accrued Credits and Debits of Colorado and New Mexico Due to Evaporation Losses

Annual evaporation losses are charged annually (as a debit) against any Credit Water impounded in reservoirs between San Marcial and Courchesne. Any Accrued Debit water impounded in reservoirs above San Marcial are reduced for evaporative losses on that storage (as a credit). Such evaporative accounting is assessed in proportion to the amount of such credits or debits to the total amount of water in such reservoirs during the year.

The accounting of any such reduction in Accrued Debits or Credits appears as accounting entries in that portion of either the “Deliveries by Colorado at State Line” or “Deliveries by New Mexico at Elephant Butte” ledger sheets as a line item in the section entitled “Summary of Debits and Credits” when such conditions occur.

4.8 Article VII Limitation on Upstream Storage due to Lack of Usable Water in Rio Grande Project Storage

Article VII prohibits either Colorado or New Mexico from increasing storage in reservoirs constructed after 1929 whenever there is less than 400,000 acre-feet of Usable Water in Rio Grande Project Storage. The threshold value of 400,000 acre-feet is adjusted downward if annual releases from Rio Grande Project Storage have averaged more than 790,000 acre-feet since the time of the last Actual Spill. The amount of the downward adjustment is equal to 790,000 acre-feet minus the amount in which average Rio Grande Project releases exceeded 790,000 acre-feet. A note should be included in the “Remarks” section of the “Release and Spill from Project Storage” ledger sheet of the dates in which Usable Water was less than 400,000 acre-feet.

4.9 Article VII Relinquishment of Accrued Credits of Colorado and New Mexico

Either Colorado, or New Mexico, or both, may relinquish Accrued Credits impounded in Rio Grande Project Storage to Texas at any time. Texas may accept or decline such relinquishment. Upon acceptance, the state, or states, so relinquishing is entitled to store water in an amount

equivalent to the amount of water so relinquished during times in which the Article VII storage prohibition described directly above is in effect.

4.10 Article VIII Release of Accrued Debits of Colorado and New Mexico for the Purpose of Increasing Usable Water in Rio Grande Project Storage

Texas may demand that Colorado and New Mexico release debit water in storage, and New Mexico may demand that Colorado release debit water in storage, in reservoirs constructed after 1929, during the month of January for the purpose of increasing the quantity of Usable Water in Rio Grande Project Storage to 600,000 acre-feet by March 1 and to maintain such an amount until April 30th. Any such releases of debit water are to be made in proportion to the total debit of each state at the greatest rate practicable.

5.0 Accounting Disputes

A number of disputes between the Colorado, New Mexico and Texas have arisen since the Compact accounting went into effect in 1940, reflecting different positions on how the accounting should be performed.³⁴ Some, but not all, such disputes resulted in interstate litigation before the U.S. Supreme Court. Typically, when such disputes arise, the result from a bookkeeping point of view is that the Engineer Advisers produce multiple ledger sheets for each state for each year such disputes remain in effect. Once a dispute is resolved, the Compact accounting since the date such dispute arose is typically revised and final accounting ledger sheets for the years covered by the dispute are approved by the RGCC.

³⁴ Colorado, New Mexico and Texas have been in dispute over Compact accounting since 2011. That dispute has not been resolved as of the time of this report.

ATTACHMENT – 2018 Compact Accounting Sheets

Method 2: Reduce Credit Water for Evaporation at the End of the 2018 Calendar Year - Developed by Colorado and New Mexico
 RIO GRANDE COMPACT - DELIVERIES BY COLORADO AT STATE LINE
 YEAR 2018 - Method 2

Quantities in thousands of acre feet to nearest hundred

CONEJOS INDEX SUPPLY												RIO GRANDE INDEX SUPPLY								DELIVERIES				
MONTH	MEASURED FLOW				ADJUSTMENTS				SUPPLY				ADJUSTMENTS						SUPPLY		CONEJOS RIVER AT MOUTH NEAR LASAUCES	RIO GRANDE LESS CONEJOS RIVER	RIO GRANDE AT LOBATOS	ACCUMULATED TOTAL AT LOBATOS
	CONEJOS AT MOGOTE	LOS PINOS NEAR ORTIZ	SAN ANTONIO AT ORTIZ	TOTAL	STORAGE AT END OF MONTH ^a	CHANGE IN STORAGE ^b	OTHER ADJUSTMENTS	NET ADJUSTMENTS	SUPPLY IN MONTH	ACCUMULATED TOTAL	RECORDED FLOW NEAR DEL NORTE	STORAGE AT END OF MONTH	CHANGE IN STORAGE	TRANS MOUNTAIN DIVERSIONS ^c	OTHER ADJUSTMENTS ^d	NET ADJUSTMENTS	SUPPLY IN MONTH	ACCUMULATED TOTAL						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
JAN	3.7			3.7	18.6	-0.1			3.6	3.6	10.5	0.2				0.0	10.5	10.5	3.9	13.5	17.4	0.0		
FEB	3.1			3.1	18.6	0.0			3.1	6.7	10.2	0.2	0.0			0.0	10.2	20.7	4.0	15.1	19.1	36.5		
MAR	5.6			5.6	18.7	0.1			5.7	12.4	15.7	0.2	0.0			0.0	15.7	36.4	3.9	16.2	20.1	56.6		
APR	23.1	14.8	2.7	40.6	19.4	0.7			41.3	53.7	48.5	0.2	0.0			0.0	48.5	84.9	2.3	4.0	6.3	62.9		
MAY	52.2	11.8	0.5	64.5	19.2	-0.2	0.2		64.5	118.2	96.0	0.2	0.0			0.0	96.0	180.9	1.4	6.6	8.0	70.9		
JUN	18.2	1.9	0.0	20.1	17.1	-2.1	0.2		18.2	136.4	26.8	0.2	0.0			0.0	26.8	207.7	0.3	3.9	4.2	75.1		
JUL	7.3	1.0	0.0	8.3	14.9	-2.2	0.1		6.2	142.6	13.3	0.2	0.0	-3.1	0.3	-2.8	10.5	218.2	0.0	0.9	0.9	76.0		
AUG	3.4	0.7	0.0	4.1	14.1	-0.8	0.0		3.3	145.9	13.4	0.2	0.0			0.0	13.4	231.6	0.0	0.6	0.6	76.6		
SEPT	2.3	0.7	0.0	3.0	13.8	-0.3	0.1		2.8	148.7	14.0	0.2	0.0			0.0	14.0	245.6	0.0	0.6	0.6	77.2		
OCT	4.3	1.6	0.1	6.0	14.1	0.3	0.0		6.3	155.0	13.4	0.2	0.0			0.0	13.4	259.0	0.0	1.0	1.0	78.2		
NOV	3.4				13.8	-0.3	0.0		3.1	158.1	10.2	0.2	0.0			0.0	10.2	269.2	0.1	2.0	2.1	80.3		
DEC	2.6				13.5	-0.3	0.0		2.3	160.4	8.2	0.2	0.0			0.0	8.2	277.4	1.5	7.4	8.9	89.2		
YEAR	129.2	32.5	3.3	165.0		-5.2	0.6		160.4		280.2		0.0	-3.1	0.3	-2.8	277.4		17.4	71.8	89.2			
SUMMARY OF DEBITS AND CREDITS																								
ITEM																								
C1 Balance at Beginning of Year																								
C2 Scheduled Delivery from Conejos River																								
C3 Scheduled Delivery from Rio Grande																								
C4 Actual Delivery at Lobatos plus 10,000 Acre Feet																								
C5 Reduction of Debits a/c Evaporation ^e																								
C6 Reduction of Credits a/c Evaporation																								
C7																								
C8 Balance at End of Year																								
Cr 3.1																								

Remarks: Cols. 6 and 13 do not include transmountain water.

^a Evaporation loss post-compact reservoirs; report of the Engineer Adviser for Colorado.

^b 3,301 ac-ft minus 243 ac-ft pre-compact; report of the Engineer Adviser for Colorado.

^c Evaporation of debit water accounted as described in Article VI of the Rio Grande Compact.

^d Note: No relinquishment credit stored in 2018. Storage of relinquished credit to date has totaled 2,068 acre-feet; balance remaining is 932 acre-feet.

^e See Engineer Adviser report in regards to change of storage.

Remarks: Cols. 6 and 13 do not include transmountain water.
^a Evaporation loss post-compact reservoirs; report of the Engineer Adviser for Colorado.
^b 3,301 ac-ft minus 243 ac-ft pre-compact; report of the Engineer Adviser for Colorado.
^c Evaporation of debit water accounted as described in Article VI of the Rio Grande Compact.
^d Note: No relinquishment credit stored in 2018. Storage of relinquished credit to date has totaled 2,068 acre-feet; balance remaining is 932 acre-feet.
^e See Engineer Adviser report in regards to change of storage.

APPROVED: _____ Date: _____
 Engineer Adviser for Colorado Engineer Adviser for New Mexico Engineer Adviser for Texas

Method 2: Reduce Credit Water for Evaporation at the End of the 2018 Calendar Year - Developed by Colorado and New Mexico
 RIO GRANDE COMPACT - DELIVERIES BY NEW MEXICO AT ELEPHANT BUTTE
 YEAR 2018 - Method 2

Quantities in thousands of acre feet to nearest hundred

MONTH	OTOWI INDEX SUPPLY										ELEPHANT BUTTE EFFECTIVE SUPPLY				
	ADJUSTMENTS					INDEX SUPPLY					STORAGE IN ELEPHANT BUTTE RESERVOIR		Recorded Flow Below Elephant Butte Dam ^b		Effective Supply
	Recorded Flow at Otowi Bridge	Storage End of Month ^a	Change in Storage	Reservoir Evaporation	Other Adjustments	Trans-mountain Diversions ^d	Net Adjustments	During Month	Accumulated Total	Total Water Stored in New Mexico Above San Marcial at End of Month ^a	End of Month ^a	Change Gain (+) Loss (-)	During Month	Accumulated Total	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
JAN	41.1	39.8	41.9	2.1	0.1	-3.5	-1.3	39.8	39.8	41.3	425.1	458.0	0.1	33.0	33.0
FEB	38.2	45.2	3.3	0.1		-1.7	1.7	39.9	79.7	46.7	483.0	25.0	7.5	32.5	65.5
MAR	41.6	48.3	3.1	0.2		-2.2	1.1	42.7	122.4	49.3	434.9	-48.1	66.6	18.5	84.0
APR	48.9	58.5	10.2	0.4		-6.0	4.6	53.5	175.9	59.9	394.3	-40.6	48.6	8.0	92.0
MAY	59.4	34.1	-24.4	0.3		-9.1	-33.2	26.2	202.1	34.9	337.9	-56.4	59.8	3.4	95.4
JUN	60.9	0.0	-34.1	0.0		-19.0	-53.1	7.8	209.9	1.4	227.7	-110.2	110.7	0.5	95.9
JUL	52.4	0.0	0.0	-0.2		-41.1	-41.3	11.1	221.0	0.6	128.9	-98.8	107.8	9.0	104.9
AUG	48.7	0.0	0.0	-0.3		-35.2	-35.5	13.2	234.2	0.8	85.4	-43.5	57.0	13.5	118.4
SEPT	33.7	0.0	0.0	-0.3		-22.3	-22.6	11.1	245.3	0.8	58.7	-26.7	35.7	9.0	127.4
OCT	30.6	0.5	0.5	0.2		-13.6	-12.9	17.7	263.0	1.5	72.5	13.8	0.6	14.4	141.8
NOV	23.1	0.8	0.3	0.0		-2.6	-2.3	20.8	283.8	1.6	89.4	16.9	0.0	16.9	158.7
DEC	31.7	0.2	-0.6	0.1		-2.6	-3.1	28.6	312.4	-0.1	114.9	25.5	0.0	25.5	184.2
YEAR	510.3		-39.6	0.6		-158.9	-197.9	312.4				-310.2	494.4	184.2	

SUMMARY OF DEBITS AND CREDITS		
ITEM	DEBIT	CREDIT
NM1 Balance at Beginning of Year		
NM2 Scheduled Delivery at Elephant Butte	178.1	
NM3 Actual Elephant Butte Effective Supply		184.2
NM4 Reduction of Debits a/c Evaporation ^c		0.0
NM5 Reduction of Credits a/c Evaporation and Spill		
NM6		
NM7		
NM8 Balance at End of Year		Cr. 5.4

Remarks: Cols. 3, 11, and 12 do not include transmountain water.

a Note: In 2018, 47 acre-feet of relinquishment credit under previous relinquishment agreements was stored in New Mexico reservoirs. Storage of relinquished credit to date has totaled 288,328 acre-feet; balance remaining is 92,172 acre-feet.
 b Gage record reflects improved precision since 2016. A low bias in gaged flow during certain months due to algae growth was identified and addressed for 2018 forward. The low bias occurred for an undetermined amount of time. New Mexico will continue to coordinate with USGS to provide a more accurate gage record in the future.
 c Reduction of debits for evaporation of debit water stored in El Vado calculated in accordance with Article VI of the Compact. For 2018, values round to zero.
 d At the request of the New Mexico Engineer Adviser, in 2018 the San Juan-Chama Project water (SJCP) at Otowi has been reduced to account for depletions and associated transit losses of SJCP that occurred on the Rio Chama below Abiquiu during the months of June through October. See Table 8, Bureau of Reclamation 2018 Water Accounting Report.

APPROVED: _____ Date: _____ Engineer Adviser for Colorado
 _____ Date: _____ Engineer Adviser for New Mexico
 _____ Date: _____ Engineer Adviser for Texas

YEAR 2018 - Method 2

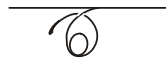
Quantities in thousands of acre feet to nearest hundred

RIO GRANDE BELOW CABALLO DAM																		
MONTH	Total Project Storage Capacity Available at End of Month ^a	USABLE WATER IN STORAGE			CREDIT WATER IN STORAGE				Flood Water in Storage in Caballo Reservoir at End of Month	Total Water in Project Storage at End of Month	Measured Flow at Caballo Gaging Station	Intervening Diversions to Canals	Total Release and Spill	SPILL FROM STORAGE			Usable Release	
		Elephant Butte Reservoir	Caballo Reservoir	Total at End of Month	Unfilled Capacity of Project Storage at End of Month	Colorado Credit Water ^c	New Mexico Credit Water ^c	Total at End of Month						Caballo Flood Water	Credit Water	Usable Water		Net During Month
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
JAN	1,999.6	458.0	37.7	495.7	1,503.9	0.0 ^b	0.0 ^b	0.0	495.7	0.1	0.0	0.0	0.1				0.1	0.1
FEB	1,999.6	483.0	44.5	527.5	1,472.1	0.0	0.0	0.0	527.5	0.0	0.0	0.1	0.1				0.1	0.2
MAR	1,999.6	434.9	57.9	492.8	1,506.8	0.0	0.0	0.0	492.8	47.8	0.1	0.1	47.9				47.9	48.1
APR	1,974.6	394.3	46.1	440.4	1,534.2	0.0	0.0	0.0	440.4	56.7	0.2	0.2	56.9				56.9	105.0
MAY	1,974.6	337.9	38.7	376.6	1,598.0	0.0	0.0	0.0	376.6	63.0	0.2	0.2	63.2				63.2	165.2
JUN	1,974.6	227.7	34.0	261.7	1,712.9	0.0	0.0	0.0	261.7	115.2	0.3	0.3	115.5				115.5	283.7
JUL	1,974.6	128.9	36.5	165.4	1,809.2	0.0	0.0	0.0	165.4	106.2	0.1	0.1	106.3				106.3	390.0
AUG	1,974.6	85.4	29.8	115.2	1,859.4	0.0	0.0	0.0	115.2	59.8	0.2	0.2	60.0				60.0	450.0
SEPT	1,974.6	58.7	23.9	82.6	1,892.0	0.0	0.0	0.0	82.6	42.7	0.2	0.2	42.9				42.9	492.9
OCT	1,999.6	72.5	25.8	98.3	1,901.3	0.0	0.0	0.0	98.3	0.0	0.0	0.0	-				0.0	492.9
NOV	1,999.6	89.4	25.9	115.3	1,884.3	0.0	0.0	0.0	115.3	0.0	0.0	0.0	-				0.0	492.9
DEC	1,999.6	114.9	26.7	141.6	1,858.0	0.0	0.0	0.0	141.6	0.1	0.0	0.0	0.1				0.1	493.0
YEAR										491.6	1.4	1.4	493.0	0.0	0.0	0.0	493.0	
ACCURRED DEPARTURE FROM NORMAL RELEASE																		
Remarks: Cols. 2, 6 and 11 reflect implementation of revised area-capacity tables for Elephant Butte and Caballo Reservoirs, effective Jan 1, 2009.																		
^a Project Storage Capacity is 1,974,600 acre-feet (April to September) and 1,999,600 acre-feet (October to March), as adopted by the Rio Grande Compact Commission on March 31, 2009, which includes flood control storage reservation at Elephant Butte Reservoir of 50,000 acre-feet from April through September and 25,000 acre-feet from October through March.																		
^b Based on Balance at Beginning of Year (C1 and NM1).																		
^c Credit water held constant during the year in accordance with Article VI and per direction of Compact Commission in March 2006. Evaporation for credit water is accounted at end of calendar year in the proportion that the credit water bore to the total amount of water in Elephant Butte Reservoir during the year. If loan had been approved, credit water would have been decreased by the amount of the negative usable water.																		
^d Due to Caballo release discrepancies during 2011, data was not approved for 2011; consequently, the accrued departure at the beginning of 2012, 2013, 2014, 2015, 2016, 2017 and 2018 could not be computed.																		
P1 Accrued Departure at Beginning of Year ^d																		
P2 Actual Release during Year																		
P3 Normal Release for Year																		
P4																		
P5																		
P6																		
P7 Accrued Departure at End of Year																		
TIME OF HYPOTHETICAL SPILL Not applicable																		

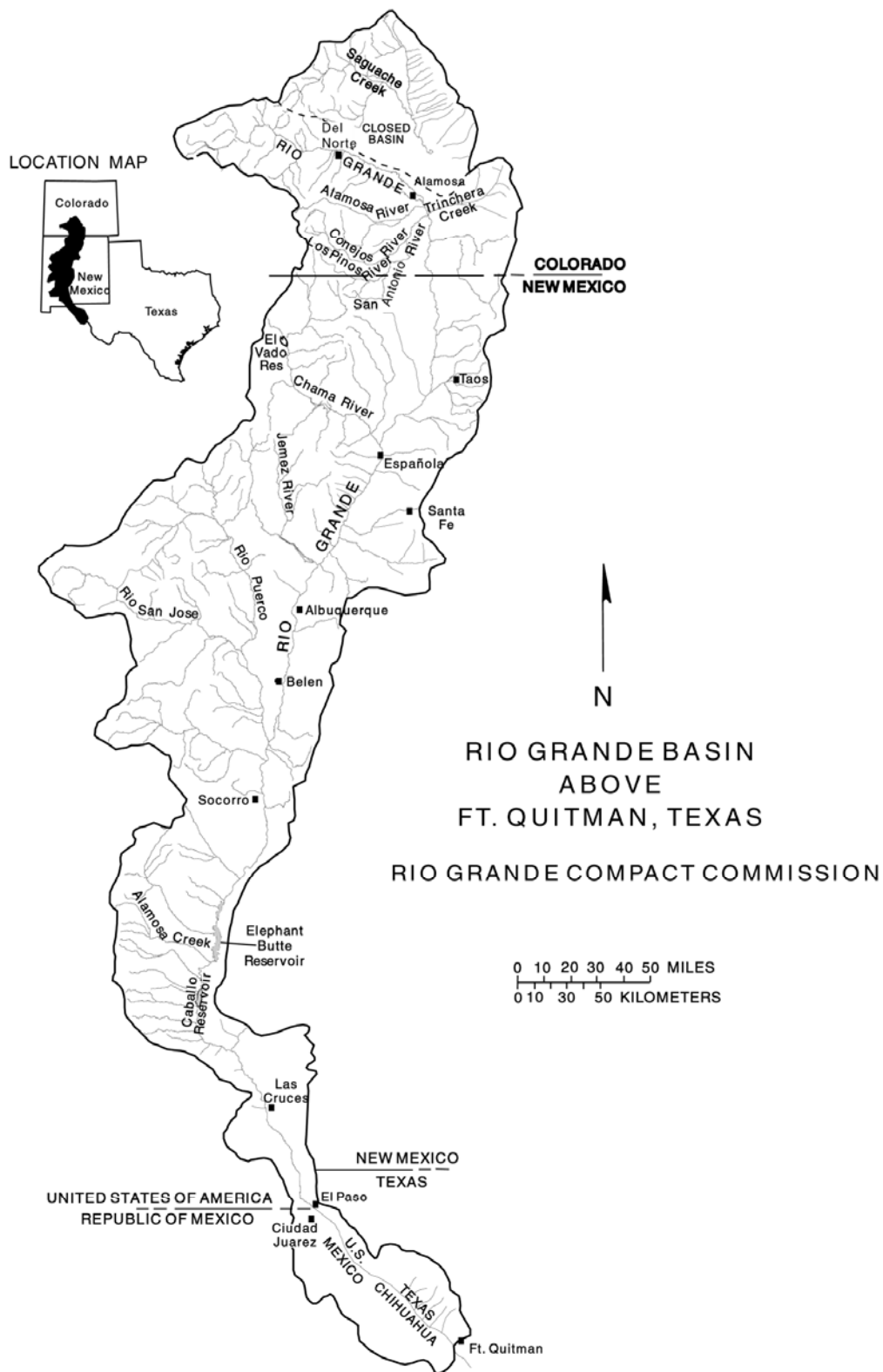
APPROVED: _____ Date: _____
Engineer Adviser for Colorado Engineer Adviser for New Mexico
Date: _____ Date: _____
Engineer Adviser for Texas

Appendix 6

**REPORT
of the
RIO GRANDE COMPACT
COMMISSION
2011**



**TO THE GOVERNORS OF
Colorado, New Mexico and Texas**



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**RIO GRANDE COMPACT COMMISSION
NEW MEXICO COLORADO TEXAS**

December 21, 2012

The Honorable Susana Martinez
Governor of the State of New Mexico
Santa Fe, New Mexico

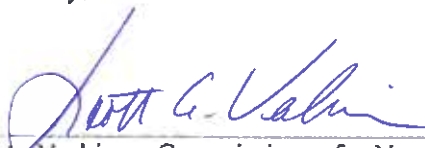
The Honorable John W. Hickenlooper
Governor of the State of Colorado
Denver, Colorado

The Honorable Rick Perry
Governor of the State of Texas
Austin, Texas

Honorable Governors:

Enclosed herewith is the 2011 Report of the Rio Grande Compact Commission.

Respectfully,



Scott A. Verhines, Commissioner for New Mexico



Dick Wolfe, Commissioner for Colorado



Patrick R. Gordon, Commissioner for Texas

**REPORT OF THE ENGINEER ADVISERS
TO THE RIO GRANDE COMPACT COMMISSION
March 16, 2012**

The Engineer Advisers to the Rio Grande Compact Commission met in Albuquerque on January 17 and 18, 2012, and in Santa Fe and Albuquerque, New Mexico from February 27 through March 2, 2012, to prepare the 2011 Rio Grande Compact (Compact) water accounting, discuss continuing and new issues in preparation for the 2012 annual meeting of the Rio Grande Compact Commission (Commission) and prepare the Engineer Adviser' report. The Engineer Advisers requested and received the participation of the U.S. Geological Survey (USGS), the U.S. Bureau of Reclamation (Reclamation), the U.S. Army Corps of Engineers (Corps), the U.S. Bureau of Indian Affairs (BIA), the International Boundary and Water Commission (IBWC), and the U.S. Fish and Wildlife Service (Service) to discuss in detail their specific water-related activities in the basin.

COMPACT ACCOUNTING –

The Engineer Advisers reviewed the streamflow and reservoir storage records and other pertinent data for calendar year 2011 and were unable to reach a consensus on the 2011 accounting. The lack of consensus arises from disagreement amongst the Texas Engineer Adviser and New Mexico and Colorado Engineer Advisers on certain actions taken by Reclamation in 2011 at Elephant Butte and Caballo reservoirs. In particular, the Engineer Advisers did not reach consensus on the reported record for the Rio Grande below Caballo Reservoir gage and on a method to account for accrued Credit Water and Usable Water in Rio Grande Project Storage during 2011. As a result, the Engineer Advisers were unable to reach consensus on how to finalize the 2011 Rio Grande Compact Delivery Tables for Colorado and New Mexico and the Release and Spill from Project Storage Table. The Engineer Advisers discussed several proposed accounting methods and decided to present them to the Rio Grande Compact Commission at its 2012 meeting. The proposed methods and/or the associated concerns and recommendations of the individual Engineer Advisers are outlined in two addenda to this report.

RIO GRANDE BASIN CONDITIONS

Snowmelt runoff levels in 2011 were below average in most of the basin in Colorado and New Mexico. Summer monsoon activity was below average throughout most of the basin. Usable Water in Project Storage was below the Article VII trigger of 400,000 acre-feet on January 1, 2011 and stayed below that level throughout the year. Platoro Reservoir reached 50 percent of capacity in June 2011. El Vado Reservoir was filled to approximately 80 percent of capacity near the end of May 2011. The San Juan-Chama Project (SJCP) delivered about 98,000 acre-feet through the Azotea Tunnel into the Rio Grande basin in 2011.

CONTINUING ISSUES

This section of the report summarizes issues previously addressed by the Engineer Advisers or the Commission. It reflects information obtained by the Engineer Advisers subsequent to the 2011 Commission meeting, including information obtained in the reports of the federal agencies at meetings with the Engineer Advisers or otherwise reported to the Engineer Advisers at the 2011 Engineer Adviser meeting. The term “reported” herein reflects information provided by various entities without analysis by the Engineer Advisers.

Federal Agency Responses to Rio Grande Compact Commission Requests -

In the 2010 Report of the Engineer Advisers to the Rio Grande Compact Commission, the Engineer Advisers made several specific requests of federal agencies for actions to be taken and/or information to be provided. The Rio Grande Compact Commission, at its 2011 meeting, approved the recommendations. The requests and resulting responses of the federal agencies are listed here:

Request:

- That the USGS and Reclamation cooperate to conduct discharge measurements at the Rio Grande below Elephant Butte gage this spring and fall for the normal range of stages experienced at the gage;

Response:

- The USGS conducted 42 discharge measurements in 2011 at various stages of flow. This is approximately twice the yearly number of measurements that have been made at this station in

recent years. These measurements were made at all ranges of stage experienced at the gage in 2011. Reclamation reported that they also made several measurements of flow at this gage during 2011. However, it is not clear what cooperation between the agencies occurred in regards to the discharge measurements at this site. The USGS did provide all their data regarding their measurements and shift adjustments during 2011 for the gage below Elephant Butte Reservoir.

Request:

- That the State of New Mexico and Reclamation continue to cooperate to verify reservoir stage at Caballo Reservoir during 2011 and 2012;

Response:

- The State of New Mexico and Reclamation have continued to verify that the reservoir stage at Caballo Reservoir is correct. See section on gaging station review.

Request:

- That Reclamation thoroughly document the procedures used to develop the gage record at the Rio Grande below Caballo gage including quality assurance, quality control, and data accessibility, and provide a report to the Engineer Advisers for review by September 30, 2011;

Response:

- Reclamation did not provide the Engineer Advisers with the requested information by September 2011. However, Reclamation did subsequently provide the Engineer Advisers with a plan, developed in concert with the USGS, documenting some of the procedures to be used in the future to develop the record at this gage. This plan included a quality assurance/quality control component. Reclamation did not indicate if this plan was used in the development of the 2011 Rio Grande below Caballo gage record.
- Request:
 - That Reclamation replace the F type chart recorder at the Rio Grande below Caballo gage with an A type chart recorder or a

second digital device such as a digital data recorder, and use the F type recorder only as a second back-up if needed. In addition, Reclamation should use the acoustic doppler velocity meter (ADVM) data to work out the final gage record;

Response:

- Reclamation reported that it has moved from using the F-type recorder as the primary record to using an electronic shaft encoder. Reclamation reported that an A-type recorder donated to Reclamation by Colorado is being used as a backup gage for daily operations. The ADVM was not functional in 2011.

Request:

- That Reclamation use the measurement data being collected during the current (March 2011) stable release from Caballo Reservoir and evaluate the measured data with the Caballo gage data. The comparison should be reported to the Engineer Advisers by May 1, 2011.

Response:

- As of this date, Reclamation has not provided a report to the Engineer Advisers. Reclamation has told the Engineer Advisers that the data was collected during the March 2011 stable release period by El Paso County Water Improvement District No. 1 (EP No. 1). However, this data apparently is still being reviewed. Reclamation assured the Engineer Advisers that a final report of this information would be forthcoming. The Engineer Advisers hope this information is available soon.

Request:

- That the USGS take regular discharge measurements at both the Rio Grande below Elephant Butte gage and Rio Grande below Caballo gage during the 2011 irrigation season (approximately once every two weeks and for a range of stages) and throughout the 2012 irrigation season, report the results to and coordinate with the Engineer Advisers, develop a shift relationship, and report gaged release volumes.

Response:

- The USGS conducted additional discharge measurements in 2011 at their gage below Elephant Butte Reservoir. The USGS also began developing a plan to make discharge measurements, develop a rating curve, and report gaged release volumes at the below Caballo gage. Following the lawsuit filed by the New Mexico Attorney General against Reclamation, the USGS reported that it was directed by the Department of Interior Solicitor in Salt Lake City not to proceed with a Joint Funding Agreement with New Mexico for this plan. Therefore, the USGS did not conduct work at the Rio Grande below Caballo gaging station during 2011. However, USGS employees have given training assistance to Reclamation employees to assist in the development of accurate discharge records for the Caballo gage. The USGS and Reclamation have collaborated on a joint proposal to increase the accuracy and reliability of the Elephant Butte and Caballo gaging stations. See section on gaging station review for additional details.

Request:

- That the USGS evaluate apparent changes to 2010 gage data for selected gages after the data had been approved as final and report back to the Engineer Advisers.

Response:

- The USGS reported their findings to the Engineer Advisers in March 2011 and indicated that the data will be finalized approximately every two months.

Request:

- That Reclamation evaluate the historical gain of San Juan-Chama water in El Vado and Abiquiu reservoirs for the period from 2002 through 2010 and report the results.

Response:

- Reclamation evaluated the increase of San Juan-Chama water in these reservoirs and reported their findings to the Engineer

Advisers in March 2011. See URGWOM Accounting Model section.

Request:

- The Colorado Engineer Adviser asked that Reclamation inform the Engineer Advisers of future meetings on the Operating Agreement.

Response:

- Reclamation did not provide notice to all of the Engineer Advisers of future dates or times for Reclamation's monthly allocation meetings until December of 2011. Reclamation has since provided notice to all of the Engineer Advisers of upcoming allocation team meetings. Meetings will be held on the second Tuesday of each month.

Additionally, the USGS New Mexico Director and Reclamation Albuquerque Area Manager participated in a portion of the February 2012 Engineer Adviser meeting and presented a draft proposal to help resolve the unresolved mass balance issues the Engineer Advisers and Rio Grande Compact Commission have been investigating for the past few years. The draft proposal is summarized in the gaging station review section below.

While not all of the information requested by the Rio Grande Compact Commission was provided, the Engineer Advisers were pleased with a number of the responses and thank the USGS Director and Reclamation Albuquerque Area Manager for their efforts to address the requests and stand ready to work with both agencies on the remaining unresolved requests.

Gaging Station Review --

The Engineer Advisers continue to monitor the water balance and gage records between Elephant Butte and Caballo reservoirs. The accuracy of stream gages in this reach is essential for compact accounting. The gage below Elephant Butte measures a portion of New Mexico's deliveries, and the gage below Caballo measures releases from Project Storage. Since 2005, the mass balance for that reach has indicated a significant deviation from historical characteristics (from 1940 to 2005). At its March 30, 2011 meeting, the Rio Grande Compact Commission approved several recommendations, as described above, to improve confidence in the gage records and the mass balance in that reach.

During 2011, the USGS and Reclamation developed the draft proposal for investigating the stream gages and the mass balance issue that was presented to the Engineer Advisers at the February 2012 meeting. The draft proposal describes a comprehensive study to investigate the unresolved gains and losses between the stream gages at San Marcial and Rio Grande below Caballo Reservoir. The Engineer Advisers expressed their appreciation to both agencies for their collaborative efforts to develop the proposal, supported moving forward, and recommended that the first priority be to improve gage records (infrastructure, measurement, analysis, review, transparency, and reporting) for the gages below Elephant Butte and Caballo reservoirs so the two sets of records can be evaluated in a consistent manner. The Texas Engineer Adviser recommends that a workgroup be established consisting of the USGS, Reclamation, the Engineer Advisers, and stakeholders who are asked to participate by any of the Engineer Advisers.

The USGS presented and discussed its gage record and process for developing the final record for the gage below Elephant Butte Reservoir for the 2011 calendar year and provided all station review materials to the Engineer Advisers.

Reclamation provided the USGS with its final below Caballo Reservoir gage record for 2011 but did not provide any back up information to support how the final record was developed. Reclamation did advise that the data was reviewed by several staff and by a USGS employee detailed to the Reclamation El Paso Office. While the review conducted by the USGS employee was not sanctioned by the USGS, Reclamation reported the reviewer has expertise in USGS data management, gage measurement methods, and gage operations and maintenance experience. Reclamation further reported that the review found some missing data but no significant errors and that the reviewer found the data to be approximately 1.3 percent different from what Reclamation had calculated with the data available. The documentation and data used in this review was not provided to the Engineer Advisers. The USGS reported that they do not conduct a technical review of the Caballo gage record, and in the past have simply published the data Reclamation provided them; but will no longer do so unless a detailed gage review is conducted by the USGS.

Because of the continuing unresolved questions about the Rio Grande below Caballo gage records described above, the New Mexico and Colorado Engineer Advisers cannot evaluate the gage record to determine its reliability at this time.

The Texas Engineer Adviser is unclear on exactly what specific errors or discrepancies the New Mexico and Colorado Engineer Advisers believe are occurring to make the Caballo gage completely unreliable at this time. The Texas Engineer Adviser understands the records of the Caballo gage do not undergo the typical USGS protocol; however, specific errors making the data unusable have not been identified.

The Engineer Advisers do recommend that Reclamation and the USGS collaborate as part of the refined draft proposal on data collection, that each conduct a technical review of the other's gage, and that they finalize their records for both gages approximately every two months to improve the accuracy of both the Rio Grande below Elephant Butte Reservoir and the Rio Grande gages below Caballo Reservoir gages and restore trust that the records are reliable. The Engineer Advisers are hopeful that such a collaborative process will address and resolve the questions about the mass balance issue.

During 2011, NMISC continued its survey of water level elevations in the reservoirs. The NMISC survey results matched the recorded elevations at Elephant Butte and Caballo Reservoirs.

As a result of the above issues, the mass balance on the reach between the gage below Elephant Butte Reservoir and Caballo Reservoir could not be developed for 2011. The New Mexico Engineer Adviser remains concerned about reported but as yet undocumented changes in the Rio Grande below Caballo gage methodology. The New Mexico and Colorado Engineer Advisers had hoped that use of the ADVIM at the gage and measurements by the USGS using USGS methods (as requested by the Rio Grande Compact Commission in 2011) at both the Rio Grande below Elephant Butte gage and Rio Grande below Caballo gage would put the mass balance issue to rest. However, neither action occurred. New Mexico indicated it still has money allocated from its current budget to allow for consistent gaging at the Rio Grande below Elephant Butte and Rio Grande below Caballo gages and continues to be ready to allocate the funds for use by the USGS in cooperation with Reclamation.

The Texas Engineer Adviser remains concerned with the continued annual change in stream bed conditions associated with the gage below Elephant Butte Reservoir. This change involves vegetation growth every irrigation season. The Texas Engineer Adviser believes the conditions require the USGS to monitor frequently in order to produce an accurate record, and the vegetation results in the

need for the USGS to apply significantly large shifts to the data collected. The Texas Engineer Adviser would ask that if the analysis to be performed by the committee he recommended above results in errors in the streamflow record being identified, that the data be reviewed for the last 10 years and be referred to the Commission for an adjustment to the Compact accounting to correct any errors.

Zebra Mussels/Quagga Mussels –

The Engineer Advisers continue to be concerned about the recent infestation of Zebra and Quagga mussels in several locations in Colorado and other neighboring states, and the possibility of infestation in waters of the Upper Rio Grande basin. Sumner, El Vado and Navajo reservoirs are suspect due to recent positive microscopic veliger tests. However, the DNA tests were negative. Reservoirs will be monitored on a monthly basis from April to November. Reclamation has purchased and operates three mobile decontamination units to help control the spread of the mussels, although resources are limited for boat inspections and decontamination.

Federal Agencies' Efforts towards a New Middle Rio Grande Biological Opinion -

The Corps and Reclamation prepared separate draft biological assessments (BAs) for their discretionary water management and flood control activities in the Middle Rio Grande in 2011. The Corps submitted their biological assessment to the Service in late October 2011 and is requesting a separate consultation from that of Reclamation's. Neither the State of New Mexico nor any other party was included in the proposed actions by the Corps.

Reclamation provided a draft of their biological Assessment (BA) to the State of New Mexico and other parties for review in August 2011. The BA included San Juan Chama Project operations in New Mexico and Middle Rio Grande Project operations but did not include river maintenance activities or State of New Mexico or other nonfederal actions other than MRGCD river diversions. Reclamation requested input on any proposed actions from nonfederal entities that they wish to have considered for coverage.

Reclamation is currently preparing a second draft BA with the intent of including all MRGCD water related operations, Reclamation's river maintenance activities, and other activities, such as those the State of New Mexico is providing

for inclusion in its proposed action and for the effect analysis. Reclamation also plans to include conservation measures in their BA using actions identified in the Recovery Implementation Program (RIP) currently being developed by the Middle Rio Grande Endangered Species Collaborative Program (Collaborative Program). Reclamation intends to provide the refined BA to the Service in April 2012 and anticipates several months of discussions resulting in a final BA in July 2012. New Mexico reported that ESA coverage is anticipated to be afforded through the RIP and Reclamation's final biological opinion (BO) for middle Rio Grande water users.

The Service indicated it still plans to review the two draft biological assessments once both have been received and prepare a single draft biological opinion by the end of February 2013. The Corps indicated it wants to consult separately and receive a separate BO for their discretionary operations; however, they still intend to remain committed to the Collaborative Program and wish to continue to be part of a RIP. The Service maintains their desire for one single BO for this re-consultation.

Compliance by Federal and State Agencies with State Water Law –

The Commission has previously adopted resolutions that requested the Corps, Reclamation, and the Service comply with state law by obtaining permits from the appropriate state agencies for any water related actions, including habitat restoration, that result in new or additional river depletions. Federal agency representatives have acknowledged the need to comply with applicable state laws regarding these projects.

The NMISC continued to coordinate with New Mexico Office of the State Engineer (NMOSE) regarding habitat restoration projects that require offset of depletions, including projects conducted by the Corps, Reclamation and NMISC. New Mexico reported these offsets are being made. In October 2011, the State Engineer issued a depletions offset policy for Habitat Restoration Projects in the Middle Rio Grande Project that provides guidance for those parties constructing habitat restoration projects in the middle Rio Grande basin. Reclamation, the Corps, and the ISC are exempted from a permit requirement due to their responsibilities for flood control and conveyance for compact deliveries. However, offsets for depletions from their projects are still necessary and must be accounted and reported to the OSE.

Rio Grande Salinity Management Coalition –

The Engineer Advisers continued to work with the Rio Grande Salinity Management Coalition (Coalition) evaluating the feasibility of salinity capture and treatment in the Rio Grande from San Acacia, New Mexico to Fort Quitman, Texas, with emphasis on the Rio Grande Project region. The primary objective of the Coalition is to identify and implement salinity reduction strategies that will reduce impacts, improve Rio Grande water quality, and extend existing water supplies in the fast-growing Rio Grande Project area.

The Coalition seeks to meet these goals through four phases of work:

- Phase 1 – Rio Grande Project Salinity Assessment;
- Phase 2 - Develop Salinity Management Alternatives and Feasibility;
- Phase 3 - Implement Pilot-Scale Salinity Control Project Testing;
- Phase 4 - Full Scale Control Project Implementation, Monitoring and Evaluation

The NMISC committed \$250,000 for the initial portion of the project. Those funds were used to match \$750,000 from the Corps' Section 729 authority in the Water Resources Development Act of 2007. The first phase of work, completed in early 2010, resulted in three deliverables: a geospatial salinity database; a USGS Rio Grande Salinity Assessment and Plan of Study; and a Rio Grande Economic Impact Assessment study.

Phase 2 of the project commenced in 2010 with feasible pilot project sites and alternative control strategies being identified. Texas will begin funding the next portion of Phase 2 in 2012 to match additional Corps funds. A contract amendment with the Corps has been finalized and is being circulated for signatures. Texas has committed \$100,000 to continue Phase 2 and initiate Phase 3 of the project. It is anticipated that additional state funding from Texas in the amount of \$150,000 will be forthcoming to complete additional portions of the project.

URGWOM Accounting Model -

During 2011, representatives of Reclamation, Corps, and NMISC met every other month and conducted quality assurance on model input river flow and reservoir data and reviewed San Juan Chama contractor releases and water exchanges. The issues that were discussed are: accuracy of Heron Reservoir

releases; evaporation data for Elephant Butte and Caballo reservoirs and the releases from Caballo Reservoir. Evaporation data and Caballo Reservoir releases were not available in time to properly complete draft accounting.

The Corps reported on model updates and developments which include: updating the PowerSim monthly model; extending URGWOM to include the Rio Grande in Colorado; developing the Lower Rio Grande portion of URGWOM; developing methods for water quality modeling in RiverWare and continue working on model calibration. The Corps also reported that the National Weather Service (NWS) has developed real-time watershed models that will be integrated with URGWOM to perform real-time water operations. In addition, Reclamation is now using the Hydrologic Database (HDB) to populate model inputs. Reclamation reported that data is sometimes input into this data base before is considered official.

URGWOM accounting procedures allocate a portion of precipitation falling on the reservoirs to stored SJCP and relinquishment water. Reclamation reported on the historical accounting practices for precipitation that allow for gain on San Juan-Chama water in El Vado and Abiquiu reservoirs for the period from 2002 to 2010. The Engineer Advisers evaluated the practice and concluded that the method used for allocating precipitation was consistent with past practice and the increases were not significant enough to warrant proposing a change to the accounting practices.

Elephant Butte Pilot Channel Project -

The pilot channel was successful in conveying the low flows from the 2011 snowmelt runoff into the active reservoir pool at Elephant Butte Reservoir. During the fall of 2011, New Mexico reported that the NMISC, working cooperatively with Reclamation, repaired spoil bank levees and removed accumulated sediment from the channel. Work occurred primarily between Indian Springs and the top of the Narrows. Work is scheduled to continue through early 2012 in preparation for the spring 2012 snow melt runoff. To date, New Mexico has spent more than \$11 million to construct and maintain the pilot channel.

In partial fulfillment of the Service's biological opinion for the pilot channel, NMISC continues to coordinate with Reclamation, New Mexico State Parks, and other stakeholders on a Southwestern willow flycatcher habitat restoration project below the reservoir to ensure compliance with the biological opinion.

Relinquishment Update –

Effective March 31, 2011, Colorado proposed and Texas accepted a relinquishment of 1,100 acre-feet of accrued credit in Elephant Butte Reservoir in exchange for 1,100 acre-feet of native water inadvertently stored in Platoro Reservoir.

During 2011, discussions were held and correspondence exchanged between the Engineer Advisers, Compact Commissioners, and Reclamation on a number of possible relinquishment proposals and credit water loan proposals of a portion of New Mexico's accrued Rio Grande credit water in Elephant Butte Reservoir. The first request was made in March, and discussions continued through the summer. However, none of the relinquishment requests or credit water loan proposals for use of New Mexico Accrued Credit Water were ultimately accepted by Texas.

Because of the lack of an agreement on the relinquishment or loan proposals by early July, the New Mexico Engineer Adviser assumed that all Rio Grande Project releases would cease soon thereafter. However, due to actions taken by Reclamation without prior approval of the Compact Commission, releases continued into September. The actions taken by Reclamation and the consequences of those actions, as viewed by each state, are outlined in the addenda to this report.

The Colorado and the New Mexico Engineer Advisers want to emphasize by mention in this report that relinquishment of Credit Water pursuant to the Rio Grande Compact is a discretionary decision of the upstream state having accrued Credit Water and as such is an integral and inseparable part of the agreement between the states that the Rio Grande Compact represents.

In 2011, both the United States and MRGCD stored relinquishment water in El Vado Reservoir. The United States stored a total of 20,000 acre-feet between May 8 and May 30, and MRGCD stored a total of 18,500 acre-feet between May 8 and May 25. The City of Santa Fe did not store any relinquishment water in 2011.

The total amount of accrued credit relinquished by New Mexico and accepted by Texas since 2003 is 380,500 acre-feet. Relinquishment water storage has occurred during 2003, 2004, 2006, 2010, and 2011 totaling 192,757 acre-feet. The majority of that relinquishment water has been released. At the end of 2011, there was a balance of 77,743 acre-feet of assigned relinquishment credit yet to be stored by MRGCD, the United States, or the City of Santa Fe in future years when

Article VII storage restrictions are in effect. The amount of unassigned relinquishment credit available for assignment and capture in future years totals 110,000 acre-feet.

YEAR 2011 OPERATIONS

Closed Basin Project -

The total production of the Closed Basin Project in 2011 was 15,167 acre-feet, with 11,579 acre-feet of that amount delivered to the Rio Grande. All of the water delivered to the Rio Grande in 2011 was of sufficient quality to qualify for credit under the Compact. Reclamation continues to address problems of biofouling in the production wells of the Closed Basin Project. Reclamation replaced six wells in 2011 that were most affected by iron bacteria, and rehabilitated numerous other wells. To date, 65 of the 150 original wells have been replaced. Wells will continue to be replaced as budgetary constraints allow in an effort to help maintain production of the project. The Closed Basin Operating Committee continues to monitor groundwater levels and groundwater production and adjust project operations pursuant to the enabling legislation.

Platoro Reservoir Operations for 2011 –

Platoro Reservoir is a post-Compact Reservoir on the Conejos River. In the winter, Platoro Reservoir is nearly inaccessible. For this reason, the outflow gates are kept at a constant setting. At times, the inflow may exceed these gate settings, causing inadvertent storage of water. In November and December of 2011, approximately 400 acre-feet of native water was inadvertently stored while provisions of Article VII were in effect.

During May 2011, the Conejos Water Conservancy District stored pre-Compact direct flow water by exchange in Platoro Reservoir. This pre-Compact water was re-regulated and released later in the summer to better meet the crop irrigation requirements. This operation is done routinely pursuant to a Colorado Water Court decree which allows pre-Compact irrigation water, which otherwise would have been diverted to irrigate crops, to be stored for a short time in Platoro Reservoir and then released later in the same season to meet irrigation demands. All of the re-regulated water was accounted for and released during the summer of 2011, thereby not affecting the Conejos index supply. This re-regulation of pre-

Compact water rights has occurred previously while Article VII restrictions have been in place, and this practice has been discussed multiple times in previous Engineer Advisers reports and in Compact Commission meetings. At no previous time did either New Mexico or Texas object to this action.

The Engineer Adviser for Texas points out that while this action has occurred and been reported historically, Article VII of the Compact says *Neither Colorado nor New Mexico shall increase the amount of water in storage in reservoirs constructed after 1929 whenever there is less than 400,000 acre-feet of usable water in project storage.....*

Colorado Groundwater Regulations –

The State Engineer of Colorado is in the continuing process of developing rules and regulations concerning the use of groundwater in the Upper Rio Grande Basin in Colorado. These rules will require the owners of most large capacity wells in the Rio Grande Basin in Colorado to develop a plan to augment any injurious depletions which their wells may cause to other water rights. In the alternative, the owners may enter into an agreement with a subdistrict to replace those depletions through a groundwater management plan. The area's first groundwater subdistrict plan was approved by the district judge in the fall of 2010 and upheld by the Colorado Supreme Court in December 2011. That groundwater subdistrict will begin making replacements of injurious depletions May 1, 2012. Six other subdistricts are in various stages of formation.

Reclamation's Supplemental Water Program -

Reclamation's supplemental water program is intended to provide additional water, primarily obtained through the voluntary leasing of San Juan-Chama Project (SJCP) water, for endangered species needs and compliance with the 2003 Biological Opinion. In 2011, Reclamation reported it released a total of 20,415 acre-feet of leased SJCP water to assure compliance with the dry year flow targets of the 2003 Biological Opinion. Supplemental water releases were made from late March through October.

SJCP water leased for the program is released for diversion and use by the MRGCD, which, in turn, allows an equivalent amount of native Rio Grande water (less conveyance losses) to remain in the river.

Reclamation indicated it continued to maintain portable pumping stations at four locations in the San Acacia reach. The pumps were operated from late March through early November to pump 14,477 acre-feet from the Low Flow Conveyance Channel (LFCC) to the Rio Grande under a permit issued by the New Mexico Office of the State Engineer.

San Juan-Chama Project Water Conveyance Losses –

In 2009, the Engineer Advisers recommended that URGWOM be used to evaluate SJCP conveyance losses between Cochiti and Elephant Butte Reservoirs because the previously approved rates were based on LFCC use and thus were no longer valid. Based upon that evaluation, the Engineer Advisers recommended that a single loss rate value for each month of the year be developed for accounting of conveyance losses for future routing of SJCP water to storage in Elephant Butte Reservoir. And, until a loss rate value(s) was approved by the Commission, that routing loss rates between Cochiti Reservoir and Elephant Butte Reservoir be determined on a case-by-case basis.

In 2010 and 2011, the Engineer Advisers and Reclamation investigated different approaches to developing fixed monthly loss rates for routing water between Cochiti and Elephant Butte reservoirs and agreed on an acceptable option. The Engineer Advisers now recommend that the Compact Commission approve the San Juan-Chama conveyance loss rates described in the memo (copy attached) from Bureau of Reclamation dated March 2, 2012. These guidelines specify that no SJCP water can be moved while the USACE is in flood operations, that releases should not occur during river drying, that releases must end by November 30 of each calendar year, and that any SJCP water moved outside of the pre-determined loss rate parameters will have loss rates determined on a case-by-case basis. The Engineer Advisers thank the Reclamation staff that worked to develop the recommendation for a job well done.

Accounting of Evaporation as part of New Mexico Deliveries -

At the Engineer Adviser meeting in February 2012, New Mexico reported that it had identified a possible problem with the Rio Grande compact accounting methodology for evaporation from Elephant Butte Reservoir. New Mexico reported that, in a year such as 2011, it would be charged for approximately 110,000 acre-feet of evaporation loss from Elephant Butte Reservoir against its

delivery (through actual evaporation loss and the credit water compensation method in Article VI) in a year when recorded data indicates that approximately 70,000 acre-feet of water actually evaporated from the reservoir. New Mexico further reported that they do not believe that it makes sense for New Mexico to be charged for more evaporation than actually occurs. Therefore, the New Mexico Engineer Adviser requested that Colorado and Texas review their files concerning development of the 1948 resolution and coordinate with New Mexico to better understand the issue. And, at the request of the Texas Engineer Adviser, the New Mexico Engineer Adviser agreed to draft a paper outlining the issue in more detail.

REPORTS OF THE FEDERAL AGENCIES

Representatives of Reclamation, Corps, Service, IBWC, USGS, and BIA presented reports to the Engineer Advisers from February 27 through March 1, 2012.

2011 Rio Grande Project Operations and Storage -

Reclamation reported a final 2011 release from Caballo Reservoir of 396,444 acre-feet (approximately 50% of a full release) for all three Rio Grande Project water users: EP No. 1, Elephant Butte Irrigation District (EBID), and Mexico. During 2011, Mexico's diversion allocation was 25,649 acre-feet. Reclamation's allocation to EBID at the diversion headings was 77,104 acre-feet (which included 20,015 in its carryover account), and EP No.1's allocation at the diversion headings was 267,814 acre-feet (which included 224,348 acre-feet in its carryover account).

Reclamation reported that inflow to Elephant Butte Reservoir was 307,474 acre-feet (36% of the 97-year average). During the irrigation season (March 1 to September 9), Reclamation reported that 405,919 acre-feet of water was released from Elephant Butte Reservoir. Elephant Butte Reservoir peaked at about 504,808 acre-feet (elevation 4,341.03 feet) on March 1, 2011, and storage at Caballo Reservoir peaked at about 66,013 acre-feet (4,150.09 feet) on May 6, 2011. End-of-year storage at Elephant Butte Reservoir was about 294,518 acre-feet, which included 55,264 acre-feet of SJCP water. The end of year storage at Caballo Reservoir was 13,604 acre-feet. Reclamation further reported that Usable Water in Project Storage remained below the Article VII limit for the entire year.

At the 2011 Engineer Adviser meeting, New Mexico asked a number of questions about Reclamation's 2011 Rio Grande Project Allocation spreadsheets. The El Paso Office Manager of Reclamation promised to provide the Engineer Advisers Reclamation's final end -of-month Rio Grande Project Allocation Spreadsheets for each month during 2011 before the end of the Engineer Adviser meeting and to answer a question concerning an apparent discrepancy between the manner in which EP No. 1's 2011 allocation was reduced in March, April, and May of 2011 and that required in the Rio Grande Project Operations Manual. As of March 14, 2012, Reclamation had not provided the requested information to the Engineer Advisers or answered the question.

The Colorado Engineer Adviser asked Reclamation's Albuquerque Area Manager about the federal government's claim in the New Mexico adjudication case that the United States had a right to "all the unappropriated water of the Rio Grande and its tributaries," including tributary groundwater, with an appropriation date of either 1844 or 1890. The Area Manager stated that this claim for water from the Rio Grande did not extend into Colorado.

Reclamation's Rio Grande Project Operations Plan for 2012 –

Reclamation reported Rio Grande Project diversion allocations as of February 1, 2012. Reclamation estimates that Elephant Butte Reservoir storage would peak at 561,000 acre-feet in June, with a minimum storage of 257,000 acre-feet in October. Reclamation estimates that the maximum storage in Caballo Reservoir would be 55,000 acre-feet during June, with a minimum storage of 10,000 acre-feet in October.

Reclamation anticipates releases to begin from Caballo Reservoir for the Rio Grande Project in May or June 2012. Reclamation also reported that they anticipate Article VII restrictions will remain in effect for the entire year.

Vegetation Management at Elephant Butte and Caballo Reservoirs -

Reclamation continued vegetation management efforts at Elephant Butte and Caballo reservoirs in 2011 through a cooperative agreement funded by the NMISC. Reclamation reported that during the 2011 fiscal year, a total of 4,038 acres were treated at Elephant Butte and Caballo reservoirs under the program by mowing, mulching and/or grubbing. There were no herbicide applications in

2011. During the last seven years, approximately 6,931 acres (of mostly salt cedar) have been treated at both reservoirs.

Middle Rio Grande Project Channel Maintenance -

Reclamation provided a presentation regarding the status of its Middle Rio Grande Project river maintenance program. Reclamation is actively engaged in work on 19 priority sites. They have identified where bank erosion or reduced channel capacity could cause levee failure, resulting in flooding and reduction in water delivery, as well as damage to irrigation infrastructure. Five of the 19 priority sites require annual review of channel capacity and maintenance needs due to sediment accumulation. Since 2004, Reclamation has implemented long-term fixes at fifteen priority sites. In 2011, Reclamation completed work at two priority sites.

Cochiti Reservoir Deviation -

Previously, the Commission passed a motion approving, with certain conditions, the Corps proposal to implement a five-year water operations strategy at Cochiti Lake and Jemez Canyon Reservoir. The strategy includes deviations from normal operations at Cochiti Lake and/or Jemez Canyon Reservoir to provide downstream recruitment and overbank flows for the benefit of the Rio Grande silvery minnow and the Southwestern willow flycatcher. For the Corps to implement a deviation under the strategy:

- New Mexico must be in an accrued credit status at the beginning of the year,
- The Corps must coordinate with Reclamation, the Service, NMISC, Pueblo de Cochiti, Santa Ana Pueblo, and the Engineer Advisers on the implementation of a deviation, including determining if a deviation is possible and whether a recruitment or overbanking flow is determined beneficial,
- The Corps must secure water or water rights and assure their availability for offset of additional depletions projected to result from a deviation before those operations are conducted in a given year, and
- The Corps must secure the specific advice and consent of the Commission at its annual meeting during each year of the term of the proposed deviation to determine if the conditions of the Resolution are met before a deviation may occur.

The Corps did request a deviation from normal operations in 2011 and secured the advice and consent of the Commission at its March 30, 2011 meeting. However, the deviation was not executed due to the insufficient runoff volume to accommodate demand and deviation storage.

For 2012, the Corps does anticipate requesting the advice and consent of the Commission for a spring 2012 deviation at its March 21, 2012 meeting.

2011 Six Middle Rio Grande Pueblos Prior and Paramount Operations -

The BIA provided a report on 2011 Prior and Paramount storage and release activities, projected 2012 storage and release activities, and discussed additional details on the background and general methodology for Prior and Paramount storage operations and releases with the Engineer Advisers.

Reclamation and BIA individually reported that 16,500 acre-feet was stored in El Vado Reservoir for delivery of irrigation water (including estimated evaporation losses) to the Prior and Paramount lands of the six Middle Rio Grande Pueblos in 2011 in the event that natural flows were insufficient. The 16,500 acre-feet was stored in May when the Article VII storage restriction was in effect. None of the water was released for Prior and Paramount uses during 2011. It was held in storage until November when it was released for delivery to Elephant Butte Reservoir before the end of the calendar year. Based on the February 1, 2012 most probable snowmelt runoff forecast, the BIA reported that Reclamation will likely store between 16,500 and 21,500 acre-feet in 2012.

The Engineer Advisers remain concerned about the procedures for quantifying storage, release and delivery of water for the Prior and Paramount lands of the six Middle Rio Grande Pueblos. The Texas Engineer Adviser remains concerned about the storage of native Rio Grande water in El Vado Reservoir by Reclamation when the storage restrictions of Article VII are in effect.

San Acacia Levee Project -

In November 2009, the Corps completed a Review Plan Limited Re-evaluation Report (Review Plan) for the San Acacia Levee Project. The project originally was intended to replace the existing 46 mile-long spoil bank levee from San Acacia to San Marcial with an engineered levee. The Review Plan reaffirmed

the economic justification, engineering design and alternative formulation for the project, as described in the 2009 Engineer Adviser report.

The Corps indicated the estimated total project cost is approximately \$140 million and will be complete in phases. Phase 1 will be construction of the Socorro portion of the levee, beginning at the Socorro North Diversion Channel proceeding south towards the Brown Arroyo outlet.

The Corps has prepared a reevaluation report and is preparing a supplemental EIS which they anticipate will be completed in 2012. The Corps indicated that the President's FY12 budget included \$10 million for this project, and they hope to award the construction contract in 2012. The New Mexico Engineer Adviser reported that the NMISC and the MRGCD have authorized the use of \$600,000 (\$300,000 each) towards Phase 1 of the project and that the MRGCD, in collaboration with the NMISC, was successful in receiving legislative authority to provide additional cost share for Phase 1 of the project through the New Mexico Water Trust Board.

Southwestern Willow Flycatcher –

Reclamation continues to conduct Southwestern willow flycatcher surveys and nest monitoring along the Rio Grande. In 2011, Reclamation reported 318 territories in the Elephant Butte Reservoir area. Riparian vegetation within the uppermost levels of the conservation pool of Elephant Butte Reservoir holds the largest breeding population of flycatchers in New Mexico. The flycatcher territories continue to move further south as the reservoir recedes.

The new Service proposal for critical habitat (August 2011) includes the Elephant Butte Reservoir pool. Reclamation, along with Texas, New Mexico and Colorado, have asked the Service to exclude Elephant Butte Reservoir from the final critical habitat designation. In addition, New Mexico has asked the Service to consider excluding the proposed critical habitat between Percha Diversion Dam and Leasburg Diversion Dam in the valley below Caballo Reservoir. The Service reported that it will soon publish a NEPA report and economic analysis for the proposed rule for public review and that they anticipate the final rule will be published in August 2012.

Reclamation reported it will initiate ESA Section 7 consultation associated with its Rio Grande Project operations in 2012. Reclamation indicated that a draft flycatcher management plan for the Rio Grande Project has been submitted to the

Service for consideration. The Engineer Advisers requested Reclamation provide a copy of the management plan, but it had not been received by the time this report was finalized.

Colorado reported that the Rio Grande Water Conservation District has submitted a Habitat Conservation Plan (HCP) for the Southwestern willow flycatcher in the San Luis Valley of Colorado. If approved by the Service, this plan could alleviate the need to designate the San Luis Valley as critical habitat for the flycatcher.

The Service indicated concerns over predation of flycatcher in the Elephant Butte area from feral hogs and raccoons.

Middle Rio Grande Endangered Species Act Collaborative Program -

The Collaborative Program continues to work to protect endangered species within the middle Rio Grande and aid federal agencies to comply with the 2003 Biological Opinion. Collaborative Program activities include, but are not limited to, water acquisition, LFCC pumping, Collaborative Program management actions, habitat restoration, silvery minnow augmentation, and numerous other projects. Cost share from non-federal signatories has been accounted, and the 25 percent match is being met.

As mentioned briefly earlier, the Collaborative Program is seeking to transition to a RIP within its program area. The goal of the RIP is to implement actions designed to conserve and contribute to the recovery of the endangered species and to protect water uses in the MRG by serving as the Endangered Species Act (ESA) compliance vehicle. It is anticipated that Reclamation's new MRG water operations programmatic BA, scheduled for completion in 2013 in a Service BO that Reclamation accepts, will identify the RIP as the conservation measure offsetting the effects of water uses in the MRG.

2003 Middle Rio Grande Programmatic Biological Opinion -

The Service reported that the 2003 Biological Opinion continued to provide ESA compliance for Reclamation and the Corps in 2011. Dry year flow targets were in effect, and as a result, a continuous flow was required in the middle valley through June 15, 2010 and 100 cubic feet per second at the Central Albuquerque gage for the remainder of the irrigation season. However, nine miles of river drying occurred in April 2011. Service Law enforcement investigated the incident.

The Service also reported that most elements of the BO have been or continue to be achieved, although progress on some elements has been limited. Outstanding elements required by the Biological Opinion are relocating the San Marcial railroad bridge and providing fish passage around in-stream barriers to up-stream silvery minnow movement.

Rio Grande Silvery Minnow -

The Service reported that they conducted silvery minnow rescue operations along 39.5 miles of the main channel of the Rio Grande in the Isleta and San Acacia reaches between June 25 and October 26, 2011. Those operations involved salvaging, transporting and releasing 10,387 silvery minnow. Incidental take was reported as 116 silvery minnow, which was well within the allowable incidental take limit.

The Service reported that 190,838 marked silvery minnow were released in the Isleta and San Acacia reaches during the November of 2011. The Service reported that during the October 2011 sampling effort, Rio Grande silvery minnow were present at 8 of the 20 sites monitored, compared to 15 of 20 sites in 2010. Silvery minnows catch rates were highest at the San Acacia reach monitoring sites and lowest at the Angostura reach sites. There was evidence of spawning in spring of 2011, but recruitment success throughout the Middle Rio Grande was fairly low in 2011 because of the poor spring runoff and low summer flows.

The Service reported there were 136,774 wild-caught eggs collected for propagation during the runoff in 2011. This met the Services target for egg collection in 2011.

Silvery Minnow Reintroduction in Big Bend-Texas -

The Service initiated reintroduction of silvery minnow in 2008. They reported releasing approximately 304,600 silvery minnow into the Big Bend reach of the Rio Grande in Texas in October 2011. The Service plans to release approximately 200,000 silvery minnow in 2013, the final year of the current program. Silvery minnow reintroduced in this reach are designated as experimental nonessential under Section 10(j) of the Endangered Species Act. The Service's continued monitoring documented adult silvery minnow at 14 of 57 sites, including one 17 miles upstream and one 70 miles downstream of release locations. The collections included all life stages of the silvery minnow.

International Boundary and Water Commission Activities -

The IBWC provided a report of its activities along the Rio Grande in New Mexico and Texas during 2011. IBWC discussed improvement activities at the American Dam, their 5-year dam safety inspections, and work activities related to remediation of IBWC lands affected by lead and arsenic contamination from the ASARCO plant.

IBWC discussed Rio Grande levee rehabilitation projects for improvements to meet Federal Emergency Management Agency (FEMA) accreditation standards. There were approximately 122 miles of levee construction projects in the upper Rio Grande including Mesilla Valley and Hatch in New Mexico, and Fabens, Canutillo, Sunland Park, and Tornillo areas in Texas. Several other levee design projects are also ongoing. Communities protected by FEMA accredited levees are not required to purchase flood insurance.

Numerous ongoing environmental restoration activities for the reach of the Rio Grande from Percha Diversion Dam to American Diversion Dam were discussed. The IBWC indicated that the current Service proposed critical habitat designation for the southwestern willow flycatcher in southern New Mexico threatens a voluntary water rights framework supported IBWC and its partners.

Other initiatives discussed by the IBWC included aerial surveys of the Rio Grande in 2011 using LIDAR and digital orthoimagery. The data collected will be used to produce maps of the Rio Grande to provide accurate elevation data for the river channel, floodplain, and levees to assist in hydraulic modeling of water conveyance.

They reported involvement in work associated with transboundary aquifers in the region since 2006.

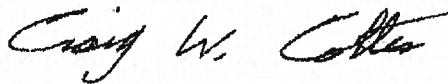
In 2011, IBWC reported that Mexico was provided 25,649 acre-feet of water at the International Diversion Dam heading. For 2012, the initial allotment to Mexico is 4,631 acre-feet. Mexico has raised concerns about the initial allotment and Bi-national monthly meetings are being held to discuss the issue.

IBWC and Reclamation conducted a bi-national tour of the Rio Grande in southern New Mexico and west Texas in June 2011. The tour covered Reclamation and IBWC dams and local irrigation infrastructure. Participants included congressional offices, Mexican Section of the IBWC, Mexican and United States water managers, TCEQ and the NMISC.

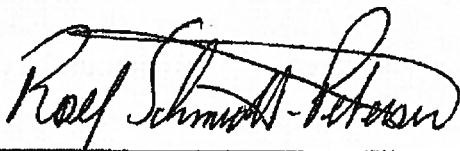
BUDGET –

The Engineer Advisers reviewed the cost of operation for the year ending June 30, 2011 and the budget for the fiscal year ending June 30, 2013. The Engineer Advisers found that the expenses for gaging stations and administration of the Compact for the year ending June 30, 2011 were \$182,994. The United States federal government bore \$53,474 of this total, with the balance of \$129,520 borne equally by the three states.

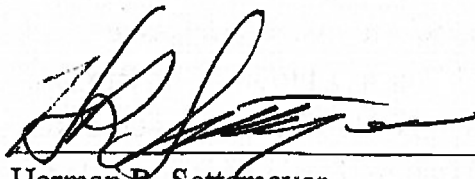
The proposed budget for the fiscal year ending June 30, 2013 indicates a total of \$186,337 will be spent for gaging and administration, with a proposed contribution by the United States federal government of \$53,142.



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New Mexico and Colorado Addendum to the 2012 Engineer Adviser Report to the Rio Grande Compact Commission

March 2012

At the 2012 Rio Grande Compact Commission (RGCC) Engineer Adviser meeting held in Santa Fe, NM on February 27-29, 2012 and in Albuquerque, NM on March 1-2, 2012, the Engineer Advisers were unable to reach consensus on a method by which to conduct the 2011 Rio Grande Compact Accounting. Releases from Elephant Butte Reservoir by the U.S. Bureau of Reclamation (Reclamation) exhausted all of the Usable Water in Project Storage by late July 2011. Reclamation continued to release water from Elephant Butte Reservoir in July, August, and September 2011 when there was no Usable Water in Project Storage. The lack of consensus stems from a disagreement regarding both the source of the water that Reclamation released and the appropriate accounting of 2011 New Mexico and Colorado deliveries that were affected by Reclamation's release beyond the available Usable Water (See the Method 1 and Method 2.b attachments, the Release and Spill from Project Storage Sheet of each, Columns 3 and 5). Regardless of this disagreement the RGCC must develop an accounting of the water deliveries, releases, and credits that resulted.

The Texas Engineer Adviser, joined by a Reclamation representative from its El Paso Office, took the position at the 2011 Engineer Adviser meeting that Reclamation released water that had been converted from accrued Credit Water to Usable Water in Project Storage during 2011 through monthly accounting to compensate for evaporation rather than the annual accounting defined in Article VI of the Compact. The Colorado and New Mexico Engineer Advisers disagreed and took the position that Reclamation's action contravened the method described in the last unnumbered paragraph of Article VI of the Compact to compensate for evaporation of Credit Water, that Reclamation also disregarded the 2006 direction of the Rio Grande Compact Commission with regard to the last unnumbered paragraph of Article VI, and that Reclamation made a release of New Mexico's and Colorado's accrued Credit Water in 2011 without the authorization of the RGCC or the states of Colorado or New Mexico. The New Mexico Engineer Adviser further took the position that the release harmed New Mexico farmers in the Lower Rio Grande because none of the water Reclamation took was available for diversion by the Elephant Butte Irrigation District for delivery to its farmers. The lawsuit filed by New Mexico in August 2011 against Reclamation addresses these issues, in part.

The Engineer Advisers discussed and developed alternatives for accounting for these actual and unauthorized releases of water by Reclamation, that reflect the differences in the position of the Texas Engineer Adviser and the position of the Colorado and New Mexico Engineer Advisers regarding the source of the water that Reclamation released and the 2006 direction of the

RGCC. Neither a relinquishment of Compact Credit Water nor a loan was authorized during the summer of 2011, even though both options were offered by New Mexico. However, Reclamation's unilateral and unauthorized action in July, August, and September 2011 may be accounted by the RGCC, retroactively, in a manner similar to that conducted for a relinquishment (Method 2.a., below) or a loan of Credit Water (Method 2.b.).

Two methods of accounting were developed and they can be described as follows:

- 1) Reduce Credit Water for evaporation monthly during the calendar year – as developed by Texas and Reclamation.
- 2) Reduce Credit Water for annual evaporation at the end of the calendar year – as developed by New Mexico and Colorado. Two options were put forward under this method:
 - a. New Mexico and Colorado Credit Water released during 2011 and accounted as being reduced in the month it was released.
 - b. New Mexico and Colorado Credit Water released during 2011, accounted as being reduced in the month it was released; but then exchanged back into storage in Elephant Butte Reservoir before the end of 2011 as new inflow arrived.

Method 1--Reduce Credit Water For Evaporation Monthly During the 2011 Calendar Year –

Method 1 (Attachment 1) was developed by the Texas Engineer Adviser and a Reclamation representative. Based on this method, the Accrued Credits for the 2012 calendar year would be 2,600 acre-feet for Colorado and 75,300 acre-feet for New Mexico. However, Method 1 contravenes the last unnumbered paragraph of Article VI of the Compact. At that 2006 RGCC meeting, the RGCC approved the consensus recommendations of the Engineer Advisers and directed that:

- (1) Accrued Credit Water be held constant during the year.
- (2) The Engineer Advisers meet and develop a recommendation(s) for Commission approval for the optimum use of water in Project Storage if Credit Water exceeds 150,000 acre-feet and Usable Water is less than a full allocation or if the combined accrued Credit Water exceeds 50 percent of Project Storage.
- (3) Reclamation release Credit Water only as directed by the RGCC.

The Colorado and New Mexico Engineer Advisers believe that approval of Method 1 would require that the RGCC disregard both the explicit language of the Compact and the RGCC 2006

directives. Therefore, Method 1 is not acceptable to the Colorado and New Mexico Engineer Advisers and it is not discussed further herein.

The accounting results of the Method 2 options are discussed below.

Method 2--Reduce Credit Water for Evaporation at the end of the Calendar Year -

Both options developed by New Mexico and Colorado for this method comply with the last paragraph of Article VI of the Compact, wherein Credit Water in Elephant Butte Reservoir is “reduced annually to compensate for evaporation losses in the proportion that such credits (or debits) bear to the total amount of water...during the year”. Accrued Credit Water is held constant during the calendar year and Usable Water is then accounted during the year as defined in Article I(I). Using this method, during 2011 Reclamation made an unauthorized release of a total of 32,825 acre-feet of New Mexico and Colorado accrued Credit Water during July, August, and September. The relative amounts of New Mexico and Colorado accrued Credit Water released were accounted by New Mexico and Colorado as proportional to the individual Credit Water pools: approximately 99% from New Mexico and 1% from Colorado.

At the 2012 Engineer Adviser meeting, New Mexico and Colorado outlined two options for accounting the unauthorized Credit Water release.

Method 2.a. (Attachment 2). Reclamation released accrued Credit Water from Elephant Butte Reservoir during July, August, and September 2011. The accounting for this option includes diminishing Credit Water by the amount of the release in proportion to the total amount of Credit Water held by New Mexico and Colorado. The New Mexico and Colorado Engineer Advisers attempted to reflect the release of Credit Water in the RGCC “Release and Spill from Project Storage” accounting sheet but were not able to do so because the calculations embedded in the spreadsheet allow for the conversion of Credit Water to Usable Water through the relinquishment process but are not configured to show the direct release and reduction of Credit Water without increasing Usable Water.

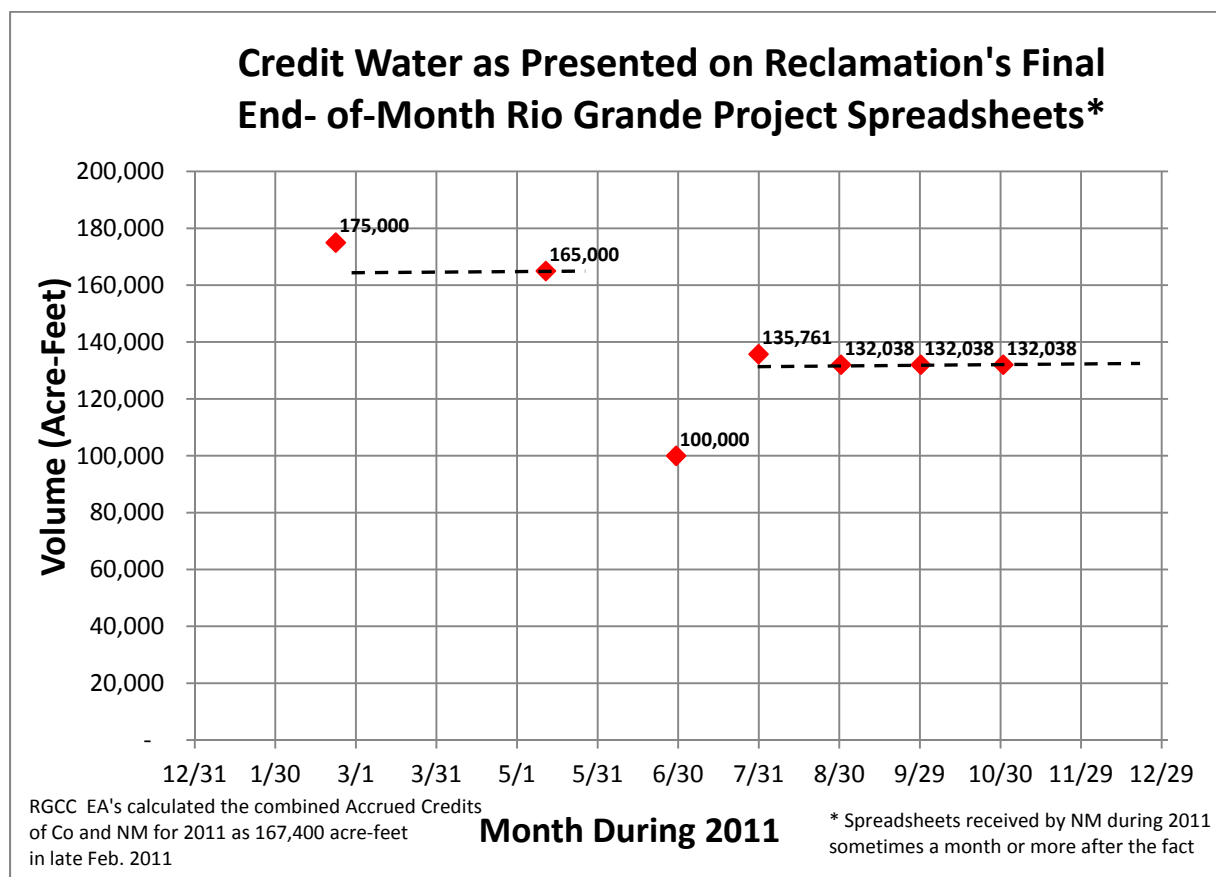
Using this method, the combined New Mexico and Colorado Credit Water accounts (166,300 acre-feet total for 2011 after an authorized relinquishment of 1,100 acre-feet by Colorado in April 2011) would be reduced by the amount of the Credit Water released by Reclamation (32,825 acre-feet total) proportional to the amount of Credit Water each state had in storage. Consequently, New Mexico’s Credit Water account would be reduced by 32,509 acre-feet and Colorado’s by 316 acre-feet during July, August, and September 2011. The Credit Water accounts would then be held constant at a combined total of 133,475 acre-feet for the remainder of the calendar year. Based on this method, the Accrued Credits for the 2012 calendar year would be 2,300 acre-feet for Colorado and 44,600 acre-feet for New Mexico. Unlike an authorized relinquishment, however, neither New Mexico nor Colorado received the

Article VII benefit of being able to store a like amount of water to that released in post-compact reservoirs in the future when the Article VII of the compact storage restriction is in effect.

Therefore, this method is unacceptable because it would reduce the accrued Credit Water of each state without authorization and without providing the benefits of relinquishment to the upstream states.

The New Mexico and Colorado Engineer Advisers note that accounting per Method 2.a. most closely approximates the results of Reclamation's incomplete and inconsistent accounting of accrued Credit Water during 2011 in its Rio Grande Project Allocation Spreadsheets provided to New Mexico.

The New Mexico Engineer Adviser developed the graph below that illustrates the inconsistent accounting of accrued Credit Water in storage in Elephant Butte Reservoir as reported by Reclamation. The Reclamation spreadsheets used to develop the graph were provided to New Mexico by Reclamation at various times in 2011, although often several months after the fact. While accounting Method 2.a. approximates the Credit Water values reported by Reclamation to New Mexico in 2011, none of the methods or options proposed by the Engineer Advisers to the RGCC matches the accrued Credits calculations reported by Reclamation.



At the 2011 Engineer Adviser meeting, the Reclamation representative indicated that Final End-Of-Month Allocation Spreadsheets had been developed by Reclamation for each month of 2011 and that he would provide them to the Engineer Advisers. As of the writing of this document, none of the reported additional 2011 allocation spreadsheets had been received from Reclamation.

Method 2.b. (Attachment 3). The accounting in this method reflects a “loan of credit water” solution such as that which New Mexico proposed to Texas in 2011, but which was rejected by Texas. Nonetheless, this accounting should be approved by the RGCC to account for the unilateral and unauthorized Reclamation actions in a manner that retains New Mexico’s and Colorado’s rightful accrued Credit Water. Further, the RGCC should again direct Reclamation to avoid similar unauthorized actions in the future.

As in Method 2.a., Reclamation released accrued Credit Water from Elephant Butte Reservoir during July, August, and September 2011. The accrued Credit Water is released from Elephant Butte Reservoir. However, in this option, the release is accounted (in Attachment 3, Sheet 3, Columns 3, 4, and 5) as being negative Usable Water. Then, as additional water flowed into Elephant Butte Reservoir and releases from the reservoir ceased, the Credit Water would be accounted as being replenished by inflowing water. This accounting option closely resembles the method approved for use in 1951 by the RGCC at the request of the Texas Commissioner. Based on this method, the Accrued Credits of Colorado for the 2012 calendar year would be 2,600 acre-feet and 76,300 acre-feet for New Mexico.

Summary of Method 2

Method 2.a. results in diminishment of New Mexico and Colorado accrued Credit Water without the benefit of a relinquishment to the upstream states, and therefore is not acceptable.

Method 2.b. is the only option that the New Mexico and Colorado Engineer Advisers find acceptable.

Recommendation

No after-the-fact accounting can address the primary Rio Grande Project operational issues that occurred in 2011 when Reclamation made its unauthorized release of accrued Credit Water, which are:

- 1) New Mexico and Colorado have sole and exclusive authority to decide the disposition of any of their respective accrued Credit Water; and

- 2) Reclamation's effective denial of the upstream states' benefits associated with relinquishments under the Compact and elimination of the Texas' incentive to accept a relinquishment during drought times. That incentive being the receipt of water that otherwise would not be available for use downstream of Elephant Butte Dam.

However, If Reclamation will agree to comply with the last unnumbered paragraph of Article VI of the Compact and the RGCC's 2006 directives regarding the accounting and release of Credit Water, the Colorado and the New Mexico Engineer Advisers recommend, **for 2011 only**, that Method 2.b. be adopted by the RGCC to account for the result of Reclamation's unauthorized release of Colorado and New Mexico accrued Credit Water during 2011.

Absent an explicit agreement by Reclamation to abide by the last unnumbered paragraph of Article VI of the Compact and the RGCC's 2006 directives regarding the accounting and release of accrued Credit Water, the Colorado and the New Mexico Engineer Advisers recommend that the RGCC not approve any compact accounting for 2011 until the underlying issues are resolved.

RIO GRANDE COMPACT - DELIVERIES BY COLORADO AT STATE LINE
YEAR 2011 - Developed by Texas and Reclamation

Quantities in thousands of acre feet to nearest hundred

Quantities in thousands of acre feet to nearest hundred																							
CONEJOS INDEX SUPPLY												RIO GRANDE INDEX SUPPLY										DELIVERIES	
MONTH	MEASURED FLOW				ADJUSTMENTS				ADJUSTMENTS				SUPPLY						CONEJOS RIVER AT MOUTH NEAR LASAUCES	RIO GRANDE LESS CONEJOS RIVER	RIO GRANDE AT LOBATOS	ACCUMULATED TOTAL AT LOBATOS	
	CONEJOS AT MOGOTE	LOS PINOS NEAR ORTIZ	SAN ANTONIO AT ORTIZ	TOTAL	STORAGE AT END OF MONTH	CHANGE IN STORAGE ^a	OTHER ADJUSTMENTS	NET ADJUSTMENTS	SUPPLY IN MONTH	ACCUMULATED TOTAL	RECORDED FLOW NEAR DEL NORTE	STORAGE AT END OF MONTH	CHANGE IN STORAGE	TRANS MOUNTAIN DIVERSIONS ^b	OTHER ADJUSTMENTS ^c	NET ADJUSTMENTS	SUPPLY IN MONTH	ACCUMULATED TOTAL					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
					18.5					0.0		0.2						0.0					
JAN	2.8			2.8	18.6	0.1		0.1	2.9	2.9	11.7	0.2	0.0			0.0	11.7	11.7	3.0	12.4	15.4	15.4	
FEB	2.4			2.4	18.6	0.0		0.0	2.4	5.3	9.3	0.2	0.0			0.0	9.3	21.0	3.3	12.2	15.5	30.9	
MAR	4.3			4.3	18.7	0.1		0.1	4.4	9.7	14.4	0.2	0.0			0.0	14.4	35.4	5.3	16.9	22.2	53.1	
APR	11.2	7.5	2.2	20.9	18.4	-0.3		-0.3	20.6	30.3	37.1	0.2	0.0			0.0	37.1	72.5	2.9	3.8	6.7	59.8	
MAY	29.8	23.8	3.3	56.9	18.5	0.1	0.1	0.1	57.1	87.4	95.6	0.2	0.0			0.0	95.6	168.1	13.1	7.2	14.3	74.1	
JUN	77.0	20.2	0.4	97.6	24.1	5.6	0.2	5.8	103.4	190.8	183.8	0.2	0.0			0.0	183.8	351.9	8.5	14.6	23.1	130.9	
JUL	29.4	2.5	0.0	31.9	19.0	-5.1	0.1	-5.0	26.9	217.7	58.8	0.2	0.0	-0.7	0.3	-0.4	58.4	410.3	2.7	6.4	9.1	140.0	
AUG	11.3	1.6	0.1	13.0	16.4	-2.6	0.1	-2.5	10.5	228.2	22.8	0.2	0.0			0.0	22.8	433.1	1.8	3.1	4.9	144.9	
SEPT	7.2	1.9	0.1	9.2	17.8	1.4	0.1	1.5	10.7	238.9	17.2	0.2	0.0			0.0	17.2	450.3	8.6	3.2	11.8	156.7	
OCT	12.8	2.2	0.2	15.2	13.7	-4.1	0.1	-4.0	11.2	250.1	26.9	0.2	0.0			0.0	26.9	477.2	9.0	18.4	27.4	184.1	
NOV	7.4			7.4	11.7	-2.0	0.0	-2.0	5.4	255.5	15.5	0.2	0.0			0.0	15.5	492.7	3.9	12.0	15.9	200.0	
DEC	2.7				12.1	0.4	0.4	0.4	3.1	258.6	9.6	0.2	0.0			0.0	9.6	502.3	69.2	130.8	200.0		
YEAR	198.3	59.7	6.3	264.3		-6.4	0.7	-5.7	258.6		502.7		0.0	-0.7	0.3	-0.4	502.3						
SUMMARY OF DEBITS AND CREDITS																							
ITEM																							
DEBIT																							
CREDIT																							
BALANCE																							
C1	Balance at Beginning of Year																			80.8			Cr. 2.7
C2	Scheduled Delivery from Conejos River																			127.8			Dr. 78.1
C3	Scheduled Delivery from Rio Grande																						Dr. 205.9
C4	Actual Delivery at Lobatos plus 10,000 Acre Feet																			210.0			Cr. 4.1
C5	Reduction of Debits c/o Evaporation																						
C6	Reduction of Credits c/o Evaporation ^d																			0.4			Cr. 3.7
C7	Accrued credit relinquished to project storage on Mar. 31, 2011.																			1.1			Cr. 2.6
C8	Balance at End of Year																						Cr. 2.6

Remarks: Cols. 6 and 13 do not include transmountain water.

^a Evaporation loss post-compact reservoirs; report of the Engineer Adviser for Colorado.

^b 986 ac-ft minus 243 ac-ft pre-compact; report of the Engineer Adviser for Colorado.

^c See Engineer Adviser report in regards to change of storage.

^d Reduction of Credit for Evaporation calculated on a monthly basis.

Remarks: Cols. 6 and 13 do not include transmountain water.

^a Evaporation loss post-compact reservoirs; report of the Engineer Adviser for Colorado.^b 986 ac-ft minus 243 ac-ft pre-compact; report of the Engineer Adviser for Colorado.^c See Engineer Adviser report in regards to change of storage.^d Reduction of Credit for Evaporation calculated on a monthly basis.

APPROVED:

Engineer Adviser for Colorado

Date:

Engineer Adviser for New Mexico

Date:

Engineer Adviser for Texas

Date:

RIO GRANDE COMPACT - DELIVERIES BY NEW MEXICO AT ELEPHANT BUTTE

YEAR 2011 - Developed by Texas and Reclamation

Quantities in thousands of acre feet to nearest hundred

Quantities in thousands of acre feet to nearest hundred

OTOWI INDEX SUPPLY															ELEPHANT BUTTE EFFECTIVE SUPPLY				
MONTH	ADJUSTMENTS										Total Water Stored in New Mexico Above San Marcial at End of Month ^{a, b}	STORAGE IN ELEPHANT BUTTE RESERVOIR		Recorded Flow Below Elephant Butte Dam	During Month	Accumulated Total			
	RESERVOIRS: LOBATOS TO OTOWI					Trans-mountain Diversions	Net Adjustments	During Month	Accumulated Total	End of Month ^a		Change Gain (+) Loss (-)							
	Recorded Flow at Otowi Bridge	Storage End of Month ^{a, b}	Change in Storage	Reservoir Evaporation	Other Adjustments														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
			44.5							44.7	372.9								
JAN	39.7		42.6	-1.9	0.0	-2.1	-4.0	35.7	35.7	42.7	409.8	36.9	0.6	37.5	37.5				
FEB	38.1		43.3	0.7	0.0	-2.6	-1.9	36.2	71.9	43.6	441.6	31.8	0.5	32.3	69.8				
MAR	51.1		42.6	-0.7	0.2	-2.8	-3.3	47.8	119.7	42.6	404.5	-37.1	65.5	28.4	98.2				
APR	58.1		53.9	11.3	0.4	-9.0	2.7	60.8	180.5	53.7	322.8	-81.7	94.0	12.3	110.5				
MAY	77.4		98.3	44.4	0.5	-4.5	40.4	117.8	298.3	98.5	299.5	-23.3	38.6	15.3	125.8				
JUN	92.9		91.4	-6.9	0.8	-5.1	-11.2	81.7	380.0	91.7	224.7	-74.8	95.5	20.7	146.5				
JUL	70.1		64.5	-26.9	0.3	-7.2	-33.8	36.3	416.3	65.0	166.1	-56.6	66.3	7.7	154.2				
AUG	53.3		36.5	-28.0	0.2	-4.9	-32.7	20.6	436.9	36.4	146.3	-19.8	30.2	10.4	164.6				
SEPT	34.7		35.1	-1.4	0.2	-13.8	-15.0	19.7	456.6	34.9	145.7	-0.6	16.5	15.9	180.5				
OCT	32.8		35.2	0.1	0.2	-3.6	-3.3	29.5	486.1	35.3	157.8	12.1	0.4	12.5	193.0				
NOV	56.5		29.5	-5.7	0.2	-3.4	-8.9	47.6	533.7	29.6	191.2	33.4	0.1	33.5	226.5				
DEC	50.3		20.3	-9.2	0.1	-3.0	-12.1	38.2	571.9	20.0	245.9	54.7	0.1	54.8	281.3				
YEAR	655.0		-24.2	3.1		-62.0	-83.1	571.9				-127.0	408.3	281.3					
REMARKS:																			
a Cols. 3, 11, and 12 do not include transmountain water.																			
Note: Storage in Abiquiu, El Vado, McClure and Nichols Reservoirs under the April 23, 2003 and the February 1, 2008 agreements for relinquishment of accrued credits totaled 38,500 acre-feet in 2011.																			
Storage of relinquished credit to date totaled 192,757 acre-feet; balance of assigned relinquishment credit remaining to be stored is 77,745 acre-feet.																			
c Reduction of Credit for Evaporation calculated on a monthly basis.																			
APPROVED:																			
Cr. 75.3																			

Remarks:
^a Cols. 3, 11, and 12 do not include transmountain water.
 Note: Storage in Abiquiu, El Vado, McClure and Nichols Reservoirs under the April 23, 2003 and the February 1, 2008 agreements for relinquishment of accrued credits totaled 38,500 acre-feet in 2011.
 Storage of relinquished credit to date totaled 192,757 acre-feet; balance of assigned relinquishment credit remaining to be stored is 77,743 acre-feet.
^c Reduction of Credit for Evaporation calculated on a monthly basis.

APPROVED: _____ Date: _____ Engineer Adviser for Colorado
 _____ Date: _____ Engineer Adviser for New Mexico
 _____ Date: _____ Engineer Adviser for Texas

RIO GRANDE COMPACT - DELIVERIES BY COLORADO AT STATE LINE

YEAR 2011 - Developed by Colorado and New Mexico

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RIO GRANDE COMPACT COMMISSION REPORT

Quantities in thousands of acre feet to nearest hundred																										
CONEJOS INDEX SUPPLY												RIO GRANDE INDEX SUPPLY										DELIVERIES				
MONTH	MEASURED FLOW			ADJUSTMENTS					SUPPLY				ADJUSTMENTS						SUPPLY				CONEJOS RIVER AT MOUTH NEAR LASAUCES	RIO GRANDE LESS CONEJOS RIVER	RIO GRANDE AT LOBATOS	ACCUMULATED TOTAL AT LOBATOS
	CONJOS AT MOGOTE	LOS PINOS NEAR ORTIZ	SAN ANTONIO AT ORTIZ	TOTAL	STORAGE AT END OF MONTH	CHANGE IN STORAGE ^c	OTHER ADJUSTMENTS	NET ADJUSTMENTS	SUPPLY IN MONTH	ACCUMULATED TOTAL	RECORDED FLOW NEAR DEL NORTE	STORAGE AT END OF MONTH	CHANGE IN STORAGE	TRANS MOUNTAIN ^b	DIVERSIONS ^b	OTHER ADJUSTMENTS ^a	NET ADJUSTMENTS	SUPPLY IN MONTH	ACCUMULATED TOTAL							
1																										
JAN	2.8				18.5	18.6	0.1		0.1	2.9	2.9	11.7	0.2	0.0				0.0	11.7	11.7	0.0				0.0	
FEB	2.4				18.6	0.0			0.0	2.4	5.3	9.3	0.2	0.0				0.0	9.3	21.0	15.4	3.0	12.4	15.4	15.4	
MAR	4.3				18.7	0.1			0.1	4.4	9.7	14.4	0.2	0.0				0.0	14.4	35.4	30.9	3.3	12.2	15.5	30.9	
APR	11.2	7.5	2.2	20.9	18.4	-0.3		-0.3	20.6	30.3	37.1	0.2	0.0				0.0	37.1	72.5	53.1	5.3	16.9	22.2	53.1		
MAY	29.8	23.8	3.3	56.9	18.5	0.1	0.1	0.1	57.1	87.4	95.6	0.2	0.0				0.0	95.6	168.1	59.8	2.9	3.8	6.7	59.8		
JUN	77.0	20.2	0.4	97.6	24.1	5.6	0.2	5.8	103.4	190.8	183.8	0.2	0.0				0.0	183.8	351.9	74.1	7.1	7.2	14.3	74.1		
JUL	29.4	2.5	0.0	31.9	19.0	-5.1	0.1	-5.0	26.9	217.7	58.8	0.2	0.0	-0.7	0.3		-0.4	58.4	410.3	130.9	13.1	20.6	33.7	107.8		
AUG	11.3	1.6	0.1	13.0	16.4	-2.6	0.1	-2.5	10.5	228.2	22.8	0.2	0.0				0.0	22.8	433.1	140.0	8.5	14.6	23.1	130.9		
SEPT	7.2	1.9	0.1	9.2	17.8	1.4	0.1	1.5	10.7	238.9	17.2	0.2	0.0				0.0	17.2	450.3	144.9	2.7	6.4	9.1	140.0		
OCT	12.8	2.2	0.2	15.2	13.7	-4.1	0.1	-4.0	11.2	250.1	26.9	0.2	0.0				0.0	26.9	477.2	156.7	8.6	3.2	11.8	156.7		
NOV	7.4			7.4	11.7	-2.0	0.0	-2.0	5.4	255.5	15.5	0.2	0.0				0.0	15.5	492.7	184.1	9.0	18.4	27.4	184.1		
DEC	2.7			2.7	12.1	0.4	0.4	0.4	3.1	258.6	9.6	0.2	0.0				0.0	9.6	502.3	200.0	3.9	12.0	15.9	200.0		
YEAR	198.3	59.7	6.3	264.3		-6.4	0.7	-5.7	258.6		502.7		0.0	-0.7	0.3		-0.4	502.3		200.0	69.2	130.8	200.0	200.0		
SUMMARY OF DEBITS AND CREDITS																										
ITEM																										
C1 Balance at Beginning of Year																										
C2 Scheduled Delivery from Conejos River																										
C3 Scheduled Delivery from Rio Grande																										
C4 Actual Delivery at Lobatos plus 10,000 Acre Feet																										
C5 Unauthorized release of Credit Water																										
C6 Reduction of Credits of Credit Water																										
C7 Accrued credit relinquished to project storage on Mar. 31, 2011.																										
C8 Balance at End of Year																										

Remarks: Cols. 6 and 13 do not include transmountain water.

^a Evaporation loss post-compact reservoirs; report of the Engineer Adviser for Colorado.

^b 986 ac-ft minus 243 ac-ft pre-compact; report of the Engineer Adviser for Colorado.

^c See Engineer Adviser report in regards to change of storage.

^d Evaporation of Credit Water as described in Article VI of the Rio Grande Compact, using Reclamation unauthorized release of 316 ac-ft of Credit Water.

Remarks: Cols. 6 and 13 do not include transmountain water.

a Evaporation loss post-compact reservoirs; report of the Engineer Adviser for Colorado.

b 986 ac-ft minus 243 ac-ft pre-compact; report of the Engineer Adviser for Colorado.

c See Engineer Adviser report in regards to change of storage.

d Evaporation of Credit Water as described in Article VI of the Rio Grande Compact, using Reclamation unauthorized release of 316 ac-ft of Credit Water.

APPROVED:

Engineer Adviser for Colorado

Date:

Engineer Adviser for New Mexico

Date:

Engineer Adviser for Texas

Date:

Method 2.a -- Reduce Credit Water for Unauthorized Release and for Evaporation at the end of the Calendar Year
 RIO GRANDE COMPACT - DELIVERIES BY NEW MEXICO AT ELEPHANT BUTTE
 YEAR 2011 - Developed by Colorado and New Mexico

MONTH	OTOWI INDEX SUPPLY										ELEPHANT BUTTE EFFECTIVE SUPPLY				
	ADJUSTMENTS										STORAGE IN ELEPHANT BUTTE RESERVOIR		Recorded Flow Below Elephant Butte Dam	During Month	Accumulated Total
	Recorded Flow at Otowi Bridge	Storage End of Month a, b	Change in Storage	Reservoir Evaporation	Other Adjustments	Trans-mountain Diversions	Net Adjustments	During Month	Accumulated Total	Total Water Stored in New Mexico Above San Marcial at End of Month a, b	End of Month a	Change Gain (+) Loss (-)			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
JAN	39.7	44.5	-1.9	0.0			-2.1	-4.0	35.7	44.7	372.9				
FEB	38.1	42.6	0.7	0.0			-2.6	-1.9	36.2	42.7	409.8	36.9	0.6	37.5	37.5
MAR	51.1	43.3	-0.7	0.2			-2.8	-3.3	47.8	43.6	441.6	31.8	0.5	32.3	69.8
APR	58.1	42.6	11.3	0.4			-9.0	2.7	60.8	42.6	404.5	-37.1	65.5	28.4	98.2
MAY	77.4	53.9	44.4	0.5			-4.5	40.4	117.8	53.7	322.8	-81.7	94.0	12.3	110.5
JUN	92.9	98.3	-6.9	0.8			-5.1	-11.2	81.7	98.5	299.5	-23.3	38.6	15.3	125.8
JUL	70.1	91.4	-26.9	0.3			-7.2	-33.8	36.3	91.7	224.7	-74.8	95.5	20.7	146.5
AUG	53.3	64.5	-28.0	0.2			-4.9	-32.7	20.6	65.0	c 166.1	-58.6	68.3	7.7	154.2
SEPT	34.7	35.1	-1.4	0.2			-13.8	-15.0	19.7	38.4	c 146.3	-19.8	30.2	10.4	164.6
OCT	32.8	35.2	0.1	0.2			-3.6	-3.3	29.5	34.9	c 145.7	-0.6	16.5	15.9	180.5
NOV	56.5	29.5	-5.7	0.2			-3.4	-8.9	47.6	35.3	c 157.8	12.1	0.4	12.5	193.0
DEC	50.3	20.3	-9.2	0.1			-3.0	-12.1	38.2	29.6	191.2	33.4	0.1	33.5	226.5
YEAR	655.0		-24.2	3.1			-82.0	-83.1	571.9	20.0	245.9	-127.0	408.3	54.8	281.3
SUMMARY OF DEBITS AND CREDITS															
										ITEM					
										DEBIT		CREDIT		BALANCE	
										NM1		Balance at Beginning of Year		Cr. 164.7	
										NM2		Scheduled Delivery at Elephant Butte		Dr. 163.7	
										NM3		Actual Elephant Butte Effective Supply		Cr 117.6	
										NM4		Reduction of Debits o/c Evaporation			
										NM5		Reduction of Credits o/c Evaporation and Spill ^d		Cr 77.1	
										NM6		Unauthorized release of Credit Water		Cr. 44.6	
										NM7					
										NM8		Balance at End of Year		Cr 44.6	

Remarks:
 a Cols. 3, 11, and 12 do not include transmountain water.
 b Note: Storage in Abiquiu, El Vado, McCure and Nichols Reservoirs under the April 23, 2003 and the February 1, 2008 agreements for relinquishment of accrued credits totaled 38,500 acre-feet in 2011.
 c Storage of relinquished credit to date totaled 192,757 acre-feet; balance of assigned relinquishment credit remaining to be stored is 77,743 acre-feet.
 d Elephant Butte Reservoir storage was below Credit Water Pool (166,300 ac-ft) during July, August, September, and October due to Bureau of Reclamation's unauthorized release of Credit Water.
 e Credit Water computed according to Article VI of the Rio Grande Compact, using Reclamation unauthorized release of 32,509 ac-ft of Credit Water.

APPROVED: _____ Date: _____
 Engineer Adviser for Colorado
 _____ Date: _____
 Engineer Adviser for New Mexico

Method 2.b -- Reduce Credit Water for Evaporation at the end of the Calendar Year with Unauthorized Release of Credit Water Replaced by Late Season Inflow

RIO GRANDE COMPACT - DELIVERIES BY COLORADO AT STATE LINE

YEAR 2011 - Developed by Colorado and New Mexico

Quantities in thousands of acre feet to nearest hundred

Quantities in thousands of acre feet to nearest hundred																								
CONEJOS INDEX SUPPLY												RIO GRANDE INDEX SUPPLY										DELIVERIES		
MONTH	MEASURED FLOW			ADJUSTMENTS					SUPPLY				RECORDED FLOW NEAR DEL NORTE	ADJUSTMENTS					SUPPLY		CONJOS RIVER AT MOUTH NEAR LASAUCES	RIO GRANDE LESS CONJOS RIVER	RIO GRANDE AT LOBATOS	ACCUMULATED TOTAL AT LOBATOS
	CONJOS AT MOGOTE	LOS PEÑAS NEAR ORTIZ	SAN ANTONIO AT ORTIZ	TOTAL	STORAGE AT END OF MONTH	CHANGE IN STORAGE ^c	OTHER ADJUSTMENTS	NET ADJUSTMENTS	SUPPLY IN MONTH	ACCUMULATED TOTAL	STORAGE AT END OF MONTH	CHANGE IN STORAGE		TRANSMOUNTAIN ^b	DIVERSIONS ^b	OTHER ADJUSTMENTS ^a	ADJUSTMENTS	SUPPLY IN MONTH	ACCUMULATED TOTAL					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
JAN	2.8				18.5					0.0		0.2						0.0				0.0		
FEB	2.4			2.8	18.6	0.1		0.1	2.9	2.9	11.7	0.2	0.0			0.0	11.7	11.7	3.0	12.4	15.4	15.4		
MAR	4.3			2.4	18.6	0.0		0.0	2.4	5.3	9.3	0.2	0.0			0.0	9.3	21.0	3.3	12.2	15.5	30.9		
APR	11.2	7.5	2.2	4.3	18.7	0.1		0.1	4.4	9.7	14.4	0.2	0.0			0.0	14.4	35.4	5.3	16.9	22.2	53.1		
MAY	29.8	23.8	3.3	20.9	18.4	-0.3		-0.3	20.6	30.3	37.1	0.2	0.0			0.0	37.1	72.5	2.9	3.8	6.7	59.8		
JUN	77.0	20.2	0.4	56.9	18.5	0.1	0.1	0.2	57.1	87.4	95.6	0.2	0.0			0.0	95.6	168.1	7.1	7.2	14.3	74.1		
JUL	29.4	2.5	0.0	31.9	19.0	-5.1	0.1	-5.0	26.9	217.7	183.8	0.2	0.0			0.0	183.8	351.9	13.1	20.6	33.7	107.8		
AUG	11.3	1.6	0.1	13.0	16.4	-2.6	0.1	-2.5	10.5	228.2	58.8	0.2	0.0	-0.7	0.3		58.4	410.3	8.5	14.6	23.1	130.9		
SEPT	7.2	1.9	0.1	9.2	17.8	1.4	0.1	1.5	10.7	238.9	22.8	0.2	0.0			0.0	22.8	433.1	2.7	6.4	9.1	140.0		
OCT	12.8	2.2	0.2	15.2	13.7	-4.1	0.1	-4.0	11.2	250.1	17.2	0.2	0.0			0.0	17.2	450.3	1.8	3.1	4.9	144.9		
NOV	7.4			7.4	11.7	-2.0	0.0	-2.0	5.4	255.5	26.9	0.2	0.0			0.0	26.9	477.2	8.6	3.2	11.8	156.7		
DEC	2.7			2.7	12.1	0.4		0.4	3.1	258.6	15.5	0.2	0.0			0.0	15.5	492.7	9.0	18.4	27.4	184.1		
YEAR	198.3	59.7	6.3	264.3		-6.4	0.7	-5.7	258.6		502.7	0.2	0.0	-0.7	0.3	-0.4	502.3		3.9	12.0	15.9	200.0		
SUMMARY OF DEBITS AND CREDITS																								
ITEM																								
DEBIT																								
CREDIT																								
BALANCE																								
C1 Balance at Beginning of Year																								
C2 Scheduled Delivery from Conejos River																								
C3 Scheduled Delivery from Rio Grande																								
C4 Actual Delivery at Lobatos plus 10,000 Acre Feet																								
C5 Reduction of Debits of Evaporation																								
C6 Reduction of Credits of Evaporation ^d																								
C7 Accrued credit relinquished to project storage on Mar. 31, 2011.																								
C8 Balance at End of Year																								

Remarks: Cols. 6 and 13 do not include transmountain water.

^a Evaporation loss post-compact reservoirs; report of the Engineer Adviser for Colorado.

^b 986 ac-ft minus 243 ac-ft pre-compact; report of the Engineer Adviser for Colorado.

^c See Engineer Adviser report in regards to change of storage.

^d Evaporation of Credit Water computed according to Article VI of the Rio Grande Compact using the annual method applied by the Rio Grande Compact Commission for the 1951 Lack of Credit Water.

Remarks: Cols. 6 and 13 do not include transmountain water.

^a Evaporation loss post-compact reservoirs; report of the Engineer Adviser for Colorado.^b 986 ac-ft minus 243 ac-ft pre-compact; report of the Engineer Adviser for Colorado.^c See Engineer Adviser report in regards to change of storage.^d Evaporation of Credit Water computed according to Article VI of the Rio Grande Compact using the annual method applied by the Rio Grande Compact Commission for the 1951 12-14 of Credit Water.

APPROVED:

Engineer Adviser for Colorado

Date:

Engineer Adviser for New Mexico

Date:

Engineer Adviser for Texas

Date:

RIO GRANDE COMPACT - DELIVERIES BY NEW MEXICO AT ELEPHANT BUTTE
YEAR 2011 - Developed by Colorado and New Mexico

RIO GRANDE COMPACT COMMISSION REPORT

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Quantities in thousands of acre feet to nearest hundred

MONTH	OTOWI INDEX SUPPLY										ELEPHANT BUTTE EFFECTIVE SUPPLY				
	ADJUSTMENTS										STORAGE IN ELEPHANT BUTTE RESERVOIR				
	RESERVOIRS: LOBATOS TO OTOWI										Change Gain (+) Loss (-)				
	Recorded Flow at Otowi Bridge	Storage End of Month a, b	Change in Storage	Reservoir Evaporation	Other Adjustments	Trans-mountain Diversions	Net Adjustments	During Month	Accumulated Total	Total Water Stored in New Mexico Above San Marcial at End of Month a, b	End of Month a	Recorded Flow Below Elephant Butte Dam	During Month	Effective Supply	Accumulated Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
JAN	39.7	44.5	-1.9	0.0	0.0	-2.1	-4.0	35.7	35.7	44.7	372.9	36.9	0.6	37.5	37.5
FEB	38.1	43.3	0.7	0.0	0.0	-2.6	-1.9	36.2	71.9	42.7	409.8	31.8	0.5	32.3	69.8
MAR	51.1	42.6	-0.7	0.2	0.2	-2.8	-3.3	47.8	119.7	43.6	441.6	-37.1	65.5	28.4	98.2
APR	58.1	53.9	11.3	0.4	0.4	-9.0	2.7	60.8	180.5	53.7	404.5	-81.7	94.0	12.3	110.5
MAY	77.4	98.3	44.4	0.5	0.5	-4.5	40.4	117.8	298.3	98.5	322.8	-23.3	38.6	15.3	125.8
JUN	92.9	91.4	-6.9	0.8	0.8	-5.1	-11.2	81.7	380.0	91.7	294.7	-74.8	95.5	20.7	146.5
JUL	70.1	64.5	-26.9	0.3	0.3	-7.2	-33.8	36.3	416.3	65.0	166.1	-58.6	66.3	7.7	154.2
AUG	53.3	36.5	-28.0	0.2	0.2	-4.9	-32.7	20.6	436.9	36.4	146.3	-19.8	30.2	10.4	164.6
SEPT	34.7	35.1	-1.4	0.2	0.2	-13.8	-15.0	19.7	456.6	34.9	145.7	-0.6	18.5	15.9	180.5
OCT	32.8	35.2	0.1	0.2	0.2	-3.6	-3.3	29.5	486.1	35.3	157.8	12.1	0.4	12.5	193.0
NOV	51.1	29.5	-5.7	0.2	0.2	-3.4	-8.9	47.6	533.7	29.6	191.2	33.4	0.1	33.5	226.5
DEC	50.3	20.3	-9.2	0.1	0.1	-3.0	-12.1	38.2	571.9	20.0	245.9	54.7	0.1	54.8	281.3
YEAR	655.0	-24.2	3.1	-82.0	-83.1	571.9	571.9	571.9	571.9	571.9	571.9	571.9	571.9	571.9	571.9
SUMMARY OF DEBITS AND CREDITS															
ITEM															
Balance at Beginning of Year															
NM1															
Balance at Beginning of Year															
NM2															
Scheduled Delivery at Elephant Butte															
NM3															
Actual Elephant Butte Effective Supply															
NM4															
Reduction of Debits o/c Evaporation															
NM5															
Reduction of Credits o/c Evaporation and Spill a															
NM6															
Balance at End of Year															
NM7															
Balance at End of Year															
NM8															
Balance at End of Year															
Cr. 164.7															
Dr. 163.7															
Cr. 117.6															
Cr. 76.3															
Cr. 76.3															

REMARKS:

a Cols. 3, 11, and 12 do not include transmountain water.

b Note: Storage in Abiquiu, El Vado, McClure and Nichols Reservoirs under the April 23, 2003 and the February 1, 2008 agreements for relinquishment of accrued credits totaled 38,500 acre-feet in 2011. Storage of relinquished credit to date totaled 192,757 acre-feet; balance of assigned relinquishment credit remaining to be stored is 77,743 acre-feet.

c Elephant Butte Reservoir storage was below Credit Water Pool (166,300 ac-ft) during July, August, September, and October due to Bureau of Reclamation's unauthorized release of Credit Water.

d Evaporation of Credit Water computed according to Article VI of the Rio Grande Compact using the annual method applied by the Rio Grande Compact Commission for the 1951 loan of Credit Water.

APPROVED: _____ Date: _____
Engineer Adviser for Colorado_____
Engineer Adviser for New Mexico_____
Engineer Adviser for Texas_____
Date:

Method 2.b -- Reduce Credit Water for Evaporation at the end of the Calendar Year with Unauthorized Release of Credit Water Replaced by Late Season Inflow

RIO GRANDE COMPACT - RELEASE AND SPILL FROM PROJECT STORAGE
YEAR 2011 - Developed by Colorado and New Mexico

Quantities in thousands of acre feet to nearest hundred

MONTH	USABLE WATER IN STORAGE				CREDIT WATER IN STORAGE				Flood Water in Storage in Caballo Reservoir at End of Month	Total Water in Project Storage at End of Month	RIO GRANDE BELOW CABALLO DAM ^e						USABLE RELEASE	
	Elephant Butte Reservoir	Caballo Reservoir	Total at End of Month	Unfilled Capacity of Project Storage at End of Month	c Colorado Credit Water	c New Mexico Credit Water	Total at End of Month	Measured Flow at Caballo Gaging Station			Intervening Diversions to Canals	Total Release and Spill ^f	Caballo Flood Water	Credit Water	Usable Water	Net During Month	Accumulated Total	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	2,225.0	b 205.5	22.0	b 227.5	1,997.5	b 2.7	b 164.7	b 167.4		394.9								0.0
JAN	2,225.0	242.4	23.6	266.0	1,959.0	2.7	164.7	167.4		433.4								
FEB	2,225.0	274.2	24.8	299.0	1,926.0	2.7	164.7	167.4		466.4								
MAR	2,225.0	237.1	34.1	271.2	1,953.8	1.6	164.7	166.3		438.6								
APR	2,200.0	155.4	63.2	218.6	1,981.4	1.6	164.7	166.3		386.0								
MAY	2,200.0	132.1	53.0	185.1	2,014.9	1.6	164.7	166.3		352.5								
JUN	2,200.0	57.3	37.5	94.8	2,105.2	1.6	164.7	166.3		262.2								
JUL	2,200.0	d -1.3	32.2	30.9	2,169.1	1.6	164.7	c 166.3		198.3								
AUG	2,200.0	d -21.1	7.3	-13.8	2,213.8	1.6	164.7	c 166.3		153.6								
SEPT	2,200.0	d -21.7	8.5	-13.2	2,213.2	1.6	164.7	c 166.3		154.2								
OCT	2,225.0	c -9.6	10.1	0.5	2,224.5	1.6	164.7	c 166.3		167.9								
NOV	2,225.0	23.8	11.6	35.4	2,189.6	1.6	164.7	166.3		202.8								
DEC	2,225.0	78.5	13.6	92.1	2,132.9	1.6	164.7	166.3		259.5								
YEAR																		

Remarks: Cois. 2, 6 and 11 reflect implementation of revised area-capacity tables from Elephant Butte and Caballo Reservoirs, effective Jan 1, 2009.

a Project Storage Capacity is 2,200,030 acre-feet (April to September) and 2,225,030 acre-feet (October to March) as recognized by the September 9, 1998 Resolution of the Rio Grande Compact Commission with flood control storage reservation at Elephant Butte Reservoir of 50,000 acre-feet from April through September and 25,000 acre-feet from October through March.

b Based on Balance at Beginning of Year (C1 and NM1).

c Credit Water held constant during the year in accordance with Article VI and per direction of Compact Commission in March 2006. Evaporation for Credit Water is accounted at end of calendar year in the proportion that the Credit Water bore to the total amount of water in Elephant Butte Reservoir during the year. If ban had been approved Credit Water would have been decreased by the amount of the negative Usable Water.

d Cois. 3 and 5 - negative Usable Water in Elephant Butte due to Bureau of Reclamation unauthorized release of Credit Water.

e Cois. 12-19 and Accrued Departure from Normal Release - Due to caballo releases discrepancy, data was not approved. See Texas developed accounting sheet for Bureau of Reclamation reported data.

ACCURED DEPARTURE FROM NORMAL RELEASE					TIME OF HYPOTHETICAL SPILL Did not occur			
ITEM	Accrued Departure at Beginning of Year	DEBIT	CREDIT	BALANCE				
P1	Actual Release during Year							
P2	Normal Release for Year							
P3	Under Release in Excess of 150.0							
P4								
P5								
P6								
P7	Accrued Departure at End of Year							

Remarks: Cols. 2, 6 and 11 reflect implementation of revised area-capacity tables from Elephant Butte and Caballo Reservoirs, effective Jan 1, 2009.

a Project Storage Capacity is 2,200,030 acre-feet (April to September) and 2,225,030 acre-feet (October to March) as recognized by the September 9, 1998 Resolution of the Rio Grande Compact Commission with flood control storage reservation at Elephant Butte Reservoir of 50,000 acre-feet from April through September and 25,000 acre-feet from October through March.

b Based on Balance at Beginning of Year (C1 and NM1).

c Credit Water held constant during the year in accordance with Article VI and per direction of Compact Commission in March 2006. Evaporation for Credit Water is accounted at end of calendar year in the proportion that the Credit Water bore to the total amount of water in Elephant Butte Reservoir during the year. If loan had been approved Credit Water would have been decreased by the amount of the negative Usable Water.

d Cols. 3 and 5 - negative Usable Water in Elephant Butte due to Bureau of Reclamation unauthorized release of Credit Water.

e Cols. 12-19 and Accured Departure from Normal Release - Due to caballo releases discrepancy, data was not approved. See Texas developed accounting sheet for Bureau of Reclamation reported data.

APPROVED:

Engineer Adviser for Colorado

Date:

Engineer Adviser for New Mexico

Date:

Engineer Adviser for Texas

Date:

Addendum Engineer Advisers Report
Texas Engineer Adviser
March 21, 2012

The Engineer Advisers to the Rio Grande Compact Commission (Commission) were unable to reach agreement on the Accounting of water deliveries for 2011. The issue centered on how the evaporation losses on credit water are calculated and tabulated.

The history of this issue is addressed in a memorandum from the Engineer Advisers to the Commission dated March 23, 2006. As described in the memorandum, the Commission has been inconsistent in the way it has tabulated credit water in storage based on evaporation losses during the year. There are times when credit water is held constant each month and the credit water only reduced at the end of the year, even though the calculation of credit water evaporation is a summation of monthly evaporation amounts. Also, there are times when the Commission approved the evaporation of credit water monthly. The Engineer Advisers presented recommendations to the Commission on this issue in 2006. The Commission approved three recommendations. The recommendations were:

The Commission direct that accrued Credit Water be held constant during the year.

The Commission direct the Engineer Advisers to meet if the total combined accrued Credit Water exceeds 150,000 acre-feet and Usable Water is less than a full allocation or if the combined accrued Credit Water exceeds 50% of Project Storage and make a recommendation to the Commission regarding optimum use of water in Project Storage for Commission approval.

The Commission direct Reclamation to allocate or release Credit Water only as directed by the Commission.

The water supply conditions for 2011 met the criteria described in the second recommendation. The Engineer Advisers did not agree on a recommendation and the Commission did not approve a proposal to optimize the use of water in Project Storage. As the irrigation season progressed, it was evident that there would not be enough Usable Water in storage to meet the irrigation allocation to the Rio Grande Project if the evaporation of credit water had to be absorbed by the Usable Water until the end of the year. Therefore, since one of the methods historically used by the Commission was to tabulate evaporation of credit water on a monthly basis, Reclamation proceeded with this historical practice and allocated the monthly tabulated evaporation of Credit Water to Usable Water. The results of this accounting are below. This resulted in no Credit Water being released from Elephant Butte Reservoir. The Texas Engineer Adviser agrees with this accounting method as the practical approach to optimize the use of water in Project Storage for 2011 as contemplated in the recommendation above.

COMPACT ACCOUNTING 2011

The Texas Engineer Adviser has reviewed the streamflow and reservoir storage records and other pertinent data for calendar year 2011. This method, recommended by the Texas Engineer Adviser, reduces the credit water for evaporation monthly. The scheduled and actual deliveries, release of Usable Water for the year 2011, and balances as of January 1, 2011, are as follows:

(a) Deliveries by Colorado at the State line:

Balance as of January 1, 2011	2,700 acre-feet
Scheduled delivery	208,600 acre-feet
Actual delivery at Lobatos plus 10,000 acre-feet	210,000 acre-feet
Reduction of credit on account of evaporation	400 acre-feet
Accrued credit relinquishment to project storage on March 31, 2011	1,100 acre-feet
Accrued credit January 1, 2012	2,600 acre-feet

(b) Deliveries by New Mexico at Elephant Butte Dam:

Balance as of January 1, 2011	164,700 acre-feet
Scheduled delivery	328,400 acre-feet
Actual delivery	281,300 acre-feet
Reduction of credit on account of evaporation	42,300 acre-feet
Accrued credit January 1, 2012	75,300 acre-feet

(c) Project Storage and Releases:

Accrued departure (credit) as of January 1, 2011	1,115,800 acre-feet
Actual release of Usable Water	398,500 acre-feet
Normal release for year	790,000 acre-feet
Accrued departure (credit) as of January 1, 2012	1,265,800 acre-feet
Under release capped at 150,000	

The Texas Engineer Adviser also presents a tabulation of the accounting showing the results of holding the Credit Water constant until the end of the calendar year. The accounting showed that Usable Water went negative during the months of July, August, September, and October. Usable Water became positive in November. Thus, any "Credit Water" that may have been released under this scenario was restored prior to the end of year accounting. The accounting tabulation is listed below. The difference in the two accounting scenarios amounts to 1,000 acre-feet of additional credit water for New Mexico under this tabulation. There was no change for Colorado.

As determined by the Texas Engineer Adviser, the scheduled and actual deliveries, release of Usable Water for the year 2011, and balances as of January 1, 2012, are as follows:

(a) Deliveries by Colorado at the State line:

Balance as of January 1, 2011	2,700 acre-feet
Scheduled delivery	208,600 acre-feet
Actual delivery at Lobatos plus 10,000 acre-feet	210,000 acre-feet
Reduction of credit on account of evaporation	400 acre-feet
Accrued credit relinquishment to project storage on March 31, 2011	1,100 acre-feet
Accrued credit January 1, 2012	2,600 acre-feet

(b) Deliveries by New Mexico at Elephant Butte Dam:

Balance as of January 1, 2011	164,700 acre-feet
Scheduled delivery	328,400 acre-feet
Actual delivery	281,300 acre-feet
Reduction of credit on account of evaporation	41,300 acre-feet
Accrued credit January 1, 2012	76,300 acre-feet

(c) Project Storage and Releases:

Accrued departure (credit) as of January 1, 2011	1,115,800 acre-feet
Actual release of Usable Water	398,500 acre-feet
Normal release for year	790,000 acre-feet
Accrued departure (credit) as of January 1, 2011	1,265,800 acre-feet
Under release capped at 150,000	

Texas Accounting based on Credit Water Evaporating Monthly
RIO GRANDE COMPACT - DELIVERIES BY COLORADO AT STATE LINE
YEAR 2011 - Developed by Texas

Quantities in thousands of acre feet to nearest hundred

MONTH	CONEJOS INDEX SUPPLY										RIO GRANDE INDEX SUPPLY										DELIVERIES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	MEASURED FLOW					ADJUSTMENTS					RECORDED FLOW NEAR DEL NORTE	ADJUSTMENTS					SUPPLY					CONEJOS RIVER AT MOUTH NEAR LASAUCES	RIO GRANDE LESS CONEJOS RIVER	RIO GRANDE AT LOBATOS	ACCUMULATED TOTAL AT LOBATOS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	CONEJOS AT MOGOTE	LOS PINOS NEAR ORTIZ	SAN ANTONIO AT ORTIZ	TOTAL	STORAGE AT END OF MONTH	CHANGE IN STORAGE ^c	OTHER ADJUSTMENTS	NET ADJUSTMENTS	SUPPLY IN MONTH	ACCUMULATED TOTAL		STORAGE AT END OF MONTH	CHANGE IN STORAGE	TRANS MOUNTAIN ^b DIVERSIONS	OTHER ^a ADJUSTMENTS	NET ADJUSTMENTS	SUPPLY IN MONTH	ACCUMULATED TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Remarks: Cols. 6 and 13 do not include transmountain water.
^a Evaporation loss post compact reservoirs; report of the Engineer Adviser for Colorado.
^b 996 ac-ft minus 243 ac-ft pre-compact; report of the Engineer Adviser for Colorado.
^c See Engineer Adviser report in regards to change of storage.
^d Reduction of Credit for Evaporation calculated on a monthly basis.

APPROVED:

Engineer Adviser for Colorado

Date:

Engineer Adviser for New Mexico

Date:

Engineer Adviser for Texas

Date:

Texas Accounting based on Credit Water Evaporating Monthly
RIO GRANDE COMPACT - DELIVERIES BY NEW MEXICO AT ELEPHANT BUTTE
YEAR 2011 - Developed by Texas

Quantities in thousands of acre feet to nearest hundred

MONTH	OTOWI INDEX SUPPLY										ELEPHANT BUTTE EFFECTIVE SUPPLY				
	ADJUSTMENTS										STORAGE IN ELEPHANT BUTTE RESERVOIR				
	RESERVOIRS: LOBATOS TO OTOWI										STORAGE IN ELEPHANT BUTTE RESERVOIR				
	Recorded Flow at Otowi Bridge	Storage End of Month ^a	Change in Storage	Reservoir Evaporation	Other Adjustments	Trans-mountain Diversions	Net Adjustments	During Month	Accumulated Total	Total Water Stored in New Mexico Above San Marcial at End of Month ^{a, b}	End of Month ^a	Change Gain (+) Loss (-)	Recorded Flow Below Elephant Butte Dam	During Month	Accumulated Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		44.5								44.7	372.9				
JAN	39.7	42.8	-1.9	0.0		-2.1	-4.0	35.7	35.7	42.7	409.8	38.9	0.6	37.5	37.5
FEB	38.1	43.3	0.7	0.0		-2.6	-1.9	36.2	71.9	43.6	441.6	31.8	0.5	32.3	69.8
MAR	51.1	42.6	-0.7	0.2		-2.8	-3.3	47.8	119.7	42.6	404.5	-37.1	65.5	28.4	98.2
APR	58.1	53.9	11.3	0.4		-9.0	2.7	60.8	180.5	53.7	322.8	-81.7	94.0	12.3	110.5
MAY	77.4	98.3	44.4	0.5		-4.5	40.4	117.8	298.3	98.5	299.5	-23.3	38.6	15.3	125.8
JUN	92.9	91.4	-6.9	0.8		-5.1	-11.2	81.7	380.0	91.7	224.7	-74.8	95.5	20.7	146.5
JUL	70.1	64.5	-28.9	0.3		-7.2	-33.8	20.6	416.3	65.0	166.1	-58.6	66.3	7.7	154.2
AUG	53.3	38.5	-28.0	0.2		-4.9	-32.7	36.4	436.9	36.4	146.3	-18.8	30.2	10.4	184.8
SEPT	34.7	35.1	-1.4	0.2		-13.8	-15.0	19.7	456.6	34.9	145.7	-0.6	16.5	15.9	180.5
OCT	32.8	35.2	0.1	0.2		-3.6	-3.3	29.5	486.1	35.3	157.8	12.1	0.4	12.5	193.0
NOV	56.5	29.5	-5.7	0.2		-3.4	-8.9	47.6	533.7	29.5	191.2	33.4	0.1	33.5	226.5
DEC	50.3	20.3	-9.2	0.1		-3.0	-12.1	38.2	571.9	20.0	245.9	54.7	0.1	54.8	281.3
YEAR	655.0		-24.2	3.1		-62.0	-83.1	571.9				-127.0	408.3	281.3	
SUMMARY OF DEBITS AND CREDITS															
ITEM															
Balance at Beginning of Year															
NM1 Balance at Beginning of Year															
NM2 Scheduled Delivery at Elephant Butte															
NM3 Actual Elephant Butte Effective Supply															
NM4 Reduction of Debits o/c Evaporation															
NM5 Reduction of Credits o/c Evaporation and Spill ^c															
NM6															
NM7															
Balance at End of Year															
BALANCE															
Cr. 184.7															
Dr. 163.7															
Cr. 117.6															
Cr. 75.3															
Cr. 75.3															

Remarks:
^a Cols. 3, 11, and 12 do not include transmountain water.
^b Note: Storage in Abiquiu, El Vado, McChure and Nichols Reservoirs under the April 23, 2003 and the February 1, 2008 agreements for relinquishment of accrued credits aggregated 0.0 acre-feet in 2009.
 Storage of relinquished credit to date aggregated 154,224 acre-feet balance remaining is 146,276 acre-feet.
^c Reduction of Credit for Evaporation calculated on a monthly basis.

APPROVED: _____ Date: _____
 Engineer Adviser for Colorado _____ Date: _____
 Engineer Adviser for New Mexico _____ Date: _____
 Engineer Adviser for Texas _____ Date: _____

Texas Accounting based on Credit Water Evaporating Monthly

RIO GRANDE COMPACT - RELEASE AND SPILL FROM PROJECT STORAGE
YEAR 2011 - Developed by Texas

Quantities in thousands of acre feet to nearest hundred

MONTH	USABLE WATER IN STORAGE					CREDIT WATER IN STORAGE					RIO GRANDE BELOW CABALLO DAM							
	^a Total Project Storage Capacity Available at End of Month	Elephant Butte Reservoir	Caballo Reservoir	Total at End of Month	Unfilled Capacity of Project Storage at End of Month	^c Colorado Credit Water	^b New Mexico Credit Water	Total at End of Month	Flood Water in Storage in Caballo Reservoir at End of Month	Total Water in Project Storage at End of Month	Measured Flow at Gaging Station	Intervening Diversions to Canals	Total Release and Spill	Caballo Flood Water	Credit Water	Usable Water	Net During Month	Accumulated Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	2,225.0	^b 205.5	22.0	^b 227.5	1,997.5	^b 2.7	^b 164.7	^b 167.4		394.9								0.0
JAN	2,225.0	243.9	23.6	267.5	1,957.5	2.7	163.2	165.9		433.4	0.1	0.0	0.1				0.1	0.1
FEB	2,226.0	277.5	24.8	302.3	1,922.7	2.6	161.5	164.1		486.4	0.1	0.1	0.2				0.2	0.3
MAR	2,225.0	245.1	34.1	279.2	1,945.8	1.5	157.9	159.4		438.6	47.7	0.1	47.8				47.8	48.1
APR	2,200.0	168.5	63.2	231.7	1,968.3	1.4	152.9	154.3		386.0	54.8	0.1	54.9				54.9	103.0
MAY	2,200.0	150.8	53.0	203.8	1,996.2	1.4	147.3	148.7		352.5	44.0	0.2	44.2				44.2	147.2
JUN	2,200.0	83.7	37.5	121.2	2,078.8	1.3	139.7	141.0		262.2	103.7	0.4	104.1				104.1	251.3
JUL	2,200.0	31.2	32.2	63.4	2,136.6	1.3	133.6	134.9		198.3	69.7	0.4	70.1				70.1	321.4
AUG	2,200.0	15.6	7.3	22.9	2,177.1	1.2	129.5	130.7		163.6	58.0	0.2	58.2				58.2	379.6
SEPT	2,200.0	18.1	8.5	26.6	2,173.4	1.2	126.4	127.6		164.2	18.6	0.0	18.6				18.6	398.2
OCT	2,225.0	32.9	10.1	43.0	2,182.0	1.2	123.7	124.9		167.9	0.1	0.0	0.1				0.1	398.3
NOV	2,225.0	68.0	11.6	79.6	2,145.4	1.2	122.0	123.2		202.8	0.1	0.0	0.1				0.1	398.4
DEC	2,225.0	122.3	13.6	135.9	2,089.1	1.2	122.4	123.6		259.5	0.1	0.0	0.1				0.1	398.5
YEAR	—	—	—	—	—	—	—	—	—	—	397.0	1.5	398.5	0.0	0.0	0.0	398.5	—
											ACCUMULATED DEPARTURE FROM NORMAL RELEASE							
											ITEM							
											P1							
											P2							
											P3							
											P4							
											P5							
											P6							
											P7							
											TIME OF HYPOTHETICAL SPILL Did not occur							

Remarks: Cols. 2, 6 and 11 reflect implementation of revised area-capacity tables from Elephant Butte and Caballo Reservoirs, effective Jan. 1, 2009

^a Project Storage Capacity is 2,200,000 acre-feet (April to September) and 2,225,000 acre-feet (October to March) as recognized by the September 9, 1998 Resolution of the Rio Grande Compact Commission with flood control storage reservation at Elephant Butte Reservoir of 50,000 acre-feet from April through September and 25,000 acre-feet from October through March.

^b Based on Balance at Beginning of Year (C1 and NM1).

^c Calculated on a monthly basis.

Remarks: Cols. 2, 6 and 11 reflect implementation of revised area capacity tables from Elephant Butte and Caballo Reservoirs, effective Jan 1, 2009

a Project Storage Capacity is 2,200,030 acre-feet (April to September) and 2,225,030 acre-feet (October to March) as recognized by the September 9, 1988 Resolution of the Rio Grande Compact Commission with flood control storage reservation at Elephant Butte Reservoir of 50,000 acre-feet from April through September and 25,000 acre-feet from October through March.

b Based on Balance at Beginning of Year (C1 and NM1).

c Calculated on a monthly basis.

APPROVED: _____
Engineer Adviser for Colorado

Date: _____

Engineer Adviser for New Mexico

Date: _____

Engineer Adviser for Texas

Date: _____

New Mexico and Colorado Accounting Using the Rio Grande Compact Commission 1951 Loan Methodology for Bureau of Reclamation's Unauthorized 2011 Credit Water Release

RIO GRANDE COMPACT - DELIVERIES BY COLORADO AT STATE LINE

YEAR 2011 - Developed by Colorado and New Mexico

Quantities in thousands of acre feet to nearest hundred

Quantities in thousands of acre feet to nearest hundredth																											
MONTH	CONEJOS INDEX SUPPLY										RIO GRANDE INDEX SUPPLY										DELIVERIES						
	MEASURED FLOW			ADJUSTMENTS				SUPPLY			RECORDED FLOW NEAR DEL NORTE	STORAGE AT END OF MONTH	CHANGE IN STORAGE	ADJUSTMENTS			SUPPLY			CONJOS RIVER AT MOUTH NEAR LASAUCES	RIO GRANDE LESS CONJOS RIVER	RIO GRANDE AT LOBATOS	ACCUMULATED TOTAL AT LOBATOS				
	CONEJOS AT MOGOTE	LOS PINOS NEAR ORTIZ	SAN ANTONIO AT ORTIZ	TOTAL	STORAGE AT END OF MONTH	CHANGE IN STORAGE ^c	OTHER ADJUSTMENTS	NET ADJUSTMENTS	SUPPLY IN MONTH	ACCUMULATED TOTAL				TRANSFORMATION ^b	OTHER ADJUSTMENTS ^a	NET ADJUSTMENTS	SUPPLY IN MONTH	ACCUMULATED TOTAL									
1																											
						18.5						0.2															0.0
JAN	2.8				2.8	18.6	0.1		0.1	2.9	2.9	11.7	0.2	0.0					11.7	11.7		3.0	12.4	15.4	15.4	15.4	
FEB	2.4				2.4	18.8	0.0		0.0	2.4	5.3	9.3	0.2	0.0					9.3	21.0		3.3	12.2	15.5	30.9	30.9	
MAR	4.3				4.3	18.7	0.1		0.1	4.4	9.7	14.4	0.2	0.0					14.4	35.4		5.3	16.9	22.2	53.1	53.1	
APR	11.2	7.5	2.2	20.9	18.4	-0.3			-0.3	20.6	30.3	37.1	0.2	0.0					37.1	72.5		2.9	3.8	6.7	59.8	59.8	
MAY	29.8	23.8	3.3	56.9	18.5	0.1	0.1	0.1	0.2	57.1	87.4	95.6	0.2	0.0					95.6	188.1		7.1	7.2	14.3	74.1	74.1	
JUN	77.0	20.2	0.4	97.6	24.1	5.6	0.2	5.8	103.4	190.8	183.8	0.2	0.0					183.8	351.9		13.1	20.6	33.7	107.8	107.8	107.8	
JUL	29.4	2.5	0.0	31.9	19.0	-5.1	0.1	-5.0	28.9	217.7	58.8	0.2	0.0	-0.7	0.3	-0.4		58.4	410.3		8.5	14.6	23.1	130.9	130.9	130.9	
AUG	11.3	1.6	0.1	13.0	18.4	-2.6	0.1	-2.5	10.5	228.2	22.8	0.2	0.0					22.8	433.1		2.7	6.4	9.1	140.0	140.0	140.0	
SEPT	7.2	1.9	0.1	9.2	17.8	1.4	0.1	1.5	10.7	238.9	17.2	0.2	0.0					17.2	450.3		1.8	3.1	4.9	144.9	144.9	144.9	
OCT	12.8	2.2	0.2	15.2	13.7	-4.1	0.1	-4.0	11.2	250.1	26.9	0.2	0.0					26.9	477.2		8.6	3.2	11.8	156.7	156.7	156.7	
NOV	7.4			7.4	11.7	-2.0	0.0	-2.0	5.4	255.5	15.5	0.2	0.0					15.5	492.7		9.0	18.4	27.4	184.1	184.1	184.1	
DEC	2.7			2.7	12.1	0.4		0.4	3.1	258.6	9.6	0.2	0.0					9.6	502.3		3.9	12.0	15.9	200.0	200.0	200.0	
YEAR	198.3	59.7	6.3	264.3		-6.4	0.7	-5.7	258.6		502.7			-0.7	0.3	-0.4	-0.4	502.3			89.2	130.8	200.0				
SUMMARY OF DEBITS AND CREDITS																											
ITEM																											
C1 Balance at Beginning of Year																											
C2 Scheduled Delivery from Conejos River																											
C3 Scheduled Delivery from Rio Grande																											
C4 Actual Delivery at Lobatos plus 10,000 Acre Feet																											
C5 Reduction of Debits c/o Evaporation																											
C6 Reduction of Credits c/o Evaporation ^d																											
C7 Actual credit relinquished to project storage on Mar. 31, 2011.																											
C8 Balance at End of Year																											

Remarks: Cols. 8 and 13 do not include Transmountain water.
^a Evaporation loss post-compact reservoirs; report of the Engineer Adviser for Colorado.
^b 986 ac-ft minus 243 ac-ft pre-compact; report of the Engineer Adviser for Colorado.
^c See Engineer Adviser report in regards to change of storage.
^d Evaporation of Credit Water computed according to Article VI of the Rio Grande Compact using the Annual Method applied by the Rio Grande Compact Commission for the 1951 Loan of Credit.

Remarks: Cols. 8 and 13 do not include Transmountain water.

a Evaporation loss post-compact reservoirs; report of the Engineer Adviser for Colorado.

b 986 ac-ft minus 243 ac-ft pre-compact; report of the Engineer Adviser for Colorado.

c See Engineer Adviser report in regards to change of storage.

d Evaporation of Credit Water computed according to Article VI of the Rio Grande Compact using the Annual Method applied by the Rio Grande Compact Commission for the 1951 Loan of Credit.

APPROVED:
Engineer Adviser for Colorado

Date: _____

Date: _____

Engineer Adviser for Texas

Date: _____

New Mexico and Colorado Accounting Using the Rio Grande Compact Commission 1951 Loan Methodology for Bureau of Reclamation's Unauthorized 2011 Credit Water Release

RIO GRANDE COMPACT - DELIVERIES BY NEW MEXICO AT ELEPHANT BUTTE

YEAR 2011 - Developed by Colorado and New Mexico

Quantities in thousands of acre feet to nearest hundred

MONTH	OTOWI INDEX SUPPLY										ELEPHANT BUTTE EFFECTIVE SUPPLY				
	ADJUSTMENTS					INDEX SUPPLY					STORAGE IN ELEPHANT BUTTE RESERVOIR		Recorded Flow Below Elephant Butte Dam		Accumulated Total
	Recorded Flow at Otowi Bridge	Storage End of Month ^{a, b}	Change in Storage	Reservoir Evaporation	Other Adjustments	Trans-mountain Diversions	Net Adjustments	During Month	Accumulated Total	Total Water Stored in New Mexico Above San Marcial at End of Month ^{a, b}	End of Month	Change Gain (+) Loss (-)	During Month	Effective Supply	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
JAN	39.7	44.5	-1.9	0.0	0.0	-2.1	-4.0	35.7	35.7	44.7	372.9	36.9	0.6	37.5	37.5
FEB	38.1	43.3	0.7	0.0	0.0	-2.6	-1.9	36.2	71.9	42.7	409.8	31.8	0.5	32.3	69.8
MAR	51.1	42.6	-0.7	0.2	0.2	-2.8	-3.3	47.8	119.7	42.6	441.6	-37.1	65.5	28.4	98.2
APR	58.1	53.9	11.3	0.4	0.4	-9.0	2.7	60.8	180.5	53.7	404.5	-81.7	94.0	12.3	110.5
MAY	77.4	98.3	44.4	0.5	0.5	-4.5	40.4	117.8	298.3	98.5	322.8	-23.3	38.6	15.3	125.8
JUN	92.6	91.4	-6.9	0.8	0.8	-5.1	-11.2	81.7	380.0	91.7	294.7	-74.8	95.5	20.7	148.5
JUL	70.1	64.5	-26.9	0.3	0.3	-7.2	-33.8	38.3	418.3	65.0	166.1	-58.6	86.3	7.7	154.2
AUG	53.3	35.5	-28.0	0.2	0.2	-4.9	-32.7	20.6	436.9	36.4	146.3	-19.8	30.2	10.4	164.6
SEPT	34.7	35.1	-1.4	0.2	0.2	-13.8	-15.0	19.7	456.6	34.9	145.7	-0.6	16.5	15.9	180.5
OCT	32.8	35.2	0.1	0.2	0.2	-3.6	-3.3	29.5	486.1	35.3	157.8	12.1	0.4	12.5	193.0
NOV	56.5	29.5	-6.7	0.2	0.2	-3.4	-8.9	47.6	533.7	29.6	191.2	33.4	0.1	33.5	226.5
DEC	50.3	20.3	-3.2	0.1	0.1	-3.0	-12.1	38.2	571.9	20.0	245.9	54.7	0.1	54.8	281.3
YEAR	655.0		-24.2	3.1		-62.0	-83.1	571.9				-127.0	408.3	281.3	
SUMMARY OF DEBITS AND CREDITS															
ITEM															
DEBIT															
CREDIT															
BALANCE															
Cr. 154.7															
Dr. 183.7															
Cr. 117.6															
Cr. 76.3															
Cr. 76.3															
Cr. 76.3															
Cr. 76.3															

Remarks:

^a Cole, 3, 11, and 12 do not include transmountain water.

^b Note: Storage in Abiquiu, El Vado, McCure and Nichols Reservoirs under the April 23, 2003 and the February 1, 2008 agreements for relinquishment of accrued credits totaled 38,500 acre-feet in 2011.

Storage of relinquished credit to date totaled 182,757 acre-feet; balance of assigned relinquishment credit remaining to be stored is 77,743 acre-feet.

^c Elephant Butte Reservoir storage was below Credit Water Pool (166,300 ac-ft) during July, August, September, and October due to Bureau of Reclamation's unauthorized release of Credit Water.

^d Evaporation of Credit Water computed according to Article VI of the Rio Grande Compact using the Annual Method applied by the Rio Grande Compact Commission for the 1951 Loan of Credit.

APPROVED:

Engineer Adviser for Colorado

Date:

Engineer Adviser for New Mexico

Date:

Engineer Adviser for Texas

Date:

New Mexico and Colorado Accounting Using the Rio Grande Compact Commission 1951 Loan Methodology for Bureau of Reclamation's Unauthorized 2011 Credit Water Release

RIO GRANDE COMPACT - RELEASE AND SPILL FROM PROJECT STORAGE

YEAR 2011 - Developed by Colorado and New Mexico

Quantities in thousands of acre feet to nearest hundred

MONTH	USABLE WATER IN STORAGE				CREDIT WATER IN STORAGE				RIO GRANDE BELOW CABALLO DAM ^a							USABLE RELEASE		
	^a Total Project Storage Capacity Available at End of Month	Elephant Butte Reservoir	Caballo Reservoir	Total at End of Month	Unfilled Capacity of Project Storage at End of Month	^c Colorado Credit Water	^c New Mexico Credit Water	Total at End of Month	Flood Water in Storage in Caballo Reservoir at End of Month	Total Water in Project Storage at End of Month	Measured Flow at Caballo Gaging Station	Intervening Diversions to Canals	Total Release and Spill	Caballo Flood Water	Credit Water	Usable Water	Net During Month	Accumulated Total
1		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
JAN	2,225.0	2,205.5	227.5	2,225.0	1,997.5	2,275.0	1,997.5	1,997.5	1,997.5	394.9	394.9	---	---	---	---	---	---	0.0
FEB	2,225.0	2,242.4	23.8	2,266.0	1,999.0	2,7	184.7	167.4	167.4	433.4	433.4	---	---	---	---	---	---	---
MAR	2,225.0	2,742.2	24.8	2,990.0	1,928.0	2,7	184.7	167.4	167.4	466.4	466.4	---	---	---	---	---	---	---
APR	2,225.0	2,371.1	34.1	2,712.2	1,953.8	1.6	164.7	166.3	166.3	438.6	438.6	---	---	---	---	---	---	---
MAY	2,200.0	1,654.4	63.2	2,181.6	1,981.4	1.6	164.7	166.3	166.3	386.0	386.0	---	---	---	---	---	---	---
JUN	2,200.0	1,321.1	53.0	1,851.1	2,014.9	1.6	164.7	166.3	166.3	352.5	352.5	---	---	---	---	---	---	---
JUL	2,200.0	573.3	37.5	94.8	2,105.2	1.6	164.7	166.3	166.3	282.2	282.2	---	---	---	---	---	---	---
AUG	2,200.0	-1.3	32.2	30.9	2,169.1	1.6	164.7	166.3	166.3	198.3	198.3	---	---	---	---	---	---	---
SEPT	2,200.0	-21.1	7.3	-13.8	2,213.8	1.6	164.7	166.3	166.3	153.6	153.6	---	---	---	---	---	---	---
OCT	2,225.0	-21.7	8.5	-13.2	2,213.2	1.6	164.7	166.3	166.3	154.2	154.2	---	---	---	---	---	---	---
NOV	2,225.0	-9.6	10.1	0.5	2,224.5	1.6	164.7	166.3	166.3	187.9	187.9	---	---	---	---	---	---	---
DEC	2,225.0	23.8	11.6	35.4	2,199.6	1.6	164.7	166.3	166.3	202.8	202.8	---	---	---	---	---	---	---
YEAR	2,225.0	78.5	13.6	92.1	2,132.9	1.6	164.7	166.3	166.3	289.5	289.5	---	---	---	---	---	---	---
Remarks: Cols. 2, 6 and 11 reflect implementation of revised area-capacity tables from Elephant Butte and Caballo Reservoirs, effective Jan 1, 2009. ^a Project Storage Capacity is 2,200,000 acre-feet (April to September) and 2,225,000 acre-feet (October to March) as recognized by the September 9, 1988 Resolution of the Rio Grande Compact Commission with flood control storage reservation at Elephant Butte Reservoir of 50,000 acre-feet from April through September and 25,000 acre-feet from October through March. ^b Based on Balance at Beginning of Year (C1 and NM1). ^c Credit water held constant during the year in accordance with Article VI and per direction of Compact Commission in March 2006. Evaporation for credit water is accounted at end of calendar year in the proportion that the Credit Water bore to the total amount of water in Elephant Butte Reservoir during the year. If loan had been approved Credit Water would have been decreased by the amount of the negative usable water. ^d Cols. 3 and 5 - negative usable water in Elephant Butte due to Bureau of Reclamation unauthorized release of credit water. ^e Cols. 12-19 and Accrued Departure from Normal Release - Due to caballo releases discrepancy data was not approved. See Texas developed accounting sheet for Bureau of Reclamation reported data.																		
ACCRUED DEPARTURE FROM NORMAL RELEASE ITEM P1 Accrued Departure at Beginning of Year P2 Actual Release during Year P3 Normal Release for Year P4 Under Release in Excess of 150.0 P5 P6 P7 Accrued Departure at End of Year TIME OF HYPOTHETICAL SPILL Did not occur																		
DEBIT CREDIT BALANCE 790.0																		

APPROVED:

Engineer Adviser for Colorado

Date:

Engineer Adviser for New Mexico

Date:

Engineer Adviser for Texas

Date:

BUDGET FOR FISCAL YEAR ENDING JUNE 30, 2011

Item	Total Cost	Borne by United States	Borne by		
			Colorado	New Mexico	Texas
GAGING STATIONS					
In Colorado ¹	\$65,392		\$65,392		
In New Mexico, above Caballo Reservoir	\$72,174	\$39,559		\$32,615	
In New Mexico, Caballo Reservoir and below	\$29,180	\$7,040		\$3,130	\$19,010
Subtotal	\$166,746	\$46,599	\$65,392	\$35,745	\$19,010
ADMINISTRATION					
USGS Technical Services	\$16,625	\$6,875	\$3,250	\$3,250	\$3,250
Other expenses ²	\$3,928		\$1,309	\$1,309	\$1,309
Subtotal	\$20,553	\$6,875	\$4,559	\$4,559	\$4,559
GRAND TOTAL	\$187,299	\$53,474	\$69,951	\$40,304	\$23,569
EQUAL SHARES			\$44,608	\$44,608	\$44,608

¹Includes \$4,305 to Colorado USGS for review and publication of Colorado Rio Grande Compact gage records.

²Includes cost of court reporter and publication of Annual Report.

BUDGET FOR FISCAL YEAR ENDING JUNE 30, 2013

Item	Total Cost	Borne by United States	Borne by		
			Colorado	New Mexico	Texas
GAGING STATIONS					
In Colorado ¹	\$66,673		\$66,673		
In New Mexico, above Caballo Reservoir	\$75,060	\$41,141		\$33,919	
In New Mexico, Caballo Reservoir and below	\$24,314	\$6,117		\$3,256	\$14,941
Subtotal	\$166,047	\$47,258	\$66,673	\$37,175	\$14,941
ADMINISTRATION					
USGS Technical Services	\$17,290	\$5,884	\$3,802	\$3,802	\$3,802
Other expenses ²	\$3,000		\$1,000	\$1,000	\$1,000
Subtotal	\$20,290	\$5,884	\$4,802	\$4,802	\$4,802
GRAND TOTAL	\$186,337	\$53,142	\$71,475	\$41,977	\$19,743
EQUAL SHARES			\$44,398	\$44,398	\$44,398

¹Includes \$4,305 to Colorado USGS for review and publication of Colorado Rio Grande Compact gage records.

²Includes cost of court reporter and publication of Annual Report.

RECLAMATION

Managing Water in the West

MEMORANDUM

TO: ENGINEER ADVISERS TO THE RIO GRANDE COMPACT COMMISSION

FROM: WATER OPERATIONS GROUP- BUREAU OF RECLAMATION
ALBUQUERQUE AREA OFFICE

SUBJECT: PROPOSED LOSS RATES ON SAN JUAN-CHAMA WATER ROUTED TO
ELEPHANT BUTTE RESERVOIR

DATE: 3/2/2012

Routing of San Juan-Chama (SJ-C) water to Elephant Butte Reservoir requires valid loss rates through the middle valley between Cochiti and Elephant Butte reservoirs. In 1985, the Rio Grande Compact Commission approved loss rates for routing SJ-C water through the middle valley (Table 1). The approved use assumed that the Low Flow Conveyance Channel (LFCC) was in operation. The following limitations applied, and do not match current conditions or operations:

- Loss rates were approved only for the months of October through May; that is, no loss rates are approved for the summer months of June through September, which are shaded blue below.
- They are only valid for Rio Grande flows between 400 cfs to 1400 cfs, and SJ-C flows of 0 cfs to 2000 cfs, and the combined flow must be less than 3000 cfs.
- In the event that the routing of SJ-C water to Elephant Butte was made via the river, the SJ-C water was to be accounted as the first water diverted to the river and was to absorb all those initial losses required to prime the river channel. This condition assumed that the LFCC would be used to route all flows below San Acacia.

Table 1. Loss Rates Approved in 1985 for Routing SJ-C Water to Elephant Butte

To	From		
	Heron & El Vado	Abiquiu	Cochiti
Elephant Butte	(5-day lag)	(4-day lag)	(3-day lag)
Jan	5.60%	4.50%	3.30%
Feb	6.10%	5.00%	3.80%
Mar	7.50%	6.40%	5.20%
Apr	8.80%	7.70%	6.50%
May	9.50%	8.30%	7.20%
Jun			
Jul			
Aug			
Sep			
Oct	6.90%	5.80%	4.60%
Nov	6.00%	4.90%	3.70%
Dec	5.60%	4.50%	3.30%

Note that, while Table 1 lists loss rates for movement of water from Heron, El Vado, Abiquiu, and Cochiti, the only loss rates in question are those for water moved from Cochiti to Elephant Butte. Reclamation therefore only modeled the movement of water between these two reservoirs.

In 2010, the Engineer Advisors (EAs) asked the Bureau of Reclamation (Reclamation) for a recommendation to establish reasonable loss rates through the middle valley. This memorandum summarizes the method used to develop monthly loss rates using the middle valley portion of the Upper Rio Grande Water Operations Model (URGWOM).

The data used for modeling is from 1990 - 2007. In 2010, the New Mexico Interstate Stream Commission used this model to determine loss rates on a case-by-case basis for SJ-C water moved in that year. Reclamation reviewed that work, and then began their modeling with the same model and dataset. The loss rates that were used until 2010 assumed that the LFCC would be used to convey flows up to 2000 cfs. The LFCC is no longer operated, so new loss rates reflect actual conditions, and therefore the dataset begins in 1990 without influence of LFCC operations. The dataset ends in 2007 because this is the most recent year with a full, calibrated URGWOM dataset.

Reclamation found noticeable changes in SJC losses by month, SJC release rate, and native (Rio Grande Basin) flow out of Cochiti. Figures 1 and 2 are graphs of data derived from the modeling by NMISC. Figure 2 is a finer horizontal scale than Figure 1, and shows where Reclamation saw distinct changes in the loss rates computed. From this data, Reclamation determined that there should be separate loss rates for three native flow ranges: 500 - 1200 cfs, 1200 - 2000 cfs, and greater than 2000 cfs.

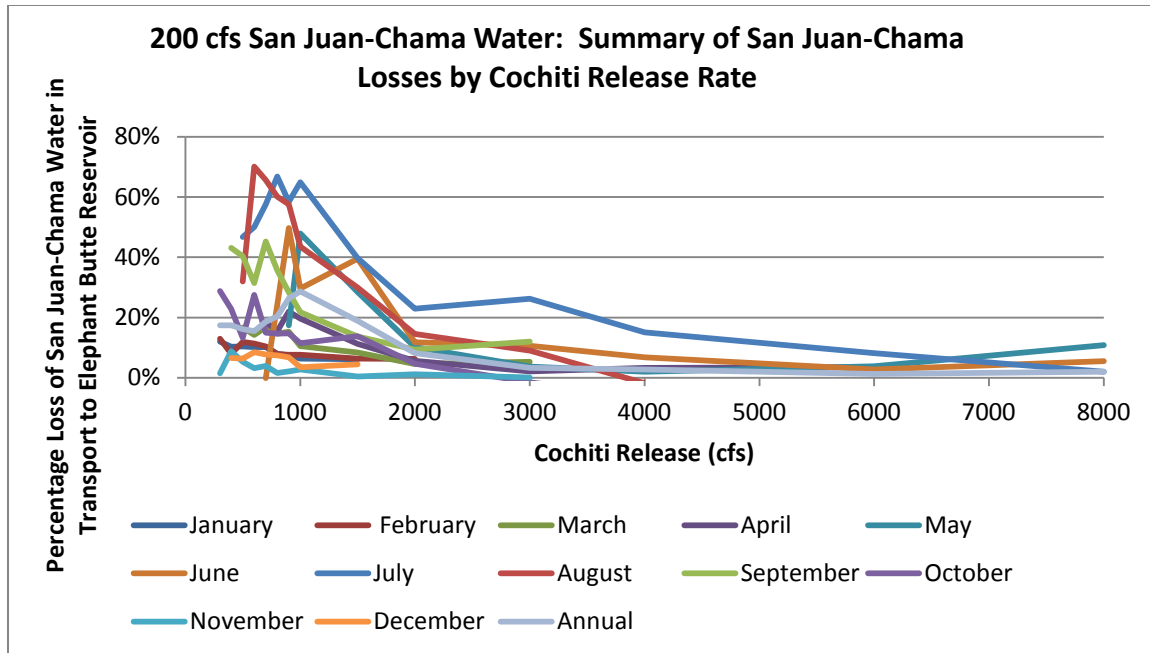


Figure 1. SJC loss rates from URGWOM Model at various native releases

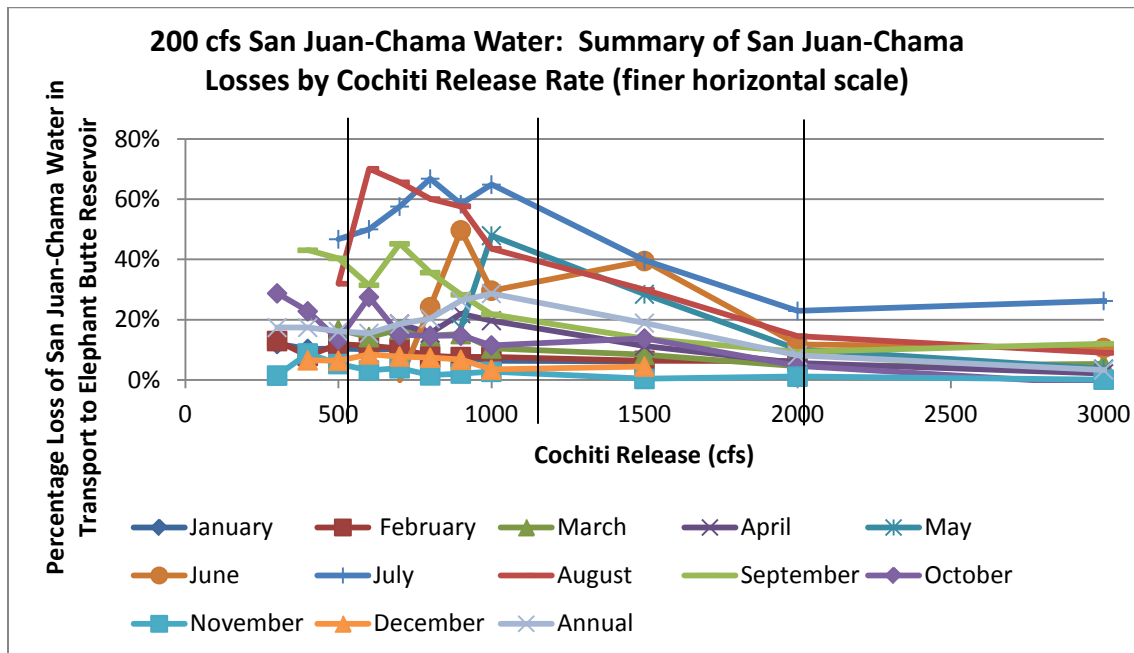


Figure 2. SJC loss rates from URGWOM Model at various native releases (finer horizontal scale)

In this modeling, an SJC block release was modeled, which reflects current practice. Reclamation modeled four block release periods of five days, ten days, 15 days, and 20 days to determine if length of the release periods within typical, practical ranges would result in significantly different loss rates.

Based on analysis of these runs, Reclamation proposes four distinct SJC release ranges for loss rates, with the loss rate determined by modeling the average flow within the range. These ranges are: less than 300 cfs, 300 - 600 cfs, 600 cfs - 900 cfs, and 900 cfs - 1500 cfs.

In modeling, SJC releases of the average flow in each range were placed on blocks of days in a historical month that had native flows with an average in the desired native flow range to be modeled. For example, loss rates for a five day SJC block release less than 300 cfs and within the native flow bracket of 500 - 1200 cfs were determined from a modeled release of 150 cfs of SJC water released from 1/15-19/1990, when the native flow ranged from 619 – 686 cfs. This was done for all months and flow ranges required for the native and SJC flow ranges.

To calculate the loss rates, inflow into Elephant Butte Reservoir is cut off at 30 days from the end of the block release or 1 cfs, whichever comes first. The inflow to Elephant Butte was then compared to the release from Cochiti. For a given set of conditions, loss rates were determined by averaging loss rates for the same SJC release rate and duration at a variety of different native flow rates within the range.

The results of this modeling are presented in Tables L1- L3. Figures 3 and 4 graphically show the efficiency of water movement equivalent to the loss rates in Table L-1.

Reclamation recommends that the modeling results be used as fixed loss rates for moving SJC water from Cochiti to Elephant Butte. Reclamation recommends that the model-determined loss rates be used for accounting. Reclamation recommends that SJC contractors' water be moved under conditions stipulated by the loss rate tables and other guidelines as discussed by Reclamation and the Compact Engineer Advisors and listed below.

SJC water movement from Cochiti to Elephant Butte guidelines:

- Pre-determined loss rates will only apply to water moved within the parameters of the Commission approved tables
- Releases should not occur during river drying
- Releases should end on or before November 30 of each calendar year
- Contractors can request specific flow rates and times, but must be aware that while water will be moved, exact dates and flow rates may not be met due to system constraints (Article VII, flooding, Dam safety, ramp up and ramp down, etc.)
- SJC water cannot be moved during flood operations out of any of the reservoirs
- SJC water can be moved outside of the pre-determined loss rate parameters with approval of Compact Commissioners and Reclamation or in cases of emergency
- SJC water moved outside of the pre-determined loss rate parameters will have loss rates determined on a case by case basis

Table L-1 SJC Loss from Cochiti to Elephant Butte, Native Flow at Cochiti 500-1200 cfs

	SJC Release Rate (cfs)	SJC Release Length (days)			
		5	10	15	20
January	0-300	13%	12%	12%	11%
	300-600	12%	12%	11%	10%
	600-900	12%	11%	10%	10%
	900-1500	11%	10%	10%	9%
February	0-300	13%	12%	12%	11%
	300-600	12%	12%	11%	10%
	600-900	12%	11%	11%	10%
	900-1500	11%	11%	10%	9%
March	0-300	15%	14%	13%	13%
	300-600	14%	13%	12%	12%
	600-900	13%	13%	12%	11%
	900-1500	13%	12%	11%	10%
April	0-300	23%	22%	22%	23%
	300-600	20%	20%	19%	20%
	600-900	19%	18%	17%	18%
	900-1500	17%	17%	16%	16%
May	0-300	53%	54%	51%	49%
	300-600	45%	44%	42%	40%
	600-900	38%	37%	35%	33%
	900-1500	32%	30%	29%	27%
June	0-300	75%	70%	69%	64%
	300-600	57%	52%	52%	49%
	600-900	48%	44%	43%	41%
	900-1500	40%	36%	35%	33%
July	0-300	68%	70%	67%	65%
	300-600	59%	58%	55%	52%
	600-900	49%	47%	44%	41%
	900-1500	40%	38%	35%	32%
August	0-300	56%	58%	57%	54%
	300-600	45%	45%	43%	41%
	600-900	38%	37%	35%	33%
	900-1500	31%	30%	29%	27%
September	0-300	33%	32%	31%	30%
	300-600	29%	27%	25%	24%
	600-900	25%	23%	22%	21%
	900-1500	22%	20%	19%	18%
October	0-300	23%	22%	21%	20%
	300-600	20%	19%	18%	17%
	600-900	18%	17%	16%	15%
	900-1500	17%	16%	14%	13%
November	0-300	11%	10%	9%	7%
	300-600	11%	9%	9%	7%
	600-900	11%	9%	8%	7%
	900-1500	10%	9%	8%	7%

Table L-2 SJC Loss from Cochiti to Elephant Butte, Native Flow at Cochiti 1200-2000 cfs

	SJC Release Rate (cfs)	SJC Release Length (days)			
		5	10	15	20
March	0-300	13%	12%	12%	11%
	300-600	12%	12%	11%	11%
	600-900	12%	11%	11%	11%
	900-1500	11%	11%	10%	10%
April	0-300	14%	14%	15%	14%
	300-600	13%	14%	14%	14%
	600-900	13%	13%	13%	13%
	900-1500	12%	12%	13%	12%
May	0-300	29%	37%	45%	21%
	300-600	27%	32%	39%	19%
	600-900	24%	28%	34%	18%
	900-1500	22%	24%	28%	16%
June	0-300	42%	41%	42%	34%
	300-600	34%	32%	32%	25%
	600-900	30%	28%	28%	22%
	900-1500	26%	24%	24%	19%
July	0-300	31%	31%	32%	33%
	300-600	26%	25%	25%	25%
	600-900	23%	23%	21%	21%
	900-1500	21%	20%	19%	18%
August	0-300	21%	19%	20%	20%
	300-600	19%	17%	18%	18%
	600-900	18%	16%	17%	16%
	900-1500	17%	15%	15%	15%
September	0-300	17%	15%	15%	16%
	300-600	15%	15%	14%	14%
	600-900	15%	14%	13%	13%
	900-1500	14%	13%	12%	12%

Table L-3 SJC Loss from Cochiti to Elephant Butte, Native Flow at Cochiti >2000 cfs

	SJC Release Rate (cfs)	SJC Release Length (days)			
		5	10	15	20
April	0-300	9%	8%	8%	8%
	300-600	9%	8%	8%	8%
	600-900	9%	8%	8%	8%
	900-1500	8%	8%	8%	8%
May	0-300	9%	8%	8%	8%
	300-600	9%	8%	8%	8%
	600-900	9%	8%	8%	8%
	900-1500	8%	7%	8%	8%
June	0-300	10%	10%	8%	7%
	300-600	9%	9%	7%	7%
	600-900	9%	9%	7%	7%
	900-1500	8%	9%	7%	6%

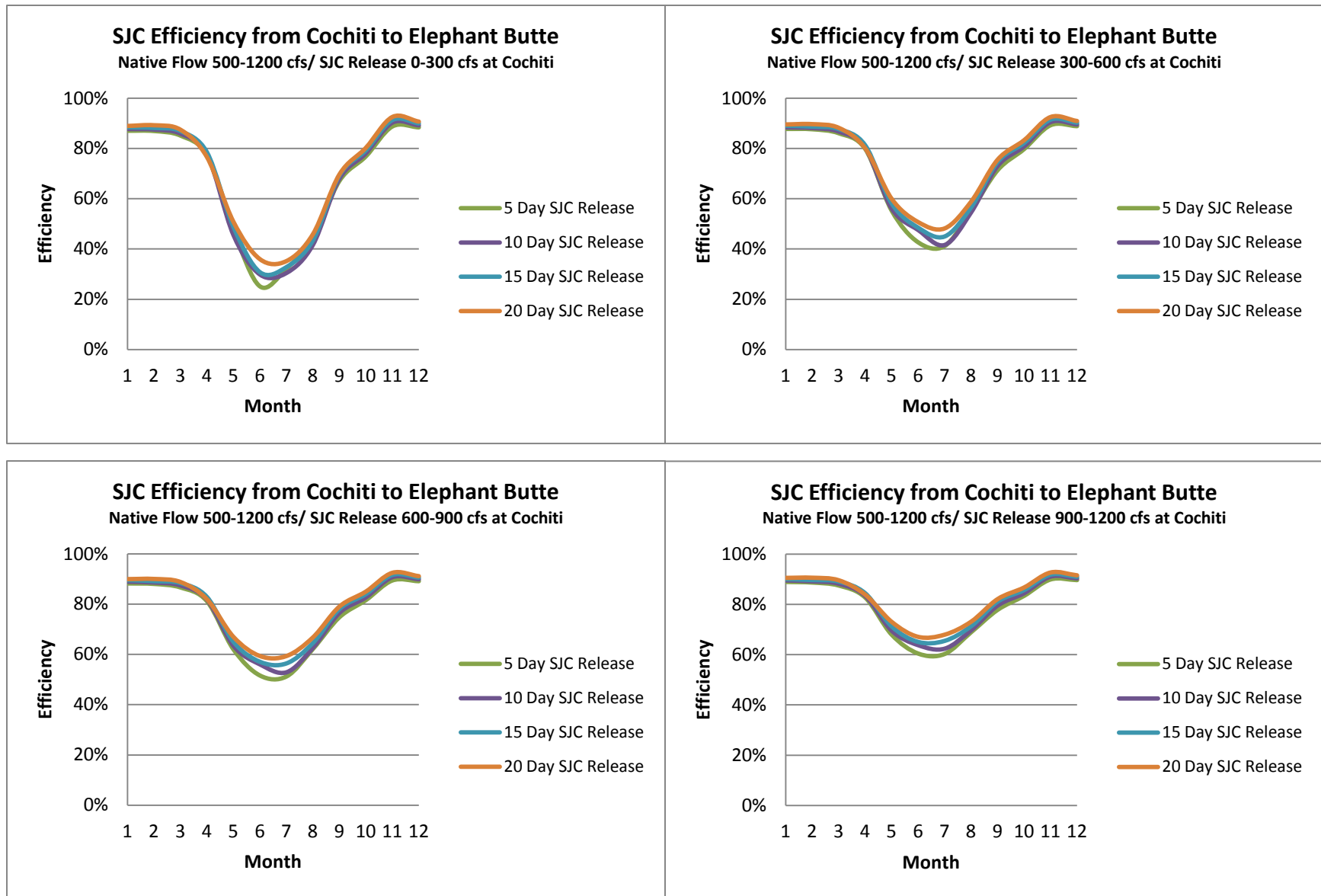


Figure 3. Efficiency graphs to show changes over months and SJC release, grouped by release rate

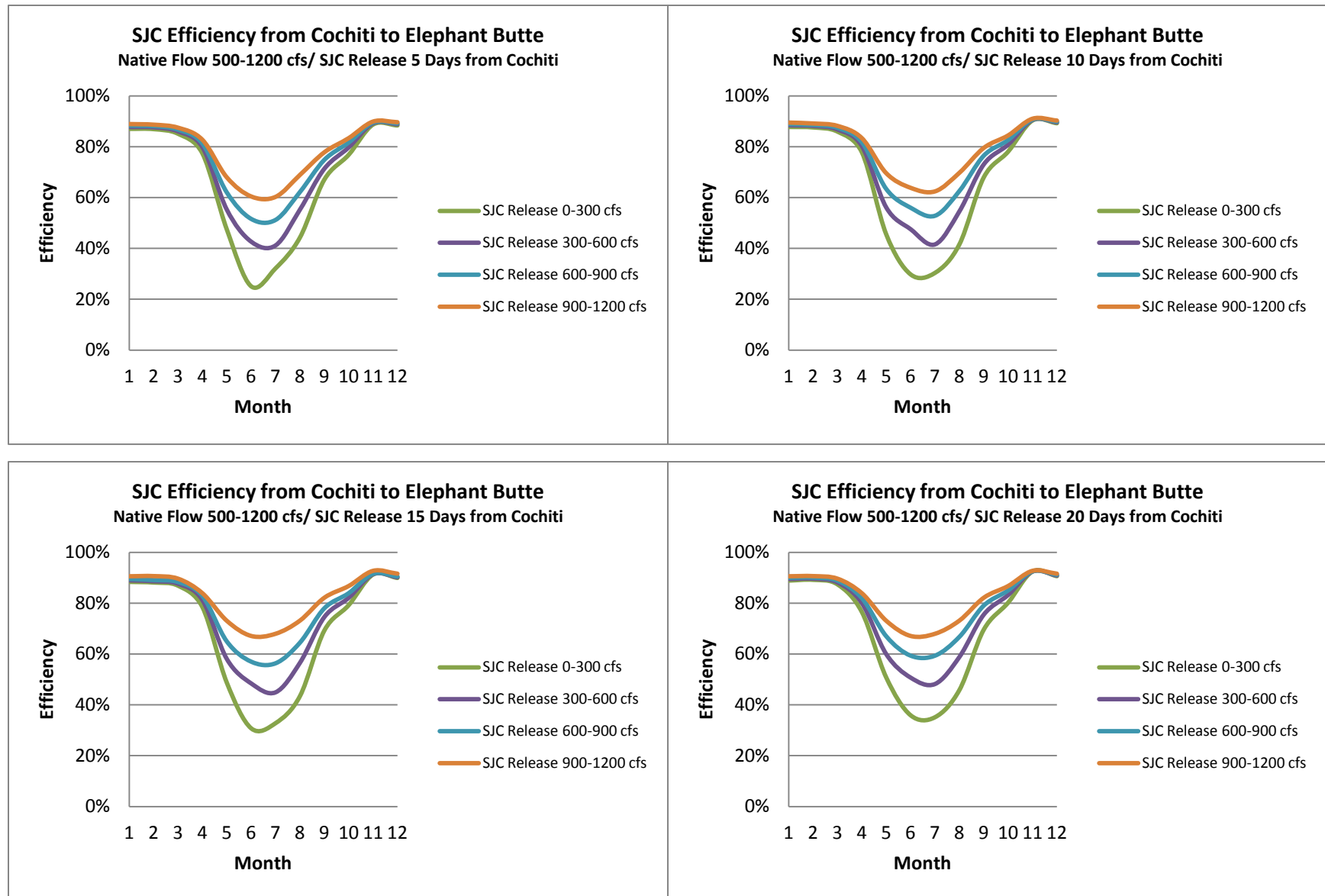


Figure 4. Efficiency graphs to show changes over months and SJC releases, grouped by length of release



United States Department of the Interior

U.S. GEOLOGICAL SURVEY
New Mexico Water Science Center
DUNS 02 528 7520
5338 Montgomery Blvd NE, Suite 400
Albuquerque, NM 87109-1311

April 16, 2012

Mr. Dick Wolfe
Rio Grande Compact Commissioner for Colorado
1313 Sherman Street, Room 818
Denver, CO 80203
303-866-3581

Mr. Patrick Gordon
Rio Grande Compact Commissioner for Texas
P.O. Box 1917
El Paso, TX 79950-1917
915-834-7075

Mr. Scott A. Verhines
Rio Grande Compact Commissioner for New Mexico
Bataan Building
P.O. Box 25102
Santa Fe, NM 87504-5102
505-827-6091

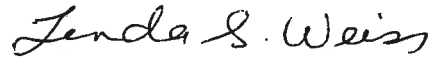
Dear Compact Commission:

Enclosed are five copies of the Joint Funding Agreement (JFA), 12CRNM0000000017, for the period July 1, 2012 to June 30, 2013, for assistance from the U.S. Geological Survey as described on the Statement of Work for the Rio Grande Compact Commission. The agreement provides for a total expenditure of \$16,023 of which the U.S. Geological Survey portion will be \$5,883 and the State of Colorado, the State of New Mexico, and the State of Texas will each provide \$3,380.

If you concur, please sign and return all copies of the JFA to this office. Once all signatures are obtained, an original will be sent to each state. Work performed with funds from this agreement will be conducted on a fixed-price basis. The States of Colorado, New Mexico, and Texas will be billed for work completed as part of the agreement via a DI-1040 on a semi-annual basis.

On behalf of the USGS, I sincerely appreciate your participation in our Cooperative Program. If you have any questions concerning the work on this project, please call Ms. Anne Marie Matherne at (505) 830-7971. Administrative questions should be addressed to Ms. Susan Kell at (505) 830-7904.

Sincerely,

A handwritten signature in cursive script that reads "Linda S. Weiss".

Linda S. Weiss
Director

Enclosure

cc: BFS
Project File: RG209L7
Project Chief: Gunn, Matherne
Customer File: 6000000320
Read File

Agreement No: 12CRNM000000017

Customer No: 6000000320

Project No: RG209L7

Tax ID: 84-0644739 (CO)

85-6000565 (NM)

74-1694284 (TX)

Fixed-price agreement

**COOPERATIVE AGREEMENT
FOR
INVESTIGATION OF WATER RESOURCES**

THIS AGREEMENT, entered into this 1st day of July, 2012 by and between the United States Geological Survey, party of the first part, and each of the Commissioners representing the three signatory states and the Representative of the United States, constituting the Rio Grande Compact Commission, party of the second part.

In consideration of the mutual promises and agreements herein contained, it is agreed by and between the parties hereto as follows:

1. The parties agree that, subject to the availability of appropriations and in accordance with their respective authorities, there shall be maintained a cooperative program for duties as stated in the attached Statement of Work, for the Rio Grande Compact Commission within and among the three states in accordance with the terms of the Rio Grande Compact, incorporated herein by reference.

The parties further agree that this agreement shall in no manner affect any other agreement between the United States Geological Survey and any of the three states of the basin concerning the collection of hydrologic data, but in each case where there is or may be another agreement covering the collection of such data, the duty of the United States Geological Survey as provided here, shall be to compile, correlate, and present hydrographic data that has been collected under such agreements.

2. The parties agree to contribute to this program in the amounts specified or as are from time to time agreed upon in writing, funds needed and available to cover all the cost of the necessary field and office work directly related to the program, excluding any general administrative or accounting work in the office of any of the parties, and excluding the costs of publication by any of the parties of the results of the program.

3. The United States Geological Survey and state members of the Rio Grande Compact agree to contribute to the program during the period from July 1, 2012 to June 30, 2013, the following amounts:

(a)	U.S. Geological Survey	\$5,883
(b)	State of Colorado	\$3,380
(c)	State of New Mexico	\$3,380
(d)	State of Texas	\$3,380

4. So far as may be mutually agreed, all expenses shall be paid in the first instance by the United States Geological Survey with appropriate reimbursement thereafter by the other parties hereto. Each of the parties shall furnish to each of the other parties such statements or reports of expenditures as may be needed to satisfy fiscal requirements.

5. Unless previously terminated by the parties hereto, this agreement shall terminate on June 30, 2013, provided it may be renewed by the mutual agreement of the United States Geological Survey and each of the Commissioners representing the three signatory states to the Rio Grande Compact, as the voting members of the Rio Grande Compact Commission, on or before June 30, 2013, for a period of 1 year, and may be renewed in a like manner on or before June 30th of any year thereafter for a similar period. Any party may terminate this agreement by providing 60 day's written notice to the other party. When an accepted agreement is terminated by the State members of the Rio Grande Compact Commission, the USGS is authorized to collect costs incurred prior to the effective date of termination of the agreement plus any termination cost.

6. The original records resulting from this program will be deposited in the office of origin of those records. Upon request, copies of the original records will be provided to the office of the other parties.

7. In the event this Agreement is renewed as herein provided, the amounts to be contributed by the parties for each renewal period may be determined by mutual agreement and set forth by exchange of letters between the parties at or near the beginning of each such period.

8. Billing for this agreement will be rendered semi-annually in January 2013 and July 2013. Payments of bills are due within 60 days after the billing date. If not paid by the due date, interest will be charged at the current Treasury rate for each 30-day period, or portion thereof, that the payment is delayed beyond the due date. (31 USC 3717, Comptroller General File-B212222, August 23, 1983)

9. The Legal authorities for the U.S. Geological Survey to enter into this Agreement are 43 USC 36C; 43 USC 50; and 43 USC50b.

UNITED STATES GEOLOGICAL SURVEY

Linda S. Weiss 4-16-12
Linda S. Weiss Date
Director, New Mexico Water Science Center

RIO GRANDE COMPACT COMMISSION

Dick Wolf 5/31/12
Commissioner for Colorado Date
John G. Kuhn 6/28/12
Commissioner for New Mexico Date
Pat Gndm 6-22-12
Commissioner for Texas Date

Representative of the United States Date

**Statement of Work
for
12CRNM000000017**

The duties of the United States Geological Survey are as follows:

1. Obtain data for yearly accounting from U.S. Geological Survey in New Mexico and Colorado as well as U.S Bureau of Reclamation, Albuquerque and El Paso Offices, and Colorado Division of Water Resources.
2. Prepare and submit provisional water accounting reports on the deliveries of the Rio Grande water.
3. Compile Rio Grande Compact Commission water accounting from the data supplied by various agencies. Present annual accounting at the Engineer Advisor's Meeting. Obtain signature of Engineer Advisors on approved accounting sheets.

**RESOLUTION
RIO GRANDE COMPACT COMMISSION**

Honoring Donald J. Gallegos

March 21, 2012

WHEREAS, *Donald (Don) J. Gallegos for 31 years has been a valued employee of the Albuquerque District, U.S. Army Corps of Engineers, particularly in the Reservoir Control Branch; and*

WHEREAS, *during that time Mr. Gallegos did faithfully and conscientiously carry out his assigned duties to the overall benefit of not only the Corps but to the three states involved in the Rio Grande Compact; and*

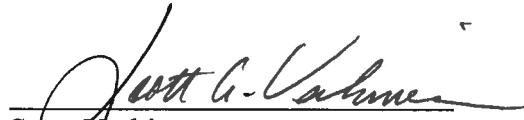
WHEREAS, *during his tenure as a Corps employee, the Rio Grande Compact Commissioners and Engineer Advisers of the three states of Colorado, New Mexico and Texas did develop great admiration, respect, and appreciation for Mr. Gallegos and his work;*

NOW THEREFORE, BE IT RESOLVED *that the Rio Grande Compact Commission assembled in its 73rd annual meeting held in Austin, Texas acknowledges the devoted service of Donald J. Gallegos to the people of the Rio Grande basin which greatly benefited the Rio Grande Compact Commission, and this Commission extends to Mr. Gallegos its best wishes for a prosperous and enjoyable future; and*

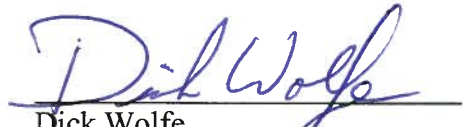
BE IT FURTHER RESOLVED, *that the New Mexico Engineer Adviser of the Rio Grande Compact Commission is hereby directed to furnish a copy of this unanimously adopted resolution to Donald J. Gallegos, and to cause said resolution to be included in the Minutes of the 73rd annual meeting of the Rio Grande Compact Commission.*



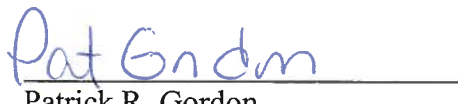
Hal Simpson
Chairman and Commissioner
for the United States of America



Scott Verhines
Commissioner for New Mexico



Dick Wolfe
Commissioner for Colorado



Patrick R. Gordon
Commissioner for Texas

RESOLUTION
RIO GRANDE COMPACT COMMISSION

Honoring John R. D'Antonio, Jr.

March 21, 2012

WHEREAS, *John R. D'Antonio, Jr. served as the New Mexico State Engineer and Secretary to the New Mexico Interstate Stream Commission from 2003 through 2011; and*

WHEREAS, *John R. D'Antonio, Jr. served as the Rio Grande Compact Commissioner for New Mexico from 2003 through 2011; and*

WHEREAS, *John R. D'Antonio, Jr. has worked tirelessly to protect New Mexico's compact entitlements to the waters of the Rio Grande and is regarded by all as a competent and knowledgeable professional whose judgment can be trusted; and*

WHEREAS, *John R. D'Antonio, Jr. has rendered long, meritorious service to the Rio Grande Compact Commission in matters related to the conservation, utilization and development of the water and related land resources of the Rio Grande Basin; and*

WHEREAS, *as a result of his professional conduct in addressing numerous matters regarding administration of the Rio Grande, his fellow Commissioners, their advisers and staff have developed great respect, admiration and appreciation for John R. D'Antonio, Jr.; and*

NOW, THEREFORE, BE IT RESOLVED, *that the Rio Grande Compact Commission, at its 73rd annual meeting held in Austin, Texas on March 21, 2012 does hereby express the gratitude and appreciation of the Commission and its staff for the untiring service and counsel rendered by John R. D'Antonio, Jr. in addressing the many technical and political water resource problems that have confronted the Commission during his tenure as the Commissioner for New Mexico; and*

BE IT FURTHER RESOLVED, *that the Rio Grande Compact Commission, its advisers and staff sincerely wish John R. D'Antonio, Jr., his wife Cassandra and their family the best of all health, happiness and prosperity in all their future endeavors; and*

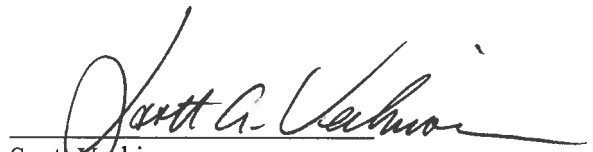
BE IT FURTHER RESOLVED, *that the New Mexico Engineer Adviser of the Rio Grande Compact Commission is hereby directed to furnish copies of this unanimously adopted Resolution to John R. D'Antonio, Jr. and the Governor of the State of New Mexico, and to cause said resolution to be included in the Minutes of the 73rd annual meeting of the Rio Grande Compact Commission.*



Hal Simpson
Chairman and Commissioner
For the United States of America



Dick Wolfe
Commissioner for Colorado



Scott Verhines
Commissioner for New Mexico



Patrick R. Gordon
Commissioner for Texas

WATER RESOURCES DATA

ACKNOWLEDGMENTS

This report was prepared by the U.S. Geological Survey, secretary to the Rio Grande Compact Commission. The water supply data contained in this report have been provided by various Federal and State agencies

The office of the State Engineer of Colorado provided records of transmountain diversions and of storage for the following:

Squaw Lake	Jumper Creek Reservoir	Mill Creek Reservoir
Rito Hondo Reservoir	Big Meadows Reservoir	Fuchs Reservoir
Hermit Lakes Reservoir No. 3	Alberta Park Reservoir	Platoro Reservoir
Troutvale No. 2 Reservoir	Shaw Lake Enlargement	Trujillo Meadows Reservoir

The office of the State Engineer of Colorado provided records of discharge for the following:

Rio Grande near Del Norte, Colo.	Los Pinos River near Ortiz, Colo.
Conejos River below Platoro Reservoir, Colo.	Conejos River near Lasauces, Colo.
Conejos River near Mogote, Colo.	Rio Grande near Lobatos, Colo.
San Antonio River at Ortiz, Colo.	

The U.S. Bureau of Reclamation, Albuquerque, N. Mex., provided the following records

Azotea Tunnel at Outlet, near Chama, N. Mex.	Storage in Heron Reservoir near Los Ojos, N. Mex.
Willow Creek above Heron Res., near Los Ojos, N. Mex.	Willow Creek below Heron Dam, N. Mex.
Horse Lake Creek above Heron Res., near Los Ojos, N. Mex.	Storage in El Vado Reservoir near Tierra Amarilla, N. Mex.

The U.S. Geological Survey, in cooperation with the U.S. Bureau of Reclamation, Albuquerque, N. Mex., provided the following records:

Storage in Nambe Falls Reservoir near Nambe, N. Mex.
Rio Nambe below Nambe Falls Dam, near Nambe, N. Mex.

The U.S. Geological Survey supplied the record for Rio Grande below Elephant Butte Dam, and in cooperation with the New Mexico Interstate Stream Commission, also provided the following:

Rio Chama below El Vado Dam, N. Mex.	Santa Fe River near Santa Fe, N. Mex.
Rio Grande at Otowi Bridge, near San Ildefonso, N. Mex.	Storage in Nichols Reservoir near Santa Fe, N. Mex.
Storage in McClure Reservoir near Santa Fe, N. Mex.	

The U.S. Geological Survey, in cooperation with the Corps of Engineers, Albuquerque, N. Mex., also provided the following records:

Rio Chama below Abiquiu Dam, N. Mex.
Rio Grande below Cochiti Dam, N. Mex.
Galisteo Creek below Galisteo Dam, N. Mex.
Jemez River below Jemez Canyon Dam, N. Mex.

The Corps of Engineers, Albuquerque, N. Mex., provided the following records of storage:

Abiquiu Reservoir.
Galisteo Reservoir.
Jemez Canyon Reservoir.
Cochiti Lake.

The Laguna Agency, Bureau of Indian Affairs, Laguna, N. Mex., supplied the records of storage in Seama Reservoir

The U.S. Bureau of Reclamation, El Paso, Texas, provided the following records:

Storage in Elephant Butte Reservoir at Elephant Butte, N. Mex.
Storage in Caballo Reservoir near Arrey, N. Mex.
Rio Grande below Caballo Dam, N. Mex.
Bonito ditch below Caballo Dam, N. Mex.

The Rio Grande Compact Commission gratefully acknowledges the cooperation received from the agencies listed above

ACCURACY OF RECORDS

The Rules and Regulations of the Commission state that the equipment, method, and frequency of measurement at each gaging station shall be sufficient to obtain records at least equal in accuracy to those classified as "good" by the U.S. Geological Survey. Within the physical limitations of stream gaging, the agencies obtaining the records at Compact gaging stations have complied with these regulations.

The accuracy of streamflow records depends primarily on (1) the stability of the stage- discharge relation or, if the control is unstable, the frequency of discharge measurements, and (2) the accuracy of observations of stage, measurements of discharge, and interpretation of records.

The station description states the degree of accuracy attributed to the records. "Excellent" means that about 95 percent of the daily discharges are within 5 percent of the true value; "good" within 10 percent; and "fair" within 15 percent. Records that do not meet the criteria mentioned are rated "poor." Different accuracies may be attributed to different parts of a given record. The probable error in a monthly or annual mean discharge depends more on the distribution of the daily errors between the limits than it does on the limits themselves. For this reason, monthly and annual records are more accurate than most daily records.

STREAMFLOW

Rio Grande near Del Norte, Colo

Location. -- Water-stage recorder, lat 37°41'22", long 106°27'38", in NW 1/4 sec. 29, T. 40 N., R. 5 E., on right bank, 20 ft downstream from county highway bridge, 6 mi west of Del Norte, and 18 mi upstream from Pinos Creek. Datum of gage is 7,980.25 ft above mean sea level, datum of 1929. Prior to May 16, 1908, staff gage at site 4 mi downstream.

Records are equivalent.

Drainage area. -- 1,320 sq mi, approximately

Average discharge. -- 122 years (1890-2011), 891 ft³/s (645,900 acre-ft per year).

Extremes. -- 1889-2011: Maximum discharge, 18,000 ft³/s Oct. 5, 1911 (gage height, 6.80 ft), from rating curve extended above 12,900 ft³/s; minimum daily, 69 ft³/s Aug. 21, 1902.

Remarks. -- Records good except those for winter months, which are fair. Flow regulated by four reservoirs, total capacity 126,100 acre-ft, and by several smaller ones. Six transmountain diversions import water into basin above station.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	5,905	210	160	190	11,710
February	4,695	180	140	168	9,310
March	7,281	329	165	235	14,440
April	18,710	983	368	624	37,110
May	48,174	3,810	521	1,554	95,550
June	92,640	4,140	2,250	3,088	183,800
July	29,655	2,290	429	957	58,820
August	11,487	569	276	371	22,780
September	8,652	382	246	288	17,160
October	13,577	630	247	438	26,930
November	7,810	416	180	260	15,490
December	4,860	175	130	157	9,640
Calendar year 2011	253,446	4,140	130	694	502,700

Conejos River below Platoro Reservoir, Colo.

Location. -- Water-stage recorder and concrete control, lat 37°21'18", long 106°32'37", in NW 1/4NW 1/4 sec. 22, T. 36 N., R. 4 E., on left bank 1,100 ft downstream from valve house for Platoro Reservoir, and 0.7 mi northwest of Platoro. Datum of gage is 9,866.60 ft above mean sea level (levels by Bureau of Reclamation).

Drainage area. -- 40 sq mi, approximately.

Average discharge. -- 59 years (1890-2011), 922 ft³/s (66,810 acre-ft per year).

Extremes. -- 1952-2011: Maximum discharge, 1,160 ft³/s Nov. 1, 1957; maximum gage height, 4.29 ft June 15, 1958; no flow Oct. 16-20, 1955.

Remarks. -- Records good except those for winter months, which are fair. No diversions above station. Flow completely regulated by Platoro Reservoir (capacity, 59,570 acre-ft).

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	229	7.4	7.4	7.4	455
February	231	8.3	7.4	8.2	457
March	218	8.3	4.8	7.0	431
April	1,232	98	7.9	41	2,440
May	4,334	492	22	140	8,600
June	15,318	617	292	511	30,380
July	8,209	502	133	265	16,280
August	2,927	213	33	94	5,810
September	1,014	63	24	34	2,010
October	3,731	167	28.0	120	7,400
November	1,739	138	10.0	58	3,450
December	268	9.1	8.3	8.7	532
Calendar year 2011	39,449	617	4.8	108	78,250

STREAMFLOW

Conejos River near Mogote, Colo

Location. -- Water-stage recorder, lat 37°03'14", long 106°11'13", in SE 1/4SE 1/4 sec. 34, T. 33 N., R. 7 E., on right bank 25 ft upstream from bridge on State Highway 174, 0.4 mi downstream from Fox Creek, and 5.3 mi west of Mogote. Datum of gage is 8,271.54 ft above mean sea level.

Drainage area. -- 282 sq mi.

Average discharge. -- 101 years (1904, 1912-2011), 321 ft³/s (232,900 acre-ft per year).

Extremes. -- 1903-05, 1911-2011: Maximum discharge, 9,000 ft³/s Oct. 5, 1911 (gage height, 8.50 ft), from rating curve extended above 3,100 ft³/s; minimum daily determined, 10 ft³/s July 18, 1904.

Remarks. -- Records good except those for winter months, which are fair. Diversions above station for irrigation of about 500 acres. Since 1951 flow partly regulated by Platoro Reservoir.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	1,422	52	40	46	2,820
February	1,204	46	40	43	2,390
March	2,183	100	46	70	4,330
April	5,630	338	93	188	11,170
May	15,018	1,310	157	484	29,790
June	38,826	1,700	908	1,294	77,010
July	14,799	928	224	477	29,350
August	5,699	384	105	184	11,300
September	3,614	197	86	120	7,170
October	6,445	291	83	208	12,780
November	3,755	223	50	125	7,450
December	1,383	59	26	45	2,740
Calendar year 2011	99,978	1,700	26	274	198,300

San Antonio River at Ortiz, Colo

Location. -- Water-stage recorder, lat 36°59'35", long 106°02'17", in New Mexico in NE1/4SE1/4, sec. 24, T. 32 N., R. 8 E., on left bank 800 ft south of New Mexico-Colorado State line, 0.4 mi southeast of Ortiz, and 0.4 mi upstream from Los Pinos River. Altitude of gage is 7,970 ft.

Drainage area. -- 110 sq mi.

Average discharge. -- 71 years (1941-2011), 24.8 ft³/s (17,950 acre-ft per year).

Extremes. -- 1920, 1925-2011: Maximum discharge, 1,750 ft³/s Apr. 15, 1937 (gage height, 5.38 ft), from rating curve extended above 1,100 ft³/s; no flow at times.

Remarks. -- Records good except those for winter months, which are fair. A few small diversions above station for irrigation.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	39	2.0	0.2	1.2	76
February	78	3.9	1.6	2.8	155
March	304	26	3.7	9.8	602
April	1,094	80	12	37	2,170
May	1,685	114	25	54	3,340
June	190	22	0.2	6.3	377
July	1	0.7	0.0	0.0	2.2
August	48	14	0.0	1.5	95
September	48	6.5	0.3	1.6	96
October	91	7.0	0.9	2.9	180
November	70	4.5	0.8	2.3	139
December	50	2.1	1.3	1.6	99
Calendar year 2011	3,698	114	0.0	10	7,330

STREAMFLOW

Los Pinos River near Ortiz, Colo

Location. -- Water-stage recorder, lat 36°58'56", long 106°04'23", in New Mexico on line between secs. 26 and 27, T. 32 N., R. 8 E., on left bank 0.9 mi south of New Mexico-Colorado State line, 2.1 mi southwest of Ortiz, and 2.9 mi upstream from mouth. Altitude of gage is 8,040 ft.

Drainage area. -- 167 sq mi.

Average discharge. -- 93 years (1915-20, 1925-2011), 117 ft³/s (85,040 acre-ft per year).

Extremes. -- 1915-20, 1925-2011: Maximum discharge, 3,160 ft³/s May 12, 1941 (gage height, 5.77 ft, site and datum then in use), from rating curve extended above 1,600 ft³/s; minimum observed, 4.0 ft³/s Dec. 17, 1945.

Remarks. -- Records good except those for winter months, which are fair. Diversions above station for irrigation.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	489	19	10	16	970
February	480	24	12	17	952
March	774	33	22	25	1,540
April	3,791	307	36	126	7,520
May	11,964	736	111	386	23,730
June	10,167	580	101	339	20,170
July	1,277	95	24	41	2,530
August	814	74	10	26	1,610
September	969	80	20	32	1,920
October	1,113	49	21	36	2,210
November	814	36	15	27	1,610
December	571	30	11	18	1,130
Calendar year 2011	33,223	736	10	91	65,900

Conejos River near Lasauces, Colo

Location. -- Water-stage recorder, lat 37°18'01", long 105°44'47", in secs. 2 and 11(two channels), T. 35 N., R. 11 E., on left bank of main channel 125 ft downstream from bridge on State Highway 158 and on left bank of secondary channel 230 ft upstream from bridge, 1.0 mi upstream from mouth, and 2.1 mi north of Lasauces. Datum of gage on main channel is 7,495.02 ft and on secondary (south) channel is 7,496.89 ft above main sea level (levels by Bureau of Reclamation).

Drainage area. -- 887 sq mi.

Average discharge. -- 90 years (1922-2011), 175 ft³/s (126,600 acre-ft per year).

Extremes. -- 1921-2011: Maximum discharge, 3,890 ft³/s May 15, 1941; no flow at times in some years.

Remarks. -- Records good except those for winter months, which are fair. Diversions above station for irrigation of about 75,000 acres above station.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	1,826	66	53	59	3,620
February	2,032	79	62	73	4,030
March	3,335	130	81	108	6,610
April	16,005	1,210	133	534	31,750
May	12,901	1,120	203	416	25,590
June	5,837	824	3.3	195	11,580
July	189	34	0.0	6.1	375
August	6.4	4.0	0.0	0.2	13
September	0.0	0.0	0.0	0.0	0.0
October	2.1	2.1	0.0	0.1	4.2
November	326	14	1.0	11	646
December	1,405	71	15	45	2,790
Calendar year 2011	43,864	1,210	0.0	120	87,000

STREAMFLOW

Rio Grande near Lobatos, Colo

Location. -- Water-stage recorder, lat 37°04'42", long 105°45'22", in sec. 22, T. 33 N., R. 11 E., on right bank at highway bridge, 6 mi north of Colorado-New Mexico State line, 10 mi east of Lobatos, and 14 mi east of Antonito. Datum of gage is 7,427.63 ft above mean sea level, datum of 1929.

Drainage area. -- 7,700 sq mi, approximately (includes 2,940 sq mi in closed basin in San Luis Valley).

Average discharge. -- 32 years (1900-30), 846 ft³/s (612,900 acre-ft per year); 81 years (1931-2011) 435 ft³/s (315,000 acre-ft per year).

Extremes. -- 1899-2011: Maximum discharge observed, 13,200 ft³/s June 8, 1905 (gage height, 9.1 ft); from rating curve extended above 8,000 ft³/s; no flow at times in 1950-51, 1956.

Remarks. -- Records good except those for winter months, which are fair. Natural flow of stream affected by transmountain diversions, storage reservoirs, ground-water withdrawals and diversions for irrigation, and return flow from irrigated areas.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	7,765	290	140	250	15,400
February	7,834	380	180	280	15,540
March	11,184	466	154	361	22,180
April	3,379	283	56	113	6,700
May	7,204	391	127	232	14,290
June	16,983	896	213	566	33,690
July	11,651	628	190	376	23,110
August	4,614	324	51	149	9,150
September	2,481	123	56	83	4,920
October	5,944	317	75	192	11,790
November	13,807	600	282	460	27,390
December	8,006	361	150	258	15,880
Calendar year 2011	100,852	896	51	276	200,000

Willow Creek above Heron Reservoir, near Los Ojos, N. Mex.

Location. -- Water-stage recorder, lat 36°44'33", long 106°37'34", in Tierra Amarilla Grant, on right bank 200 ft downstream from bridge, 0.2 mi downstream from Iron Spring Creek, 3.3 mi west of Los Ojos, and at mi 9.7. Datum of gage is 7,196.29 ft above mean sea level. Prior to Apr. 1, 1971, at site 900 ft downstream.

Drainage area. -- 112 sq mi.

Average discharge. -- 7 years (1963-69), 11.5 ft³/s (8,330 acre-ft per year) prior to completion of Azotea tunnel; 42 years (1970-2011) 136 ft³/s (98,660 acre-ft per year) subsequent to completion of Azotea tunnel.

Extremes. -- 1962-2011: Maximum discharge, 1,610 ft³/s Mar. 12, 1985 (gage height, 6.65 ft); no flow at times.

Remarks. -- Records good except those for winter months, which are fair. Subsequent to Nov. 16, 1970, flow affected by transmountain diversions through Azotea tunnel. Flow in Rutheron Drain included prior to Apr. 1, 1971.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	0.0	0.0	0.0	0.0	0.0
February	0.0	0.0	0.0	0.0	0.0
March	1,405	115	0.0	45	2,787
April	7,832	430	137	261	15,535
May	11,698	894	82	377	23,202
June	21,477	988	407	716	42,600
July	4,805	395	28	155	9,531
August	961	126	1.0	31	1,906
September	1,041	178	4.0	35	2,064
October	2,469	143	2.5	80	4,897
November	655	54	9.1	22	1,299
December	26	11	0.0	0.8	51
Calendar year 2011	52,368	988	0.0	144	103,872

STREAMFLOW

Horse Lake Creek above Heron Reservoir, near Los Ojos, N. Mex.

Location. -- Water-stage recorder, lat 36°42'24", long 106°44'42", in Tierra Amarilla Grant, on right bank 3.7 mi northwest of Heron Dam, 7.8 mi downstream from Horse Lake, and 9.9 mi west of Los Ojos. Datum of gage is 7,188.85 ft above National Geodetic Vertical Datum of 1929. Prior to July 1, 1971, at site 1,100 ft upstream.

Drainage area. -- 45 sq mi, approximately.

Average discharge. -- 12 years (1963-73,1986), 1.17 ft³/s (848 acre-ft per year).

Extremes. -- 1963-2011: Maximum discharge, 3,960 ft³/s July 30, 1968 (gage height, 4.9 ft); no flow most of time.

Remarks. -- Records good for period of record. Diversions above station for irrigation of meadows and for off-channel stock tanks. Seasonal gage discontinued in 2011.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	---	---	---	---	---
February	---	---	---	---	---
March	---	---	---	---	---
April	---	---	---	---	---
May	---	---	---	---	---
June	---	---	---	---	---
July	---	---	---	---	---
August	---	---	---	---	---
September	---	---	---	---	---
October	---	---	---	---	---
November	---	---	---	---	---
December	---	---	---	---	---
Calendar year 2011	---	---	---	---	---

Willow Creek below Heron Dam, N. Mex.

Location. -- Totalizing flowmeters, lat 36°39'56", long 106°42'12", in Tierra Amarilla Grant, in outlet conduits at Heron Dam, 0.2 mi upstream from Rio Chama, 5.1 mi northeast of El Vado Dam, and 8.7 mi southwest of Los Ojos.

Drainage area. -- 193 sq mi.

Average discharge. -- 41 years (1971-2011), 128 ft³/s (93,040 acre-ft per year).

Extremes. -- 1971-2011: Maximum daily discharge, 2,780 ft³/s Dec. 18, 19, 1982; no flow at times each year.

Remarks. -- Records excellent. Flow completely regulated by Heron Dam.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	907	50	0.0	29	1,799
February	520	40	0.0	19	1,031
March	0.0	0.0	0.0	0.0	0.0
April	1,038	50	0.0	35	2,059
May	870	50	0.0	28	1,726
June	0.0	0.0	0.0	0.0	0.0
July	0.0	0.0	0.0	0.0	0.0
August	14,600	550	0.0	471	28,959
September	17,199	710	0.0	573	34,114
October	0.0	0.0	0.0	0.0	0.0
November	7,100	400	31	237	14,083
December	1,618	90	0.0	52	3,208
Calendar year 2011	43,852	710	0.0	120	86,979

STREAMFLOW

Rio Chama below El Vado Dam, N. Mex

Location. -- Water-stage recorder with satellite telemetry, lat 36°34'48", long 106°43'24", in Tierra Amarilla Grant, on left bank 1.5 mi downstream from El Vado Dam, 2.8 mi upstream from Rio Nutrias, and 13 mi southwest of Tierra Amarilla. Datum of gage is 6,696.12 ft above National Geodetic Vertical Datum of 1929. Prior to October 1935, at site 1.5 mi upstream and October 1935 to September 1938, at site 1.1 mi upstream at different datums.

Drainage area. -- 877 sq mi, of which about 100 sq mi is probably noncontributing.

Average discharge. -- 4 years (1914, 1921-23), 444 ft³/s (321,700 acre-ft per year), prior to completion of El Vado Dam; 35 years (1936-70), 372 ft³/s (269,500 acre-feet per year), prior to release of transmountain water; 41 years (1971-2011) 464 ft³/s (336,100 acre-feet per year).

Extremes. -- 1914-16, 1920-24, 1936-2011; Maximum discharge observed, 9,000 ft³/s May 22, 1920 (gage height, 12 ft); no flow Mar. 25, 26, 31, 1955.

Remarks. -- Records good. Diversions above station for irrigation of about 10,600 acres. Since 1935 flow regulated by El Vado Reservoir and since October 1970 flow partly regulated by Heron Reservoir. Subsequent to May 1971 flow affected by releases of transmountain water from Heron Reservoir.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	2,422	102	40	78	4,800
February	1,728	109	41	62	3,430
March	4,106	169	103	132	8,140
April	12,956	606	185	432	25,700
May	19,602	1,470	341	632	38,880
June	23,062	1,560	367	769	45,740
July	19,924	863	438	643	39,520
August	26,308	1,080	393	849	52,180
September	18,871	988	200	629	37,430
October	5,149	205	95	166	10,210
November	7,987	391	110	266	15,840
December	8,361	390	43	270	16,580
Calendar year 2011	150,476	1,560	40	412	298,500

Rio Chama below Abiquiu Dam, N. Mex.

Location. -- Water-stage recorder with satellite telemetry, lat 36°14'12", long 106°24'59", in SE1/4SE1/4 sec. 8, T. 23 N., R. 5 E., on right bank 0.8 mi downstream from Abiquiu Dam and 5.9 mi northwest of Abiquiu. Altitude of gage is 6,040 ft above National Geodetic Vertical Datum of 1929 (from river-profile map and topographic map).

Drainage area. -- 2,147 sq mi, of which about 100 sq mi is probably noncontributing.

Average discharge. -- 9 years (1962-70), 376 ft³/s (272,400 acre-ft per year), prior to release of transmountain water; 41 years (1971-2011), 511 ft³/s (370,100 acre-feet per year).

Extremes. -- 1961-2011; Maximum discharge, 2,990 ft³/s July 1, 1965 (gage height, 6.69 ft); minimum, about 0.5 ft³/s Mar. 17, 1966, Jan. 28, 1972.

Remarks. -- Records good. Flow regulated by Heron, El Vado, and Abiquiu Reservoirs. Diversions above station for irrigation of about 17,600 acres. Subsequent to May 1971 flow affected by the release of transmountain water from Heron Reservoir.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	3,621	164	60	117	7,180
February	3,278	189	57	117	6,500
March	5,790	235	161	187	11,480
April	18,762	817	356	625	37,210
May	24,055	1,210	459	776	47,710
June	27,433	1,520	419	914	54,410
July	21,482	896	409	693	42,610
August	18,770	1,070	231	605	37,230
September	9,753	528	202	325	19,350
October	4,361	273	80	141	8,650
November	6,744	300	143	225	13,380
December	8,504	380	148	274	16,870
Calendar year 2011	152,553	1,520	57	418	302,600

STREAMFLOW

Rio Nambe below Nambe Falls Dam, near Nambe, N. Mex.

Location. -- Water-stage recorder with satellite telemetry, lat 35°50'46", long 105°54'17", in NE1/4SW1/4 sec. 29, T. 19 N., R. 10 E., in Nambe Indian Reservation, in outlet conduits at Nambe Falls Dam, 300 ft upstream from Nambe Falls, 2.6 mi upstream from confluence of Rio Nambe and Rio En Medio, 4.4 mi southeast of Nambe Pueblo, and 5.4 mi southeast of Nambe. Datum of gage is 6,840 ft above National Geodetic Vertical Datum of 1929, from topographic map.

Drainage area. -- 34.1 sq mi.

Average discharge. -- 33 years (1979-2011), 13 ft³/s (9,480 acre-feet per year).

Extremes. -- 1979-2011; Maximum discharge, 312 ft³/s June 9, 1979 (gage height, 1.96 ft), at site 1,100 ft downstream; no flow December 31, 1994.

Remarks. -- Records good. Flow completely regulated by Nambe Falls Reservoir.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	16	0.6	0.5	0.5	31
February	31	2.7	0.5	1.1	61
March	117	5.0	2.7	3.8	233
April	217	23	3.5	7.2	431
May	549	25	4.5	18	1,090
June	354	26	4.4	12	701
July	185	6.4	5.3	6.0	368
August	245	21	2.0	7.9	487
September	234	22	3.4	7.8	464
October	143	4.9	2.2	4.6	284
November	15	0.9	0.3	0.5	29
December	16	0.6	0.5	0.5	32
Calendar year 2011	2,123	26	0.3	5.8	4,210

Rio Grande at Otowi Bridge, near San Ildefonso, N. Mex.

Location. -- Water-stage recorder with satellite telemetry, lat 35°52'29", long 106°08'30", in SW1/4SW1/4 sec. 18, T. 19 N., R. 8 E., in San Ildefonso Pueblo Grant, 400 ft downstream from bridge on State Highway 502, 1.8 mi southwest of San Ildefonso Pueblo, 2.5 mi downstream from Pojoaque River, and 6.8 mi west of Pojoaque. Datum of gage is 5,488.48 ft above National Geodetic Vertical Datum of 1929. Prior to May 19, 1904, and July 25 to Oct 1, 1904, staff gage at site 180 ft upstream at datum 2.02 ft lower.

Drainage area. -- 14,300 sq mi, approximately (includes 2,940 sq mi in closed basin in San Luis Valley, Colo.).

Average discharge. -- 112 years (1896-1905, 1910-2011), 1,499 ft³/s (1,086,000 acre-feet per year).

Extremes. -- 1895-1905, 1910-2011; Maximum discharge, 24,400 ft³/s May 23, 1920 (gage height, 14.1 ft); minimum daily, 60 ft³/s July 4, 5, 1902.

Remarks. -- Records good. Flow partly regulated by Heron, El Vado, and Abiquiu Reservoirs. Diversions above station for irrigation of about 620,000 acres in Colorado and 75,000 acres in New Mexico. Subsequent to May 1971 flow affected by releases of transmountain water from Heron Reservoir.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	20,029	706	348	646	39,730
February	19,227	838	490	687	38,140
March	25,763	934	719	831	51,100
April	29,290	1,330	693	976	58,100
May	39,000	1,530	1,060	1,258	77,360
June	46,830	2,290	1,080	1,561	92,890
July	35,338	1,400	887	1,140	70,090
August	26,859	1,270	436	866	53,270
September	17,482	862	425	583	34,680
October	16,539	712	448	534	32,810
November	28,476	1,070	679	949	56,480
December	25,346	941	622	818	50,270
Calendar year 2011	330,179	2,290	348	905	654,920

STREAMFLOW

Santa Fe River near Santa Fe, N. Mex.

Location. -- Water-stage recorder with satellite telemetry and concrete control, lat 35°41'12", long 105°50'35", in NE1/4SE1/4 sec. 23, T. 17 N., R. 10 E., 0.4 mi downstream from McClure Dam, and 5.3 mi east of Santa Fe. Altitude of gage is 7,720 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Nov. 4, 1930, at site 1.5 mi downstream, and Apr. 11, 1931 to Sept. 30, 1947, at site 0.3 mi upstream, each at different datum.

Drainage area. -- 18.2 sq mi.

Average discharge. -- 99 years (1913-2011), 8.0 ft³/s (5,800 acre-feet per year).

Extremes. -- 1913-2011; Maximum discharge, 1,500 ft³/s Aug. 14, 1921 (gage height, 5.17 ft); from rating curve extended above 150 ft³/s; minimum, no flow Aug. 2-10, 2000.

Remarks. -- Records good. Flow regulated by McClure Reservoir, completed in 1926, raised in 1935 and again in 1947.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	65	4.6	1.4	2.1	129
February	125	4.8	4.1	4.5	249
March	135	5	3.8	4.4	269
April	114	4	3.6	3.8	226
May	113	4	3.4	3.6	223
June	160	11	1.7	5.3	318
July	71	3	1.9	2.3	141
August	178	8	1.5	5.7	353
September	45	2	1.5	1.5	89
October	47	1.6	1.5	1.5	94
November	42	1.5	1.3	1.4	83
December	50	1.9	1.4	1.6	99
Calendar year 2011	1,145	11	1.3	3.1	2,270

Rio Grande below Cochiti Dam, N. Mex.

Location. -- Water-stage recorder with satellite telemetry, lat 35°37'05", long 106°19'24", in SW1/4NE1/4 sec. 17, T. 16 N., R. 6 E., in Pueblo de Cochiti Grant, 320 ft upstream from bridge on State Highway 22, 700 ft downstream from Cochiti Dam, and 1.4 mi northeast of Cochiti Pueblo. Datum of gage is 5,226.08 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 14, 1973, at site 2.4 mi downstream at altitude 5,210 ft, from topographic map. Nov. 14, 1973 to Jan. 8, 1976, at site 320 ft downstream at datum 1.79 ft lower.

Drainage area. -- 14,900 sq mi, approximately (includes 2,940 sq mi in closed basin in San Luis Valley, Colo.).

Average discharge. -- 41 years (1971-2011), 1,319 ft³/s (956,000 acre-feet per year).

Extremes. -- 1971-2011; Maximum discharge, 10,300 ft³/s July 26, 1971 (gage height, 7.90 ft) at site 2.4 mi downstream prior to closure of Cochiti Dam; from rating curve extended above 2,600 ft³/s; minimum discharge 0.51 ft³/s Aug. 3-5, 1977, Aug. 27-28, 1978.

Remarks. -- Records good. Since Nov. 12, 1973, flow completely regulated by Cochiti Dam. Cochiti Eastside Main Canal on left bank and Sili Main Canal on right bank bypass station.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	19,271	788	358	622	38,220
February	17,729	772	354	633	35,170
March	22,089	896	584	713	43,810
April	24,246	1,090	645	808	48,090
May	32,346	1,330	912	1,043	64,160
June	41,240	1,820	1,070	1,375	81,800
July	30,704	1,250	743	990	60,900
August	24,232	1,080	439	782	48,060
September	14,294	766	328	476	28,350
October	11,952	618	331	386	23,710
November	26,081	1,170	486	869	51,730
December	25,176	971	551	812	49,940
Calendar year 2011	289,360	1,820	328	793	573,900

STREAMFLOW

Galisteo Creek below Galisteo Dam, N. Mex.

Location. -- Water-stage recorder with satellite telemetry, lat 35°27'53", long 106°12'49", in NE1/4NE1/4 sec. 8, T. 14 N., R. 7 E., in Mesita de Juana Lopez Grant, on right bank 0.4 mi downstream from Galisteo Dam, 5.3 mi northwest of Cerrillos, and at mile 11.4. Elevation of gage is 5,450 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Dec. 21, 1981, at site 1,200 ft downstream at different datum.

Drainage area. -- 597 sq mi.

Average discharge. -- 41 years (1971-2011), 5.1 ft³/s (3,681 acre-feet per year).

Extremes. -- 1970-2011; Maximum discharge, 3,460 ft³/s Aug. 24, 1997 (gage height, 5.57 ft); no flow many days each year.

Remarks. -- Records poor. Flow partly regulated by uncontrolled outlet in Galisteo Dam. Capacity of outlet, 5,000 ft³/s when reservoir is full. Diversions for irrigation of about 50 acres above reservoir.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	0.0	0.0	0.0	0.0	0.0
February	0.0	0.0	0.0	0.0	0.0
March	0.0	0.0	0.0	0.0	0.0
April	0.0	0.0	0.0	0.0	0.0
May	0.0	0.0	0.0	0.0	0.0
June	0.0	0.0	0.0	0.0	0.0
July	88	48	0.0	2.8	174
August	184	54	0.0	5.9	364
September	85	35	0.0	2.8	169
October	41	28	0.0	1.3	81
November	0.0	0.0	0.0	0.0	0.0
December	0.0	0.0	0.0	0.0	0.0
Calendar year 2011	397	54	0.0	1.1	788

Jemez River Outlet below Jemez Canyon Dam, N. Mex

Location. -- Water-stage recorder with satellite telemetry, lat 35°23'41", long 106°32'41", in NE1/4 sec. 32, T. 14 N., R. 4 E., gage located at outlet pipe for Jemez Canyon Dam, 0.7 mi upstream from prior gage location. Datum of gage is 5,162.60 ft above National Geodetic Vertical Datum of 1929, from topographic map. Gage replaces Jemez River below Jemez Canyon Dam. Discharge records for two gages are comparable except the period 2002-2009, when original gage was affected by siltation.

Drainage area. -- 1,034 sq mi.

Average discharge. -- 2 years (2011-2012), 34 ft³/s (24,450 acre-feet per year).

Extremes. -- 2011; Maximum discharge, 2,790 cfs Jan. 8, 2011, gage height 1.90; no flow many days each year.

Remarks. -- Records good. Flow regulated by Jemez Canyon Dam since October 1953. Diversions for irrigation of about 3,000 acres above station.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	190	10	1.2	6.1	376
February	557	36	3.7	20	1,110
March	920	41	4.8	30	1,820
April	928	52	11	31	1,840
May	835	41	6.2	27	1,660
June	24	5.0	0.0	0.8	48
July	8.4	7.5	0.0	0.3	17
August	97	40	0.0	3.1	193
September	60	31	0.0	2.0	118
October	71	31	0.0	2.3	141
November	209	15	0.5	7.0	414
December	459	60	0.1	15	910
Calendar year 2011	4,359	60	0.0	12	8,650

STREAMFLOW

Rio Grande below Elephant Butte Dam, N. Mex.

Location. -- Water-stage recorder with satellite telemetry, lat 33°08'54", long 107°12'22", in SW1/4 sec. 25, T. 13 S., R. 4 W. (projected), in Pedro Armendariz Grant, 1.0 mi downstream from dam and 1.5 mi upstream from Cuchillo Negro River. Datum of gage is 4,241.09 ft above National Geodetic Vertical Datum of 1929. Prior to April 23, 1942, at several different sites and datums.

Drainage area. -- 29,450 sq mi approximately (includes 2,940 sq mi in closed basin in San Luis Valley, Colo.).

Average discharge. -- 97 years (1915-2011), 996 ft³/s (721,700 acre-feet per year).

Extremes. -- 1915-2011; Maximum daily discharge, 8,220 ft³/s May 22, 1942; no flow at times prior to 1929, March 2-4, 1979, and October 22-24 and November 17-21, 2011.

Remarks. -- Records good. Flow regulated by Elephant Butte Reservoir. Diversions for irrigation of about 800,000 acres above station.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	285	11	8.2	9.2	565
February	227	25	6.9	8.1	449
March	33,003	1,900	381	1,065	65,460
April	47,370	1,900	1,190	1,579	93,960
May	19,454	1,190	543	628	38,590
June	48,134	1,840	834	1,604	95,470
July	33,406	1,890	39	1,078	66,260
August	15,244	824	34	492	30,240
September	8,342	1,220	11	278	16,550
October	273	25	0.0	8.8	541
November	62	10	0.0	2.1	123
December	26	1.6	0.5	0.8	52
Calendar year 2011	205,825	1,900	0.0	564	408,300

Rio Grande below Caballo Dam, N. Mex.

Location. -- Water-stage recorder, lat 32°53'05", long 107°17'31", in NE1/4SW1/4 sec. 30, T. 16 S., R. 4 W., 2,000 ft upstream from Interstate Highway 25, 4,200 ft downstream from Caballo Dam, 1.3 mi upstream from Percha diversion dam, and 3 mi northeast of Arrey. Datum of gage is 4,140.90 ft above National Geodetic Vertical Datum of 1929. October 13, 1938 to December 31, 1945, at datum 5.0 ft higher.

Drainage area. -- 30,700 sq mi, approximately (includes 2,940 sq mi in closed basin in San Luis Valley, Colo.).

Average discharge. -- 74 years (1938-2011), 921 ft³/s (667,000 acre-feet per year).

Extremes. -- 1938-2011; Maximum daily discharge, 7,650 ft³/s May 20, 1942; minimum daily, 0.1 ft³/s Oct. 31 to Nov. 14, 1954, Nov. 7 to Dec. 31, 1955, Feb. 15-29, 1972.

Remarks. -- Records good. Flow regulated by Elephant Butte Reservoir and Caballo Reservoirs. Diversions for irrigation of about 800,000 acres above station.

Monthly and yearly discharge, in cubic feet per second

Month	Second-foot-days	Maximum daily	Minimum daily	Mean	Runoff in acre-feet
January	31	1.0	1.0	1.0	61
February	28	1.0	1.0	1.0	56
March	24,069	1,700	2.0	776	47,740
April	27,632	1,170	699	921	54,810
May	22,169	1,660	405	715	43,970
June	52,290	2,130	1,510	1,743	103,700
July	35,150	2,120	561	1,134	69,720
August	29,216	1,120	857	942	57,950
September	9,354	1,040	1.0	312	18,550
October	31	1.0	1.0	1.0	61
November	30	1.0	1.0	1.0	60
December	31	1.0	1.0	1.0	61
Calendar year 2011	200,031	2,130	1.0	548	396,800

STREAMFLOW

Bonito Ditch below Caballo Dam, N. Mex.

Records available. -- January 1938 to current year. Published as supplementary data with Rio Grande below Caballo Dam in U.S.G.S. Water-Supply Papers and Water-Data Reports from October 1947 until September, 2005.

Remarks. -- Ditch diverts directly from Caballo Reservoir for irrigation of lands on right bank of river. The total release from Project Storage, as used in computations of Compact Commission, is the combined flow of this ditch and Rio Grande below Caballo Dam.

Diversion, in acre-ft

January	0.0
February	95.4
March	96.4
April	85.4
May	177.2
June	369.1
July	386.3
August	207.7
September	59.1
October	0.0
November	0.0
December	0.0
Calendar year 2011	1,476.6

Reservoirs in Rio Grande Basin in Colorado
(constructed or enlarged since 1937)

Month-end gage height, in feet, and contents, in acre-feet

Calendar Year 2011

[illegible]

Month-end gage height, in feet, and contents, in acre-feet

Calendar Year 2011

[illegible]

Month-end gage height, in feet, and contents, in acre-feet

Calendar Year 2011

[illegible]

Month-end gage height, in feet, and contents, in acre-feet

Calendar Year 2011

[illegible]

Reservoirs in Rio Grande Basin in Colorado
(constructed or enlarged since 1937)

Month-end gage height, in feet, and contents, in acre-feet

Calendar Year 2011

[illegible]

Month-end gage height, in feet, and contents, in acre-feet

Calendar Year 2011

[illegible]

Month-end gage height, in feet, and contents, in acre-feet

Calendar Year 2011

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Cal. Yr.
Gage height	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	-
Contents	598	598	598	598	598	598	598	598	598	598	598	598	-
Change	0	0	0	0	0	0	0	-204	0	0	0	0	0

Month-end gage height, in feet, and contents, in acre-feet

Calendar Year 2011

[illegible]

STORAGE IN RESERVOIRS

Reservoirs in Rio Grande Basin in Colorado
(constructed or enlarged since 1937)

Mill Creek Reservoir. – In sec. 16, T. 39 N., R. 3 E., on Mill Creek. Completed in 1953; capacity, 43 acre-ft. Capacity based on elevation above bottom of outlet. Includes 43 acre-ft of transmountain water, by exchange, in 1976.

Month-end gage height, in feet, and contents, in acre-feet

Calendar Year 2011

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Cal. Yr.
Gage height	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	-
Contents	41	41	41	41	41	41	41	41	41	41	41	41	-
Change	0	0	0	0	0	0	0	0	0	0	0	0	0

Fuchs Reservoir. – Staff gage in sec. 2, T. 37 N., R. 4 E., on East Pinos Creek. Completed in 1939; capacity, 237 acre-ft with 2 ft of flash boards in spillway. Prior to calendar year 1999, contents reported as 238 acre-ft were actually 237 acre-ft. Pinos Creek enters Rio Grande below station near Del Norte.

Month-end gage height, in feet, and contents, in acre-feet

Calendar Year 2011

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Cal. Yr.
Gage height	12.3	12.6	13.2	14.2	17.2	13.5	8.4	0.0	0.0	0.0	5.5	8.3	-
Contents	134	140	152	172	237	157	70	0.0	0.0	0.0	34	68	-
Change	+3	+6	+12	+20	+65	-80	-87	-70	0.0	0.0	+34	+34	-63

Platoro Reservoir. – Water-stage recorder in NW1/4 sec. 22, T. 36 N., R. 4 E., on Conejos River. Completed in 1951; capacity, 59,570 acre-ft at crest of spillway. Reservoir is used for irrigation and flood control. Storage affects Conejos Index Supply. Contents include 3,000 acre-ft of transmountain water stored by exchange in April 1985 on behalf of the Colorado Division of Wildlife.

Month-end elevation, in feet, and contents, in acre-feet

Date	Elevation	Contents	Change in contents
December 31, 2010	9,985.62	21,565	-
January 31, 2011	9,985.65	21,586	+21
February 28	9,985.66	21,592	+6
March 31	9,985.86	21,712	+120
April 30	9,985.37	21,422	-290
May 31	9,985.48	21,487	+65
June 30	9,994.39	27,104	+5,617
July 31	9,986.34	21,996	-5,108
August 31	9,981.96	19,439	-2,557
September 30	9,984.33	20,809	+1,370
October 31	9,977.05	16,756	-4,053
November 30	9,973.12	14,747	-2,009
December 31, 2011	9,973.82	15,098	+351
Calendar year 2011	-	-	-6,467

Trujillo Meadows Reservoir. – In sec. 5, T. 32 N., R. 5 E., on Los Pinos River. Completed in 1957; capacity, 869 acre-ft, effective Jan. 1, 1999. Water is used for fish culture. Storage is transmountain water, by exchange, in 1959.

Month-end gage height, in feet, and contents, in acre-feet

Calendar Year 2011

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Cal. Yr.
Gage height	22.6	22.6	22.6	22.6	23.6	23.3	22.8	22.7	22.7	22.7	22.6	22.6	-
Contents	738	738	738	738	777	790	751	751	764	790	764	738	-
Change	0.0	0.0	0.0	0.0	+39	+13	-39	0.0	+13	+26	-26	-26	0.0

STORAGE IN RESERVOIRS

Reservoirs in Rio Grande Basin in New Mexico
(constructed or enlarged since 1929)

Heron Reservoir. – Water-stage recorder with satellite telemetry, lat 36°39'56", long 106°42'13", on Willow Creek. Storage began in October 1970. Capacity, 401,300 acre-ft at elevation 7,186.1 ft (low point on crest of spillway); dead storage, 1,340 acre-ft at elevation 7,003.0 ft. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Used for storage of transmountain water

Month-end elevation, in feet, and contents, in acre-feet

Date	Elevation	Contents	Change in contents
December 31, 2010	7151.67	226680	-
January 31, 2011	7151.14	224430	-2250
February 28	7150.88	223328	-1102
March 31	7151.43	225660	+2332
April 30	7154.12	237265	+11605
May 31	7158.39	256398	+19133
June 30	7167.02	297648	+41250
July 31	7168.4	304554	+6906
August 31	7162.58	276005	-28549
September 30	7155.43	243043	-32962
October 31	7156.33	247058	+4015
November 30	7153.23	233386	-13672
December 31, 2011	7152.39	229761	-3625
Calendar year 2011	-	-	+3081

El Vado Reservoir. – Water-stage recorder and surface follower, lat 36°35'39", long 106°44'00", on Rio Chama. Storage began in January 1935. Capacity, 186,250 acre-ft at gage height 6,902.0 ft (crest of spillway); dead storage, 480 acre-ft, below gage height 6,775.0 ft (invert of outlet works), as determined by survey in 1984. Datum of gage is 8.21 ft above National Geodetic Vertical Datum of 1929. Storage includes both Rio Grande and transmountain water.

Month-end gage height, in feet, and contents, in acre-feet

Date	Gage Height	Contents	Change in contents	Transmountain water
December 31, 2010	6,872.59	108,611	-	65,649
January 31, 2011	6,872.39	108,158	-453	65,973
February 28	6,872.95	109,430	+1272	66,674
March 31	6,872.61	108,656	-774	66,511
April 30	6,877.36	119,920	+11264	66,320
May 31	6,892.96	162,799	+42879	65,668
June 30	6,890.40	155,182	-7,617	64,128
July 31	6,877.76	120,910	-34,272	56,589
August 31	6,868.28	99,195	-21,715	62,863
September 30	6,868.19	99,006	-189	63,998
October 31	6,865.57	93,609	-5,397	58,633
November 30	6,866.86	96,239	+2630	67,441
December 31, 2011	6,862.03	86,655	-9,584	67,332
Calendar year 2011	-	-	-21,956	-

STORAGE IN RESERVOIRS

Reservoirs in Rio Grande Basin in New Mexico
(constructed or enlarged since 1929)

Abiquiu Reservoir. -- Water-stage recorder, lat 36°14'24", long 106°25'44", on Rio Chama. Completed in February 1963; capacity, 1,192,800 acre-ft at elevation 6,350 feet (crest of spillway) by 1998 survey. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Reservoir is operated by Corps of Engineers for flood control and sediment storage. A resolution granting permission to store transmountain waters was approved by Rio Grande Compact Commission on May 3, 1974. Storage includes both Rio Grande and transmountain water.

Month-end elevation, in feet, and contents, in acre-feet

Date	Elevation	Contents	Change in contents	Transmountain water
December 31, 2010	6,220.02	183,962	-	179,012
January 31, 2011	6,219.45	181,677	-2,285	177,849
February 28	6,218.80	179,088	-2,589	175,155
March 31	6,217.78	175,071	-4,017	171,276
April 30	6,215.03	164,478	-10,593	160,773
May 31	6,213.59	159,086	-5,392	154,516
June 30	6,211.43	151,112	-7,974	147,245
July 31	6,210.77	148,700	-2,412	145,034
August 31	6,214.52	162,561	+13861	158,843
September 30	6,218.92	179,565	+17004	175,858
October 31	6,219.17	180,558	+993	176,695
November 30	6,219.47	181,757	+1199	177,492
December 31, 2011	6,219.43	181,597	-160	177,025
Calendar year 2011	-	-	-2,365	-

Nambe Falls Reservoir. -- Water-stage recorder, lat 35°50'46", long 105°54'17", in NE1/4SW1/4 sec. 29, T. 19 N., R. 10 E., in Nambe Indian Reservation, on Rio Nambe. Completed in 1976; capacity 1,920 acre-ft at elevation 6,826.6 feet (crest of spillway) by 2004 survey, dead storage 121 acre-ft at elevation 6,760.9 ft. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by Bureau of Reclamation). Storage is transmountain water by exchange (see resolution adopted March 27, 1975).

Month-end elevation, in feet, and contents, in acre-feet

Date	Elevation	Contents	Change in contents
December 31, 2010	6,820.67	1,599	-
January 31, 2011	6,824.19	1,784	+185
February 28	6,826.33	1,904	+120
March 31	6,826.60	1,920	+16
April 30	6,824.42	1,797	-123
May 31	6,811.00	1,156	-641
June 30	6,802.07	830	-326
July 31	6,803.50	877	+47
August 31	6,803.83	888	+11
September 30	6,799.79	758	-130
October 31	6,801.94	825	+67
November 30	6,807.98	1,037	+212
December 31, 2011	6,812.57	1,221	+184
Calendar year 2011	-	-	-378

STORAGE IN RESERVOIRS

Reservoirs in Rio Grande Basin in New Mexico
(constructed or enlarged since 1929)

McClure (Granite Point) Reservoir. – Water-stage recorder, lat 35°41'18", long 105°50'06", in NE1/4SW1/4 sec. 24, T. 17 N., R. 10 E., on Santa Fe River. Original reservoir completed in 1926, capacity, 561 acre-ft; in 1935, permanent flash boards were installed in spillway increasing capacity to 650 acre-ft; in 1947 both dam and spillway were reconstructed increasing capacity to 2,615 acre-ft (gage height, 96.6 ft, crest of spillway). In 1953 spillway was equipped with radial gates that opened automatically, increasing capacity to over 3,000 acre-ft. In 1972, radial gates were removed decreasing capacity to 2,615 acre-ft. In 1989, modifications to the dam and spillway increased capacity to 2,813 acre-ft. In 1995, modification to the dam and spillway increased capacity to 3,257 acre-ft. No dead storage. Elevation of gage is 7,790 ft above National Geodetic Vertical Datum of 1929, from topographic map.

Water is for municipal use in Santa Fe. Storage includes both Rio Grande water and transmountain water by exchange. Capacity includes 561 acre-ft for pre-Compact storage and additional capacity as may be available to accommodate up to a total of 1,061 acre-feet of pre-Compact storage in McClure and Nichols Reservoirs combined.

Month-end gage height, in feet, and contents, in acre-feet

Date	Gage height	Contents	Change in contents	Pre-Compact water	Transmountain water
December 31, 2010	7,861.68	1,601	-	0	1,601
January 31, 2011	7,860.82	1,550	-51	0	1,550
February 28	7,857.98	1,390	-160	0	1,390
March 31	7,855.70	1,280	-110	0	1,280
April 30	7,854.56	1,220	-60	0	1,220
May 31	7,854.92	1,240	+20	0	1,240
June 30	7,850.39	1,030	-210	0	1,030
July 31	7,849.22	984	-46	0	984
August 31	7,847.24	903	-81	0	903
September 30	7,847.55	915	+12	0	915
October 31	7,848.06	931	+16	0	931
November 30	7,847.81	926	-5	0	926
December 31, 2011	7,847.91	929	+3	0	929
Calendar year 2011	-	-	-672	-	-

Nichols Reservoir. – Water-stage recorder, lat 35°41'24", long 105°52'46", in SE1/4NE1/4 sec. 21, T. 17 N., R. 10 E., on Santa Fe River. Completed in 1942; capacity, 685 acre-ft at gage height 167.0 feet (crest of spillway), dead storage, 14 acre-ft at gage height 121.1 feet. Datum of gage is 7,313.2 feet above National Geodetic Vertical Datum of 1929. Water is for municipal use in Santa Fe. Storage includes both Rio Grande water and transmountain water by exchange. Capacity may include pre-Compact storage such that total pre-Compact storage in McClure and Nichols Reservoirs combined does not exceed 1,061 acre-ft.

Month-end gage height, in feet, and contents, in acre-feet

Date	Gage height	Contents	Change in contents	Pre-Compact water	Transmountain water
December 31, 2010	151.59	310	-	0	310
January 31, 2011	145.92	216	-94	1	215
February 28	150.41	287	+71	0	287
March 31	155.84	394	+107	16	378
April 30	160.77	512	+118	74	438
May 31	158.46	455	-57	37	418
June 30	160.21	497	+42	0	497
July 31	149.05	264	-233	0	264
August 31	156.61	412	+148	198	214
September 30	159.41	477	+65	275	202
October 31	162.39	555	+78	369	186
November 30	162.53	559	+4	368	191
December 31, 2011	162.28	552	-7	364	188
Calendar year 2011	-	-	+242	-	-

Reservoirs in Rio Grande Basin in New Mexico
(constructed or enlarged since 1929)

Month-end elevation, in feet, and contents, in acre-feet

Galisteo Reservoir. – Water-stage recorder above elevation 5,500.3 ft, nonrecording below, lat 35°27'44", long 106°12'30", in NW1/4 sec. 9, T. 14 N., R. 7 E., on Galisteo Creek. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Storage records begin in October 1970. Capacity 88,990 acre-ft at elevation 5,608.0 ft (crest of spillway). No dead storage. Reservoir is operated by Corps of Engineers for flood control and sediment storage.

Month-end contents, in acre-feet

[illegible]

STORAGE IN RESERVOIRS

Reservoirs in Rio Grande Basin in New Mexico
(constructed or enlarged since 1929)

Jemez Canyon Reservoir. – Water-stage recorder, lat 35°23'40", long 106°32'50", in SW1/4SW1/4 sec. 32, T. 14 N., R. 4 E., on Jemez River. Completed in 1953; capacity, 259,423 acre-ft at elevation 5,271.20 ft. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Maximum controlled capacity at elevation 5,232.0 ft (floor of spillway) is 97,425 acre-ft by 1998 survey. Reservoir is operated by Corps of Engineers for flood control and sediment storage. A sediment pool of about 2,000 acre-ft of transmountain water has been maintained since August 1979.

Month-end elevation, in feet, and contents, in acre-feet

Date	Elevation	Contents	Change in contents	Transmountain water
December 31, 2010	5,155.00	0	-	0
January 31, 2011	5,155.00	0	0	0
February 28	5,155.00	0	0	0
March 31	5,155.00	0	0	0
April 30	5,155.00	0	0	0
May 31	5,155.00	0	0	0
June 30	5,155.00	0	0	0
July 31	5,155.00	0	0	0
August 31	5,155.00	0	0	0
September 30	5,155.00	0	0	0
October 31	5,155.00	0	0	0
November 30	5,155.00	0	0	0
December 31, 2011	5,155.00	0	0	0
Calendar year 2011	-	-	0	-

Acomita Reservoir. – Staff gage in SE1/4 sec. 29, T. 10 N., R. 7 W., on San Fidel Arroyo; water for reservoir is diverted from Rio San Jose. Completed in 1938; original capacity, 850 acre-ft; present capacity 650 acre-ft on basis of 1956 sediment survey. Water is used for irrigation on Acoma Indian Reservation. Storage omitted from accounting by action of Commission on March 23, 2000.

Month-end contents, in acre-feet

Calendar Year 2011

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Cal. Yr.
Contents	-	-	-	-	-	-	-	-	-	-	-	-	-
Change	-	-	-	-	-	-	-	-	-	-	-	-	-

Seama Reservoir. – In sec. 36, T. 10 N., R. 7 W., off channel from Rio San Jose. Completed in October 1980; capacity approximately 400 acre-ft. Water is used for irrigation on Laguna Indian Reservation.

No storage during 2011.

STORAGE IN RESERVOIRS

Reservoirs in Rio Grande Basin in New Mexico
(project storage)

Elephant Butte Reservoir. – Water-stage recorder, lat 33°09'15", long 107°11'28", in NW1/4 sec. 30, T. 13 S., R. 3 W., on Rio Grande. Storage began Jan. 6, 1915; capacity, 2,023,400 acre-ft at gage height 4,407.0 ft (crest of spillway), by survey of 1999 with flood control storage reservation of 50,000 acre-ft from April through September and 25,000 acre-ft from October through March in accordance with Sept. 9, 1998 resolution of the Rio Grande Compact Commission. Datum of gage is 43.3 ft above National Geodetic Vertical Datum of 1929. Water is used for power development and irrigation in New Mexico and Texas. Records furnished by Bureau of Reclamation. Delivery of transmountain water for minimum recreation pool was initiated in December 1975. Beginning Jan. 1, 1977 gage readings are midnight readings.

Month-end gage height, in feet, and contents, in acre-feet

Date	Gage Height	Contents	Change in contents	Transmountain water
December 31, 2010	4,335.68	437,172	-	45,011
January 31, 2011	4,338.67	474,226	+37054	45,604
February 28	4,340.99	504,286	+30060	45,652
March 31	4,338.05	466,384	-37,902	45,406
April 30	4,331.06	383,663	-82,721	45,009
May 31	4,328.82	359,318	-24,345	50,274
June 30	4,321.26	283,121	-76,197	60,756
July 31	4,314.43	222,987	-60,134	60,367
August 31	4,311.76	202,227	-20,760	59,666
September 30	4,311.59	200,959	-1,268	58,995
October 31	4,312.53	208,053	+7094	58,544
November 30	4,316.60	241,004	+32951	58,122
December 31, 2011	4,322.45	294,518	+53514	64,257
Calendar year 2011	-	-	-142,654	-

Caballo Reservoir. – Water-stage recorder, lat 32°53'47", long 107°17'30", in SE1/4SW1/4 sec. 19, T. 16 S., R. 4 W., on Rio Grande. Storage began Feb. 8, 1938; capacity, 326,700 acre-ft (by 1999 resurvey), at gage height 4,182.0 ft (above which spillway gates open automatically). Datum of gage is 43.3 ft above National Geodetic Vertical Datum of 1929.

Month-end gage height, in feet, and contents, in acre-feet

Date	Gage height	Contents	Change in contents
December 31, 2010	4,137.21	21,981	-
January 31, 2011	4,137.89	23,563	+1582
February 28	4,138.40	24,790	+1227
March 31	4,141.86	34,143	+9353
April 30	4,149.49	63,167	+29024
May 31	4,147.19	53,040	-10,127
June 30	4,142.93	37,478	-15,562
July 31	4,141.19	32,166	-5,312
August 31	4,129.22	7,256	-24,910
September 30	4,130.02	8,460	+1204
October 31	4,131.07	10,141	+1681
November 30	4,131.91	11,554	+1413
December 31, 2011	4,133.07	13,604	+2050
Calendar year 2011	-	-	-8,377

STORAGE IN RESERVOIRS

Reservoirs in Rio Grande Basin in New Mexico
(project storage)

Project storage. – The combined total storage in Elephant Butte and Caballo Reservoirs.

Month-end contents, in acre-feet

Date	Contents	Change in contents
December 31, 2010	459,153	-
January 31, 2011	497,789	+38636
February 28	529,076	+31287
March 31	500,527	-28,549
April 30	446,830	-53,697
May 31	412,358	-34,472
June 30	320,599	-91,759
July 31	255,153	-65,446
August 31	209,483	-45,670
September 30	209,419	-64
October 31	218,194	+8775
November 30	252,558	+34364
December 31, 2011	308,122	+55564
Calendar year 2011		-151,031

NOTE.-- Values of combined contents may not agree with sum of individual values because of rounding.

TRANSMOUNTAIN DIVERSIONS

Pine River - Weminuche Pass ditch (Fuchs ditch).-- Water-stage recorder and 3-ft Parshall flume in sec. 33, T. 40 N., R. 4 W., at Weminuche Pass in Colorado. Diversion is from North Fork Los Pinos River in San Juan River Basin into Weminuche Creek in Rio Grande Basin. Second enlargement was completed in 1936. Diversion for irrigation is from Rio Grande above the Del Norte gaging station.

Weminuche Pass ditch (Raber-Lohr ditch).-- Water-stage recorder and 4-ft rectangular flume in sec. 33, T. 40 N., R. 4 W., at Weminuche Pass in Colorado. Diversion is from Rincon la Vaca Creek in San Juan River Basin into Weminuche Creek in Rio Grande Basin. Second enlargement was completed in 1936. Diversion for irrigation is from Rio Grande above the Del Norte gaging station.

Williams Creek - Squaw Pass ditch.-- Water-stage recorder and 2-ft Parshall flume in sec. 21, T. 39 N., R. 3 W., at Squaw Pass in Colorado. Diversion is from Williams Creek in San Juan River Basin into Squaw Creek in Rio Grande Basin. Constructed in 1938. Diversion for irrigation is from Rio Grande below Del Norte gaging station.

Tabor ditch.-- Water-stage recorder and 3-ft Parshall flume in sec. 35, T. 43 N., R. 3 W., at Spring Creek Pass in Colorado. Diversion is from Cebolla Creek in Gunnison River Basin into tributary of Clear Creek in Rio Grande Basin. Completed in 1910 or 1911. Diversion for irrigation is from Rio Grande below Del Norte gaging station.

Don La Font No. 1 & 2 ditches (Piedra Pass ditch).-- Water-stage recorder and 2-ft Parshall flume in sec. 4, T. 38 N., R. 1 W., at Piedra Pass in Colorado. Diversion is from tributaries of Piedra River in San Juan River Basin to South River in Rio Grande Basin. Original ditch completed in 1938, first enlargement completed in 1940. Water is imported by Colorado Game and Fish Department, beginning in 1959, to offset losses from fish culture reservoirs.

Treasure Pass diversion ditch.-- Water-stage recorder and 2-ft Parshall flume in sec. 31, T. 38 N., R. 2 E., at Wolf Creek Pass in Colorado. Diversion is from Wolf Creek in San Juan River Basin to a tributary of South Fork Rio Grande. Completed in 1923 or 1924. Water is diverted for irrigation from Rio Grande above the Del Norte gaging station, beginning in 1959. Prior to 1959 it was diverted below gaging station.

Azotea tunnel.-- Water-stage recorder and 10-ft Parshall flume, lat 36°51'12", long 106°40'18", at south portal of Azotea tunnel, San Juan-Chama Project. Diversion is from Rio Blanco, Little Navajo River, and Navajo River in Colorado and discharge is into Azotea in New Mexico. Construction completed in 1970.

Imported quantities, in acre-feet, 2011

Month	Pine River- Weminuche Pass ditch	Weminuche Pass ditch	Williams Creek- Squaw Pass ditch	Tabor ditch	Don La Font ditches	Treasure Pass diversion ditch	Azotea tunnel
January	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0
March	0	0	0	0	0	0	2,008
April	0	0	0	11	0	0	13,570
May	0	0	0	87	1	0	22,315
June	283	299	283	309	262	236	42,779
July	24	0	96	81	33	26	8,404
August	0	0	16	57	0	0	1,594
September	0	0	0	33	0	0	1,852
October	0	0	0	12	0	0	4,452
November	0	0	0	0	0	0	1,295
December	0	0	0	0	0	0	52
Calendar year	307	299	395	590	296	262	98,321

EVAPORATION AND PRECIPITATION

The last paragraph of Article VI of the Compact states, in part, --- "such credits and debits shall be reduced annually to compensate for evaporation losses in the proportion that such credits or debits bear to the total amount of water in such reservoirs during the year."

To provide the data needed for the computation of such evaporation losses, the Commission has encouraged the establishment and operation of evaporation stations near each major reservoir in the basin and at other selected locations.

Evaporation and other climatological data collected at the several stations in Colorado and New Mexico are tabulated on the next page. At some of the stations, it was not possible to obtain evaporation records throughout the winter period.

The measurements of evaporation were made in accordance with standard practice for the type of pan in use. Measurements of precipitation were made in standard 8-inch rain gages, which were supplemented at some of the stations by recording rain gages.

Records for the evaporation stations at the State University, Elephant Butte Dam, and El Vado Dam antedated the creation of the Commission; the stations at Abiquiu Dam, Cochiti Dam, and Jemez Canyon Dam were established by the Corps of Engineers. All others were established at the request of the Commission.

The Rio Grande Compact Commission gratefully acknowledges the cooperation of the National Oceanic and Atmospheric Administration, U.S. Army Corps of Engineers, and U.S. Bureau of Reclamation for furnishing the climatological records contained in this report.

Alamosa Airport--Lat 37°27', long 105°52', in Alamosa County at airport near Alamosa, Colo. Standard class A pan, anemometer, maximum and minimum thermometers, standard 8-inch and recording rain gages at elevation 7,536 ft.

Platoro Dam--Lat 37°21', long 106°30', in Conejos County near Platoro, Colo. Standard class A pan, anemometer, maximum and minimum thermometers, fan type psychrometer, standard 8-inch and recording rain gages at elevation 9,826 ft.

Heron Dam--Lat 36°40', long 106°42', in Rio Arriba County about 4 mi. northeast of Heron Dam near Tierra Amarilla, N. Mex. Standard class A pan, maximum and minimum thermometers, and standard 8-inch rain gage at elevation 7,310 ft.

El Vado Dam--Lat 36°36', long 106°44', in Rio Arriba County at El Vado Dam near Tierra Amarilla, N. Mex. Standard class A pan, anemometer, maximum and minimum thermometers, standard 8-inch and recording rain gages at elevation 6,750 ft.

Abiquiu Dam--Lat 36°14', long 106°26', in Rio Arriba County at Abiquiu Dam near Abiquiu, N. Mex. Standard class A pan, maximum and minimum thermometers, standard 8-inch and recording rain gages at elevation 6,380 ft.

Nambe Falls Dam--Lat 35°51', long 105°54', in Santa Fe County at Nambe Falls Dam, N. Mex. Standard class A pan, maximum and minimum thermometers, recording thermograph, standard 8-inch and recording rain gages at elevation 6,840 ft.

Cochiti Dam--Lat 35°38', long 106°19', in Sandoval County at operations building, at Cochiti Dam, N. Mex. Standard class A pan, anemometer, maximum and minimum thermometers, standard 8-inch and recording rain gages at elevation 5,560 ft.

Jemez Canyon Dam--Lat 35°23', long 106°32', in Sandoval County at Jemez Canyon Dam, N. Mex. Standard class A pan, anemometer, maximum and minimum thermometers, standard 8-inch and recording rain gages at elevation 5,388 ft.

Elephant Butte Dam--Lat 33°09', long 107°11', in Sierra County at Elephant Butte Dam, N. Mex. Standard class A pan, anemometer, maximum and minimum thermometers, and standard 8-inch rain gage at elevation 4,576 ft.

Caballo Dam--Lat 32°54', long 107°18', in Sierra County at Caballo Dam, N. Mex. Standard class A pan, anemometer, maximum and minimum thermometers, standard 8-inch and recording rain gages at elevation 4,190 ft.

New Mexico State University--Lat 32°17', long 106°45', in Doña Ana County at University Park, N. Mex. Standard class A pan, anemometer, maximum and minimum thermometers, standard 8-inch and recording rain gages at elevation 3,881 ft.

EVAPORATION AND PRECIPITATION

Evaporation and precipitation, in inches
2011

Station		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.	Annual
Alamosa	Evap.	-	-	-	-	-	-	-	-	-	-	-	-	-
Airport	Precip.	0.06	0.39	0.02	0.13	0.18	0	0.14	1.27	1.15	0.48	0.51	0.27	4.60
Platoro	Evap.	-	-	-	-	1.68	6.84	5.28	4.20	2.76	2.40	-	-	-
Dam	Precip.	-	-	-	-	-	.47	2.47	3.91	2.78	2.64	-	-	-
Heron	Evap.	-	-	-	5.40	6.89	10.81	8.89	8.71	5.18	3.35	-	-	-
Dam	Precip.	0.05	0.42	0.89	1.96	0.95	0.00	0.58	1.62	2.65	2.26	1.29	1.14	13.81
El Vado	Evap.	-	-	-	6.41	8.02	11.32	8.61	8.79	5.72	3.81	-	-	-
Dam	Precip.	0.05	0.22	0.56	2.12	0.55	0.01	1.65	1.04	3.55	2.35	1.19	0.79	14.08
Abiquiu	Evap.	-	-	-	8.63	11.38	15.22	10.79	9.09	7.22	5.59	-	-	-
Dam	Precip.	0.03	0.07	0.00	1.43	0.73	0.00	0.72	0.74	1.98	1.49	0.07	0.78	8.04
Nambe	Evap.	-	-	-	7.71	10.54	13.95	11.22	10.26	6.88	5.21	-	-	-
Canyon Dam	Precip.	0.00	0.37	0.00	0.38	0.22	0.00	1.41	2.40	1.25	2.20	0.52	1.40	10.15
Cochiti	Evap.	-	-	-	10.12	11.53	12.35	10.15	10.2	7.07	5.88	-	-	-
Dam	Precip.	0.00	0.04	0.03	0.06	0.00	0.00	0.32	1.82	1.30	1.75	0.15	1.32	6.79
Jemez	Evap.	-	-	-	9.53	12.62	14.33	13.92	11.84	9.37	6.01	-	-	-
Canyon Dam	Precip.	0.00	0.00	0.04	0.02	0.03	0.00	1.17	1.99	0.50	0.91	0.18	1.09	5.93
Elephant	Evap.	5.78	6.53	12.74	16.53	18.98	21.91	18.37	14.64	11.57	9.74	7.81	1.79	146.39
Butte Dam	Precip.	0.00	0.01	0.00	0.00	0.00	0.04	0.66	1.87	1.26	0.61	0.58	2.63	7.66
Caballo	Evap.	-	-	11.33	13.88	15.44	15.10	14.56	13.16	11.15	8.31	5.07	1.67	-
Dam	Precip.	-	-	-	0.00	-	0.03	1.72	1.44	0.79	0.80	1.07	2.19	-
State	Evap.	-	-	9.11	12.48	14.09	15.31	13.28	10.01	10.17	6.92	4.13	-	-
University	Precip.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.04	0.27

RIO GRANDE COMPACT

The State of Colorado, the State of New Mexico, and the State of Texas, desiring to remove all causes of present and future controversy among these States and between citizens of one of these States and citizens of another State with respect to the use of the waters of the Rio Grande above Fort Quitman, Texas, and being moved by considerations of interstate comity, and for the purpose of effecting an equitable apportionment of such waters, have resolved to conclude a Compact for the attainment of these purposes, and to that end, through their respective Governors, have named as their respective Commissioners:

For the State of Colorado
For the State of New Mexico
For the State of Texas

M. C. Hinderlider
Thomas M. McClure
Frank B. Clayton

who, after negotiations participated in by S. O. Harper, appointed by the President as the representative of the United States of America, have agreed upon the following articles, to- wit:

ARTICLE I

(a) The State of Colorado, the State of New Mexico, the State of Texas, and the United States of America, are hereinafter designated "Colorado," "New Mexico," "Texas," and the "United States," respectively.

(b) "The Commission" means the agency created by this Compact for the administration thereof.

(c) The term "Rio Grande Basin" means all of the territory drained by the Rio Grande and its tributaries in Colorado, in New Mexico, and in Texas above Fort Quitman, including the Closed Basin in Colorado.

(d) The "Closed Basin" means that part of the Rio Grande Basin in Colorado where the streams drain into the San Luis Lakes and adjacent territory, and do not normally contribute to the flow of the Rio Grande.

(e) The term "tributary" means any stream which naturally contributes to the flow of the Rio Grande.

(f) "Transmountain Diversion" is water imported into the drainage basin of the Rio Grande from any stream system outside of the Rio Grande Basin, exclusive of the Closed Basin.

(g) "Annual Debits" are the amounts by which actual deliveries in any calendar year fall below scheduled deliveries.

(h) "Annual Credits" are the amounts by which actual deliveries in any calendar year exceed scheduled deliveries.

(i) "Accrued Debits" are the amounts by which the sum of all annual debits exceeds the sum of all annual credits over any common period of time.

(j) "Accrued Credits" are the amounts by which the sum of all annual credits exceeds the sum of all annual debits over any common period of time.

(k) "Project Storage" is the combined capacity of Elephant Butte Reservoir and all other reservoirs actually available for the storage of usable water below Elephant Butte and above the first diversion to lands of the Rio Grande Project, but not more than a total of 2,638,860 acre feet.

RIO GRANDE COMPACT

(l) "Usable Water" is all water, exclusive of credit water, which is in project storage and which is available for release in accordance with irrigation demands, including deliveries to Mexico.

(m) "Credit Water" is that amount of water in project storage which is equal to the accrued credit of Colorado, or New Mexico, or both.

(n) "Unfilled Capacity" is the difference between the total physical capacity of project storage and the amount of usable water then in storage.

(o) "Actual Release" is the amount of usable water released in any calendar year from the lowest reservoir comprising project storage.

(p) "Actual Spill" is all water which is actually spilled from Elephant Butte Reservoir, or is released therefrom for flood control, in excess of the current demand on project storage and which does not become usable water by storage in another reservoir; provided, that actual spill of usable water cannot occur until all credit water shall have been spilled.

(q) "Hypothetical Spill" is the time in any year at which usable water would have spilled from project storage if 790,000 acre feet had been released therefrom at rates proportional to the actual release in every year from the starting date to the end of the year in which hypothetical spill occurs; in computing hypothetical spill the initial condition shall be the amount of usable water in project storage at the beginning of the calendar year following the effective date of this Compact, and thereafter the initial condition shall be the amount of usable water in project storage at the beginning of the calendar year following each actual spill.

ARTICLE II

The Commission shall cause to be maintained and operated a stream gaging station equipped with an automatic water stage recorder at each of the following points, to-wit:

(a) On the Rio Grande near Del Norte above the principal points of diversion to the San Luis Valley;

(b) On the Conejos River near Mogote;

(c) On the Los Pinos River near Ortiz;

(d) On the San Antonio River at Ortiz;

(e) On the Conejos River at its mouths near Los Sauces;

(f) On the Rio Grande near Lobatos;

(g) On the Rio Chama below El Vado Reservoir;

(h) On the Rio Grande at Otowi Bridge near San Ildefonso;

(i) On the Rio Grande near San Acacia;

(j) On the Rio Grande at San Marcial;

(k) On the Rio Grande below Elephant Butte Reservoir;

(l) On the Rio Grande below Caballo Reservoir.

Similar gaging stations shall be maintained and operated below any other reservoir constructed after 1929, and at such other points as may be necessary for the securing of records required for the carrying out of the Compact; and automatic water stage recorders shall be maintained and operated on each of the reservoirs mentioned, and on all others constructed after 1929.

RIO GRANDE COMPACT

Such gaging stations shall be equipped, maintained and operated by the Commission directly or in cooperation with an appropriate Federal or State agency, and the equipment, method and frequency of measurement at such stations shall be such as to produce reliable records at all times. (Note: See Resolution of Commission printed elsewhere in this report.)

ARTICLE III

The obligation of Colorado to deliver water in the Rio Grande at the Colorado-New Mexico State Line, measured at or near Lobatos, in each calendar year, shall be ten thousand acre feet less than the sum of those quantities set forth in the two following tabulations of relationship, which correspond to the quantities at the upper index stations:

DISCHARGE OF CONEJOS RIVER

Quantities in thousands of acre feet

Conejos Index Supply (1)	Conejos River at Mouths (2)
100	0
150	20
200	45
250	75
300	109
350	147
400	188
450	232
500	278
550	326
600	376
650	426
700	476

Intermediate quantities shall be computed by proportional parts.

(1) Conejos Index Supply is the natural flow of Conejos River at the U.S.G.S. gaging station near Mogote during the calendar year, plus the natural flow of Los Pinos River at the U.S.G.S. gaging station near Ortiz and the natural flow of San Antonio River at the U.S.G.S. gaging station at Ortiz, both during the months of April to October, inclusive.

(2) Conejos River at Mouths is the combined discharge of branches of this river at the U.S.G.S. gaging stations near Los Sauces during the calendar year.

DISCHARGE OF RIO GRANDE EXCLUSIVE OF CONEJOS RIVER

Quantities in thousands of acre feet

Rio Grande at Del Norte (3)	Rio Grande at Lobatos less Conejos at Mouths (4)
200	60
250	65
300	75
350	86
400	98
450	112
500	127
550	144
600	162

RIO GRANDE COMPACT
DISCHARGE OF RIO GRANDE EXCLUSIVE OF CONEJOS RIVER--Con.

Quantities in thousands of acre feet

Rio Grande at Del Norte (3)	Rio Grande at Lobatos less Conejos at Mouths (4)
650	182
700	204
750	229
800	257
850	292
900	335
950	380
1,000	430
1,100	540
1,200	640
1,300	740
1,400	840

Intermediate quantities shall be computed by proportional parts.

(3) Rio Grande at Del Norte is the recorded flow of the Rio Grande at the U.S.G.S. gaging station near Del Norte during the calendar year (measured above all principal points of diversion to San Luis Valley) corrected for the operation of reservoirs constructed after 1937.

(4) Rio Grande at Lobatos less Conejos at Mouths is the total flow of the Rio Grande at the U.S.G.S. gaging station near Lobatos, less the discharge of Conejos River at its Mouths, during the calendar year.

The application of these schedules shall be subject to the provisions hereinafter set forth and appropriate adjustments shall be made for (a) any change in location of gaging stations; (b) any new or increased depletion of the runoff above inflow index gaging stations; and (c) any transmountain diversions into the drainage basin of the Rio Grande above Lobatos.

In event any works are constructed after 1937 for the purpose of delivering water into the Rio Grande from the Closed Basin, Colorado shall not be credited with the amount of such water delivered, unless the proportion of sodium ions shall be less than forty-five percent of the total positive ions in that water when the total dissolved solids in such water exceeds three hundred fifty parts per million.

ARTICLE IV

The obligation of New Mexico to deliver water in the Rio Grande at San Marcial, during each calendar year, exclusive of the months of July, August, and September, shall be that quantity set forth in the following tabulation of relationship, which corresponds to the quantity at the upper index station:

RIO GRANDE COMPACT
DISCHARGE OF RIO GRANDE AT OTOWI BRIDGE AND AT SAN MARCIAL
EXCLUSIVE OF JULY, AUGUST AND SEPTEMBER

Quantities in thousands of acre feet

Otowi Index Supply (5)	San Marcial Index Supply (6)
100	0
200	65
300	141
400	219
500	300
600	383
700	469
800	557
900	648
1,000	742
1,100	839
1,200	939
1,300	1,042
1,400	1,148
1,500	1,257
1,600	1,370
1,700	1,489
1,800	1,608
1,900	1,730
2,000	1,856
2,100	1,985
2,200	2,117
2,300	2,253

Intermediate quantities shall be computed by proportional parts.

(5) The Otowi Index Supply is the recorded flow of the Rio Grande at the U.S.G.S. gaging station at Otowi Bridge near San Ildefonso (formerly station near Buckman) during the calendar year, exclusive of the flow during the months of July, August and September, corrected for the operation of reservoirs constructed after 1929 in the drainage basin of the Rio Grande between Lobatos and Otowi Bridge.

(6) San Marcial Index Supply is the recorded flow of the Rio Grande at the gaging station at San Marcial during the calendar year exclusive of the flow during the months of July, August and September.

The application of this schedule shall be subject to the provisions hereinafter set forth and appropriate adjustments shall be made for (a) any change in location of gaging stations; (b) depletion after 1929 in New Mexico at any time of the year of the natural runoff at Otowi Bridge; (c) depletion of the runoff during July, August and September of tributaries between Otowi Bridge and San Marcial, by works constructed after 1937; and (d) any transmountain diversions into the Rio Grande between Lobatos and San Marcial.

Concurrent records shall be kept of the flow of the Rio Grande at San Marcial, near San Acacia, and of the release from Elephant Butte Reservoir to the end that the records at these three stations may be correlated. (Note: See Resolution of Commission printed elsewhere in this report.)

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ARTICLE V

If at any time it should be the unanimous finding and determination of the Commission that because of changed physical conditions, or for any other reason, reliable records are not obtainable, or cannot be obtained, at any of the stream gaging stations herein referred to, such stations may, with the unanimous approval of the Commission, be abandoned, and with such approval another station, or other stations, shall be established and new measurements shall be substituted which, in the unanimous opinion of the Commission, will result in substantially the same results so far as the rights and obligations to deliver water are concerned, as would have existed if such substitution of stations and measurements had not been so made. (Note: See Resolution of Commission printed elsewhere in this report.)

ARTICLE VI

Commencing with the year following the effective date of this Compact, all credits and debits of Colorado and New Mexico shall be computed for each calendar year; provided, that in a year of actual spill no annual credits nor annual debits shall be computed for that year.

In the case of Colorado, no annual debit nor accrued debit shall exceed 100,000 acre feet, except as either or both may be caused by holdover storage of water in reservoirs constructed after 1937 in the drainage basin of the Rio Grande above Lobatos. Within the physical limitations of storage capacity in such reservoirs, Colorado shall retain water in storage at all times to the extent of its accrued debit.

In the case of New Mexico, the accrued debit shall not exceed 200,000 acre feet at any time, except as such debit may be caused by holdover storage of water in reservoirs constructed after 1929 in the drainage basin of the Rio Grande between Lobatos and San Marcial. Within the physical limitations of storage capacity in such reservoirs, New Mexico shall retain water in storage at all times to the extent of its accrued debit. In computing the magnitude of accrued credits or debits, New Mexico shall not be charged with any greater debit in any one year than the sum of 150,000 acre-feet and all gains in the quantity of water in storage in such year.

The Commission by unanimous action may authorize the release from storage of any amount of water which is then being held in storage by reason of accrued debits of Colorado or New Mexico; provided, that such water shall be replaced at the first opportunity thereafter.

In computing the amount of accrued credits and accrued debits of Colorado or New Mexico, any annual credits in excess of 150,000 acre feet shall be taken as equal to that amount.

In any year in which actual spill occurs, the accrued credits of Colorado, or New Mexico, or both, at the beginning of the year shall be reduced in proportion to their respective credits by the amount of such actual spill; provided that the amount of actual spill shall be deemed to be increased by the aggregate gain in the amount of water in storage, prior to the time of spill, in reservoirs above San Marcial constructed after 1929; provided, further, that if the Commissioners for the States having accrued credits authorize the release of part, or all, of such credits in advance of spill, the amount so released shall be deemed to constitute actual spill.

In any year in which there is actual spill of usable water, or at the time of hypothetical spill thereof, all accrued debits of Colorado, or New Mexico, or both, at the beginning of the year shall be cancelled.

RIO GRANDE COMPACT

In any year in which the aggregate of accrued debits of Colorado and New Mexico exceeds the minimum unfilled capacity of project storage, such debits shall be reduced proportionally to an aggregate amount equal to such minimum unfilled capacity.

To the extent that accrued credits are impounded in reservoirs between San Marcial and Courchesne, and to the extent that accrued debits are impounded in reservoirs above San Marcial, such credits and debits shall be reduced annually to compensate for evaporation losses in the proportion that such credits or debits bore to the total amount of water in such reservoirs during the year.

ARTICLE VII

Neither Colorado nor New Mexico shall increase the amount of water in storage in reservoirs constructed after 1929 whenever there is less than 400,000 acre feet of usable water in project storage; provided, that if the actual releases of usable water from the beginning of the calendar year following the effective date of this Compact, or from the beginning of the calendar year following actual spill, have aggregated more than an average of 790,000 acre feet per annum, the time at which such minimum stage is reached shall be adjusted to compensate for the difference between the total actual release and releases at such average rate; provided, further, that Colorado, or New Mexico, or both, may relinquish accrued credits at any time, and Texas may accept such relinquished water, and in such event the state, or states, so relinquishing shall be entitled to store water in the amount of the water so relinquished.

ARTICLE VIII

During the month of January of any year the Commissioner for Texas may demand of Colorado and New Mexico, and the Commissioner for New Mexico may demand of Colorado, the release of water from storage reservoirs constructed after 1929 to the amount of the accrued debits of Colorado and New Mexico, respectively, and such releases shall be made by each at the greatest rate practicable under the conditions then prevailing, and in proportion to the total debit of each, and in amounts, limited by their accrued debits, sufficient to bring the quantity of usable water in project storage to 600,000 acre feet by March first and to maintain this quantity in storage until April thirtieth, to the end that a normal release of 790,000 acre feet may be made from project storage in that year.

ARTICLE IX

Colorado agrees with New Mexico that in event the United States or the State of New Mexico decides to construct the necessary works for diverting the waters of the San Juan River, or any of its tributaries, into the Rio Grande, Colorado hereby consents to the construction of said works and the diversion of waters from the San Juan River, or the tributaries thereof, into the Rio Grande in New Mexico, provided the present and prospective uses of water in Colorado by other diversions from the San Juan River, or its tributaries, are protected.

ARTICLE X

In the event water from another drainage basin shall be imported into the Rio Grande Basin by the United States or Colorado or New Mexico, or any of them jointly, the State having the right to the use of such water shall be given proper credit therefor in the application of the schedules.

ARTICLE XI

New Mexico and Texas agree that upon the effective date of this Compact all controversies between said States relative to the quantity or quality of the water of the Rio Grande are composed and settled; however, nothing herein shall be interpreted to prevent

RIO GRANDE COMPACT

recourse by a signatory state to the Supreme Court of the United States for redress should the character or quality of the water, at the point of delivery, be changed hereafter by one signatory state to the injury of another. Nothing herein shall be construed as an admission by any signatory state that the use of water for irrigation causes increase of salinity for which the user is responsible in law.

ARTICLE XII

To administer the provisions of this Compact there shall be constituted a Commission composed of one representative from each state, to be known as the Rio Grande Compact Commission. The State Engineer of Colorado shall be ex-officio the Rio Grande Compact Commissioner for Colorado. The State Engineer of New Mexico shall be ex-officio the Rio Grande Compact Commissioner for New Mexico. The Rio Grande Compact Commissioner for Texas shall be appointed by the Governor of Texas. The President of the United States shall be requested to designate a representative of the United States to sit with such Commission, and such representative of the United States, if so designated by the President, shall act as Chairman of the Commission without vote.

The salaries and personal expenses of the Rio Grande Compact Commissioners for the three States shall be paid by their respective States, and all other expenses incident to the administration of this Compact, not borne by the United States, shall be borne equally by the three States.

In addition to the powers and duties hereinbefore specifically conferred upon such Commission, and the members thereof, the jurisdiction of such Commission shall extend only to the collection, correlation and presentation of factual data and the maintenance of records having a bearing upon the administration of this Compact, and, by unanimous action, to the making of recommendations to the respective States upon matters connected with the administration of this Compact. In connection therewith, the Commission may employ such engineering and clerical aid as may be reasonably necessary within the limit of funds provided for that purpose by the respective States. Annual reports compiled for each calendar year shall be made by the Commission and transmitted to the Governors of the signatory States on or before March first following the year covered by the report. The Commission may, by unanimous action, adopt rules and regulations consistent with the provisions of this Compact to govern their proceedings.

The findings of the Commission shall not be conclusive in any court or tribunal which may be called upon to interpret or enforce this Compact.

ARTICLE XIII

At the expiration of every five-year period after the effective date of this Compact, the Commission may, by unanimous consent, review any provisions hereof which are not substantive in character and which do not affect the basic principles upon which the Compact is founded, and shall meet for the consideration of such questions on the request of any member of the Commission; provided, however, that the provisions hereof shall remain in full force and effect until changed and amended within the intent of the Compact by unanimous action of the Commissioners, and until any changes in this Compact are ratified by the legislatures of the respective states and consented to by the Congress, in the same manner as this Compact is required to be ratified to become effective.

ARTICLE XIV

The schedules herein contained and the quantities of water herein allocated shall never be increased nor diminished by reason of any increase or diminution in the delivery or loss of water to Mexico.

RIO GRANDE COMPACT

ARTICLE XV

The physical and other conditions characteristic of the Rio Grande and peculiar to the territory drained and served thereby, and to the development thereof, have actuated this Compact and none of the signatory states admits that any provisions herein contained establishes any general principle or precedent applicable to other interstate streams.

ARTICLE XVI

Nothing in this Compact shall be construed as affecting the obligations of the United States of America to Mexico under existing treaties, or to the Indian Tribes, or as impairing the rights of the Indian Tribes.

ARTICLE XVII

This Compact shall become effective when ratified by the legislatures of each of the signatory states and consented to by the Congress of the United States. Notice of ratification shall be given by the Governor of each state to the Governors of the other states and to the President of the United States, and the President of the United States is requested to give notice to the Governors of each of the signatory states of the consent of the Congress of the United States.

IN WITNESS WHEREOF, the Commissioners have signed this Compact in quadruplicate original, one of which shall be deposited in the archives of the Department of State of the United States of America and shall be deemed the authoritative original, and of which a duly certified copy shall be forwarded to the Governor of each of the signatory States.

Done at the City of Santa Fe, in the State of New Mexico, on the 18th day of March, in the year of our Lord, One Thousand Nine Hundred and Thirty-eight.

(Sgd.) M. C. HINDERLIDER

(Sgd.) THOMAS M. McCLURE

(Sgd.) FRANK B. CLAYTON

APPROVED:

(Sgd.) S. O. HARPER

RATIFIED BY:

Colorado, February 21, 1939

New Mexico, March 1, 1939

Texas, March 1, 1939

Passed Congress as Public Act No. 96, 76th Congress,

Approved by the President May 31, 1939

RESOLUTION ADOPTED BY RIO GRANDE COMPACT COMMISSION
AT THE ANNUAL MEETING HELD AT EL PASO, TEXAS, FEBRUARY 22-24, 1948, CHANGING
GAGING STATIONS AND MEASUREMENTS OF
DELIVERIES BY NEW MEXICO

R E S O L U T I O N

Whereas, at the Annual Meeting of the Rio Grande Compact Commission in the year 1945, the question was raised as to whether or not a schedule for delivery of water by New Mexico during the entire year could be worked out, and

Whereas, at said meeting the question was referred to the Engineering Advisers for their study, recommendations and report, and

Whereas, said Engineering Advisers have met, studied the problems and under date of February 24, 1947, did submit their Report, which said Report contains the findings of said Engineering Advisers and their recommendations, and

Whereas, the Compact Commission has examined said Report and finds that the matters and things therein found and recommended are proper and within the terms of the Rio Grande Compact, and

Whereas, the Commission has considered said Engineering Advisers' Report and all available evidence, information and material and is fully advised:

Now, Therefore, Be it Resolved:

The Commission finds as follows:

- (a) That because of change of physical conditions, reliable records of the amount of water passing San Marcial are no longer obtainable at the stream gaging station at San Marcial and that the same should be abandoned for Compact purposes.
- (b) That the need for concurrent records at San Marcial and San Acacia no longer exists and that the gaging station at San Acacia should be abandoned for Compact purposes.
- (c) That it is desirable and necessary that the obligations of New Mexico under the Compact to deliver water in the months of July, August, September, should be scheduled.
- (d) That the change in gaging stations and substitution of the new measurements as hereinafter set forth will result in substantially the same results so far as the rights and obligations to deliver water are concerned, and would have existed if such substitution of stations and measurements had not been so made.

Be it Further Resolved:

That the following measurements and schedule thereof shall be substituted for the measurements and schedule thereof as now set forth in Article IV of the Compact:

"The obligation of New Mexico to deliver water in the Rio Grande into Elephant Butte Reservoir during each calendar year shall be measured by that quantity set forth in the following tabulation of relationship which corresponds to the quantity at the upper index station:

RIO GRANDE COMPACT COMMISSION REPORT
DISCHARGE OF RIO GRANDE AT OTOWI BRIDGE AND ELEPHANT BUTTE EFFECTIVE
SUPPLY

Quantities in thousands of acre-feet

Otowi Index Supply (5)	Elephant Butte Effective Index Supply (6)
100	57
200	114
300	171
400	228
500	286
600	345
700	406
800	471
900	542
1,000	621
1,100	707
1,200	800
1,300	897
1,400	996
1,500	1,095
1,600	1,195
1,700	1,295
1,800	1,395
1,900	1,495
2,000	1,595
2,100	1,695
2,200	1,795
2,300	1,895
2,400	1,995
2,500	2,095
2,600	2,195
2,700	2,295
2,800	2,395
2,900	2,495
3,000	2,595

Intermediate quantities shall be computed by proportional parts.

- (5) The Otowi Index Supply is the recorded flow of the Rio Grande at the U.S.G.S. gaging station at Otowi Bridge near San ildefonso (formerly station near Buckman) during the calendar year, corrected for the operation of reservoirs constructed after 1929 in the drainage basin of the Rio Grande between Lobatos and Otowi Bridge.
- (6) Elephant Butte Effective Index Supply is the recorded flow of the Rio Grande at the gaging station below Elephant Butte Dam during the calendar year plus the net gain in storage in Elephant Butte Reservoir during the same year or minus the net loss in storage in said reservoir, as the case may be.

RIO GRANDE COMPACT

The application of this schedule shall be subject to the provisions hereinafter set forth and appropriate adjustments shall be made for (a) any change in location of gaging stations; (b) depletion after 1929 in New Mexico of the natural runoff at Otowi Bridge; and (c) any transmountain diversions into the Rio Grande between Lobatos and Elephant Butte Reservoir.”

Be it Further Resolved:

That the gaging stations at San Acacia and San Marcial be, and the same are hereby abandoned for Compact purposes.

Be it Further Resolved:

That this Resolution has been passed unanimously and shall be effective January 1, 1949, if within 120 days from this date the Commissioner for each State shall have received from the Attorney General of the State represented by him, an opinion approving this Resolution, and shall have so advised the Chairman of the Commission, otherwise, to be of no force and effect.

(Note: The following paragraph appears in the Minutes of the Annual Meeting of the Commission held at Denver, Colorado, February 14-16, 1949.

“The Chairman announced that he had received, pursuant to the Resolution adopted by the Commission at the Ninth Annual Meeting on February 24, 1948, opinions from the Attorneys General of Colorado, New Mexico and Texas that the substitution of stations and measurements of deliveries by New Mexico set forth in said resolution was within the powers of the Commission”).

RULES AND REGULATIONS FOR ADMINISTRATION OF THE RIO GRANDE COMPACT

A Compact, known as the Rio Grande Compact, between the States of Colorado, New Mexico and Texas, having become effective on May 31, 1939 by consent of the Congress of the United States, which equitably apportions the waters of the Rio Grande above Fort Quitman and permits each State to develop its water resources at will, subject only to its obligations to deliver water in accordance with the schedules set forth in the Compact, the following Rules and Regulations have been adopted for its administration by the Rio Grande Compact Commission; to be and remain in force and effect only so long as the same may be satisfactory to each and all members of the Commission, and provided always that on the objection of any member of the Commission, in writing, to the remaining two members of the Commission after a period of sixty days from the date of such objection, the sentence, paragraph or any portion or all of these rules to which any such objection shall be made, shall stand abrogated and shall thereafter have no further force and effect; it being the intent and purpose of the Commission to permit these rules to obtain and be effective only so long as the same may be satisfactory to each and all of the Commissioners.

GAGING STATIONS /1

Responsibility for the equipping, maintenance and operation of the stream gaging stations and reservoir gaging stations required by the provisions of Article II of the Compact shall be divided among the signatory States as follows:

(a) Gaging stations on streams and reservoirs in the Rio Grande Basin above the Colorado-New Mexico boundary shall be equipped, maintained, and operated by Colorado in cooperation with the U.S. Geological Survey.

(b) Gaging stations on streams and reservoirs in the Rio Grande Basin below Lobatos and above Caballo Reservoir shall be equipped, maintained and operated by New Mexico in cooperation with the U.S. Geological Survey to the extent that such stations are not maintained and operated by some other Federal agency.

(c) Gaging stations on Elephant Butte Reservoir and on Caballo Reservoir, and the stream gaging stations on the Rio Grande below those reservoirs shall be equipped, maintained and operated by or on behalf of Texas through the agency of the U.S. Bureau of Reclamation.

The equipment, method and frequency of measurements at each gaging station shall be sufficient to obtain records at least equal in accuracy to those classified as "good" by the U.S. Geological Survey. Water-stage recorders on the reservoirs specifically named in Article II of the Compact shall have sufficient range below maximum reservoir level to record major fluctuations in storage. Staff gages may be used to determine fluctuations below the range of the water-stage recorders on these and other large reservoirs, and staff gages may be used upon approval of the Commission in lieu of water-stage recorders on small reservoirs, provided that the frequency of observation is sufficient in each case to establish any material changes in water levels in such reservoirs.

/1 Amended at Eleventh Annual Meeting, February 23, 1950.

RULES AND REGULATIONS

RESERVOIR CAPACITIES /1

Colorado shall file with the Commission a table of areas and capacities for each reservoir in the Rio Grande Basin above Lobatos constructed after 1937; New Mexico shall file with the Commission a table of areas and capacities for each reservoir in the Rio Grande Basin between Lobatos and San Marcial constructed after 1929; and Texas shall file with the Commission tables of areas and capacities for Elephant Butte Reservoir and for all other reservoirs actually available for the storage of water between Elephant Butte and the first diversion to lands under the Rio Grande Project.

Whenever it shall appear that any table of areas and capacities is in error by more than five per cent, the Commission shall use its best efforts to have a re-survey made and a corrected table of areas and capacities to be substituted as soon as practicable. To the end that the Elephant Butte effective supply may be computed accurately, the Commission shall use its best efforts to have the rate of accumulation and the place of deposition of silt in Elephant Butte Reservoir checked at least every three years.

ACTUAL SPILL /2, /3, /4, /6

(a) Water released from Elephant Butte in excess of Project requirements, which is currently passed through Caballo Reservoir, prior to the time of spill, shall be deemed to have been Usable Water released in anticipation of spill, or Credit Water if such release shall have been authorized.

(b) Excess releases from Elephant Butte Reservoir, as defined in (a) above, shall be added to the quantity of water actually in storage in that reservoir, and Actual Spill shall be deemed to have commenced when this sum equals the total capacity of that reservoir to the level of the uncontrolled spillway less capacity reserved for flood purposes, i.e., 1,999,600 acre-feet in the months of October through March inclusive, and 1,974,600 acre-feet in the months of April through September, inclusive, as determined from the 2009 area-capacity table or successor area-capacity tables and flood control storage reservation of 50,000 acre-feet from April through September and 25,000 acre-feet from October through March.

(c) All water actually spilled at Elephant Butte Reservoir, or released therefrom, in excess of Project requirements, which is currently passed through Caballo Reservoir, after the time of spill, shall be considered as Actual Spill, provided that the total quantity of water then in storage in Elephant Butte Reservoir exceeds the physical capacity of that reservoir at the level of the sill of the spillway gates, i.e. -1,830,000 acre-ft in 1942.

(d) Water released from Caballo Reservoir in excess of Project requirements and in excess of water currently released from Elephant Butte Reservoir, shall be deemed Usable Water released, excepting only flood water entering Caballo Reservoir from tributaries below Elephant Butte Reservoir.

DEPARTURES FROM NORMAL RELEASES /5

For the purpose of computing the time of Hypothetical Spill required by Article VI and for the purpose of the adjustment set forth in Article VII, no allowance shall be made for the difference between Actual and Hypothetical Evaporation, and any under-release of usable water from Project Storage in excess of 150,000 acre-ft in any year shall be taken as equal to that amount.

/1 Amended at Eleventh Annual Meeting, February 23, 1950.

/2 Adopted at Fourth Annual Meeting, February 24, 1943.

/3 Amended September 9, 1998.

/4 Amended March 22, 2001; made effective January 1, 2001.

/5 Adopted June 2, 1959; made effective January 1, 1952.

/6 Adopted March 31, 2009; made effective January 1, 2010.

RULES AND REGULATIONS

EVAPORATION LOSSES /6, /7, /8

The Commission shall encourage the equipping, maintenance and operation, in cooperation with the U.S. Weather Bureau or other appropriate agency, of evaporation stations at Elephant Butte Reservoir and at or near each major reservoir in the Rio Grande Basin within Colorado constructed after 1937 and in New Mexico constructed after 1929. The net loss by evaporation from a reservoir surface shall be taken as the difference between the actual evaporation loss and the evapo-transpiration losses which would have occurred naturally, prior to the construction of such reservoir. Changes in evapo-transpiration losses along stream channels below reservoirs may be disregarded.

Net losses by evaporation, as defined above, shall be used in correcting Index Supplies for the operation of reservoirs upstream from Index Gaging Stations as required by the provisions of Article III and Article IV of the Compact.

In the application of the provisions of the last unnumbered paragraph of Article VI of the Compact:

(a) Evaporation losses for which accrued credits shall be reduced shall be taken as the difference between the gross evaporation from the water surface of Elephant Butte Reservoir and rainfall on the same surface.

(b) Evaporation losses for which accrued debits shall be reduced shall be taken as the net loss by evaporation as defined in the first paragraph.

ADJUSTMENT OF RECORDS

The Commission shall keep a record of the location, and description of each gaging station and evaporation station, and, in the event of change in location of any stream gaging station for any reason, it shall ascertain the increment in flow or decrease in flow between such locations for all stages. Wherever practicable, concurrent records shall be obtained for one year before abandonment of the previous station.

NEW OR INCREASED DEPLETIONS

In the event any works are constructed which alter or may be expected to alter the flow at any of the Index Gaging Stations mentioned in the Compact, or which may otherwise necessitate adjustments in the application of the schedules set forth in the Compact, it shall be the duty of the Commissioner specifically concerned to file with the Commission all available information pertaining thereto, and appropriate adjustments shall be made in accordance with the terms of the Compact; provided, however, that any such adjustments shall in no way increase the burden imposed upon Colorado or New Mexico under the schedules of deliveries established by the Compact.

TRANSMOUNTAIN DIVERSIONS

In the event any works are constructed for the delivery of waters into the drainage basin of the Rio Grande from any stream system outside of the Rio Grande Basin, such waters shall be measured at the point of delivery into the Rio Grande Basin and proper allowances shall be made for losses in transit from such points to the Index Gaging Station on the stream with which the imported waters are comingled.

/6 Amended at Tenth Annual Meeting, February 15, 1949.

/7 Amended at Twelfth Annual Meeting, February 24, 1951.

/8 Amended June 2, 1959.

RULES AND REGULATIONS

QUALITY OF WATER

In the event that delivery of water is made from the Closed Basin into the Rio Grande, sufficient samples of such water shall be analyzed to ascertain whether the quality thereof is within the limits established by the Compact.

SECRETARY /8, /9

The Commission may, on a yearly basis, employ appropriate entities to render such engineering and clerical aid as may reasonably be necessary for administration of the Compact. The entities may be employed to:

(1) Collect and correlate all factual data and other records having a material bearing on the administration of the Compact and keep each Commissioner advised thereof.

(2) Inspect all gaging stations required for administration of the Compact and make recommendations to the Commission as to any changes or improvements in methods of measurement or facilities for measurement which may be needed to insure that reliable records be obtained.

(3) Report to each Commissioner by letter on or before the fifteenth day of each month, except January, a summary of all hydrographic data then available for the current year - on forms prescribed by the Commission - pertaining to:

- (a) Deliveries by Colorado
- (b) Deliveries by New Mexico
- (c) Operation of Project Storage

(4) Make such investigations as may be requested by the Commission in aid of its administration of the Compact.

(5) Act as Secretary to the Commission and submit to the Commission at its regular meeting in February a report on its activities and a summary of all data needed for determination of debits and credits and other matters pertaining to administration of the Compact.

COSTS /1, /2

At its annual meeting, the Commission shall adopt a budget for the ensuing fiscal year beginning July first.

Such budget shall set forth the total cost of maintenance and operating of gaging stations, of evaporation stations, the cost of engineering and clerical aid, and all other necessary expenses excepting the salaries and personal expenses of the Rio Grande Compact Commissioners.

Contributions made directly by the United States and the cost of services rendered by the United States without cost shall be deducted from the total budget amount; the remainder shall then be allocated equally to Colorado, New Mexico and Texas.

/8 The substitution of this section for the section titled "Reports to Commissioners" was adopted at Ninth Annual Meeting, February 22, 1948.

/9 Amended March 31, 2009.

/1 Amended at Eleventh Annual Meeting, February 23, 1950.

/2 Amended March 31, 2009.

RULES AND REGULATIONS

Expenditures made directly by any State for purposes set forth in the budget shall be credited to that State; contributions in cash or in services by any State under a cooperative agreement with any federal agency shall be credited to such State, but the amount of the federal contribution shall not so be credited; in event any State, through contractual relationships, causes work to be done in the interest of the Commission, such State shall be credited with the cost thereof, unless such cost is borne by the United States.

Costs incurred by the Commission under any cooperative agreement between the Commission and any U.S. Government Agency, not borne by the United States, shall be apportioned equally to each State, and each Commissioner shall arrange for the prompt payment of one-third thereof by his State.

The Commissioner of each State shall report at the annual meeting each year the amount of money expended during the year by the State which he represents, as well as the portion thereof contributed by all cooperating federal agencies, and the Commission shall arrange for such proper reimbursement in cash or credits between States as may be necessary to equalize the contributions made by each State in the equipment, maintenance and operation of all gaging stations authorized by the Commission and established under the terms of the Compact.

It shall be the duty of each Commissioner to endeavor to secure from the Legislature of his State an appropriation of sufficient funds with which to meet the obligations of his State, as provided by the Compact.

MEETING OF COMMISSION /1, /10

The Commission shall meet in Santa Fe, New Mexico, on the third Thursday of February of each year for the consideration and adoption of the annual report for the calendar year preceding, and for the transaction of any other business consistent with its authority; provided that the Commission may agree to meet elsewhere. Other meetings as may be deemed necessary shall be held at any time and place set by mutual agreement, for the consideration of data collected and for the transaction of any business consistent with its authority.

No action of the Commission shall be effective until approved by the Commissioner from each of the three signatory States.

(Signed) M. C. HINDERLIDER

M. C. Hinderlider

Commissioner for Colorado

(Signed) THOMAS M. McCLURE

Thomas M. McClure

Commissioner for New Mexico

(Signed) JULIAN P. HARRISON

Julian P. Harrison

Commissioner for Texas

Adopted December 19, 1939.

/1 Amended at Eleventh Annual Meeting, February 23, 1950.

/10 Amended at Thirteenth Annual Meeting, February 25, 1952.

LEGEND

- ▲ STREAM-GAGING STATION
- CITY OR TOWN
- BASIN BOUNDARY
- - - COUNTY LINE
- - - CLOSED BASIN BOUNDARY
- TABOR TRANSMOUNTAIN DIVERSION

EXPLANATION

RIO GRANDE COMPACT STREAM-GAGING STATIONS

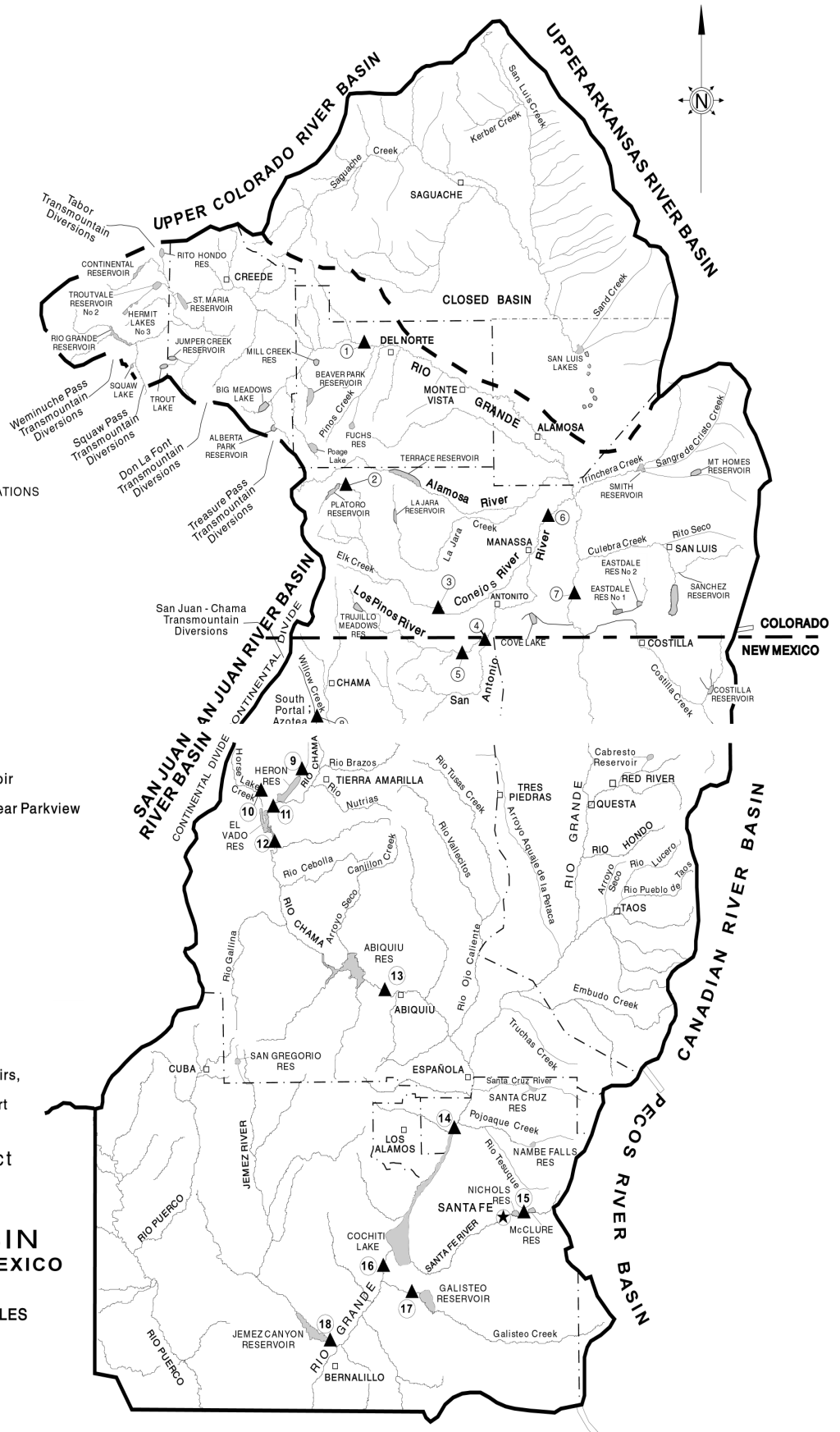
- ① Rio Grande near Del Norte
- ② Conejos River below Platoro Reservoir
- ③ Conejos River near Mogote
- ④ San Antonio River at Ortiz
- ⑤ Los Pinos River near Ortiz
- ⑥ Conejos River near Lasasues
- ⑦ Rio Grande near Lobatos
- ⑧ Azotea Tunnel at South Portal
- ⑨ Willow Creek above Heron Reservoir
- ⑩ Horse Lake Creek above Heron Reservoir
- ⑪ Willow Creek below Heron Reservoir, near Parkview
- ⑫ Rio Chama below El Vado Dam
- ⑬ Rio Chama below Abiquiu Dam
- ⑭ Rio Grande at Otowi Bridge
- ⑮ Santa Fe River near Santa Fe
- ⑯ Rio Grande below Cochiti Dam
- ⑰ Galisteo Creek below Galisteo Dam
- ⑱ Jemez River below Jemez Canyon Dam

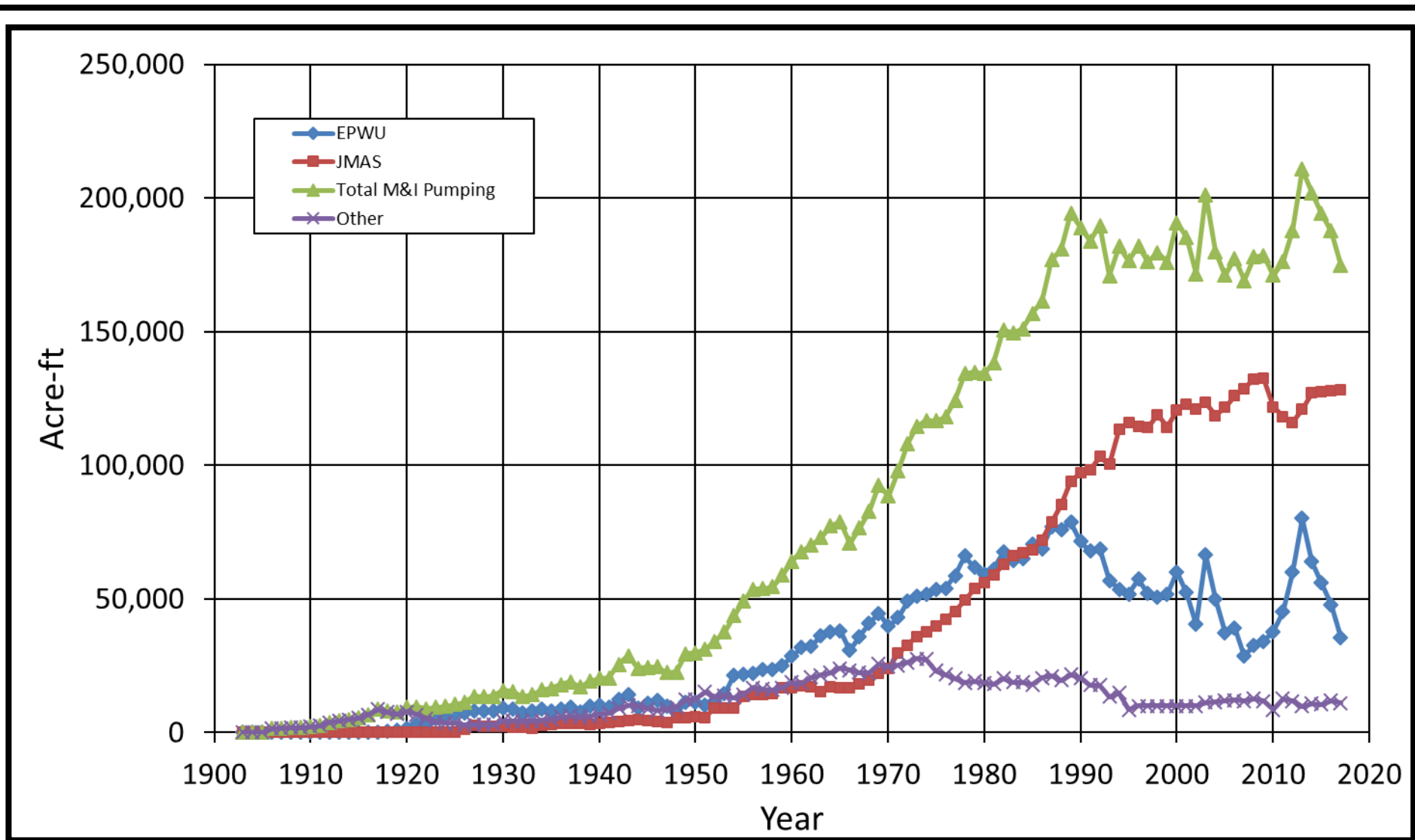
NOTE: Screened areas denote reservoirs, whose capacity is all or in part subject to provisions of the Rio Grande Compact

Revised March 1989

RIO GRANDE BASIN ABOVE BERNALILLO, NEW MEXICO

0 10 20 30 40 50 MILES
0 10 20 30 40 50 KILOMETERS





TX v. NM # 141
New Mexico Exhibit

NM_EX-121A

Figure 5.4 – Graph showing annual municipal and industrial pumping, 1903 to 2017.



May 31, 2019

EXPERT REPORT OF:
Scott A. Miltenberger, Ph.D.

In the matter of:

No. 141, Original
In the Supreme Court of the United States
State of Texas v. State of New Mexico and State of Colorado

Prepared for:

Somach Simmons & Dunn
500 Capitol Mall, Suite 1000
Sacramento, CA 95814

Prepared by:

A handwritten signature in blue ink that reads "Scott A. Miltenberger". The signature is written in a cursive style and is positioned above a horizontal line.

SCOTT A. MILTENBERGER
JRP HISTORICAL CONSULTING, LLC
1000 JEFFERSON STREET, DAVIS CA 95618

TX v. NM # 141

New Mexico Exhibit

NM_EX-128

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Introduction

I, Scott A. Miltenberger, Ph.D., am a partner at JRP Historical Consulting, LLC (JRP), located at 2850 Spafford Street, Davis, California. This expert report was prepared by me for Somach Simmons & Dunn, attorneys representing the State of Texas before the Supreme Court of the United States in *State of Texas v. State of New Mexico and State of Colorado*, No. 141, Original. I have been asked to provide opinions on the following questions regarding the Rio Grande Compact of 1938 and its historical interpretation:

1. What was the purpose of the 1938 Rio Grande Compact?
2. Did the amount of water apportioned to Texas by the 1938 Rio Grande Compact include water to address water quality concerns on Rio Grande Project lands in Texas?
3. What comprised the water supply for the Rio Grande Project, circa 1938?
4. What did delivery of water by the State of New Mexico to San Marcial, under the terms of the 1938 Rio Grande Compact, constitute?
5. Did the 1938 Rio Grande Compact limit the uses to which water in the Upper Rio Grande Basin could be put?
6. Did the Special Master fairly describe the background history leading to the 1938 Rio Grande Compact on pages 31 through 187 and 203 through 209 of the *First Interim Report of the Special Master*, dated February 9, 2017?

In addressing these questions, I have relied upon my education and nearly 13 years of experience as a professional historian, primarily of western water and land use, as well as my review and analysis of archival documents, published sources, and academic monographs. Together with my former business partner (now retired) Mr. Stephen Wee and JRP staff under my direction (all of whom possess graduate degrees in history), I undertook research and collected historical material from a number of federal, state, and local repositories. These include: the National Archives in Washington, DC, at College Park, Maryland, at Denver, Colorado, and at Fort Worth, Texas; the Dolph Briscoe Center for American History at The University of Texas at Austin; the Texas State Archives in Austin; the C.L. Sonnichsen Special Collections Department of the University of Texas at El Paso; the El Paso Historical Society; the New Mexico State Archives in Santa Fe; the University of New Mexico Special Collections in Albuquerque; the New Mexico State University Archives and Special Collections in Las Cruces; History Colorado (formerly the Colorado Historical Society) in Denver; the Water Resource Archives at Colorado State University, Fort Collins; the American Heritage Center at the University of Wyoming in Laramie; the Water Resources Collections and Archives at the University of California, Riverside; and the Harvard Law School Library, Historical and Special Collections, in Cambridge, Massachusetts. I also examined documents produced by the states of Texas, Colorado, and New Mexico, and the United States in this action as well as the materials appended to the *First Interim Report of the Special Master*.

Initial review of these documents was a collaborative effort between Mr. Wee and myself, but I am the sole author of this expert report. My current (as of May 31, 2019) resume is included in the **Appendix** to this report.

My compensation for this matter is \$154 per hour for time spent in research, analysis, and preparation of this expert report. My compensation for deposition and trial testimony is \$308. A list of cases for which I have provided expert testimony at deposition or trial over the past four years is included in my resume, along with a list of my publications in the previous 10 years.

As indicated above, I have based my opinions on primary and secondary sources known to me, gathered by me or those under my direction, or produced in this action. Those sources are cited in the history profession's preferred footnote citation format as detailed in the *Chicago Manual of Style*. There are other documents that support my opinions which are not cited herein. In the interests of brevity and to avoid repetition, I have chosen to discuss the historical evidence that most directly informs my responses to the questions posed to me. If any other historical material is presented or made known to me, or if I review any additional documents, it may have some effect on the specific opinions offered herein.

Opinion I: The purpose of the 1938 Rio Grande Compact was to protect the water supply of the federal Rio Grande Project while making possible new water developments in Colorado and New Mexico above the project's Elephant Butte Reservoir by equitably apportioning the waters of the Upper Rio Grande Basin among the states of Colorado, New Mexico, and Texas.

Since the 1880s, the Rio Grande had been a source of international and interstate conflict with the US and Mexico, and Colorado, New Mexico, and Texas each making claims to the river's waters. The Rio Grande Project, authorized in 1905, offered a partial solution by delivering water via its Elephant Butte Reservoir to Mexico under the terms of a 1906 treaty, and to lands in southern New Mexico and western Texas that had been deprived by upstream diversions near the river's headwaters. The so-called Rio Grande "embargo," enacted to prevent further upstream diversions from inflaming international tensions until a settlement with Mexico could be negotiated, supported the project's development into the 1920s yet restricted further utilization of the Rio Grande above Elephant Butte. Revocation of the embargo in 1925 created momentum for the negotiation of a tristate compact, with Colorado seeking the opportunity to develop its own water resources projects comparable to the Rio Grande Project. Texas and New Mexico, while not entirely opposed to Colorado, nonetheless sought to safeguard not only the water necessary for the federal reclamation project but also for Texas, the water necessary for lands down to Fort Quitman. Texas and New Mexico's subsequent dispute over the Middle Rio Grande Conservancy District's proposed development above Elephant Butte created further urgency for a compact in the mid-1930s and precipitated the federal Rio Grande Joint Investigation. With data gathered by federal engineers, the engineering advisors for three states recognized that in the absence of additional water being imported into the Upper Rio Grande Basin the usable water supply was limited. They therefore devised two water delivery schedules that became the foundation for the compact – one for Lobatos, near the Colorado-New Mexico state line, and another for San Marcial, above Elephant Butte Reservoir. These schedules were intended to enable water resource development in Colorado and New Mexico above Elephant Butte Reservoir without compromising the Rio Grande Project and the supply of water to lands in Texas above Ft. Quitman.

The limited availability of usable water in the Upper Rio Grande Basin spawned the international and interstate problem of equitable distribution of the Rio Grande waters. The basin is an area of approximately 34,000 square miles that stretches from the headwaters of the Rio Grande in the San Juan Mountains in Colorado southward through the narrow Rio Grande Valley in New Mexico and then southeast to Fort Quitman, Texas. Historically, it has been divided into three smaller sections: the San Luis Valley in Colorado; the Middle Rio Grande Valley between the Colorado-New Mexico state line and San Marcial, New Mexico; and the Elephant Butte-Ft. Quitman section that encompasses the area between Elephant Butte Reservoir and Ft. Quitman (roughly 80 miles downstream from El Paso).

At nearly 2,000 miles long, draining approximately 175,000 square miles before debouching into the Gulf of Mexico, the Rio Grande is the principal river within the basin. Ft. Quitman has long been recognized as a natural dividing point on the river's course. Above Ft. Quitman, nearly all of the water supply for the Rio Grande originates in Colorado and New Mexico, and by the early 1930s the river in this stretch was devoted almost entirely to irrigated agriculture. Below Ft. Quitman, numerous arroyos and tributary streams originating in Mexico feed the river for the remainder of its course.¹

Like most western rivers under natural conditions, the Rio Grande was irregular; sustained periods of minimal or no flow were punctuated by shorter periods of high flows and even flood. Lack of precipitation in the Upper Rio Grande Basin floor historically demanded the use of the river's waters for irrigation. Native Americans in the basin had irrigated from the Rio Grande, its lesser tributaries, and intermittent basin streams long before the Spanish encountered them in the mid-sixteenth century. They cultivated wheat, corn, fruit, and flowers, principally through the use of what the Spanish identified as "acequias," or community ditches. The most historically significant of these was the so-called "Acequia Madre" located in present-day Ciudad Juarez opposite El Paso, Texas. This large diversion, which could be more than four centuries old in origin, became the centerpiece of Spanish colonization in the area in the seventeenth century.²

Following the signing of the Treaty of Guadalupe Hidalgo in 1848 at the end of the Mexican-American War, American settlers in Colorado's San Luis Valley began irrigating from the river. It was not until the 1880s, however, that considerable development occurred on both sides of the international border established at the Rio Grande. Many of the canal systems that predated the federal Rio Grande Project were constructed during this decade. In the immediate vicinity of Juarez and El Paso, an estimated 550 cubic feet per second (cfs, or second feet) of water was diverted to support irrigated agriculture and burgeoning populations – some 15,000 acres and nearly 10,000 people on the American side, and 25,000 acres and 20,000 people on the Mexican

¹ National Resources Committee, *Regional Planning Part VI – The Rio Grande Joint Investigation in the Upper Rio Grande Basin in Colorado, New Mexico, and Texas 1936-1937*, vol. 1 (GPO, 1938) [hereafter *JIR*], 7; and Douglas R. Littlefield, *Conflict on the Rio Grande: Water and the Law, 1879-1939* (Norman: University of Oklahoma Press, 200), 18-19, and 33-36.

² *International Dam in Rio Grande River, Near El Paso, Tex.*, 54th Cong., 1st sess., 1896, H. Doc. 125, 1; and Ottamar Hamele, Special Attorney Representing the Bureau of Reclamation before the Rio Grande Commission, "The Embargo on the Upper Rio Grande," November 11, 1924, 1. 8-3 Rio Grande Distribution of Waters (Loose File), Box 1638, 8-3, Rio Grande C-D, Central Classified File 1907-1936 [hereafter CCF 1907-36], Records of the Department of the Interior, Office of the Secretary, Record Group 48 [hereafter RG 48], National Archives at College Park, Maryland [hereafter NARA II]; and *JIR*, 7.

side. Demands on the river were reportedly still greater upstream. In the Territory of New Mexico nearly 183,000 acres used 5,600 cfs, and in Colorado, roughly 122,000 acres used 3,700 cfs.³

As upstream diversions increased, downstream American irrigators in the Mesilla and El Paso valleys and Mexican irrigators in the vicinity of Juarez began to complain of diminished river flows. They focused their ire on Colorado's San Luis Valley, near the Rio Grande's headwaters. The Mexican government took up their citizens' complaints, arguing to the US State Department that the diversions were an abrogation of the 1848 treaty. The dispute lingered over the next decade, and while Congress authorized the president in 1890 to negotiate a resolution with Mexico, the only achievement was the creation of the joint US and Mexican International Boundary Commission (predecessor to the present International Boundary and Water Commission) to address questions of the international boundaries formed by the Rio Grande and Colorado rivers.⁴

The Rio Grande Dam and Irrigation Company's proposed dam in New Mexico ultimately brought decisive action from the US. In early 1895, under the March 3, 1891 federal right-of-way act that granted ditch and canal companies and drainage and irrigation districts a right of way through federal (public domain) lands, the secretary of the interior authorized the company to develop a reservoir site near the mountain peak of Elephant Butte, more than 100 miles upstream from El Paso and Juarez. The company, financed largely by British capital, was led by Dr. Nathan Boyd. Boyd envisioned developing much of the narrow Rio Grande Valley running through New Mexico into small, irrigated farms. When the Mexican government learned of the proposed dam, it renewed its protest. The State Department was unwilling to embrace the view articulated by the attorney general that denied any US "duty or obligation" under the 1848 treaty or international law to see that Rio Grande water reached Mexican ditches. Together with the Mexican foreign minister, Secretary of State Richard Olney directed the boundary commission to investigate the problem further. The boundary commissioners endorsed construction of an "international dam" at El Paso to resolve the international dispute, and warned that Boyd's development imperiled this dam. US commissioner Anson Mills went further, recommending that further applications for rights-of-way to appropriate water on the public domain in the Upper Rio Grande Basin be denied. Olney relayed Mills' recommendation to the Interior Department, and on December 5, 1896, Secretary of the Interior D.R. Francis directed the commissioner of the General Land Office by letter "to suspend action on any and all applications for right of way through public lands for

³ Hamele, "The Embargo on the Upper Rio Grande," November 11, 1924, 3. 8-3 Rio Grande Distribution of Waters (Loose File), Box 1638, CCF 1907-36, RG 48, NARA II; and *JIR*, 8.

⁴ Hamele, "The Embargo on the Upper Rio Grande," November 11, 1924, 3-5. 8-3 Rio Grande Distribution of Waters (Loose File), Box 1638, CCF 1907-36, RG 48, NARA II; and Littlefield, *Conflict on the Rio Grande*, 18-32.

the purpose of irrigation by using the waters of the Rio Grande River or any of its tributaries in the State of Colorado or in the Territory of New Mexico until further instructed....”⁵

This “embargo,” as it came to be known, brought private irrigation development above Elephant Butte, particularly in Colorado, almost to a halt for three decades. The embargo was modified several times, prior to its revocation in 1925. These modifications permitted some rights of way that made possible the appropriation of nearly 115,000 af in Colorado by 1923. Nearly every modification, however, safeguarded the delivery of water to Mexico under the 1906 treaty and the Rio Grande reclamation project, authorized in 1905.⁶

Coloradoans chafed at the embargo’s restrictions. San Luis Valley landowners were the most vocal in their condemnation. They insisted that their irrigation works did not impair downstream developments. Valley landowners and their state representatives argued that the embargo violated both the enabling act by which Colorado was admitted to the Union, and the 1891 right-of-way act.

Federal authorities into the 1920s rejected these arguments. They maintained that the enabling act reserved unto the federal government control of public lands within Colorado, and that the secretary of the interior enjoyed “discretion” under the 1891 act to approve or disapprove of right-of-way applications in the “public interest.” Congressional authorization of the Rio Grande Project, they further argued, provided “that as a condition precedent to the approval of any application, it must appear clear that the Government project will not be injured thereby.”⁷

As controversial as the embargo was within the Upper Rio Grande Basin, it nevertheless fostered settlement of the international dispute between the US and Mexico and development of the Rio Grande Project. In 1897, the federal government moved against Boyd and his company, seeking

⁵ Edw. A. Bowers, Assistant Commissioner, Department of the Interior, General Land Office, to Register and Receiver, Las Cruces, N. Mex., February 11, 1895, “Correspondence Touching the Protest of Mexican Citizens Against the Construction of Dams by the Rio Grande Dam and Irrigation Company,” in *Equitable Distribution of the Waters of the Rio Grande. Message from the President of the United States, transmitting, in response to resolution of the Senate of February 26, 1898, reports from the Secretary of State, the Secretary of War, the Secretary of the Interior, and the Attorney-General, with accompanying papers, relative to the equitable distribution of the waters of the Rio Grande River*, 55th Cong., 2d sess, 1898, S. Doc. 229, 2-3; Hamele, “The Embargo on the Upper Rio Grande,” November 11, 1924, 6, 14-15, and Exhibit E, 49. 8-3 Rio Grande Distribution of Waters (Loose File), Box 1638, CCF 1907-36, RG 48, NARA II; and Littlefield, *Conflict on the Rio Grande*, 39-40, and 46-52.

⁶ Hamele, “The Embargo on the Upper Rio Grande,” November 11, 1924, 15-16, and 25-28. 8-3 Rio Grande Distribution of Waters (Loose File), Box 1638, CCF 1907-36, RG 48, NARA II.

⁷ Hamele, “The Embargo on the Upper Rio Grande,” November 11, 1924, 29-30. 8-3 Rio Grande Distribution of Waters (Loose File), Box 1638, CCF 1907-36, RG 48, NARA II; and Littlefield, *Conflict on the Rio Grande*, 170-171.

to nullify the right-of-way for the private Elephant Butte Dam. Over the next 12 years, federal attorneys and company lawyers argued over whether the river was a navigable waterway; if the Rio Grande was navigable, as US lawyers argued, then the secretary of the interior could not issue a right-of-way under the 1891 act. Twice the US Supreme Court reversed findings made in trial court and affirmed by the New Mexico Territorial Supreme Court that favored the Rio Grande Dam and Irrigation Company, remanding the case back to the lower court. The US changed tactics for the third and final trial. Federal attorneys argued that as five years' time had elapsed for the company to begin construction with no work being done, the right-of-way had expired. Persuaded, the trial court found for the US in May 1903. Both the Territorial Supreme Court and the US Supreme Court subsequently affirmed the decision, effectively bringing the private effort to develop an Elephant Butte reservoir to end in 1909.⁸

The federal government's victory over the Rio Grande Dam and Irrigation Company coincided with a policy shift that finally brought forth a settlement with Mexico. The embargo had eased Mexican concerns, leading the US's southern neighbor to propose a treaty, but the US's own efforts to provide a physical solution to the international problem had lagged. Ongoing litigation with the private company contributed to delays, as did opposition in New Mexico. Several bills were introduced in Congress in the late 1890s and early 1900s that provided for the construction of an international dam at El Paso, and a system of distribution between the US and Mexico. Interests in New Mexico, however, reportedly opposed the idea of this dam, fearing that it would flood much of the Mesilla Valley and impede agricultural development.⁹

This was a view that the principal federal engineer responsible for the Rio Grande Project, Benjamin M. Hall, shared.¹⁰ Passage of the National Reclamation Act of 1902 – also known as the Newlands Reclamation Act, or the Newlands Act for its sponsor Representative Francis Newlands of Nevada – established a new federal program to furnish water to arid regions of the American West. The act created the United States Reclamation Service (Reclamation), forerunner to the present Bureau of Reclamation. Reclamation initially focused on developing those Western

⁸ Hamele, "The Embargo on the Upper Rio Grande," November 11, 1924, 18-19, 11, and Exhibit G, 55-56. 8-3 Rio Grande Distribution of Waters (Loose File), Box 1638, CCF 1907-36, RG 48, NARA II. The complicated legal fight between the United States and Boyd's Rio Grande Dam and Irrigation Company is discussed at length in Littlefield, *Conflict on the Rio Grande*, 56-78.

⁹ Hamele, "The Embargo on the Upper Rio Grande," November 11, 1924, 19-20. 8-3 Rio Grande Distribution of Waters (Loose File), Box 1638, CCF 1907-36, RG 48, NARA II.

¹⁰ Benjamin M. Hall, or B.M. Hall, earned a degree in engineering from the University of Georgia in 1876. He was a mathematics instructor at what is now North Georgia College and State University, before finding work as an engineer on water and mining projects. Hall consulted with the USGS in 1896, and joined Reclamation soon after it was established. Hall was the supervising engineer on a number of federal reclamation projects in New Mexico, and after leaving Reclamation worked in Puerto Rico. Littlefield, *Conflict on the Rio Grande*, 97.

reservoir sites that had been identified by the “Irrigation Survey” of the United States Geological Survey (USGS) between 1889 and 1890. The Elephant Butte site that Boyd had intended to develop was among these. A more detailed federal investigation began in March 1903, as the final trial with Rio Grande Dam and Irrigation Company neared its conclusion, and involved assessing the possible irrigable acreage that could be served by a reservoir at Elephant Butte. By February 1904, borings for a federal dam at the location were complete. In June, after Mexico once again entreated the US for a settlement, Secretary of State John Hay suggested to Secretary of the Interior Ethan Hitchcock that the National Reclamation Act might offer a path to a settlement with Mexico. Planning for a federal reclamation project centered at Elephant Butte embraced the idea.¹¹

Before the assembled delegates to the National Irrigation Congress in November 1904, Hall declared that 180,000 acres of land in the United States could be served by a dam opposite Engle, New Mexico, a third of a mile below Elephant Butte, while delivering water to Mexico. Hall’s presentation was based upon a much larger study that he had made prior to the congress, “A Discussion of Past and Present Plans for Irrigation of the Rio Grande Valley.” Both in his presentation to the congress and in that study, Hall asserted that a Reclamation dam near Elephant Butte could offer more than the “International Dam” proposed for the El Paso area; it would furnish valuable flood control benefits and supply more US lands with water. Hall’s proposed reservoir would have a storage capacity of 2 million af and would yield 600,000 acre-feet (af) to serve “110,000 acres in New Mexico,” “20,000...[in] Texas above El Paso,” and “50,000...[in] El Paso Valley below El Paso.” In order to serve the valley lands sufficiently, given the area’s aridity, seasonal flooding, and the high silt content of the Rio Grande, Hall insisted upon building a reservoir

as large as possible, and as deep as possible; having capacity for carrying a supply of water over from year to year to equalize the yearly inequalities, a surplus capacity for mud accumulations, and a surface for evaporation that is as small as possible in comparison with the quantity of water in storage.

As he emphasized in his presentation and study, “[a]ll of the water that comes down the river is needed for irrigation. We can not [*sic*] afford to waste any of it.”¹²

¹¹ Hamel, “The Embargo on the Upper Rio Grande,” November 11, 1924, 20-211. 8-3 Rio Grande Distribution of Waters (Loose File), Box 1638, CCF 1907-36, RG 48, NARA II; and Littlefield, *Conflict on the Rio Grande*, 94-97.

¹² Guy Elliott Mitchell, ed., *The Official Proceedings of the Twelfth National Irrigation Congress, Held at El Paso, Texas, Nov. 15-16-17-18, 1904* (Galveston, TX: Clarke & Courts, 1905), 215-216; B.M. Hall, Supervising Engineer, U.S. Reclamation Service, “A Discussion of Past and Present Plans for Irrigation of the Rio Grande Valley,” November 1904, 7-8, and 57-58. ff. 46 Rio Grande Project. Penasco Rock Resv.

The delegates were pleased with Hall's proposal, calling it "an equitable distribution of the waters of the Rio Grande with due regard to the rights of New Mexico, Texas and Mexico," and Congress acted swiftly to make the project a reality. In 1905, it authorized the Rio Grande Project for New Mexico and Texas. Specifically, it extended the 1902 Newlands Act

to the portion of the State of Texas bordering upon the Rio Grande which can be irrigated from a dam to be constructed near Engle, in the Territory of New Mexico, on the Rio Grande, to store the flood waters of that river, and if there shall be ascertained to be sufficient land in New Mexico and in Texas which can be supplied with the stored water at a cost which shall render the project feasible and return to the reclamation fund the cost of the enterprise, then the Secretary of the Interior may proceed with the work of constructing a dam on the Rio Grande as part of the general system of irrigation, should all other conditions as regards feasibility be found satisfactory.¹³

The following year, with the conclusion of successful negotiations with Mexico, the Senate ratified a treaty promising the US's southern neighbor 60,000 af of water a year from the Rio Grande.¹⁴

Federal reclamation authorities worked to develop the Rio Grande Project over the next several years. In 1906, Hall filed a notice of appropriation with the New Mexico territorial engineer for 730,000 af of water for the project. That same year, Reclamation entered into the first of several agreements with two water users associations, the Elephant Butte Water Users Association in New Mexico and the El Paso Valley Water Users Association in Texas, and their successors Elephant Butte Irrigation District (EBID) and El Paso County Water Improvement District No. 1 (EP #1), to furnish water from the project. Two years later, new project supervising engineer Louis C.

Site-Elephant Butte Resv. Site, 1904-1905, Box No. 792, Rio Grande 17-46, Entry 3, General Administrative and Project Records, 1902-1919 [hereafter Entry 3], Records of the Bureau of Reclamation, Record Group 115 [hereafter RG 115], National Archives at Denver [hereafter NARA Denver]; and Littlefield, *Conflict on the Rio Grande*, 100-102 and 108-109.

¹³ Historian Douglas Littlefield argues that by extending the provisions of Newlands Act to the El Paso Valley in Texas – a non-"Reclamation" state – Congress "authorized the Reclamation Service to carry out the first true apportionment of any interstate stream." He goes on to connect this act to the later 1938 "interdistrict agreement" between Elephant Butte Irrigation District and El Paso County Water Improvement District No. 1, approved by the Interior Department to explain why no state-line delivery to Texas was established. See Littlefield, *Conflict on the Rio Grande*, 114-115, 203 and 207, and Opinion IV below.

¹⁴ Mitchell, ed., *Official Proceedings*, 107; Hamele, "The Embargo on the Upper Rio Grande," November 11, 1924, 23-25. 8-3 Rio Grande Distribution of Waters (Loose File), Box 1638, CCF 1907-36, RG 48, NARA II; *An Act Relating to the construction of a dam and reservoir on the Rio Grande, in New Mexico, for the impounding of the flood waters of said river for purposes of irrigation*, February 25, 1905, chap. 798, 33 Stat. 814; and Littlefield, *Conflict on the Rio Grande*, 105-145.

Hill filed a supplemental notice for “[a]ll of the unappropriated water of the Rio Grande and its tributaries.”¹⁵

Construction proceeded apace. Leasburg Diversion Dam and its canal, the first elements of the project system, were completed in 1908. Eight years later, Elephant Butte Dam was completed, and the remaining major irrigation works were constructed between 1914 and 1919. In the late 1910s, work began on a vast drainage system to manage rising groundwater levels and fulfill Hall’s plan to utilize all of the waters of the Rio Grande, including return flow (see Opinion III). By the mid-1920s, while planning and construction of various elements would continue into the 1930s, the project was substantially completed.¹⁶

Although the embargo was intended to last until a resolution could be found to the diplomatic dispute with Mexico, federal officials eager to protect the water supply of the Rio Grande Project continued to supported it into the early 1920s. Successful conclusion of the Colorado River Compact, however, prompted Reclamation Director A.P. Davis to solicit the opinions of the Colorado attorney general and the general managers of EBID and EP #1 as to a modification of the embargo and possible negotiation of a compact in December 1922.¹⁷

In March 1923, citing recent criticism of the embargo by Coloradoans, Davis recommended to Secretary of the Interior Albert B. Fall that the embargo be modified such that Reclamation could “negotiate for the release of specific areas of public land for purposes of water storage under conditions that will best conserve and protect vested rights in all parts of the Rio Grande Basin.”

¹⁵ B.M. Hall, Supervising Engineer to Mr. David L. White, Territorial Irrigation Engineer, Jan. 23, 1906. ff. 41 New Mexico, Water Appropriations- -General, Thru 1910, Box 6 38C- -41; Supervising Engineer [Louis C. Hill] to Mr. Vernon L. Sullivan, Territorial Engineer, Subject: Supplemental notice of the intention of the United States to use the waters of the Rio Grande for irrigation purposes on the Rio Grande Project, April 14, 1908. ff. 41-D New Mexico. Water Appropriations. RIO GRANDE PROJECT THRU 1910, Box 9 41B- -41D; Articles of Agreement between the United States of America, the Elephant Butte Water Users’ Association, and the El Paso Valley Water Users’ Association, June 27, 1906. ff. 330-B Rio Grande. Contracts with Elephant Butte Irri. Dist., Box 817 Rio Grande 330B- -348C, Entry 3, RG 115, NARA Denver.

¹⁶ F.H. Newell, Director, *Seventh Annual Report of the Reclamation Service 1907-1908* (GPO, 1908), 150; Arthur P. Davis, Director and Chief Engineer, and Will R. King, Chief Counsel, *Seventeenth Annual Report of the Reclamation Service 1917-1918* (GPO, 1918), 250-251; and *Twenty-Fourth Annual Report of the Bureau of Reclamation, Transmitted to Congress in pursuance of the Act of June 17, 1902 (32 Stat. 388) for the Fiscal Year Ended June 30, 1925* (GPO, 1925), 25.

¹⁷ A.P. Davis, Director, to Hon. V.E. Keynes, Attorney General of Colorado, Dec. 12, 1922; A.P. Davis, Director, to Mr. H.H. Brook, President, Elephant Butte Irrigation District, Dec. 12, 1922.; and A.P. Davis, Director, to Mr. Roland Harwell, President, El Paso County Water Improvement Dist. #1, Dec. 12, 1922. ff. 032.02, Rio Grande Basin Water Rights: Rio Grande River Basin Embargo, Thru 1925, Box No. 925 Rio Grande Basin 032.02-- Lower Rio Grande 090., Project Files, 1919-1929, General Administrative and Project Records, 1919-1945, Entry 7 [hereafter Entry 7], RG 115, NARA Denver; and Littlefield, *Conflict on the Rio Grande*, 170-171.

The director predicated this recommendation on an analysis proffered by federal reclamation engineer Harold Conkling nearly four years earlier. In a June 1919 memorandum, Conkling argued that water developments in the San Luis and the Middle Rio Grande valleys would have a negligible impact on the Rio Grande Project downstream. In fact, he believed that with the construction of drainage works these developments could augment the water supply below Elephant Butte. Davis echoed this belief, expressing confidence that with Reclamation granted new authority, upstream projects could move forward without compromising the Rio Grande Project's water supply. Fall concurred, authorizing the modification in March 1923.¹⁸

The embargo came to an end entirely two years later. In September 1924, Davis's successor Elwood Mead expressed his support for the long-contemplated Vega-Sylvestre Reservoir in San Luis Valley. In April 1925, the Interior Department approved the reservoir. A little over a month later, Secretary of the Interior Hubert Work rescinded the embargo, reasoning that it was no longer necessary.¹⁹

Colorado and New Mexico had already moved forward with negotiating a compact, prior to Work's decision. In 1923, both states appointed commissioners to meet with a federal representative, and they initially sought to negotiate an agreement solely between themselves with the secretary of the interior's support and encouragement.²⁰ Concern for the possible

¹⁸ Memorandum, From: Engineer Harold Conkling, To: Chief of Construction, Subject: Water Supply-Rio Grande River, June 18, 1919. ff. 302.31 New Mexico, Surveys & Investigations, Thru 1929, 2 of 2, Transfer Case, Box 262 302.28- -302.31 A NV-NM, Entry 7 General Files, 1919-1929; A.P. Davis, Director, to The Secretary of the Interior, March 2, 1923, Approved: Albert B. Fall, Secretary, 9-11. ff. 032.02 Rio Grande Basin Water Rights: Rio Grande Basin Embargo Thru 1929, Box No. 925 Rio Grande Basin 032.02--Lower Rio Grande 090., Entry 7, RG 115, NARA Denver; and Littlefield, *Conflict on the Rio Grande*, 183.

¹⁹ Elwood Mead, Commissioner, Memorandum to the Secretary, September 6, 1924. ff. 032.02 Rio Grande Basin Water Rights: Rio Grande Basin Embargo Thru 1929, Box No. 925, Entry 7, RG 115, NARA Denver; and Hubert Work, Secretary, to The President, May 23, 1925. ff. Rio Grande Compact Commission Records, 1924-1941, Richard Burges Papers: Correspondence, 1924-1935, May-December 1925, Box 2F468, Rio Grande Compact Commission Records, 1924-1941, 1970 [hereafter RGCCR, 1924-1941, 1970], Briscoe Center for American History, University of Texas at Austin [hereafter UTA]; and Littlefield, *Conflict on the Rio Grande*, 184-187.

²⁰ According to Colorado Lieutenant Governor George Corlett's recollection, that encouragement came circa 1925, when at a conference with Work in Washington, D.C. The Secretary of the Interior urged Corlett to meet with New Mexico's commissioner Francis Wilson, who was also in D.C., and find "just one thing" upon which they agreed. Arrangements were made for the two men to meet at the Senate office building, and they ultimately sat down with Work and Reclamation representatives to discuss the possibility of an "outlet drain" for Colorado. Proceedings of the Rio Grande Compact Conference held at Santa Fe, New Mexico, December 10-11, 1934, 5-6. ff. Proceedings of the Rio Grande Compact Commission, Santa Fe, New Mexico. 1934-1935, Box 62, Series 7: Publications and reports, 1856-1992 and undated [hereafter Series 7], Subseries 7.1: Compacts and rivers, 1893-1986 and undated [hereafter Series 7.1], Papers of Delph E. Carpenter and Family [hereafter PDECF], Water Resources Archives

impact of water projects upstream from the Rio Grande Project, however, led Texas to push for inclusion. Following a preliminary “first” meeting of the Rio Grande Compact Commission in October 1924, in which El Paso attorney Major Richard F. Burges argued on Texas’s behalf as an unofficial representative, the federal representative, Secretary of Commerce Herbert Hoover and the Colorado and New Mexico commissioners agreed to include Texas.²¹ The parties further agreed that their negotiations should focus on the allocation of the waters of the Rio Grande above Fort Quitman, Texas as this was a natural dividing point in the river.²²

Appointment of an official commissioner for Texas, New Mexico’s withdrawal from compact negotiations following Work’s rescission of the embargo, and the resignation of Hoover upon his election to the presidency delayed further talks among the three states until December 1928.

[hereafter WRA], Colorado State University, Fort Collins [hereafter CSU-FC], available online at <http://hdl.handle.net/10217/41293>, last accessed April 8, 2019.

²¹ Richard Fenner Burges came from a prominent family of El Paso attorneys. After graduating from Texas Agricultural and Mechanical College (today Texas A&M University), he read law in Seguin, Texas. He joined the El Paso law practice of his oldest brother, William Henry Burges, Jr., in 1892. Burges was admitted to the bar two years later, and along with William and his middle brother Alfred Rust Burges (who joined Richard in his separate law practice in 1912) established the El Paso Bar Association in the early 1910s. Burges was the city attorney for El Paso between 1905 and 1907, where he drafted the City Charter and continued an anti-vice campaign began by William when he was city attorney. As a member of the Texas State Legislature between 1913 and 1915, Burges authored the Texas Forestry Act and the Texas Irrigation Code. He earned the military title of major for his service in France during World War I; Burges also earned a Croix de Guerre for his bravery on the battlefield. Returning to El Paso after the war, he was considered as a potential gubernatorial candidate but Burges declined. Instead he dedicated much of the rest of his life to representing El Paso, El Paso County, and adjacent Hudspeth County, particularly on matters related to the Rio Grande – as noted in the opinions offered here. From 1935 to 1940, Burges served as a special counsel to the Department of Justice on the Rio Grande Rectification Project (see footnote 169). See Laura Hollingsed, Biography, “Guide to MS 262 Burges-Perrenot Family Papers,” C.L. Sonnichsen Special Collections Department, University of Texas at El Paso, available online at digitalcommons.utep.edu/cgi/viewcontent.cgi?article=1073&context=finding_aid, last accessed April 15, 2019.

²² Pat M. Neff, Governor of Texas, to Honorable Herbert Hoover, Secretary of Commerce, Re: Commission to Divide Waters of the Rio Grande, September 20, 1924. Folder 3, Herbert Hoover, Sec. of Commerce (11.); First Meeting, Rio Grande River Compact Commission, Breadmoor Hotel, Colorado Springs, Colo., Sunday, October 26, 1924, 1-37. Folder 1. First Meeting Rio Grande Compact Commission. Oct. 26, 1924, Box 02-D.002, MS 0235 Elephant Butte Irrigation District Records, 1883-1981 [hereafter MS 0235], Rio Grande Historical Collections [hereafter RGHC], New Mexico State University Archives and Special Collections, Las Cruces [hereafter NMSU Spec. Coll]; and Littlefield, *Conflict on the Rio Grande*, 177-183.

As Burges put it, “It is a matter of fact, and it can be established to the satisfaction of any fair minded person, that the use of water of the Rio Grande above Fort Quitman does not at least materially affect the interests of the people below Del Rio, Texas, as there is no irrigation that is of any consequence, and I think no possible irrigation of any importance between Fort Quitman and Del Rio, Texas.” First Meeting, Rio Grande River Compact Commission...October 26, 1924, 4.

Over the course of three meetings, from December 19 through December 21, New Mexico and Texas aligned in defending the Rio Grande Project against Colorado. New Mexico's commissioner Francis Wilson was adamant that a specific quantity of water for New Mexico be determined and delivered at the Colorado-New Mexico state line. Wilson also argued that the best development Colorado could make, and which would have little effect on projects downstream, would be to drain the so-called "Closed Basin" – lands in the San Luis Valley waterlogged by the river. Any dam or reservoir that would impound the existing surface flow of the stream, in his view, threatened the Rio Grande Project and its 1906 and 1908 water filings in New Mexico.²³

Burges, speaking for Texas, argued that his state's claims to the waters of the Rio Grande derived largely from the Rio Grande Project filings and the allocation of water to lands in New Mexico and Texas within the project. He further pointed out that approximately 20,000 acres below the end of the project (roughly Fabens, Texas) down to Ft. Quitman was irrigated. These lands in Hudspeth County relied almost entirely upon return flow from the project, obtained under the provisions of a federal Warren Act contract (see Opinion III).²⁴

Colorado sought the freedom to develop its San Luis Valley. Lieutenant Governor George M. Corlett was the principal voice for the state. He insisted downstream water users would not be harmed by the construction of upstream reservoirs and in fact, stood to benefit from return flows and reduced evaporation caused by the long transit time in stream flow to Elephant Butte. Corlett acknowledged the benefits of the drain suggested by Wilson, and although he did not abandon the idea of a San Luis reservoir he ultimately agreed to join with New Mexico and Texas to request federal support for a Closed Basin drainage project.²⁵

Although Colorado marshaled data to convince New Mexico and Texas of its position, there was little else upon which the states agreed aside from the Closed Basin project. In February 1929, limited again by their states' respective schedules and needing more time to study the problem, Colorado, New Mexico, and Texas concluded a temporary compact. This agreement, in effect, was to maintain the status quo in the basin for a period of six years until June 1935. Neither Colorado (Article V) nor New Mexico (Article XII) was to "cause or suffer the water supply" of the

²³ Proceedings of the Rio Grande Compact Conference, Held December 19-20-21, 1928, At Santa Fe, New Mexico, 3, and 10-11. ff. Rio Grande Compact Commission Records, 1924-1941, 1970, Richard F. Burges Papers, Proceedings of the Rio Grande Compact Conference Held Dec. 19-20-21 at Santa Fe, N.M. (Title page, 78 pp.) [hereafter ff. Proceedings of the Rio Grande Compact Conference Held Dec. 19-20-21], Box 2F471, RGCCR, 1924-1941, 1970, UTA; and Littlefield, *Conflict on the Rio Grande*, 187-189.

²⁴ Proceedings of the Rio Grande Compact Conference...1928, 13. ff. Proceedings of the Rio Grande Compact Conference Held Dec. 19-20-21, Box 2F471, RGCCR, 1924-1941, 1970, UTA.

²⁵ Proceedings of the Rio Grande Compact Conference...1928, 14-19. ff. ff. Proceedings of the Rio Grande Compact Conference Held Dec. 19-20-21, Box 2F471, RGCCR, 1924-1941, 1970, UTA; and Littlefield, *Conflict on the Rio Grande*, 190.

river “to be impaired by new or increased diversions or storage” – affording protection for the Rio Grande Project water supply – during this time. However, should the Closed Basin drain and State Line Reservoir be constructed prior to June 1935, “depletions” were permissible if “offset by increase of drainage return.” The temporary compact further provided for the establishment of several stream-gaging stations to gather flow data (Article III), necessary to formulating a permanent compact and endorsed construction of the Closed Basin Drain and State Line Reservoir by the federal government (Article II).²⁶

With the expiration of the temporary compact a mere six months away, Colorado commissioner M.C. Hinderlider, New Mexico commissioner Thomas McClure, Texas commissioner T.H. McGregor, and the new federal representative (and Reclamation assistant chief engineer) S.O. Harper re-opened talks on a permanent compact in December 1934. Little had changed for the three states; all remained committed to the positions they articulated back in 1928. Corlett once again insisted that Colorado have “parity” with New Mexico and Texas in the use of Rio Grande waters – which Harper understood to mean “equality as regards dependability of water supply with the lands under the Elephant Butte Reservoir in New Mexico and Texas.” New Mexico and Texas representatives, however, demanded to know whether Colorado intended to accept federal monies then being offered by the President Franklin Roosevelt’s New Deal administration for a Closed Basin drain study. Ralph Carr, legal advisor to Colorado, responded that certain obligations attached to this funding were objectionable, and he asked for New Mexico and Texas’s support in addressing those objections. He also maintained that the commission’s “problem” and “task” was “to make an equitable division of the waters of the Rio Grande.” Colorado sought to “arrive at a permanent compact,” and notwithstanding the issues surrounding the drain, Carr argued for the opportunity to “present the data which is needed to arrive at a solution....”²⁷

Burges countered that until the drain was constructed it was impossible to estimate the quantity of additional water to be developed by storage for use in Colorado, and thus an equitable apportionment remained elusive. Texas, according to Burges, preferred to continue the present compact until the effective yield of the Closed Basin drain could be determined. Carr, however, believed that this was unnecessary, as the 1929 compact, in Harper’s words, “concedes to

²⁶ Proceedings of the Rio Grande Compact Conference...1928, 22-78. ff. Proceedings of the Rio Grande Compact Conference Held Dec. 19-20-21, Box 2F471, RGCCR, 1924-1941, 1970, UTA; *JIR*, 8; and Littlefield, *Conflict on the Rio Grande*, 191-193.

²⁷ Proceedings of the Rio Grande Compact Conference...1934, 10-11, 19-23, and 27-29. ff. Proceedings of the Rio Grande Compact Commission, Santa Fe, New Mexico. 1934-1935, Box 62, Series 7, Subseries 7.1, PDECF, WRA, CSU-FC; S. O. Harper to Secretary of the Interior, December 14, 1934, 4-5. File No. 8-3 (Part 2), Rio Grande-Distribution of Waters-Compact, C-D, August 18, 1930-February 25, 1936, Box No. 1638, CCF 1907-36, RG 48, NARA II; and Littlefield, *Conflict on the Rio Grande*, 196-197.

Colorado an additional amount of water equivalent to that developed by the drain....” At an impasse, but with each of the states informed as to the others positions, the commissioners decided to adjourn, study the questions in more detail, and reconvene in January 1935.²⁸

The January meeting picked up where the December meeting had left off, with Colorado continuing to insist on parity with Texas and New Mexico. Corlett argued that construction of “the Outlet Drain” (i.e., the Closed Basin Drain) together “with the savings of avoidable waste from the Elephant Butte Project” would ensure sufficient water for Colorado’s intended developments. By “avoidable waste,” he meant the water released below Rio Grande Project lands in Texas. Corlett insisted that this waste had been controlled following the adoption of the temporary compact but since that time it had “crept into the operations of these projects, so that the releases at the Elephant Butte have now come back to approximately what they were before.” Construction of the Closed Basin drain, together with control of “avoidable waste” on the Rio Grande Project would enable, he argued, “an annual uniform supply of water to the lands of Colorado on a parity with the supply now furnished to lands in New Mexico and Texas.”²⁹

As before, negotiation of the compact for Colorado was not contingent upon construction of the drain. Corlett believed that “with all of the excellent accumulated engineering data and advice” available to the commissioners that a compact could be devised, and to that end, Colorado’s engineering advisor Royce J. Tipton took the floor.³⁰ Tipton elaborated on the argument first

²⁸ Proceedings of the Rio Grande Compact Conference...1934, 23-24, 29-30, and 34-38. ff. Proceedings of the Rio Grande Compact Commission, Santa Fe, New Mexico. 1934-1935, Box 62, Series 7, Subseries 7.1, PDECF, WRA, CSU-FC; Harper to Secretary of the Interior, December 14, 1934, 5-6. File No. 8-3 (Part 2), Box No. 1638, CCF 1907-36, RG 48, NARA II; and Littlefield, *Conflict on the Rio Grande*, 197-198.

²⁹ Proceedings of the Rio Grande Compact Commission, Santa Fe, January 28-30, 1935, 3-4. ff. Proceedings of the Rio Grande Compact Commission, Santa Fe, New Mexico. 1934-1935, Box 62, Series 7, Subseries 7.1, PDECF, WRA, CSU-FC.

³⁰ Born in Illinois in 1893, Royce Jay Tipton grew up in Colorado. After he graduated high school, he worked as an elementary school teacher before receiving practical training as an engineer with a mining company. Tipton entered the University of Colorado in 1915 to study civil engineering but before completing his degree he went overseas during World War I. Tipton never finished his academic studies, although in 1940 he was awarded “an Honorary Degree in Civil Engineering” by the university. Following his military service, Tipton worked as chief engineer for the San Luis Valley Land and Cattle Company, and in the early 1920s formed the first of several business partnerships and engineering consulting companies. In 1929, he became Colorado’s engineering advisor in the Rio Grande Compact negotiations, and briefly assisted with Reclamation water supply studies for what became the Hoover Dam. His association with the Colorado State Engineer’s office continued into the 1930s. Tipton’s professional life took him abroad, and he partnered with Hill on a water supply projects in Pakistan and Egypt. Texas’s engineering advisor recalled Tipton fondly in a 1968 deposition that Hill gave in an original action filed against Colorado by Texas and New Mexico, alleging violations of the 1938 Compact: “Mr. Royce Tipton was one of the outstanding engineer in this field... and I considered him of the of the ablest engineers in the field....I liked the man personally, I admired his ability....” “Memoir, Royce Jay Tipton, F. ASCE, Died December 23, 1967,”

advanced back in 1928 that the entire Rio Grande Basin stood to gain from the construction of reservoirs to serve the San Luis Valley. He presented technical data that he maintained demonstrated such works would assist in regulating the water supply and providing sufficient carryover storage from high to low water years in the valley, and by doing so return as much as 100,000 af to the stream to the benefit of downstream users in New Mexico and Texas.³¹

The rest of the commission, while intrigued by Tipton's presentation, felt that they had little time to consider it in detail. Extensive questioning by Burges (serving as Texas's acting commissioner at the request of the Governor James V. Allred), led to Colorado agreeing to make Tipton's work available to Texas and New Mexico for further review. In the meantime, the commissioners decided to recommend to their respective governors and legislatures a two-year extension of the temporary compact until June 1937.³²

Before negotiations resumed, Texas filed suit against New Mexico and the Middle Rio Grande Conservancy District (MRGCD) in the US Supreme Court in October 1935. Texas alleged that by permitting diversions above Elephant Butte by MRGCD, diversions that diminished both the quantity and quality of water reaching Texas lands, New Mexico had abrogated the terms of the 1929 compact. Organized in August 1925 under the laws of New Mexico, the Middle Rio Grande Conservancy District aimed to reclaim and develop that portion of the basin above San Marcial, providing not only water but also flood protection to lands in the vicinity of Albuquerque. As the negotiations leading to the 1929 temporary compact were underway, MRGCD had formulated its plans and had contracted with Reclamation for additional technical support and study, leading to an assessment of "the water conditions of the Rio Grande." By the early 1930s, primarily with financial support from the federal Reconstruction Finance Corporation, the district had embarked on constructing El Vado, a proposed 190,000-af storage reservoir on the Rio Chama near the

enclosed with Olin Kalmbach to Mr. William H. Wisely, Executive Secretary, ASCE, January 28, 1969. Folder 1 Biographical notes – Royce J. Tipton, 1967-1969, Box 1, Series 1: Tipton's biography and writings, 1915-1969 and undated, Papers of Royce J. Tipton, 1915-1969, WRA, CSU-FC, available online at <https://mountainscholar.org/handle/10217/181886>, last accessed May 20, 2019; and Deposition of Raymond A. Hill. Taken December 4, 1968. Denver, Colorado, *State of Texas and State of New Mexico, Plaintiffs, vs. State of Colorado, Defendant*, No. 29, Original, in the Supreme Court of the United States, October Term 1967, 9-11. ff. Texas & New Mex. v. Colo., w. 66-1061 Texas vs. Colorado, Box 1989 41-240, LF-TAG, TSA.

³¹ Proceedings of the Rio Grande Compact Commission...January 28-30, 1935, 6, 7, and 8-17. ff. Proceedings of the Rio Grande Compact Commission, Santa Fe, New Mexico. 1934-1935, Box 62, Series 7, Subseries 7.1, PDECF, WRA, CSU-FC.

³² Proceedings of the Rio Grande Compact Commission...January 28-30, 1935, 43-45. ff. Proceedings, Box 62, Series 7, Subseries 7.1, PDECF, WRA, CSU-FC; and Littlefield, *Conflict on the Rio Grande*, 198.

Colorado-New Mexico state line, as well as half a dozen diversion dams on the Rio Grande, and several hundred miles of irrigation and drainage canals and levees.³³

MRGCD's plans notwithstanding, New Mexico rejected Texas's allegations. The state asserted that diversions by Mexico in excess of that permitted under the 1906 treaty and inefficient operation of Elephant Butte Dam were to blame for the diminished water supply to lands in Texas. New Mexico further argued that the US's 1906 appropriation of water for the federal reservoir was not made in accordance with New Mexico law, in violation of the 1902 Newlands Act.³⁴

³³ State of New Mexico, County of Bernalillo, In the District Court, In the Matter of the Middle Rio Grande Conservancy District, No. 14157, First Report of the Board of Directors, G.E. Cook, President, Ramon Baca y Chavez, Director, Robert E. Dietz, Director, E.G. Watson, Secretary. Dated at Albuquerque, New Mexico, August 27th, 1926, 2-5, and 13. ff. 222. Rio Grande Basin Irrigation Districts Middle Rio Grande Transfer Case Thru 1929, Box 928 Rio Grande Basin-Lower Rio Grande 301.- -545., Middle Rio Grande 222.- -223., Entry 7, RG 115, NARA Denver; *Supreme Court of the United States, October Term 1936, No. 12 Original, State of Texas vs. State of New Mexico, et al., Ad Interim Report of the Special Master*, received Mar. 26, 1937, 4-5. ff. RG 267, Entry 26, TX v NM #10, Box 401 1939 to 1939 PI 139, Entry 26, Original Jurisdiction Case Files, 1792-2005 [hereafter Entry 26], Records of the Supreme Court of the United States, Record Group 267 [hereafter RG 267], National Archives Building, Washington, DC [hereafter NAB]; and Littlefield, *Conflict on the Rio Grande*, 198-199.

Discussions with Reclamation regarding development of the Middle Rio Grande extended back to late 1919, and resulted in the drafting of an initial study in December 1922 by Homer Gault. Ottamar Hamele, Acting Director, to The Secretary of the Interior, Dec.-1 1919. ff. 301. Rio Grande Basin-Middle Rio Grande Engineering Reports & Estimate Thru 1929, Box 929 Rio Grande Basin, Middle Rio Grande 301.- -400.05, Entry 7, RG 115, NARA Denver; and Homer J. Gault, Engineer, US Reclamation Service, Denver, Colorado, Department of the Interior, United States Reclamation Service, in cooperation with The State of New Mexico, Report on the Middle Rio Grande Reclamation Project, New Mexico (December 1922). ff. 21, Rio Grande Commission, 1921-1930, Box 15, MSS 90 BC Richard Charles Dillon Papers, 1918-1944, University of New Mexico Special Collections, Albuquerque.

³⁴ The State of Texas, By Wm. McCraw, Its Attorney General, H. Grady Chandler, Assistant Attorney General, Richard F. Burges, Walter S. Howe, Edwin Mechem, Of Counsel, Supreme Court of the United States, October Term, 1935, No. – Original, *State of Texas, Complainant, vs. State of New Mexico, et al.*, Motion for Leave to File Bill of Complaint and Bill of Complaint [October 29, 1935]; Supreme Court of the United States, October Term, 1935, No. 15, Original, *State of Texas, Complainant vs. State of New Mexico, et al.*, Answer of the Defendant State of New Mexico, and Answer of Defendants, Middle Rio Grande Conservancy District, Robert Dietz, M.R. Buchanan, T.J. Seneker, George Cook, and Constancio Hendren, Directors of Said District - Supreme Court of the United States [March 26, 1936]. w. Texas' Briefs, A.G. 51-238, State of Texas v. State of New Mexico, et al., Box 1993/127-1, Litigation Files, Texas Attorney General [hereafter LF-TAG], Texas State Archives, Austin [hereafter TSA]; Supreme Court of the United States, No. 15, Original, October Term, 1935, *The State of Texas, Complainant, v. The State of New Mexico, et al.*, Docket Entries, nd. ff. 4-1 Warren Charles, Correspondence re Texas v. New Mexico June 1936; and *State of Texas v. State of New Mexico*, No. 12 Original, 1936 Term. *Statement by Special Master*, March 5, 1937. ff. Warren Charles, Correspondence re Texas vs. New Mexico / March, 1937, Box 4 Correspondence,

The Supreme Court granted leave to Texas to proceed with its suit in November, and appointed a special master, attorney Charles Warren, to take testimony in May 1936. Between November 1936 when Warren opened hearings and March 1937 when hearings concluded, nearly 40 hearings were held in Albuquerque, New Mexico, and El Paso, Texas, and in excess of 3,000 pages of evidence – including more than 260 exhibits, maps, charts, graphs, and witness testimony – were produced. Warren further personally inspected several hundred miles of the Rio Grande and the various irrigation and drainage system that served lands in New Mexico and Texas.³⁵

Despite all of this, when the hearings ended the special master could not see a clear resolution. In his *Ad Interim Report* to the Supreme Court in March 1937, Warren indicated that he was “of opinion that findings of fact by me based on the evidence in its present shape would be unsatisfactory and might not result in an equitable adjustment of the situation.” Essential legal issues (such as the absence of the US and Colorado as parties to the litigation) aside, the special master cited incomplete records and partial analyses of flow depletion and salinity levels as constituting an insufficient basis for findings of fact. Aware that the federal government through the National Resources Committee (NRC) was “investigating the whole problem of water supply and distribution in the Upper Rio Grande region,” and at the request by counsel representing Texas, New Mexico, and MRGCD, to hold “further proceedings...in abeyance until the first day of October 1937,” Warren recommended postponement of the case until January 1938. The high court approved the recommendation in April.³⁶

The National Resources Committee referenced by Warren was a special working group of government officials and consultants within the Roosevelt Administration that aimed to foster development of the nation’s natural resources through planned regional public works programs. In September 1935, a month prior to Texas filing suit against New Mexico and MRGCD, “spurred by the need for prompt action to avoid uncoordinated development of water utilization projects” in the Upper Rio Grande Basin, the group appointed a Board of Review to study the various water use problems and proposed projects in the basin. The board readily identified the potential for

Notes, Reports re: Texas vs. New Mexico [hereafter Box 4], Series 1: Materials re: cases, Charles Warren Papers 1885-1954 [hereafter CWP], Manuscripts Unit, Harvard Law School Library, Historical and Special Collections, Cambridge, Massachusetts [hereafter HLS HSC]; and *Ad Interim Report of the Special Master*, received Mar. 26, 1937, 4-6. ff. RG 267, Entry 26, TX v NM #10, Box 401, Entry 26, RG 267, NAB.

³⁵ *Ad Interim Report of the Special Master*, received Mar. 26, 1937, 1. ff. RG 267, Entry 26, TX v NM #10, Box 401, Entry 26, RG 267, NAB.

³⁶ Special Master to Richard F. Burges, Esquire, March 26, 1937. ff. Correspondence re: Texas vs. New Mexico/March, 1937, Box 4, CWP, HLS HSC; *Ad Interim Report of the Special Master*, received Mar. 26, 1937, 5-13; and *Supreme Court of the United States, October Term 1936, No. 10 Original, State of Texas vs. State of New Mexico, et al., Final Report of the Special Master*, filed Sep. 25, 1939, 4. ff. RG 267, Entry 26, TX v NM #10, Box 401, Entry 26, RG 267, NAB.

the MRGCD to jeopardize the 1906 treaty with Mexico and prior federal investment in the Rio Grande Project. Other proposed federal water projects, such as the Conejos and Vega-Sylvestre dams and the so-called “State Line Reservoir” in Colorado, also presented potential conflicts with not only the Rio Grande Project and the MRGCD but also with the tristate compact under negotiation. Furthermore, the river basin was considered to be fully appropriated. New drafts on existing water resources without enhancing supply, the board ultimately concluded, would damage vested rights in the basin.³⁷

In the interests of efficient, full, and equitable utilization of the basin’s waters, the board recommended that no action be taken “to approve any application for a project involving the use of Rio Grande waters without securing from the National Resources Committee a prompt opinion on it from all relevant points of view.” President Franklin D. Roosevelt, at the urging of Secretary of the Interior Harold Ickes, issued an executive order in September 1935 prohibiting federal officials from authorizing any water projects for the Rio Grande Basin without obtaining the approval of the NRC – in effect, restoring the embargo.³⁸

In early October 1935, the NRC contacted Harper about the possibility of having representatives from the group meet with the Rio Grande Compact Commission to discuss how they might facilitate conclusion of a permanent compact by providing “needed basic data” that would foster “agreement on facts by the three states....” With the approval of Harper and the other compact commissioners, the NRC sent Harlan H. Barrows, a University of Chicago historical geographer and a member of the Board of Review, and Frank Adams, an agricultural economist with the NRC’s Water Resources Committee, to meet with the commission in December.³⁹ At that

³⁷ “Report of the Rio Grande Board of Review,” September 13, 1935, 1-4. Folder 390-Rio Grande Joint Investigation Purpose and Organization, 1935-1937, Box 26, Frank Adams Collection [hereafter FAC], Water Resources Collections and Archives, University of California, Riverside [hereafter WRCA]; *JIR*, 10; and Littlefield, *Conflict on the Rio Grande*, 200-201. For more on the NRC, see Richard Lowitt, *The New Deal and the West* (Norman: University of Oklahoma Press, 1993).

³⁸ “Report of the Rio Grande Board of Review,” September 13, 1935, 6-11. Folder 390, Box 26, FAC, WRCA; and Franklin D. Roosevelt, To Federal agencies concerned with projects or allotments for water use in the Upper Rio Grande Valley above El Paso, September 23, 1935. File No. 8-3 (Pt. 7). Reclamation Bureau - Rio Grande Project - Rio Grande River - Distribution of Waters – General, February 6, 1933 to December 12, 1956, Box 1642, 8-3, Rio Grande, R, CCF 1907-1936, RG 48, NARA II.

³⁹ Harlan H. Barrows came to the University of Chicago as an undergraduate in 1903, earned a BA in geology, and later joined the university’s Department of Geography – the first such academic department for the discipline in the United States. He went on to become a foundational figure in the study of historical geography, and garnered recognition and acclaim for his lectures. Barrows entered public service during World War I, as a member of the United States War Trade Board. In the early 1930s, he consulted on a number of US Department of the Interior-led, or -based initiatives, such as the Water Resources Committee of the National Resources Committee. See Biographical Note, “Guide to the Harlan H. Barrows Papers, circa 1880-1939,” University of Chicago Library, available online at

meeting, Barrows and Adams proposed a joint federal-state investigation of the water resources, uses, and needs throughout the Upper Rio Grande Basin, and the commissioners agreed. The investigation, it was determined, would include: 1) the water resources of the Rio Grande Basin “above Fort Quitman;” 2) the “past, present and prospective uses and consumption of water” in the basin within the United States; and 3) opportunities for conserving and enlarging the water supply to assist the commission “in reaching a satisfactory basis for the equitable apportionment of the waters of the Rio Grande Basin in the United States above Fort Quitman, as contemplated by such Rio Grande Compact.”⁴⁰

The commissioners embraced the offer of assistance, but were wary of the investigation coming to conclusions or making recommendations. Texas’s new commissioner, attorney Frank B. Clayton (who also represented Texas in its suit against New Mexico and MGRCD) explicitly raised this concern, and the other state commissioners concurred.⁴¹ In the final resolution authorizing the NRC to move forward, the Rio Grande Compact Commission pledged to assist in the joint

<https://www.lib.uchicago.edu/e/scrc/findingaids/view.php?eadid=ICU.SPCL.BARROWSH>, last accessed April 8, 2019.

Much like Barrows, Frank Adams was a pioneer in his field. He earned degrees in economics from Stanford and the University of Nebraska in the early 1900s, and worked for the US Office of Experiment Stations, based in the Department of Agriculture, between his degrees. After a brief interlude working with his brother on a commercial venture, Adams re-joined with the Office of Experiment Stations in 1910 and was later appointed to lead the Division of Irrigation Investigations and Practices at the University of California’s College of Agriculture. In the 1920s and through the 1940s, he consulted with Reclamation and was a key member of the National Resources Committee. See Biography, “Inventory of the Frank Adams papers, 1889-1962,” Water Resources Collections and Archives, University of California, Riverside, available online at https://oac.cdlib.org/findaid/ark:/13030/tf9489p11x/entire_text/, last accessed April 8, 2019.

⁴⁰ Proceedings of the Rio Grande Compact, held in Santa Fe, New Mexico, December 2-3, 1935, 2-3 and 5-7. ff. 032.1 (2/3), Box 1326 Owyhee Proj. 222., Rio Grande Basin 032.1, Entry 7, RG 115, NARA Denver; and “Resolution Passed by Rio Grande Compact Commission at Santa Fe, New Mexico,” December 3, 1935, 1-2. Folder 401-Rio Grande Compact Commission Resolutions, 1935-1937, Box 26, FAC, WRCA.

⁴¹ A native of El Paso, born in 1902, Frank Britton Clayton attended Texas Western College (now the University of Texas at El Paso) and later enrolled at the University of Texas (at Austin) where he earned his law degree in 1925. He held fellowships at Yale and Harvard in 1927 and 1928, and taught at the University of Texas law school until 1930 when he entered private practice. Between 1933 and 1935, Clayton served as special counsel to the City of El Paso before becoming Texas’s Rio Grande Compact Commissioner. As noted above, he represented the State of Texas in the original action against the State of New Mexico and the Middle Rio Grande Conservancy District; and as noted in Opinion IV, Clayton was counsel to Hudspeth County Conservation and Reclamation District No. 1. Following the ratification of the 1938 compact, he resigned his position as compact commission to become the city attorney for El Paso. In 1941, Clayton became counsel to the International Boundary and Water Commission. See Frank B. Clayton to Governor W. Lee O’Daniel, April 18, 1939. ff. Rio Grande Compact, Commissioner Appointments, 1938-9, 2001/138-143, W. Lee O’Daniel Governor’s Papers, TSA; and “F.B. Clayton, Prominent Lawyer, Dies,” *The El Paso Times*, December 2, 1951.

investigation, to secure matching state funds and services, and to share costs of the studies with the federal government. They also expressed their understanding that the cooperative investigation “shall be limited to the collection, correlation and presentation of factual data.”⁴²

After nearly two years of work, with the USGS, Reclamation, and the US Department of Agriculture’s Bureau of Agricultural Engineering and Bureau of Plant Industry all contributing, an initial draft of the Rio Grande Joint Investigation report, or *JIR*, was available in August 1937.⁴³ Barrows, in presenting that draft to the commissioners when negotiations resumed in late September, expressed his belief that the report provided “a factual basis for an allocation of the waters of the river above Ft. Quitman that would be fair and just to each of the three states and to its citizens dependent upon the river.”⁴⁴

Although Texas’s engineering advisors expressed reservations over the *JIR* (discussed in Opinion II), later accounts of the meetings between the engineering advisors for all three states and the US indicate that the report was an essential compilation of information for them. As Tipton reported to Hinderlinder, “all the basic data pertaining to the problem were assembled and analyzed” in *JIR*. This data included “detailed studies” by the individual states as well as the federal investigation itself. From this, Tipton and his fellow engineers were able to ascertain “the discharge of the river at various points under present development in the basin,” and “schedules of water delivery which would insure each section of the basin against injury by acts of water

⁴² Richard F. Burges to Governor James V. Allred, telegram, March 9, 1935. [2nd unlabeled file folder], Box 2F470, RGCCR, 1924-1941, 1970, UTA; Richard F. Burges, to Hon. S.O. Harper, Chairman, Rio Grande Compact Commission, Hon. M.C. Hinderlinder, State Engineer, Hon. Thomas M. McClure, March 9, 1935. NM_00120235; James V. Allred, Governor of Texas, to His Excellency, the Governor of New Mexico, telegram, April 27, 1935. ff. 301 Gov. Clyde K. Tingley, Rio Grande Compact, 1935-1938, Box 9, Serial No. 13103, 09-19 special reports, conservation, new deal. Dates: 1935-1938, Governor Clyde Tingley Papers, New Mexico State Records Center & Archives, Santa Fe [hereafter NMSA]; Proceedings of the Rio Grande Compact...December 2-3, 1935, 19, and 42-43. ff. 032.1 (2/3), Box 1326, Entry 7, RG 115, NARA Denver; and “Resolution Passed by Rio Grande Compact Commission at Santa Fe, New Mexico,” December 3, 1935, 1-2. Folder 401, Box 26, FAC, WRCA.

⁴³ The final draft was released in February 1938 as National Resources Committee, *Regional Planning Part VI – The Rio Grande Joint Investigation in the Upper Rio Grande Basin in Colorado, New Mexico, and Texas 1936-1937* (GPO, 1938).

⁴⁴ Frank Adams and Harlan H. Barrows, consulting board Rio Grande Joint Investigation, to Abel Wolman, chairman Water Resources Committee, Letter of Transmittal, August 10, 1937. Folder 397-Rio Grande Joint Investigation Outlines and Drafts, 1936-1937, Box 26, FAC, WRCA; and Proceedings of the Meeting of the Rio Grande Compact Commission Held in Santa Fe, New Mexico, September 27, to October 1, 1937, 1, 3 and 5. Unnamed folder 5, Box 2F463, Rio Grande Compact Comm’n. Frank B. Clayton Papers [hereafter RGCC-FBCP], UTA; and Littlefield, *Conflict on the Rio Grande*, 201.

uses in another section and yet would permit of the construction and operation of additional reservoirs above Elephant Butte Reservoir.”⁴⁵

Three decades after the permanent compact was signed, the recollections of Texas’s engineering advisor Raymond A. Hill were similar.⁴⁶ Hill acknowledged that in the course of the federal investigation requests for “clarification” were made, “questions were raised as to the accuracy of some of the data,” and “exceptions were taken to some of the findings.” The *JIR* nevertheless assembled “all essential data as to the sources and quantities of water available for use in the several States, the needs for water in these States, and means for development and use of those supplies.” Where it specifically came to development of delivery schedules that were at the heart of the compact, Hill stressed that the report brought together “all pertinent data.” With this data provided to the commission, the engineering advisors crafted the technical basis for the compact.⁴⁷

⁴⁵ R.J. Tipton, *Analysis of Report of Committee of Engineers to Rio Grande Compact Commissioner, Dated December 27, 1937* (February, 1938), 1-4. ff. 70, Box 44-70, MSS 312 Michael Creed Hinderlider Collection, 1897-1987 [hereafter MCHC 1897-1987], History Colorado, Denver [hereafter HC].

⁴⁶ Raymond A. Hill was a consulting engineer and partner with the Los Angeles-based engineering firm of Quinton, Code and Hill-Leeds and Bernard (after 1940, Leeds, Hill, Bernard and Jewett). The son of Louis C. Hill, the second supervising engineer for the Rio Grande Project, Raymond Hill graduated from the University of Michigan in 1914 with a Bachelor of Civil Engineering. He worked for Reclamation while in college on Strawberry Valley Project in Utah, the Green River Project in Colorado, and the Yuma Project in Arizona. Hill first became familiar with the Upper Rio Grande Basin when assisted in the investigation of the proposed high-line canal between Elephant Butte Reservoir and El Paso led by his father in the late 1910s. After a stint in the US Army Corps of Engineers during World War I, he returned to the University of Michigan and obtained, in his words, “the degree of Civil Engineer” in 1922. Hill and his firm were hired by EBID and EP#1 to investigate possible hydroelectric power development at the federal reservoir. In 1934, he studied possible canalization of the Rio Grande from Elephant Butte through El Paso, a study that became the basis for the Rio Grande Rectification Project (see discussion in footnote 169). In addition to serving as Texas’s engineering advisor (which he did for nearly 40 years), Hill advised the International Boundary and Water Commission and served as consulting water engineer to the cities of Santa Barbara and San Diego. He also worked internationally on projects in Mexico and the Middle East. *State of Texas vs. State of New Mexico, et al, Plaintiff’s Case in Chief*, Volumes III & IV [hereafter *Plaintiff’s Case in Chief*, Vols.], 599a-603. CB-F-171A thru CB-F-1716: Transcripts of TX v. NM, Vol. 1-16, Box 4X219, Raymond A. Hill Papers [hereafter RAHP], UTA. See also Littlefield, *Conflict on the Rio Grande*, 161.

Hill’s recollections were prompted by a suit filed in US Supreme Court by Texas and New Mexico against Colorado for breach of the compact in the mid-1960s. For more, see Opinion V below.

⁴⁷ Raymond A. Hill, Consulting Civil Engineer, “Development of the Rio Grande Compact of 1938,” 14 and 21. In re: Rio Grande Project AG No. 011504362, Copies from the Center for American History, Raymond A. Hill Papers & The Rio Grande Compact Commission Collection. See also same cited pages in Raymond Hill, Consulting Engineer, “Development of the Rio Grande Compact of 1938.” ff. 49 Development of Rio Grande Compact of 1938, good history on water conflict, Texas, New Mexico, Colorado, prepared in context of 1966 Supreme Court Case, Box 4, MS 555 Joseph F. Friedkin Papers, C.L. Sonnichsen Special

When the Rio Grande Compact Commission re-opened negotiations in September 1937 few of the attendees had had an opportunity to examine the report in advance, so the engineer-in-charge of the investigation, Harlowe M. Stafford, presented the *JIR*'s findings.⁴⁸ Calling attention to the report's immense size (1,700 mimeographed pages), he conceded that it was not easily summarized. At Harper's prodding, Stafford focused on those issues most critical to the commissioners. He emphasized that the investigation aimed to offer "factual data on the water supply, water utilization and water requirements, with the possibilities of augmenting supplies to the basin by transmountain diversion or conservation by storage." The quantity and quality of water, the federal engineer assured the commissioners, were central concerns. He described the efforts made by the various federal agencies involved to measure the water supply and assess water quality, and identified in which volumes specific information developed by these agencies could be found. Findings as to runoff, return flow, groundwater, irrigation development and irrigated acreage, and water uses and requirements within the Upper Rio Grande Basin were summarized in Volume I and, according to Stafford, assisted in the determination of the "diversion requirements of major units of the basin" – namely the San Luis Valley in Colorado, the Middle Rio Grande in New Mexico, and the lands between Elephant Butte Reservoir in New Mexico and Fort Quitman, Texas.⁴⁹

Asked by Harper to identify the amount of irrigable acreage and current water uses in these areas for the benefit of those who had not yet seen the report, Stafford went to the tables in Volume I. The study had determined that 3 million af of water was produced in the basin – almost all of which came from sources in Colorado and New Mexico. Irrigated and "water consuming" acreage in the basin amounted to nearly 2 million acres, but less than 1 million was "actually irrigated with the balance taken up by areas temporarily out of crop and areas occupied by cities and towns and bare lands." The engineer noted that the "Total for the basin [was] 924,000" – "600,000 in the San Luis section; 153,000 in the Middle Rio Grande section, which includes acreage in tributary areas; and 171,000 in the Elephant Butte-Fort Quitman sections." Basin-wide stream flow depletion was 2.7 million af, which according to Stafford suggested there was "about 200,000" acre-feet of surplus flow on average during the 46-year study period (1890-1935)

Collections Department, University of Texas at El Paso [hereafter UTEP Spec Coll]. Additionally, this narrative was published posthumously in the *Natural Resources Journal* in 1974. See Raymond A. Hill, "Development of the Rio Grande Compact of 1938," *Natural Resources Journal* 14:2 (April 1974): 64-200.

⁴⁸ The NRC selected Stafford, then serving as Water Commissioner for the Sacramento and San Joaquin Valleys of California to lead the federal effort in January 1936. Barrows and Adams were to serve as "a Consulting Board," "an advisory group," to work with Stafford and liaise with the Rio Grande Compact Commission. Rio Grande Joint Investigation, January 10, 1936, Approved: January 11, 1936, by Frederic A. Delano, Vice Chairman, National Resources Committee, 4-5. Folder 390, Box 26, FAC, WRCA.

⁴⁹ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 6-8. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

chosen by the investigation. This same 200,000 af was, he also noted, “about what now flows at Fort Quitman.” Of this 2.7 million af, the San Luis Valley, “exclusive of the consumption in the closed basin,” took 1,047,000 af; the Middle Rio Grande, 768,000 af; and the Elephant Butte-Ft. Quitman lands, 885,000 af. As to the diversion requirements for the various areas within the basin, Stafford presented the investigation’s findings concisely:

650,000 acre-feet would be the diversion demand at Del Norte; in the Conejos area 230,000; Middle Rio Grande area 580,000 at Otowi Bridge; between Middle Rio Grande and San Marcial about 80,000, and Elephant Butte-Fort Quitman section 953,000 at San Marcial; or taking out the estimate of seepage and evaporation, 773,000 acre-feet demand on the reservoir. Those figures are set up on the basis of the irrigated acreage as follows: In the San Luis section 353,000 acres; Conejos, 80,000; Middle Rio Grande, 100,000; Elephant Butte-Fort Quitman section, 145,000 acres. That would not be total irrigated acreage, but the maximum for any one year.

Almost immediately following presentation of these figures, the commission adjourned at Clayton’s suggestion. Texas’s commissioner, citing an earlier proposal by former Colorado Governor A.T. Hannett, recommended that the individual commissioners withdraw to meet with their advisors and draft “written statements” outlining “the minimum conditions under which we would be willing to negotiate.”⁵⁰

When the commission reconvened the afternoon of September 28, Colorado commissioner M.C. Hinderlider explicitly used information contained in tables and charts presented in Volume I to support his state’s longstanding view that there was sufficient water in the basin for the development of lands in Colorado “comparable to that which now exists in the Middle and Elephant Butte-Fort Quitman sections” without harming established developments in New Mexico and Texas. “As a matter of fact,” he asserted, “the usable water supply for the Middle section would be improved by the construction and operation of the reservoirs required in the San Luis section.”⁵¹

For their part, both New Mexico and Texas signaled their willingness to negotiate with each other and with Colorado. New Mexico was open to discussing “increased storage” in the basin for Colorado provided that “proper safeguards” for New Mexico’s water users were instituted and a transmountain diversion to bring additional water into the basin was “made an accomplished fact coincident with the construction of such storage in Colorado.” With regard to Texas, New Mexico indicated it was receptive to talks focusing on “the right to the use of water claimed by

⁵⁰ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 9. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

⁵¹ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 2-3 and 11. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

citizens of Texas under the Elephant Butte Project on the basis of fixing a definite amount of water to which said project is entitled.” It insisted that Mexican diversions had to “be strictly limited to treaty provision of 60,000 acre-feet per annum.” Development of the Middle Rio Grande Conservancy District to its approximately 123,000 acres, moreover, had to be respected as did “[a]ll existing rights to the use of water in the Rio Grande Basin in New Mexico.”⁵²

Texas’s negotiation position was the most succinct and direct of the three:

Although the State of Texas feels that it should share in the benefits from new works for the augmentation of the water supply of the Rio Grande, it will not insist thereon, provided that the States of Colorado and New Mexico will release and deliver at San Marcial a supply of water sufficient to assure the release annually from Elephant Butte Reservoir of 800,000 acre-feet of the same average quality as during the past ten years, or the equivalent of this quantity if the quality of the supply is altered by any developments upstream.

The proceedings then adjourned for an “informal discussion” between the commissioners and their advisors regarding how the meeting might move forward. The commissioners decided to meet in executive session the following day with each commissioner limited to two advisors who could participate in discussions. Additional representatives from each state and the NRC attended, but only as observers. No record was made of this executive session.⁵³

Substantive talks resumed on the third day, and quickly became technical in nature with the engineering advisors debating the relative merits of flow schedules and the quantity as well as the quality of water the downstream states (Texas, in particular) could expect should Colorado develop its own reservoirs upstream. For its part, Colorado offered a schedule of deliveries that would provide 750,000 af per year for the “mean required releases from Rio Grande Project storage.” After considerable discussion, principally among the engineering advisors, the commissioners elected to adjourn to provide their advisors an opportunity to meet as a group, sift through the data, develop the “technical basis” for a compact, and report back to the full commission.⁵⁴

The engineering advisors met twice following the October adjournment – the first time in Santa Fe from November 22 to 24, and the second in Los Angeles from December 15 to 27. On both

⁵² Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 12-13. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

⁵³ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 13. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

⁵⁴ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 16-42, 53, and Exhibit No. 4, 61 (the schedule is also given on p. 32 of the proceedings themselves). Untitled folder 5, Box 2F463, RGCC-FBCP, UTA; and Littlefield, *Conflict on the Rio Grande*, 201.

occasions the attendees were the same: Reclamation engineer E.B. Debler for the US, Tipton for Colorado, John Bliss for New Mexico, and Hill for Texas.⁵⁵ The Santa Fe meeting was dedicated to discussions about the factors influencing discharge of Rio Grande water at the Colorado-New Mexico state line and delivery of water to Elephant Butte Reservoir. The Los Angeles meetings dealt with these same issues in greater detail, developing explicit delivery schedules at certain control stations on the Rio Grande and its tributaries.

In Santa Fe in November, the engineers clung to their state's positions and were quite apart from each other. Tipton, as he had with the full commission meetings, opened the discussion. According to a memorandum prepared for Clayton by Hill following the meeting, in addition to insisting that Colorado receive credits for water prevented from being illegally diverted by Mexican interests, Colorado's engineering advisor stressed:

- a. Colorado can not [*sic*] consider anything less than present requirements, which means that depletion in the future will be at least as great as during the past few years.⁵⁶
- b. The people in the San Luis valley are strongly opposed to any state line schedule that will restrict their use of water prior to the time that storage is provided.
- c. Even after storage is provided, they do not want any schedule that will give more water in dry years than actually did pass the state line.

Hill took all of this to mean that Colorado would not accept any restrictions on its use of water. He nevertheless believed that Colorado desired a compact and was willing to work toward "some reasonable schedule." Tipton, in fact, had developed such a schedule for a state-line delivery, "which could have been satisfied under natural conditions during the past eight or nine years." Colorado's engineering advisor was going to try to persuade San Luis Valley interests to accept

⁵⁵ A graduate of the Colorado Agricultural College (today Colorado State University) in 1925, John Bliss first worked to the Colorado State Engineer's office in land surveying. In 1926, he joined the New Mexico State Engineer's office and eventually rose to become the state engineer in 1946. He worked on several hydrographic investigations on streams in New Mexico, which included work in the Upper Rio Grande Basin, in Colorado's San Luis Valley, the Middle Rio Grande (above Elephant Butte), and as discussed in greater detail in Opinion III below, between Elephant Butte and El Paso. In addition to serving as engineering advisor to McClure, the New Mexico State Engineer, Bliss had substantial involvement in New Mexico's contributions to the federal Rio Grande Joint Investigation. *Defendant's Case in Chief*, Vols. X & XI, 2011. CB-F-171A thru CB-F-1716: Transcripts of TX V. NM, Box 4X219, RAHP, UTA; and "Past New Mexico State Engineers," New Mexico Office of the State Engineer / Interstate Stream Commission, available online at <http://www.ose.state.nm.us/ProgramSupport/sepastEngineers.php>, last accessed May 11, 2019.

⁵⁶ In his notes, Hill did not elaborate on what Tipton meant by "depletion."

this schedule. The other advisors, for their part, did not accept it outright but rather indicated that it “might be acceptable.”⁵⁷

Bliss, according to Hill, was apparently willing to accept deliveries to Elephant Butte based upon water actually stored in the reservoir in prior years. Yet, New Mexico’s engineering advisor was apparently “very fearful of any fixed schedule, on account of uncertainty of physical conditions, particularly as to the amount of tributary inflow between Ottiwi [*sic*] and San Marcial.” Hill thought that an agreeable schedule on the basis of prior years’ inflow could be found “[i]f some formula can be developed that will protect them against under-deliveries through causes beyond their control.”

As discussed in Opinion II, Hill addressed the issue of water quality with Bliss independently of the discussions with Debler and Tipton. Texas’s engineering advisor believed that Bliss was sympathetic but unsure of how to proceed. Hill remained hopeful that he could convince Bliss “that some allowance be made for change in quality of water.”⁵⁸

For his part, Hill continued to advocate for 800,000 af for Texas via Elephant Butte. In the face of skepticism from Tipton, Bliss, and Debler, Texas’s engineering advisor argued that this quantity of water was necessary to assure downstream lands in Texas with a sufficient quality of water – what he called “equivalent service.” Hill privately acknowledged to Clayton that the 800,000 af was open to dispute given recent releases from Elephant Butte and careful operation of the project:

Unfortunately the project, with 1,500,000 acre feet in storage and more acres in crop than in any other year, or in several years, the release from Elephant Butte has been only about 730,000 acre feet, and will be less than 730,000 acre for the entire year 1937. This desire to save water in one year, when there was every reason for using larger amounts, has made and will make it very difficult to substantiate the 800,000 acre feet requirement, especially as we can look to some reduction in diversion, particularly on that to Mexico.

The economy in use this year may cost the project 50,000 acre feet annually hereafter.⁵⁹

Transmountain diversions were also discussed at the engineers’ meeting. Debler was of the mind that new water from outside the basin was needed to provide a “permanent solution.” Hill grudgingly accepted that if new water was brought into the basin for the benefit of existing lands, “the situation will be corrected automatically.” In Hill’s view, if a state paid for a water-

⁵⁷ Raymond A. Hill, Memo to Mr. Clayton: In re Meeting of Committee of Engineers, at Santa Fe, November 22 to 24, 1937, November 26, 1937, 1-2. [1937], Box 2F467, RGCC-FBCP, UTA.

⁵⁸ Hill, Memo to Mr. Clayton, November 26, 1937, 2. [1937], Box 2F467, RGCC-FBCP, UTA.

⁵⁹ Hill, Memo to Mr. Clayton, November 26, 1937, 2-3. [1937], Box 2F467, RGCC-FBCP, UTA. Notably, 730,000 af was the quantity of water first appropriated by Reclamation for the Rio Grande Project in 1906.

importation project, it should receive sole benefit of the water. If the federal government brought new water to the Rio Grande, however, each of the three states should receive equal amounts of that water. Tipton was strongly opposed to Texas receiving any new water, but he conceded “the equity of the provision” suggested by Hill.⁶⁰

Despite the limited progress Hill described in his account of the November meetings, the engineering advisors arrived at what they believed was the technical basis for a compact by the end of the December meetings. Critically for Texas, Hill secured the concession of 800,000 af from the engineering advisors from Colorado and New Mexico. At that meeting, Bliss offered his own calculations of the project requirements for Elephant Butte. Allowing for delivery of water not only within the project and to Mexico but also to downstream lands in Hudspeth County, “unavoidable” project wastes and losses, “undivertable winter flow,” and water necessary to achieve a “salt balance” down to Ft. Quitman, the engineer projected 750,000 af from Elephant Butte. This was the same figure developed by Tipton and offered by Colorado at the September-October compact proceedings.⁶¹

Yet, both Tipton and Bliss ultimately accepted 800,000 af. Tipton was persuaded, as he later explained to Hinderlider, that this “amount [was] not far different from the proposal made by Colorado [at the compact proceedings], and not far different from the conclusions of the engineers for the N.R.C. [i.e., the Rio Grande Joint Investigation].” “These engineers,” he pointed out,

arrived at two demands on Elephant Butte by two methods of analysis, one demand being 773,000 acre-feet and one being 736,000 acre-feet. The 773,000 acre-foot demand was recommended. Both were based on a delivery of 60,000 acre-feet to Mexico. It was estimated by N.R.C. engineers that the diversions to Mexico in 1930-1936 inclusive above the Tornillo Canal heading averaged 130,000 acre-feet per year. Therefore, if these diversions were reduced to 60,000 acre-feet there would result a saving of 70,000 acre-feet, and the normal release from Elephant Butte Reservoir would become 800,000 acre-feet, minus two-thirds of 70,000, or about 753,000 acre-feet. This is almost exactly the average between the two demands worked out by the engineers of the N.R.C. and practically the same as the 750,000 acre-feet suggested by Colorado in October, 1937, which was based upon a diversion to Mexico of 60,000.

This reasoning appears to have held true for Bliss as well. On December 22, as the engineering advisors prepared to draft their recommendations, he informed McClure by letter that all had

⁶⁰ Hill, Memo to Mr. Clayton, November 26, 1937, 3. [1937], Box 2F467, RGCC-FBCP, UTA.

⁶¹ [Raymond Hill], “TEXAS COMPACT: John Bliss Estimate of Project Requirements at Elephant Butte,” 12/17/37. CB-F-137-34, Box 4X215, RAHP, UTA; and “John Bliss Estimate of Project Requirements at Elephant Butte,” typescript, n.d. CB-F-137-34, Box 4X215, RAHP, UTA.

agreed that “the Elephant Butte Project [would]...be limited to annual releases of 800,000 acre feet reduced by two-thirds of the savings to be made by limiting Mexico.”⁶²

In the resulting “Report of Committee of Engineers to the Rio Grande Compact Commissioners,” dated December 27, 1937, the engineering advisors noted that they had “avoided discussion of the relative rights of water users in the three States.” Instead, they “were guided...by the general policy – expressed at the meeting of the Compact Commission in October – that present uses of water in each of the three States must be protected in the formulation the Compact,” as “the usable water supply is no more than sufficient to satisfy such needs.” The engineers further recognized that “precise determination of past conditions and close estimates of future changes” were “not possible,” so they recommended “review of these matters” by the commission “after five years and for adjustments within the intent of the Compact.”⁶³

For the purposes of their discussion on how to distribute equitably the existing water among the three states, the engineers recognized the three natural divisions of the Upper Rio Grande Basin:

1. San Luis Valley – “the drainage area above the Lobatos gaging station on the Rio Grande near the Colorado-New Mexico State Line;”
2. “The Middle Rio Grande from Lobatos to Elephant Butte Reservoir...;”
3. “The balance of the Rio Grande Basin from Elephant Butte and Fort Quitman, including the Juarez Valley in Mexico.”

The main issue with respect to Colorado was to adopt a state-line delivery schedule to New Mexico. The engineers noted that there was a “consistent relationship...between the combined inflow of the major streams flowing into San Luis Valley and the outflow of the Rio Grande at Lobatos.” Construction of upstream storage reservoirs would disrupt this relationship so the engineers offered “separate schedules [of water delivery] for the Conejos and Rio Grande stream systems.” These schedules would “automatically” compensate for “variations in discharge of contributing streams...particularly, if storage reservoirs are constructed.” “The obligation of Colorado to deliver water in the Rio Grande at the Colorado-New Mexico State Line” the engineers observed, “would be the sum of the quantities set forth” in the schedules provided, subject to certain permissible departures. Use of these schedules would permit “appropriate

⁶² Tipton, *Analysis*, 11. ff. 70, Box 44-70, MCHC 1897-1987, HC; and John H. Bliss to Tom [Thomas M. McClure, State Engineer], December 22, 1937. Rio Grande Compact – July 7, 1937 to June 30, 1938, 26th Fiscal Year, NM_0015692 – NM_00156929.

⁶³ Hill, Memo to Mr. Clayton, November 26, 1937, 3. [1937], Box 2F467, RGCC-FBCP, UTA; “Report of Committee of Engineers to Rio Grande Compact Commissioners,” December 27, 1937, in Proceedings of the Meeting of the Rio Grande Compact Commission, Held at Santa Fe, New Mexico, March 3rd to March 18th, inc., 1938, Appendix No. 1, 40. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

adjustments...[to] made for any trans-mountain diversions, for any change in location in gaging stations, and for any new or increased depletion of natural run-off at gaging stations above Lobatos.”⁶⁴

With regard to New Mexico’s obligation to Texas, the engineers observed that “wide variations in the discharge of tributary streams” rendered the “amount of water in the Rio Grande above the principal agricultural areas of New Mexico and inflow into Elephant Butte Reservoir” inconsistent and unpredictable. After careful study, they agreed that a “reasonable relationship” existed “between the discharge of Rio Grande at Otowi Bridge and the inflow to Elephant Butte Reservoir,” excluding the months of July, August, and September. Removing these three months from the calculations, the remaining data could be used to adopt a proper schedule of deliveries at Otowi Bridge to obtain the appropriate supply of water at Elephant Butte. The curve then required some adjustment “to compensate for increased salinity of the Elephant Butte supply.” The New Mexico’s obligation to deliver water into Elephant Butte Reservoir was subject to several factors: a system of accrued credits and debits on annual scheduled deliveries; “appropriate adjustments...for any change in points of measurement”; “any new and increased depletion in New Mexico of the natural runoff measured at Otowi Bridge”; and “any trans-mountain diversions between Lobatos and Elephant Butte.”⁶⁵

The engineers set an average of 800,000 af per year as the “normal release” from Elephant Butte Reservoir – the quantity for which Hill and Clayton had argued. This release was subject to “any gain and loss in usable water resulting from the operation of any reservoir below Elephant Butte.” As both Tipton and Bliss indicated to their commissioners, it would also be “reduced or increased by two-thirds of any change in aggregate diversions and loss to Mexico between Courchesne gaging station and the lowest point of diversion to lands of the Rio Grande Project.” The suggested index used to determine the amount of change was “the average annual diversion and loss to Mexico from 1928 to 1937.” Should “normal release...[be] modified by any change in the amount of diversions and loss to Mexico,” Colorado and New Mexico had to “share equally” with

⁶⁴ “Report of Committee of Engineers to Rio Grande Compact Commissioners,” December 27, 1937, in Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 1, 40-42. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

⁶⁵ “Report of Committee of Engineers to Rio Grande Compact Commissioners,” December 27, 1937, in Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 1, 42-44. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

their “accrued credits or debits...adjusted annually by an amount equal to one-third of such change in diversions and loss to Mexico.”⁶⁶

Although the engineers recognized that natural variations in discharge at their selected control stations and additional storage of flood waters in upstream reservoirs would require appropriate adjustments to delivery schedules, they established definite limitations on accrued debits and credits. Colorado’s annual or accrued debit was capped at 100,000 acre-feet, except as caused by storage in reservoirs constructed above Lobatos after 1937. New Mexico’s allowable accrued debit was capped at 200,000 acre-feet, except as caused by storage in reservoirs in New Mexico. However, in both states accrued debit caused by such storage could not exceed the amount of water held in storage in such reservoirs. If in any year the total accrued debits of Colorado and New Mexico exceeded “the difference between the total capacity of [Rio Grande] Project storage and the amount of usable water then in storage, such debit shall be reduced proportionally to an aggregate amount equal to the minimum unfilled capacity in that year.” If there was unusable spill from Elephant Butte, all accrued debits of Colorado and New Mexico for that year would be cancelled, “excepting debits caused by storage in reservoirs prior to the time of spill.”⁶⁷

Accruals in excess of the limits established for Colorado and New Mexico, respectively, could be applied to offset debits caused by storage in reservoirs. In computing accrued credits or debits, annual credits in excess of 150,000 acre-feet were to be taken as equal to that amount. If unusable spill occurred at Elephant Butte Reservoir, the aggregate credits of Colorado and New Mexico would be reduced by the amount of such spill in proportion to each state’s respective credits at the time of the spill. “[N]o credits...[would] be considered in a year of spill.”⁶⁸

The report also proposed specific protections for the Rio Grande Project water supply. “[W]henver there [was] less than 400,000 acre-feet of water in storage available for use in the Rio Grande Project,” neither Colorado nor New Mexico would be allowed to increase storage in any reservoir built after 1929 in the Upper Rio Grande Basin. Furthermore, if the same minimum stage was reached on January 1 of any year, Colorado and New Mexico had to “release on

⁶⁶ “Report of Committee of Engineers to Rio Grande Compact Commissioners,” December 27, 1937, in Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 1, 45 and 47. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

⁶⁷ “Report of Committee of Engineers to Rio Grande Compact Commissioners,” December 27, 1937, in Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 1, 45-46. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

⁶⁸ “Report of Committee of Engineers to Rio Grande Compact Commissioners,” December 27, 1937, in Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 1, 46. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

demand, at the greatest rate practicable, water from reservoirs in the amount equal to the total debit of each which was caused by storage of water in reservoirs.”⁶⁹

In addition to adjusting the curve for New Mexico’s deliveries into Elephant Butte to compensate for increased salinity in the reservoir, the engineers also recommended a limitation on the salinity at the Colorado-New Mexico state line. It was still unclear whether or not Colorado’s “Closed Basin Drain” would be constructed and what effect the drain would have on the salt content of the Rio Grande downstream. Therefore, the engineers suggested that if any works were constructed after 1937 to deliver water from the Closed Basin Drain into the Rio Grande, Colorado would only be credited for the water so delivered if “the proportion of sodium ions is less than 45% of the total positive ions in that water.”⁷⁰

Concluding their report, the engineers offered their recommendation for the basis of a compact. They noted that “no material expansion of the irrigated area in the Rio Grande Basin above Fort Quitman” was feasible without transfers of water from outside the basin. Acknowledging that “[g]ood use could be made of this [imported] water,” they nevertheless determined that the “allocation of any supply so obtained constituted a matter of policy beyond our province.” Therefore, “no recommendation [was] made” on this issue. Three other recommendations were:

1. “...that the normal release from Elephant Butte Reservoir be deemed to be 800,000 acre-feet per annum, adjusted for gains or loss of usable water resulting from the operation of any reservoir below Elephant Butte,” and “that this normal release be reduced or increased by two-thirds of any change in aggregate diversions and loss to Mexico.”
2. “...that deliveries by New Mexico into Elephant Butte Reservoir be made in accordance with the schedule based on the flow at Otowi Bridge and the usable supply at Elephant Butte, subject to proper limitations on departures” (as outlined in the table in the report, “Deliveries Into Elephant Butte Reservoir Exclusive of July, August, and September”).
3. “...that deliveries by Colorado be the sum of the amounts set forth in the schedules for the Conejos stream system and for the Rio Grande system, exclusive of Conejos River, both subject to proper limitations on departures.”

⁶⁹ “Report of Committee of Engineers to Rio Grande Compact Commissioners,” December 27, 1937, in Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 1, 46-47. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

⁷⁰ For more on the water quality requirements at the Colorado-New Mexico state line, see footnote 120 below.

Inclusion of the delivery schedules and other provisions of the report, in the opinion of the engineering advisers, would result in both “the maximum practicable use of the waters of the Rio Grande, and would minimize unusable spill at Elephant Butte.”⁷¹

Confident that progress was being made toward an interstate compact, Texas filed a motion in December for a continuance of the *Texas v. New Mexico* hearings, which Warren subsequently granted. A month later, Clayton forwarded a copy of the report of the committee of engineers to the special master. Texas’s commissioner confessed that the report “means more to an engineer than to a lawyer,” but after having Hill explain the approach and conclusions, he and the other attorneys for Texas had been convinced that it represented “a reasonably fair compromise of the views of the three States and provides a fairly workable basis for a permanent compact.”⁷²

Although all of the engineering advisors signed off on the December 1937 report and recommended its adoption by the compact commission, McClure objected to the report in late January 1938. Even before the report was completed, he had reservations. When the New Mexico state engineer and compact commissioner learned the general outlines of the report on December 22 from Bliss, McClure confidentially told his advisor that the 800,000 af release “will not be agreeable.”⁷³

The New Mexico commissioner’s opposition hardened in the wake of a detailed analysis of the December 1937 report prepared by MRGCD consulting engineer H.C. Neuffer. After reviewing the engineering advisors’ report in January, Neuffer forwarded a six-page memorandum to Bliss critical of the work. In his transmittal letter he suggested re-consideration “of the schedules of delivery at San Marcial or Elephant Butte,” and recommended that “the figures upon which the curves” of the “usable supply at Elephant Butte” be obtained as he was having difficulty deriving those curves based upon the data he had on hand.⁷⁴

⁷¹ “Report of Committee of Engineers to Rio Grande Compact Commissioners,” December 27, 1937, in Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 1, 47. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver. Water quality is also discussed in Opinion II below.

⁷² Charles Warren to Frank Clayton, December 21, 1937; and Frank B. Clayton to Charles Warren, January 27, 1938. [1938], Box 2F467, RGCC-FBCP, UTA.

⁷³ Bliss to [McClure], December 22, 1937; and T.M. McClure to John H. Bliss, telegram, 1937 Dec 24 AM 10 27. Rio Grande Compact – July 7, 1937 to June 30, 1938, 26th Fiscal Year, NM_0015692 – NM_00156929 and NM_00156927.

⁷⁴ Two weeks after this letter, and after receiving his own from Neuffer, McClure contacted Hill to obtain “the data used in corrected the Elephant Butte storage figures and thereby arriving at your [Hill’s] Usable Supply table.” Thomas M. McClure, Engineer, to Mr. Raymond A. Hill, January 14, 1938. Rio Grande Compact – July 7, 1937 to June 30, 1938, 26th Fiscal Year, NM_00156897.

Neuffer and the district's "chief objection," as Bliss privately informed Tipton, was the report's recommended "normal release" of 800,000 af from Elephant Butte. According to New Mexico's engineering advisor, "The Middle Valley people have set their mind upon a much smaller figure as ample Project release annually." Indeed, Neuffer argued that figure "need not be in excess of 700,000 acre feet per annum." The MRGCD consulting engineer pointed in his memorandum that over the past decade, 1927 to 1936, 781,000 af on average had been released from the reservoir – a figure inclusive "of excessive quantities of water delivered to Mexico, avoidable project wastes, and savings which can be made after the channel rectification is completed."⁷⁵ He calculated that as little as 686,000 af could satisfy "Project use above El Paso," "Mexican Treaty Requirements plus river loss to riverside drain in Mexico," "Unavoidable project wastes below Riverside heading," "Winter discharge of Project drains in New Mexico not redivertable," and "Net project diversions below El Paso." In Neuffer's mind, 700,000 af "would be liberal allowance" for Elephant Butte Reservoir. The engineer nonetheless conceded the necessity for negotiation, and expressed his openness to 750,000 af "as the very maximum figure without injury to New Mexico or the Middle Valley" – the same figure suggested by Tipton and Bliss prior to the December 1937 report.⁷⁶

⁷⁵ For more on this channel rectification program, see footnote 169 below.

⁷⁶ H.C. Neuffer, Consulting Engineer, to Mr. John H. Bliss, State Engineer's Office, Re: Report of Committee of Engineers to Rio Grande Compact Commissioners, December 27, 1937, January 7th, 1938. NM_00054005; H.C. Neuffer, Memorandum, Subject: Report of Committee of Engineers to Rio Grande Compact Commissioners, December 27, 1937, np [1-3, and 6]; JHB, Engineer, to Mr. R.J. Tipton, Consulting Engineer, January 14th, 1938. Rio Grande Compact – July 7, 1937 to June 30, 1938, 26th Fiscal Year, NM_00156900 – NM_00156902, NM_00156905, and NM_00156892 – NM_00156894.

The other objections included adjustments to be made for Caballo; accounting for losses to Mexico; the tally of 2,638,860 af for the "maximum storage for the Rio Grande Project"; language in the December 27, 1937 report concerning "unusable spill"; "the arbitrary figure of 400,000 acre feet storage in Project reservoirs, below which all storage debits of the upper basin states could be called for by the Project"; and the relation between Colorado-New Mexico state line deliveries and Otowi. Independently, Bliss expressed second thoughts as to the exclusion of the months of July, August, and September, in the Otowi-Elephant Butte index – although Neuffer had "no serious objection" to this. See Neuffer, Memorandum, December 27, 1937, np [1-6]; and JHB to Tipton, January 14th, 1938. Rio Grande Compact – July 7, 1937 to June 30, 1938, 26th Fiscal Year, NM_00156900 – NM_00156905, and NM_00156892 – NM_00156894.

On the issue of Elephant Butte releases, Tipton wrote back a few days later that he was "inclined to agree with" Bliss, and that it was "a matter which will have to be thoroughly discussed by the Compact Commissioner." Tipton himself was "going to give more thought to" the issue. Tipton also clarified some matters relating to the 400,000 af figure, and expressed interest in developing "a State Line-Otowi relationship." As to the exclusion of the three months from the Otowi-Elephant Butte index, the Colorado engineer admitted that he "did not follow in sufficient detail your [Bliss], and Mr. Hill's work in connection with setting up the Otowi-Elephant Butte relationship to express an opinion...." R.J. Tipton, to Mr. John H.

Two weeks after writing Bliss, Neuffer urged McClure to reject the engineering advisors' report. The MRGCD consulting engineer had thus far been unable to verify portions of the report because "of the availability of the data used by the Committee in working out the relationship of the flow of the Rio Grande at various stations." Moreover, he argued that "[t]here are...certain other items which we feel, if agreed upon, would result in permanent damage to the Middle Rio Grande Conservancy District and other water users in New Mexico above the Elephant Butte Dam." Neuffer did not specify what those items were in his letter, but they were likely the same as he raised in the memorandum forwarded to Bliss. The MRGCD consulting engineer further offered the services of the district to the engineering advisors.⁷⁷

McClure formally objected to the "Report of the Committee of Engineers" in a January 25, 1938 letter to Harper. The New Mexico state engineer indicated that he had given the report "additional consideration," and was now "in thorough accord with the position taken by Mr. Neuffer." McClure had also discussed the work "with others in authority representing the State of New Mexico," and all were of the same mind to reject it. He dismissed the report as "too vague and indefinite in some respects," lacking a sufficiency of data to support "the relationship of flow at various stations." The "basis for the water supply to the State of Texas," furthermore, was in McClure's "judgment and in the judgment of others in authority in New Mexico...so far out of reason that it could not be considered as a basis for negotiations." Most damningly, the New Mexico state engineer asserted that "the engineers in their recommendation plainly exceeded their authority." Rather than "reporting accurate basic data," which McClure understood to be their charge, they offered "a compromise of basic data." Echoing Neuffer, he called "for the engineers to reassemble at the earliest possible moment and give this matter further study."⁷⁸

New Mexico's view of the December 1937 report was in stark contrast to Texas's and Colorado's. Two days after McClure's letter to Harper, which was circulated to the other commissioners, Clayton praised the work of the engineers to the Rio Grande Compact Commission chair. He thought their report offered "a fairly workable basis for the equitable apportionment of the waters of the Rio Grande, without permitting further encroachments upon Texas' already inadequate supply." Texas's commissioner neither accepted McClure's characterization of the

Bliss, January 18, 1938. Rio Grande Compact – July 7, 1937 to June 30, 1938, 26th Fiscal Year, NM_00156881 – NM_00156882.

⁷⁷ [H.C. Neuffer] to Mr. Thomas M. McClure, State Engineer, January 13, 1938; and Thomas M. McClure, State Engineer, to Mr. S.O. Harper, Chairman, Rio Grande Compact Commission, January 25th, 1938. ff. 032.1 Rio Grande Basin Corres. re Compact between States of Colorado; New Mexico & Texas re Rio Grande Basin Water Rights, Jan. 1938 thru May 1939, Box No. 936 Rio Grande Basin 023._246., Entry 7, RG 115, NARA Denver.

⁷⁸ McClure to Harper, January 25th, 1938. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

work nor believed that the engineers had exceeded their authority. As to the assertion that “the basis for water supply to the State of Texas” was unreasonable, Clayton countered

It seems to me and to those interested with me in the protection of Texas’ water supply that the report contains no recommendations for the benefit of Texas than what she is plainly entitled to. In fact, it makes concessions to the upper States about which we are somewhat dubious. But in the interests of an amicable settlement of our common problems, we are willing to accept the report as a basis for further negotiation.... [T]he engineering representatives of all three States and of the United States, as well, apparently reached the conclusion, after considerable research and negotiation, that the basis suggested in the report will do no more than preserve the status quo as far as the water supply is concerned, while, at the same time, permitting New Mexico and Colorado to proceed with certain desired developments.

He further pointed out

in passing that the commissioner for New Mexico seems to lose sight of the fact that there is a very extensive section of his own State lying below the Elephant Butte dam, and that its large vested interests are likewise entitled to representation and protection, along with the Middle Rio Grande Conservancy District.

Texas was “unwilling to recede from...the minimum requirements for the protection of Texas’ water supply in the report,” but was ready “to proceed with negotiations towards a permanent compact, based upon the report of the committee of engineers.”⁷⁹

⁷⁹ Frank B. Clayton, Rio Grande Compact Commissioner for Texas, to Mr. S.O. Harper, Chairman, Rio Grande Compact Commission, January 27, 1938. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

Hill also took exception to McClure’s objections in two separate letters to Clayton in early February. In the first, he admitted he was “somewhat amused by McClure’s position,” in that the New Mexico’s compact commissioner “relies more upon the judgment of Neuffer than that of his own deputy.” He supported Clayton’s position that another meeting of the engineers was unnecessary and the compact commission was the best venue for further deliberation. Raymond A. Hill to Mr. Frank B. Clayton, February 3, 1938. Box 2F466, RGCC-FBCP, UTA.

The tone of Hill’s second letter, sent less than a week after the first, was angrier. Noting that Clayton had admonished McClure for failing to recognize the interests of New Mexican lands within the Rio Grande Project (Elephant Butte Irrigation District), Texas’s engineering advisor insisted “that the time has come when the State of Texas should cease being the direct representative of an irrigation district situated in New Mexico.” He argued that as long as Texas advocated for the water rights of all lands under the Rio Grande Project, New Mexico officials would identify more strongly with the interests of the Middle Rio Grande Conservancy District. Hill suggested that “pressure” be brought to bear on McClure to defend all of New Mexico’s interests, and that Texas demand a schedule of deliveries measured at Courchesne for its lands only. Such a schedule would provide roughly 500,000 af for Texas:

- (a) for all water diverted or lost to Mexico;
- (b) for all consumptive requirements below El Paso;

Hinderlider was similarly critical of McClure. Writing to Harper in early February, he insisted that “Mr. McClure should not unqualifiedly accept the views of Mr. Neuffer,” and he strongly opposed including the MRGCD engineers in the discussions. The Colorado commissioner objected further to what he saw as local interests influencing state authorities, insisting “that it will be impossible to reach an interstate agreement so long as every individual group of water users is permitted to inject and insist upon individual points of view.” Colorado sought “parity with the two lower states, in the development of her water resources in the San Luis Valley,” and Hinderlider believed that the engineers’ report “could be accepted in principle as a basis of further discussions and negotiations by the Compact Commission.” He suggested that McClure “specifically and definitely point out the items in said report to which he takes exception, and indicate the particular points upon which he desires further information.” On this basis, the commission as a whole could determine if the engineers needed to meet again prior to the commissioners.⁸⁰

Because of McClure’s letter and the subsequent correspondence from Clayton and Hinderlider, Harper suggested the commission meet on March 3 in Santa Fe. When proceedings re-opened both Clayton and Hinderlider expressed their support of the engineering advisors’ report even as McClure rose to repudiate it. Altogether New Mexico’s commissioner proposed nine separate specific changes to the report. Before the commission, however, McClure stressed that the two most important issues were: 1) the indexing between Otowi and Elephant Butte “usable [supply],” and 2) use of 800,000 af as the “basis of releases from the Elephant Butte Reservoir.” He argued that the engineers offered no “actual factual data” to support the Otowi-Elephant Butte indexing relationship and the release schedules for the reservoir. The 800,000 af was, moreover, “far in excess of past and present average releases and [was] far in excess of their project needs.” As evidence of the report’s deficiencies, McClure asserted that his office had

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- (c) for drainage outflow in sufficient amount to give a salt balance and provide equivalent service;
 - (d) for operating waste; and
 - (e) for water undivertible in the winter and in excess of irrigation demands during the irrigation season.

Hill recognized that this idea had been discussed and rejected previously, but he was of the opinion “that the situation is sufficiently changed to warrant such a demand from Texas.” Raymond A. Hill to Mr. Frank B. Clayton, February 8, 1938. Box 2F466, RGCC-FBCP, UTA. As discussed in Opinion IV, such an arrangement was untenable owing to the nature of the Rio Grande Project. No historical evidence, moreover, has come to light that Hill’s suggestion was seriously entertained by Clayton or discussed at the subsequent (and last) compact commission meetings in March 1938. See also Littlefield, *Conflict on the Rio Grande*, 202-203.

⁸⁰ M.C. Hinderlider, Commissioner for Colorado, to S.O. Harper, Chairman, Rio Grande Compact Commission, February 4, 1938. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

analyzed the indexing stations used in the report and found the Otowi-Elephant Butte indexing in the report inaccurate.⁸¹

Clayton preferred the commissioners to work out these issues, calling upon the engineering advisors or NRC representatives for clarification as necessary. Harper, Hinderlider, and the engineers themselves, however, were persuaded that the engineers should formally assess the merits of New Mexico's objections. In a presentation the following day (March 4), the engineers indicated their willingness to re-consider their report on the basis of nearly all the issues raised by McClure.⁸² With regard to the two key objections – use of an Otowi-Elephant Butte index and the 800,000 af to be released from the reservoir – they agreed “to give further consideration” to New Mexico's proposal for an Otowi-San Marcial index, and to examine “any data in support” of New Mexico's claim that “800,000 acre-feet of water exceeds both past uses and requirements below Elephant Butte,” data hitherto unavailable to them. The commissioners concluded that the engineering advisors should meet again to revise their report, with Clayton insisting that New Mexico “furnish the data and other figures on which they predicate their demands” and the commission proceed with negotiations while awaiting a revised report.⁸³

That revision took a week to complete. The engineers worked in isolation, joined only by Neuffer who acted as a “witness.”⁸⁴ A “Memo of Suggested Changes to be Made in the Engineering

⁸¹ S. O. Harper, Chairman, Rio Grande Compact Commission, to Mr. M.C. Hinderlider, Rio Grande Compact Commissioner for Colorado, Mr. Thomas M. McClure, Rio Grande Compact Commissioner for New Mexico, and Mr. Frank B. Clayton, Rio Grande Compact Commissioner for Texas, February 12, 1938. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver; and Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 1, 3, 5 and 9. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

⁸² On two issues the engineering advisors were unwilling to concede to further review. Collectively, they concluded that New Mexico's request “to be relieved of responsibility for Indian or other operations beyond its control” was “a matter...of policy for determination by the Compact Commission.” The group further dismissed New Mexico's assertion that their December 1937 report had engaged in a “judicial interpretation” of the Mexican treaty. They were nevertheless open to examining data that New Mexico might have with regard to fixing the figure of present-day use by New Mexico. Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 11-15. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

⁸³ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 7-15, and Appendix No. 6, 56-57. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

⁸⁴ Neuffer's attendance was prompted by a suggestion by one of McClure's legal advisors, former New Mexico governor Arthur T. Hannett in a stated bid to “save a lot of time.” Edwin Mechem, EBID's counsel and a legal advisor to Clayton, immediately objected to what he saw as MRGCD engineering consultant being “substituted for the State's [New Mexico's] expert.” Mechem asserted that EBID's interests were greater and that “Mr. Neuffer doesn't represent us.” Hannett countered that his suggestion was not to replace Bliss, but simply to include Neuffer. It was a “practical matter,” because MRGCD's support for the compact was essential to the compact's ratification by New Mexico's legislature. “For that reason the

Advisors' Report," prepared by Bliss coming out of the March 3 meeting, indicates that altogether 11 revisions were to be made or considered. The most notable of these were the substitution of "an "Otowi-San Marcial relation" for the engineers' recommended "Otowi-Elephant Butte Supply relation," and the reduction in the proposed 800,000 af average "Normal Release from Elephant Butte" per year to 775,000 af. This was close to the figure that the federal Rio Grande Joint Investigation had determined as the demand on the reservoir for the Elephant Butte-Ft. Quitman section of the basin, and 25,000 af more than Tipton and Bliss had calculated ahead and during the engineering advisors' meetings.⁸⁵

Dated March 9 but presented the following day, the revised engineers' report reflected the two key changes sought by New Mexico. An Otowi-San Marcial index (excluding the months of July, August, and September) replaced the original Otowi-Elephant Butte index, and the recommended figure for "normal release from Elephant Butte" was reduced. However, that reduction was not from 800,000 af annually to 775,000 af as suggested by Bliss's "Memo." Instead the normal release was proposed to be "an average of 790,000 acre-feet per annum, adjusted for any gain or loss of usable water resulting from the operation of any reservoir below Elephant Butte."⁸⁶

As discussed above, Hill had been adamant that 800,000 af was critical to serving lands in Texas with a sufficient quantity and quality of water, and it was a position that Clayton strongly supported before the rest of the commission. Nonetheless, the revised report recommended a lesser figure under pressure from interest in New Mexico. The reason for Texas's concession may very well lie in the problem Hill had identified back in November 1937: the fact that in recent years the Rio Grande Project had utilized closer to 730,000 af. Thirty years after the compact had been signed, Hill gave sworn testimony in a deposition for the *Texas and New Mexico v. Colorado*

engineering expert of that district," he asserted, "has got at least to have the opportunity to check our figures before we bind ourselves, and that's all we ask." At Hinderlider's suggestion, Neuffer was therefore designated a "witness" rather than a direct participant in the engineering discussions with the commissioners agreeing that his contributions would be at the discretion of the engineers. Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 18-20. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

⁸⁵ J.H. Bliss, Memo of Suggested Changes to be Made in Engineering Advisors' Report, March 3, 1937. . Rio Grande Compact – July 7, 1937 to June 30, 1938, 26th Fiscal Year, NM_00156842-NM_00156843. The date, "March 3, 1937," on the face of this document is likely a typographic error. The memo's content makes clear that it was drafted either just before or just after the March 3, 1938 compact meeting, in light of McClure's objections to the December 27, 1937 engineering advisors' report. Additionally, this particular copy of the memo (NM_00156842) appears in sequence of chronologically organized documents between other documents from 1938.

⁸⁶ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 61, 62, and 65. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

suit before the US Supreme Court in 1968 that succinctly explained the 790,000 af figure adopted by the commission and later ratified in the 1938 Compact:

The 790,000 acre-feet that was arrived at as the normal release, so defined in the Compact, included the water which was obligated to be delivered to Mexico under the Treaty of 1906, the 60,000 acre-feet in the Acequia Madre. So that the allotment on the downstream side of Elephant Butte was really seven hundred thirty for uses in the United States and sixty for uses in Mexico, and the provision that was incorporated that if they used more than sixty in Mexico, it came out of the seven hundred thirty....⁸⁷

Following Debler's presentation and submittal of the written report, the commission recessed until March 11 to give the compact commissioners an opportunity to review the proposed changes to the December 1937 engineering advisors' report. When the commission reconvened, it almost immediately went into a closed session to permit an "informal discussion, off the record" so the commissioners could "speak freely" on points in the report that required "further clarification or change." The precise substance of this discussion is unknown; it went unrecorded by the commission secretary. The recorded proceedings merely indicate that the commission as whole sought "additional information" about the report.

A formal written clarification report was submitted by the engineers on March 11, and before the commission Debler and Hill addressed two specific issues: "the stage of project storage when the upstream reservoirs ceased storing," and the meaning of "average" with regard to the proposed 790,000 af releases from Elephant Butte annually. For the first, Debler explained that the group had settled on 400,000 af as the minimum level of project storage to serve lands below Elephant Butte. As the clarification report went on to detail, if there was less than 400,000 af of usable storage in the reservoir then neither of the upper states could continue storing water in any reservoirs built after 1929. The "intent" (in Debler's words) or "principle" (in Hill's), was that the states would share proportionately in diminished stored water.⁸⁸

As for the second issue, according to Debler, use of the term "average" reflected the engineers' understanding that releases could be greater or lesser from year to year. McClure was concerned about the potential impact of years of releases greater than 790,000 af. Debler assured McClure that the system of debits and credits would protect the upper states from significant depletion. He also made plain that so long as the United States operated the reservoir, it would "bear down

⁸⁷ Deposition of Raymond A. Hill. Taken December 4, 1968, 18. ff. Texas & New Mex. v. Colo., w. 66-1061 Texas vs. Colorado, Box 1989 41-240, LF-TAG, TSA.

⁸⁸ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 25-27, and Appendix No. 8, 66. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

awfully hard so those boys down there [i.e., the waterusers] don't short themselves in low periods as they have in the past."⁸⁹

Following this presentation, the commissioners' focus shifted to the drafting of the compact. They accepted these revisions and appointed a "Drafting Committee" to put the final document together. The legal advisors to the commissioners comprised this committee: Corlett and Carr for Colorado; former New Mexico governor Arthur Hannett and Fred E. Wilson for New Mexico; and Burges and EBID attorney Edwin Mechem for Texas. No federal representative was available to attend, so the attorneys for the state commissioners worked out a draft. The full commission recessed for nearly a week, from March 11 to March 17, as the legal committee deliberated. "Several closed and informal meetings of the Commission," according to the recorded commission proceedings, "were held." At these meetings "controversial questions were discussed with the Drafting Committee and the engineering advisors and differences were resolved" confidentially with "[n]o record of these meetings...kept."⁹⁰

The engineers reviewed at least one draft of the compact dated March 16. A memorandum signed by all of the engineering advisors and Neuffer and dated that same day suggested some changes. They recommended, for instance, the inclusion of a paragraph compelling the Commission to undertake "special studies" of the flow at San Acacia, San Marcial, and below Elephant Butte should "the necessity arise" for "an equivalent schedule." The engineers also suggested "[a]mplifying" paragraph 15 of the draft compact like so:

During the month of January of any year the Commissioner for Texas may demand of Colorado and New Mexico, and the Commissioner for New Mexico may demand of Colorado, the release of water from storage reservoirs constructed after 1929 to the amount of the accrued debits of Colorado and New Mexico, respectively, and such release . . .

"In the next to the last line" of this paragraph, they further called for the addition of the phrase "of 790,000 acre-feet" to modify the term "release."⁹¹

On March 17, 1938, the Drafting Committee submitted their final compact draft to the commissioners who accepted it unanimously the following day. Although no provision was made in the final document for the "special studies" suggested by the engineers, Article IV required that "[c]oncurrent records...be kept of the flow of the Rio Grande at San Marcial, near San Acacia,

⁸⁹ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 29. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

⁹⁰ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 31-33. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

⁹¹ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 9, 68-70. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

and of the release from Elephant Butte Reservoir, to the end that the records at these stations may be correlated.” The final draft also incorporated the language suggested by the engineers for paragraph 15 as Article VIII.⁹²

The state compact commissioners, Clayton, Hinderlider, and McClure, soon after forwarded the document to their respective governors, and in the case of Harper, to the secretary of the interior. In his November 1938 transmittal letter to Governor W. Lee O’Daniel, Clayton expressed his opinion that the “compact represents a fair and equitable settlement of the controversies that have raged almost continuously for over forty years between the three States.” “As far as Texas is concerned,” the commissioner wrote, “it in effect prevents further encroachments on the waters of the Rio Grande by the upper basin States.”⁹³

Letters by Hinderlider, McClure, and Harper all evoked the same optimism, even as each touted the individual benefits of the compact of their respective states or for the United States. Hinderlider “believed” that the “interstate River Compact or Agreement...equitably allocates the waters of the Rio Grande Basin originating above Fort Quitman, Texas, between the States of Colorado, New Mexico, and Texas.” For Colorado specifically, he informed Governor Teller Ammons a few days after Clayton wrote O’Daniel, the “permanent compact...fully protects present and future uses of waters in the San Luis Valley, and the San Juan Basin in Colorado against exportations of water out of that basin for use in the Rio Grande Basin in New Mexico, except upon the conditions stated in the Compact.” That protection further extended, according to Hinderlider, to “the rights of the water users under federal reclamation projects in New Mexico and Texas,” as well as to “Indian tribes, and to the Republic of Mexico under existing treaty obligations.”⁹⁴

McClure used almost identical language to Hinderlider in his letter to New Mexico Governor John E. Miles in January 1939. “The Compact,” he wrote, “fully protects present and future uses of the waters of the Rio Grande stream system in New Mexico.” He envisioned an end to the controversies over the use of the Rio Grande waters with the compact, “particularly the suit

⁹² Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 33-37, and Appendix No. 11, 78 and 80. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

⁹³ Frank B. Clayton to Hon. W. Lee O’Daniel, November 16, 1938, 1-4. [1938], Box 2F467, RGCC-FBCP, UTA.

⁹⁴ M.C. Hinderlider, Commissioner for Colorado, to His Excellency, Governor Teller Ammons, State Capitol, Denver, Colorado, November 15, 1938, in *Rio Grande Basin Compact* [and Analysis Thereof by M.C. Hinderlider in Address to Colorado Legislature and to Gov. Teller Ammons on Nov. 15-1938], 5-9. ff. 58 Rio Grande Basin Compact, Box 44-70, MSS 312, MCHC 1897-1987, HC.

between the States of New Mexico and Texas now pending in the Supreme Court of the United States.”⁹⁵

Likewise, writing to Secretary of the Interior Harold Ickes, days following the conclusion of the compact negotiations in March 1938, Harper was unequivocal: “The Compact, if ratified, will end over forty years of controversy and dispute among the States, and it is the unanimous opinion of the Commissioners and their advisors that it provides an eminently fair and equitable solution of this troublesome problem.” Harper believed that U.S. “interests” were “fully safeguarded” in the compact, in part as a result of the “inclusion, in the State allocations, of all water to which Federal irrigation projects are entitled.”⁹⁶

Although some Texans below Ft. Quitman expressed concerns for the compact (discussed in Opinion IV), all three states and the United States ratified the agreement in 1939.⁹⁷ As the statements of the compact commissioners indicate, all those representatives believed that the compact equitably apportioned the waters of the Rio Grande above Ft. Quitman after several decades of controversy. That apportionment protected the Rio Grande Project in New Mexico and Texas, which also served lands down to Ft. Quitman, and gave Colorado and New Mexico above Elephant Butte the freedom to pursue new water projects. The water delivery schedules devised by the engineering advisors for the three states were the basis for that apportionment, and reflected the understanding among the engineers that in the absence of a transfer of additional water into the Upper Rio Grande Basin the Rio Grande was fully appropriated.

⁹⁵ Thomas M. McClure, Commissioner for New Mexico, to His Excellency, Governor John E. Miles, Santa Fe, New Mexico, January 9, 1939. ff. RG 267, Entry 26, TX v NM #9, Box 460 1957 (TX v. MN #9) to 1957, Entry 26, RG 267, NAB

⁹⁶ S.O. Harper, Chairman, Rio Grande Compact Commission, to The Honorable, The Secretary of the Interior, Washington, D.C., Re: Rio Grande Compact, March 26, 1938, 2. ff. 032.1 Box No. 936, Entry 7, RG 115, NARA Denver.

⁹⁷ M.C. Hinderlider, Rio Grande Compact Commissioner for Colorado to Mr. Frank B. Clayton, Rio Grande Compact Commission for Texas and Mr. Thos. M. McClure, Rio Grande Compact Commissioner for New Mexico, February 21, 1939. [1939], RGCC-FBCP, UTA; Governor of New Mexico [John E. Miles] to Hon. W. Lee O’Daniel, Governor of Texas, March 2, 1939; and W. Lee O’Daniel, Governor of Texas to Honorable John E. Miles, March 9, 1939. ff. 277 Gov. John E. Miles, Conservation – Ratification of the Rio Grande Compact, 1939, Box 9, Serial No. 13225, Governor John E. Miles, special issues, Dates: 1939-1942, Governor John E. Miles Papers, NMSA; and United States of America, *Congressional Record: Proceedings and Debates of the 76th Congress, First Session*, Volume 84-Part 6, May 19, 1939, to June 9, 1939 (pages 5771 to 6948) (GPO, 1939), 6589.

Opinion II: The quantity of water apportioned to Texas by the 1938 Rio Grande Compact included flows to address water quality concerns for Rio Grande project lands in Texas.

As noted in Opinion I, the quantity of water to be apportioned to Texas by the 1938 Rio Grande Compact was inextricably linked to the quality of water. The loudest voice for water quality belonged to Texas's engineering advisor Raymond A. Hill. Hill was vociferous in his advocacy of flows to mitigate the salinity of irrigation water reaching downstream lands in Texas. In the *Texas v. New Mexico* original action, in the compact proceedings, and before his fellow engineering advisors, he was adamant that an 800,000 af release from Elephant Butte was essential to achieving a "salt balance." Broadly speaking, Hill argued that Texas required more water than it could use consumptively to ensure that little or no additional alkali salts were deposited as a result of irrigation on downstream lands to the detriment of those lands. The 800,000 af figure reflected his calculations of what was necessary to achieve what he called, "equivalent service." Neither of Hill's counterparts in Colorado and New Mexico, Royce Tipton and John Bliss, readily agreed that such a large release from Elephant Butte was justified. The federal Rio Grande Joint Investigation, which aimed to provide the requisite technical data to craft a compact, similarly did not assess a sufficient quantity of water to achieve Hill's equivalent service. With the completion of the federal investigation and the resumption of negotiations in late 1937, Texas's engineering advisor redoubled his efforts to convince his fellow advisors that 800,000 af was the appropriate amount – and he succeeded. The December 1937 engineering advisors' report recommended 800,000 af as the "normal release" from Elephant Butte. Although this figure was reduced to 790,000 af after New Mexico's compact commissioner Thomas McClure objected (reflecting the concerns of upstream interests in New Mexico), Texas's acceptance of this reduction and the compact indicates that 790,000 af was inclusive of the flows necessary to achieve Hill's "equivalent service."

Salinity was a known issue within the stretch of the Rio Grande between Elephant Butte Reservoir and Ft. Quitman. Beginning in the 1920s, the Bureau of Reclamation (Reclamation), the US Department of Agriculture (USDA), and the International Boundary Commission (predecessor to today's International Boundary and Water Commission), responsible for overseeing the provisions of the 1906 treaty with Mexico, had made various measurements and analyses of water quality and salt concentration in the river and at riverside drains. In 1929-1930 and in 1933-1934, Rio Grande Project drainage waters were the subject of close study. According to project superintendent L.R. Fiock, in 1933 alone water from the reservoir carried 600,000 tons of dissolved salts. As noted below and discussed in Opinion IV, Reclamation purposefully released

additional water from Elephant Butte to compensate for increased salinity at the lowest end of the project, which further benefitted lands downstream to Ft. Quitman.⁹⁸

The issue of water quality with regard to the quantity of Rio Grande water to be apportioned to Texas by a compact, however, was not clearly articulated until Texas filed suit against New Mexico and the Middle Rio Grande Conservancy District (MRGCD) in the US Supreme Court in October 1935. Texas alleged that New Mexico “violated the [1929] Compact by impairing the water supply in the Elephant Butte Reservoir through excessive diversions and through injurious increase of the salt contents of the water,” and “that such excessive diversions and increase of salt contents were in violation of the rights of Texas waters users.” As discussed in Opinion I, New Mexico denied this claim and instead asserted that illegal Mexican diversions and inefficient operation of Elephant Butte were to blame.⁹⁹

Quantity and quality of water reaching lands in Texas went hand-in-hand, as Frank Clayton, attorney for Texas and the state’s Rio Grande Compact commissioner, explained to Special Master Charles Warren near the outset of the hearings in November 1936. Clayton, citing Article XII of the 1929 compact that the water supply for Elephant Butte “shall not...be impaired by new or increased diversions or storage on the upper Rio Grande,” argued that “the increased diversion in the Middle Rio Grande District has impaired both as to quality and quantity.” Compensation for the diminished quality, the attorney insisted, “required an increased quantity in order to give equivalent service.”¹⁰⁰

Although Fiock testified that Reclamation released water “for the purpose of washing out salts,” characterizing this practice as “both beneficial and necessary,” much of the testimony and evidence for Texas’s argument was offered by Hill and his associate (later partner) J.Q. Jewett.¹⁰¹

⁹⁸ *Plaintiff’s Case in Chief*, Vols. III, IV, 805-836; *Defendant’s Case in Chief*, Vols. X, XI, 1862-1864, 1871, and 1874. CB-F-171A thru CB-F-1716: Transcripts of TX v. NM, Box 4X219; C.S. Scofield, Principal Agriculturalist in Charge, Messrs. Quinton, Code and Hill-Leeds and Barnard, Attention Mr. J.Q. Jewett, August 9, 1935. ff. Elephant Butte-El Paso Dists. General Correspondence G352 1935, Box 4X190, RAHP, UTA; Charles Warren, Attorney, Mills Building, Wash. DC, large leather black binder, unpaginated [65-66]. ff. Large black binder, Box 4, CWP, HLS HSC; and “Water From Dam Enriches Lands,” *El Paso Herald-Post*, June 30, 1933. ff. 023. Rio Grande – Clippings 1930 thru 1937, Box 908 Rio Grande Pro. 010.-023, Entry 7, RG 115, NARA Denver.

⁹⁹ *Ad Interim Report of the Special Master*, received Mar. 26, 1937, 4-6. ff. RG 267, Entry 26, TX v NM #10, Box 401, Entry 26, RG 267, NAB.

¹⁰⁰ *Plaintiff’s Case in Chief*, Vol. III, IV, 498-499. CB-F-171A thru CB-F-1716: Transcripts of TX v. NM, Vol. 1-16, 4X219, RAHP, UTA.

¹⁰¹ John Q. Jewett earned his Bachelor of Science in Civil Engineering from the University of Colorado in 1920, and like Hill, later received “the degree of Civil Engineer.” He was an instructor at the university during the 1922 and 1923 academic years. After the University of Colorado, Jewett joined the Yaqui Valley Irrigation Project in Mexico as an “office engineer,” rising the position of “assistant to the Chief Engineer.”

Using a demonstrative exhibit, Hill endeavored to explain to Warren the dynamic between irrigation, drainage, and increased salt concentration in the waters of the Rio Grande as it moved downstream. The illustration from which the engineer spoke compared a typical cross-section of the Rio Grande Valley as it would appear in “a state of nature” to that same cross-section “after irrigation and drainage.” Hill noted that part of the water from the irrigation canal passed out to the land, carrying with it salts in solution. Some of that water was lost into the atmosphere as vapor, and carried no salts. Part of the water consumed by crops, the excess over the consumptive use, passed into the ground and found its way to the drainage system. Only part of this water reached the drain, but in a well-designed irrigation system, no salts can be allowed to accumulate, Hill pointed out. If it did, the land would become unfit for cultivation over time. In a successful drainage system, the engineer emphasized, there had to be a continuous movement of salt from the canal to the drain – i.e., as much salt must reach the drain as left the canal. Therefore, water in the drain would necessarily have a higher salt concentration than the water in the delivery canal. These drains necessarily connected and discharged back into the river, with the result of increased salinity as in the Rio Grande as the river flowed downstream.¹⁰²

Jewett pointed out in his testimony that this was in fact the case for land in Texas. Water quality analyses, he argued, indicated that there had been an accumulation of salts between Courchesne, Texas (immediately upstream from El Paso) and Ft. Quitman in every year from 1930-1935, inclusive, a period of consistent record. The accumulation varied from 141,000 tons in 1931-1932 to 345,000 tons in 1934. The total salt accumulation during the entire six-year period, 1930-1935, was nearly 1.3 million tons. The purpose of Jewett’s testimony, Clayton told the special master, was “to show whether we are increasing the concentration of [salt in] the soil through too sparing use of the water.” Or, put in another way, “how much water is necessary to be used to maintain a balance.” Jewett indicated that the evidence pointed to a substantial salt balance between Elephant Butte and Courchesne, lands largely in New Mexico, but a salt balance between Courchesne and Ft. Quitman, lands in Texas, was “not being maintained by a very wide margin.” If the same area was to be irrigated under the same conditions and the same amount

In 1926, Jewett joined Quinton, Code & Hill, Leeds & Barnard. He assisted in the water supply-hydroelectric power study the firm made of Elephant Butte Dam in the 1920s, and in the 1930s, oversaw the company’s work on water supply studies of the federal Salt River Project in Arizona. *Plaintiff’s Case in Chief*, Vols. I, II, 215-216. CB-F-171A thru CB-F-1716: Transcripts of TX v. NM, Vol. 1-16, Box 4X219, RAHP, UTA

¹⁰² *Plaintiff’s Case in Chief*, Vo. I, II, 409-416; and Vol. III, IV, 603-615. CB-F-171A thru CB-F-1716: Transcripts of TX v. NM, Vol. 1-16, 4X219, RAHP, UTA.

of water consumed, the only way to produce a more favorable salt balance, the engineer testified, would be to “increase the supply at the head of the valley.”¹⁰³

To accomplish this, Hill testified that 800,000 af was the necessary release of water for lands below Elephant Butte. This was the “maximum amount which can be properly withdrawn” from the reservoir, according to the engineer, based upon recorded releases from the reservoir over the past decade. Hill calculated that gross consumptive use between the reservoir and Ft. Quitman over the previous decade (1925-1935) had amounted to 675,000 af: 300,000 af from Elephant Butte to Courchesne, and 375,000 af from Courchesne to Ft. Quitman (including land in Mexico). The engineer further estimated that the “average total consumption” between Elephant Butte and Ft. Quitman “under present conditions of distribution of crops” at 3 af per acre (af/a), and in his judgment, 50,000 af of unavoidable operating waste was a “reasonable allowance” for the Rio Grande Project. Beyond these figures, Hill argued that an additional 145,000 af was necessary to maintain a “salt balance” for the lands between Courchesne and Ft. Quitman. Cumulatively, these figures were in excess of 800,000 af by 70,000 af. This led to additional testimony by Hill ascribing the additional water use to Mexican diversions above the 60,000 af prescribed by the 1906 treaty.¹⁰⁴

An undated memorandum, “Equivalent Service Under Present Conditions (Hill),” located in Clayton’s papers at the Dolph Briscoe Center University for American History at The University of Texas at Austin sheds additional light on the salt balance Hill believed necessary. According to this memorandum – which may be Clayton’s summary of a larger analysis prepared by Hill or which may have been prepared for Clayton by Hill – “[t]he “average concentration of water available for diversion to the El Paso Valley [as] 50% greater than the concentration of water available for diversion to the valleys above El Paso at the present time.” To achieve equivalent service in the valley, therefore, “the farm duty should be about 1.5 greater than for the other valleys [above El Paso, i.e., Palomas, Rincon, and Mesilla].” “However,” the memorandum acknowledged, “this excess is evidently not available even under present conditions.”¹⁰⁵

New Mexico challenged this analysis. John Bliss, New Mexico’s engineering advisor and an expert witness called by the state, in particular offered an alternative view. He acknowledged that the further downstream water travelled from Elephant Butte, the higher the concentration of salts. However, Bliss argued that project “officials dilute the entire flow of the river to produce a

¹⁰³ *Plaintiff’s Case in Chief*, Vols. III, IV, 838-851. CB-F-171A thru CB-F-1716: Transcripts of TX v. NM, Vol. 1-16, Box 4X219, RAHP, UTA.

¹⁰⁴ *Plaintiff’s Case in Chief*, Vols. V, VI & VII, 1202-1206, 1210, 1220-1221, and 1235-1238. CB-F-171A thru CB-F-1716: Transcripts of TX v. NM, Vol. 1-16, Box 4X219, RAHP, UTA.

¹⁰⁵ “Equivalent Service Under Present Conditions (Hill),” undated. ff. Rio Grande Commission (Memorandum), Box 2F465, RGCC-FBCP, UTA.

satisfactory quality” at the lowest end of the project – the “Tornillo unit.” As much as 50,000 af, New Mexico’s engineer calculated, was passed out of the project to achieve this balance at Tornillo. In fact, passing this much water, Bliss further observed, resulted in lands outside the project, in Hudspeth County above Ft. Quitman receiving as much 38,000 af of reservoir water.¹⁰⁶

As discussed in Opinion I, after nearly five months of testimony and argument, Warren was unable to arrive at suitable findings of fact for the Supreme Court. The amount of data presented and analyzed in testimony was considerable. The special master nevertheless found the evidence regarding the salt content of Rio Grande water “limited” and “unsatisfactory.” At the urging of counsel for Texas, New Mexico, and MRGCD, he recommended in March 1937 that the case be stayed, in part until the federal Rio Grande Joint Investigation completed its studies of the water resources of the Upper Rio Grande Basin.¹⁰⁷

Water quality was a critical concern for Texas in the federal investigation, but Colorado and New Mexico were initially hesitant to examine the issue of salinity. The Middle Rio Grande Conservancy District was especially opposed. Federal engineers, however, concurred with Texas as to the necessity of the work, as did representatives from Colorado following an organizational meeting of the Rio Grande Joint Investigation held in Santa Fe in late April and early May 1936. The USDA Bureau of Plant Industry and its principal agriculturalist, C.S. Scofield, were charged with the study of water quality in the basin as part of the federal investigation. Although Texas did not contribute to that investigation as Colorado and New Mexico did, Hill endeavored to relay what he believed was the appropriate consideration of “equivalent service” to the federal investigators.¹⁰⁸ In particular, he provided Scofield with the mathematical formula for “service

¹⁰⁶ *Defendant’s Case in Chief*, Vols. X & XI, 2011. CB-F-171A thru CB-F-1716: Transcripts of TX v. NM, Box 4X219, RAHP, UTA.

¹⁰⁷ *Ad Interim Report of the Special Master*, received Mar. 26, 1937, 7-13. ff. RG 267, Entry 26, TX v NM #10, Box 401, Entry 26, RG 267, NAB.

¹⁰⁸ At a series of meetings in Santa Fe in early February 1936, Barrows, Adams, the state engineering advisors, and compact commissioners worked out the plans for the joint investigation – including the work to be done and the various costs of work. Meeting with C. C. Hezmalhalch, deputy state engineer for Colorado, McClure, Clayton, and W.A. Laflin (an engineer working with Clayton’s engineering advisor Raymond Hill), Barrows and Adams asked the states to collectively contribute upwards of \$55,000 either “in cash or acceptable services.” Hezmalhalch indicated that Colorado was willing to provide a third of this amount, “how much, if any...in services to be worked out later.” McClure likewise pledged a third for New Mexico “in money or services,” but indicated that it “would take a good deal of scratching about to do this.” Clayton agreed that an equal division of the cost among the three states was “entirely fair and equitable,” but he was unable even after speaking with Gov. Allred to commit Texas to any amount of money. He pledged to “do his damndest” to convince the Texas legislature to “make an emergency appropriation for the purposes of the Rio Grande Compact Commission for the balance of the fiscal year ending Aug. 31, 1937,” but subsequent events suggest that he was unable to secure a financial contribution from Texas. Only the Colorado State Engineering Department and the Office of the New

equivalence” that was used in the Bureau of Plant Industry’s study for which the federal engineer expressed his indebtedness.¹⁰⁹

Hill’s contribution notwithstanding, the draft *JIR* distributed in mid-August 1937 failed, in his mind and Jewett’s, to recommend the necessary for equivalent service. Writing to Texas’s compact commissioner Frank Clayton not long after securing a copy of the report, Hill remarked that he was “becoming discouraged at the progress possible.” He observed that much of the “discussion of water supply [was] limited to records taken prior to the instigation of the Rio Grande Joint Investigation,” and reflected “the opinions” of federal engineers.¹¹⁰

In September, in advance of the next round of compact proceedings, Jewett elaborated on the concerns Hill alluded to in his letter to Clayton. The engineer prepared a thorough critique of the draft summary report of *JIR* (which he called Volume I, and which is identified in the final released copy as Part I). Jewett, in particular, took the study to task for failing to appreciate the scope of

Mexico State Engineer are credited in the final report as “Cooperating Agencies” from the three states. Acknowledgments are also given to “the contributions and assistance” of the MRGCD, the San Luis Valley-based Rio Grande Water Users Association, the “Rio Grande Reclamation Project,” but to no Texas state agency or local organization. Hill, in his 1968 report on the development of the compact did note that “the engineering advisor to each of the Rio Grande Compact commissioners worked closely with those carrying out the Joint Investigation” – and that certainly seems to be the case where it came to the salinity issue, as discussed below. See Typed notes, Conference in U.S.G.S. office, Santa Fe, 2-4-36, 2-5-36, and 2-6-36. Folder 393-Rio Grande Joint Investigation Financial Statements, 1935-1937; Handwritten notes, Conference with members Rio Grande Compact Com., 2-3-36, Santa Fe. Folder 394-Rio Grande Joint Investigation Minutes and Memoranda of Meetings, 1936-1937; National Resources Committee, Rio Grande Joint Investigation, Progress Report – September 1, 1936, 5. Folder 391-Rio Grande Joint Investigation Progress Reports, 1936-1937; and Rio Grande Joint Investigation, Progress Reports – February 1, 1937. Folder 390, Box 26, FAC, WRCA; *JIR*, 6 and 10; and Hill, “Development of the Rio Grande Compact of 1938,” 14.

¹⁰⁹ Even before the federal investigation, on the eve of the hearings before Special Master Warren, Hill was in communication with Scofield. During the spring and summer of 1936, he solicited the federal investigator for information and shared his views on the problem. See, for example, Raymond A. Hill to Mr. C.S. Scofield, Division of Western Irrigation, Bureau of Plant Industry, U.S. Department of Agriculture, April 16, 1936; Raymond A. Hill to Mr. C.S. Scofield, Bureau of Plant Industry, U.S. Department of Agriculture, May 12, 1936; C.S. Scofield, Principal Agriculturalist in Charge to Mr. Raymond A. Hill, June 3, 1936. ff. Elephant Butte-El Paso Dists. General Correspondence G352 1935, Box 4X190, RAHP, UTA; and *JIR*, 464.

Hill also explained how he developed this equation for equivalent service in a letter to the investigation’s engineer-in-charge, Harlowe M. Stafford, in May 1937. Raymond A. Hill to Mr. Harlowe Stafford, Engineer in Charge, Rio Grande Joint Investigation, May 18, 1937. [1937], Box 2F467, RGCC-FBCP, UTA.

¹¹⁰ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 1. Unnamed folder 5, Box 2F463; and Raymond A. Hill to Mr. Frank B. Clayton, August 20, 1937. ff. Correspondence Business and Legal, 1935-1938, Pamphlets, 1935-1938, Box 2F464, RGCC-FBCP, UTA.

water quality issues confronting downstream lands in Texas. These lands included not only those project lands at the furthest end of the Rio Grande Project, “the Tornillo unit,” but also beyond, down to Ft. Quitman, “in the Hudspeth District.” Jewett acknowledged that the report observed that “more abundant applications [of irrigation water] are needed to prevent the accumulation of salt in the soil and resultant deleterious effect upon plant growth” in these areas of the basin. Yet, the engineer pointed out, the report failed to recognize “that the concentration of salts in irrigation water may affect the production of crops regardless of whether or not there be an accumulation of salts in the soil.” No “consideration,” moreover, “[is] given to the possibility that any other portions of the Rio Grande Valley below Elephant Butte [i.e., other than Tornillo or Hudspeth] may be affected either by concentrations of the irrigation water or by accumulation of salts within the area.”¹¹¹

Jewett maintained that the draft summary report gave short shrift to “equivalent service” despite Scofield’s own use of Hill’s formula. In his assessment of the work of the federal investigators, he stressed that “nowhere in Volume I or studies of water supply by R.G.J.I. is any consideration given to the outflow of Rio Grande which should be maintained either from Rio Grande Project or from the basin at Fort Quitman to preserve the irrigated areas in a productive condition by removal of salts.” The engineer further remarked, “[n]o consideration is given to the question as to whether there has been a sufficient outflow from the El Paso District above Fabens to preserve a salt balance in that district in the past three years.” “[L]iberal allowance for water to the Tornillo District” – on the order of 19,000 af – appeared to the engineer as “an excuse for not giving further consideration to salinity control.”¹¹²

Bringing his appraisal to a conclusion, Jewett expressed the view that Texas and its needs hardly seem to matter to the federal investigators. The “general implication,” he wrote,

is that proposed storage development on Rio Grande in Colorado and New Mexico will benefit developed lands, and probably new lands in Colorado, and will improve the water supply to lands in New Mexico above Elephant Butte. The further general implication is that the lands below Elephant Butte would suffer shortages during drouth [sic] period anyway, and that probably the shortages would not be much worse if conditions in Colorado and New Mexico were to be improved.

It seems to the writer that the answer to the voluminous report of R.G.J.I. can be stated very simply. The purpose of the proposed development on the Upper Rio Grande, principally construction of storage reservoirs, is to regulate the water supply in Colorado and New Mexico to meet as closely as possible the irrigation demands in those areas, and secondarily to conserve the water supply for the purpose of avoiding shortages in

¹¹¹ J.Q. Jewett, “Notes and Comments on Volume I of Report of Rio Grande Joint Investigation,” September 1937, 41. CB-F-137-11, Box 4X215, RAHP, UTA.

¹¹² Jewett, “Notes and Comments,” 42, 44-45, 55, and 56. CB-F-137-11, Box 4X215, RAHP, UTA.

developed areas, or for the purpose of irrigating new lands. Such being the purpose of the proposed development, it follows directly that the effect upon the lands below Elephant Butte will be an impairment of their water supply in either quantity or quality, or both. This inevitable action of cause and effect cannot be stopped by estimates and opinions, by fortuitous 46-year averages [the years 1890-1935 were used as the basis for calculating water supply], or by an unsound grouping of statistics.¹¹³

It was within this context, this critical assessment by Texas's engineers that the water quality needs of lands in Texas above Ft. Quitman were not adequately addressed by the federal investigation, that Clayton offered Texas's sole demand when the Rio Grande Compact Commission reconvened in September 1937:

...that the State of Colorado and New Mexico will release and deliver at San Marcial a supply of water sufficient to assure the release annually from Elephant Butte Reservoir of 800,000 acre-feet of the same average quality as during the past ten years, or the equivalent of this quantity if the quality of the supply is altered by any developments upstream.¹¹⁴

Texas's concerns for water quality were thus not limited to developments immediately above Elephant Butte in New Mexico; those concerns extended to the water supply that Colorado proposed to develop from draining the so-called "Closed Basin" in San Luis Valley. When the subject was raised during the September-October 1937 meeting, "[s]peaking for the people at the lower end of the [El Paso] valley," Hill observed that this water was "of a highly undesirable quality [87 percent sodium content]...." Consequently, if it were "added to the Rio Grande it would be necessary for dilution at the lower end to offset it, and we much prefer that it not be dumped into the river."¹¹⁵

Federal investigators, Jewett's criticism of the *JIR* notwithstanding, were sympathetic to Texas's desire for an improved quality of water. NRC representative Harlan Barrows echoed Hill's position when called upon by commission chair S.O. Harper to offer his views at that same meeting. After praising the group for tackling the problem of the equitable distribution of the waters of the Rio Grande, Barrows surveyed various possibilities for development of each of the sections of the Upper Rio Grande Basin. The lower end, he believed, unquestionably required a higher-quality water:

Going to the lower valley, - shall I say for the sake of brevity the El Paso District, meaning the whole lower end, - what does it need if it is to realize, so far as conditions of water

¹¹³ Jewett, "Notes and Comments," 63-64. CB-F-137-11, Box 4X215, RAHP, UTA.

¹¹⁴ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 13. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

¹¹⁵ Proceedings of the Rio Grande Compact...September 27 to October 1, 1937, 24. Unnamed folder 5, Box 2F463, RGCC-FBCP, UTA. See also footnote 120.

and land are concerned, its potentialities? Of course, it needs an adequate supply of water, a reliable supply and a supply of good quality.... Hudspeth has poor water and it ought to have good water.¹¹⁶

When the development of the technical basis for the compact moved to the respective states' engineering advisors, as discussed in Opinion I above, Hill continued to insist that 800,000 af was the necessary release from Elephant Butte to meet the needs of the project in New Mexico and Texas down to Ft. Quitman. He expressly urged his fellow engineering advisors, Royce Tipton of Colorado, Bliss and E.B. Debler for the United States, to adopt "the 800,000-acre-feet requirements" for the benefit of Texas during their November 1937 meetings. Tipton and Bliss, Hill noted in a memorandum to Clayton, expressly opposed this quantity. "I showed them," the engineer explained

...by different methods of calculation that this amount [800,000 af] would be needed for equivalent service to lands below El Paso, in the Rio Grande project, or to maintain a salt balance in the El Paso area. In fact, it worked out about the same either way. If the salt balance is maintained, then equivalent service is given, and vice versa.¹¹⁷

According to Hill, New Mexico in particular did "not want to accept responsibility of furnishing Texas any additional water for salinity control in case the quality of water should change adversely." A letter to Texas's engineering advisor prepared by Bliss for McClure less than a week before the November meetings summed up the upstream state's position:

New Mexico believes that the quality of water available to Texas under present conditions is influenced by so many factors in Colorado, New Mexico and Texas, many of which are uncontrollable and for many of which New Mexico can in no way be responsible, that she is not justified in assuming the responsibility of furnishing Texas additional water for salinity control in case that quality should change adversely.¹¹⁸

Hill was not dissuaded. Away from Debler and Tipton at the November meeting, he discussed with Bliss increased water deliveries to address rising salinity levels in the Rio Grande below Elephant Butte. As noted in Opinion I above, Hill believed that New Mexico engineer sympathized with Texas's position on this issue "but does not know how to measure the effect upon the water supply produced by an irrigation development above Elephant Butte." Texas's engineering

¹¹⁶ Proceedings of the Rio Grande Compact...September 27 to October 1, 1937, 46. Unnamed folder 5, Box 2F463, RGCC-FBCP, UTA.

¹¹⁷ Raymond A. Hill, Memo to Mr. Clayton: In re Meeting of Committee of Engineers, at Santa Fe, November 22 to 24, 1937:-, November 26, 1937, 3. [1937], Box 2F467, RGCC-FBC, UTA.

¹¹⁸ Raymond A. Hill to Mr. Frank B. Clayton, November 17, 1937. [1937], Box 2F467, RGCC-FBC, UTA; and Thomas M. McClure, State Engineer, By _____ Engineer to Mr. Raymond A. Hill, JAH:EM, cc: Mr. Royce J. Tipton, November 16, 1937, 3. Rio Grande Compact – July 7, 1937 to June 30, 1938, 26th Fiscal Year, NM_00156944.

advisor remained hopeful that he could convince Bliss “that some allowance be made for change in quality of water.”¹¹⁹

As discussed in Opinion I, Hill succeeded by the end of the December meetings. When the group reconvened in Los Angeles, Bliss had prepared his own estimate of the demand on Elephant Butte Reservoir. Out of a total of 750,000 af, the New Mexico engineering advisor had made an allowance of 19,000 af for “Salt Balance & Service Equivalents” – the same amount that the *JIR* made, as Jewett had noted. At the end of the meetings, Bliss and Tipton had both conceded the 800,000 af figure to Hill.¹²⁰ The December 1937 “Report of the Committee of Engineers” subsequently adopted the figure as an average for the “Normal Release from Elephant Butte.”¹²¹

¹¹⁹ Hill, Memo to Mr. Clayton, November 26, 1937, 2. [1937], Box 2F467, RGCC-FBCP, UTA.

¹²⁰ Hill also sought a water-quality guarantee from Colorado for deliveries made at the Colorado-New Mexico state line, and here he was less successful. Hill’s own notes of the engineering advisors’ meetings do not disclose much information on this issue, but Tipton discussed the matter in his February 1938 *Analysis of Report of Committee of Engineers to Rio Grande Compact Commissioner, Dated December 27, 1937*. According to the Colorado engineer,

Due to the fears of Texas with respect to the quality of water below Courchesne, this item was a very controversial one during the meetings of the engineering committee. The Texas representative [Hill] insisted that so far as Colorado was concerned, credits at the stateline should be reduced by one acre-foot for each three ton increase in salt at the stateline over 80,000 tons per annum. Such a provision would have prevented further development in the [San Luis] Valley since Colorado cannot put into effect the proposed plan of reservoir operation without increasing the salt content at the stateline. The proposed provision by the Texas member of the Committee, therefore, was not made a part of the agreement. It was provided, however, that no credit should be claimed by Colorado for water imported from the “Dead Area” which had sodium ions in excess of 45% of the total positive ions. This would prevent the receiving by Colorado of credit for water brought to the river from the sump area proper, but would not prevent its receiving credit for water developed west of the sump, or from water developed from such creeks as Saguache, San Luis, Sand, and east side creeks.

This provision, as noted in Opinion I above, was recommended in the report, and it was ultimately incorporated into the 1938 Compact as part of Article III. Tipton, *Analysis*, 10-1. ff. 70, Box 44-70, MCHC 1897-1987, HC; and “Rio Grande Compact,” in Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 11, 77. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

¹²¹ [Raymond Hill], “TEXAS COMPACT: John Bliss Estimate of Project Requirements at Elephant Butte,” 12/17/37. CB-F-137-34, Box 4X215, RAHP, UTA; “John Bliss Estimate of Project Requirements at Elephant Butte,” typescript, n.d. CB-F-137-34, Box 4X215, RAHP, UTA; Tipton, *Analysis*, 11. ff. 70, Box 44-70, MCHC 1897-1987, HC; Bliss to Tom, December 22, 1937. Rio Grande Compact – July 7, 1937 to June 30, 1938, 26th Fiscal Year, NM_0015692 – NM_00156929; and “Report of Committee of Engineers to Rio Grande Compact Commissioners,” December 27, 1937, in Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 1, 45 and 47. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

Although the 800,000 af figure was later reduced to 790,000 af following objections raised by New Mexico (as discussed in Opinion I above), historical evidence exists that this slightly smaller figure nevertheless encompassed the flows that Hill argued was necessary for “equivalent service.” Article XI of the 1938 Compact, for example, states in pertinent part, “New Mexico and Texas agree that upon the effective date of this Compact all controversies between said States relative to the quantity or quality of the water of the Rio Grande are composed and settled....”¹²² Such a statement, given Texas’s position on the quality of Rio Grande water during the compact negotiations of the late 1930s, is indicative that the 790,000 af figure was sufficient.

Clayton joining with McClure and Hinderlider in signing the compact in March 1938, and later advocating for ratification is further evidence. In a pamphlet “To Water Users Under The Rio Grande Compact” that included a copy of the compact, released soon after the negotiations, Texas’s commissioner stressed that the compact “seeks primarily to protect vested uses of water above Fort Quitman, and guard them against future impairment, both as to quantity and quality.” Clayton delivered a similar message to water users outside the geographical confines of the compact in May 1938 (addressed in Opinion IV). At a meeting of the Lower Rio Grande Water Users Association, he expressed his conviction that Texas had obtained “every drop of water originating in Colorado and New Mexico that she was entitled to” above Ft. Quitman – a declaration that given his earlier statement would appear to be inclusive of the flows to ensure a sufficient quality of water. To Texas Governor W. Lee O’Daniel in November 1938, Clayton indicated the “engineers, attorneys, and other technical experts” for Texas were similarly convinced. In their collective “judgment,” the commissioner confidently predicted to the governor, the compact would “restore a feeling of security to the water users in Texas above Fort Quitman....”¹²³ Indeed, as noted above (and discussed in Opinion IV below), water users between the end of the Rio Grande Project and Ft. Quitman relied upon unused waters released through the project. These waters possessed a higher quality owing to Rio Grande Project operations intended to ensure a sufficient quality of water throughout the project.

¹²² “Rio Grande Compact,” in Proceedings of the Meeting of the Rio Grande Compact Commission, Held at Santa Fe, New Mexico, March 3rd to March 18th, inc., 1938, Appendix No. 11, 80. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

¹²³ Frank B. Clayton, “To Water Users Under The Rio Grande Project,” El Paso, Texas, March 25, 1938. Folder 1, Memos of Interior Department, 1913-1915, Box 14, Arthur Powell Davis Papers, 1896-1952, Accession Number 1366 [hereafter APDP 1896-1952, American Heritage Center, University of Wyoming, Laramie [hereafter AHC]; *Proceedings of Meeting Held on Friday, May 27, 1938 at El Paso, Texas, between Representative of Lower Rio Grande Water Users and Representatives of Irrigation Districts Under the Rio Grande Project of the Bureau of Reclamation*, 10. ff. Proceedings and Minutes 1935-1938, Box 2F463; Clayton to O’Daniel, November 16, 1938, 4. Box 2F467, RGCC-FBCP, UTA; and Littlefield, *Conflict on the Rio Grande*, 209-210.

That the quality of the water of the Rio Grande reaching its lands was a central concern for the State of Texas in the negotiations leading to the 1938 compact is clear. The state had singular demand by 1937: the annual release of 800,000 af from Elephant Butte Reservoir “of the same average quality as during the past ten years, or the equivalent of this quantity if the quality of the supply is altered by any developments upstream.” Texas’s engineering advisor Raymond Hill advocated for this figure, and sought to convince federal engineers and the engineering advisors for Colorado and New Mexico of the necessity of additional flows to Texas above what the state’s present consumptive use suggested. The other engineers agreed that lands downstream required an improved quality, but until late 1937 were unconvinced of Hill’s projection. Hill managed to persuade them, and while Texas ultimately agreed to a slightly lesser figure of 790,000 af, the state’s commitment to the final compact strongly indicates that this quantity of water was inclusive of the flows to ensure water of sufficient quality for downstream lands.

Opinion III: The Rio Grande Project water supply, circa 1938, included not only the surface flow of the Rio Grande captured in Elephant Butte Reservoir, but also all water tributary to the project including groundwater as well as return flows.

At the outset of the federal reclamation program established by the 1902 Newlands Act, federal lawyers and engineers embraced a broad conception of what constituted the water supply for federal projects primarily out of concerns for adequacy. The United States Reclamation Service's principal legal officer Morris Bien argued that while the Newlands Act obligated the United States to recognize state and territorial water laws concerning the appropriation of water, the federal government held dominion over public lands and unappropriated waters. The scale of proposed reclamation projects, moreover, demanded that the US have unique freedom as an appropriator, that the water supply for projects be protected from adverse claims. This latter idea found expression in New Mexico territorial water laws in 1905 and 1907 that drew upon a draft water code prepared by Bien. Legal arguments aside, Rio Grande Project supervising engineer Benjamin M. Hall envisioned the project in 1904 as utilizing all of the waters of the Rio Grande – the surface flow within the river's channel, tributary flows to the river, and groundwater – so as to serve lands in New Mexico and Texas adequately. At the recommendation of Reclamation attorneys, Hall's 1906 filing for 730,000 af was supplemented in 1908 with a filing for "[a]ll the unappropriated water of the Rio Grande and its tributaries." By the early 1910s, federal reclamation authorities were claiming "waste, seepage, spring, and percolating water arising within the project" as well as "return flows," water released from the Elephant Butte Reservoir that was diverted, used on project lands, and returned to the river channel for further use downstream. As Rio Grande Compact negotiations moved forward in the 1920s and 1930s, federal and state engineers alike recognized that surface flows, water tributary to the project including groundwater, and return flows constituted the water supply for the Rio Grande Project.

The 1902 Newlands Act, or National Reclamation Act, that created the Reclamation Service (or Reclamation, predecessor to the present Bureau of Reclamation) was not the first attempt by the US to provide for the irrigation of arid western lands. The act replaced the 1894 Federal Desert Lands Act, better known as the Carey Act after its sponsor Senator Joseph M. Carey of Wyoming. The Carey Act sought to foster private-state irrigation projects. It authorized the General Land Office, working in concert with individual western state governments, to award upwards of 1 million acres of the public domain to each semi-arid western state. The states were to administer the sale of this land, see that it was irrigated and developed into no larger than 160-acre farms sold to actual settlers only, with irrigation systems being built and operated either by individual states or by private enterprises that sold water to irrigators owning farms within the project. Project plans were to be submitted to the secretary of the interior. Although the Interior Department set aside nearly 4 million acres of the public domain for use by the states, outside of Idaho and Wyoming, the program had few demonstrably successful projects. Most western

states did not possess the necessary administrative and financial resources to fulfill the Carey Act's promise and speculative investors often had insufficient capital to carry their irrigation projects to completion. By 1902 nearly 90% of the private irrigation companies developing Carey Act projects were nearing bankruptcy, and arid land development continued to lag further behind the number of acres set aside under the Carey Act. With the failure of the Carey Act, western proponents of irrigation, led by Senator Francis Warren of Wyoming, turned to the federal government, recommending federal construction of dams and reservoirs, leaving to the states the building of water distribution systems with allocation of water in accordance with state water right laws. When Congress failed to approve Warren's bill, Representative Francis Newlands of Nevada introduced a bill in 1901 providing for the federal government itself to construct irrigation projects in western states and territories.¹²⁴

Some western representatives were hesitant of Newland's proposed legislation, fearing centralized authority and concerned that railroad and other more highly capitalized interests would benefit. Following extensive legislative negotiations involving President Theodore Roosevelt and debates over competing bills that proposed more modest programs and measures, Congress enacted the National Reclamation Act, or Newlands Act in June 1902. The act provided for the federal government, through the secretary of the interior, to withdraw un-entered and unoccupied public lands in 16 western states and territories: Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming. Upon these lands, Reclamation was to build dams, canals, and other irrigation works for the benefit of small family farmers settling on irrigable land within the designated reclamation project area.¹²⁵

Appropriation of water was central to the newly-created federal reclamation program. To varying degrees, state and territorial law by the early 1900s required that claims to the use of water were to be recorded by filing notices of appropriation that would be perfected by applying the water

¹²⁴ *An Act Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-five, and for other purposes*, August 18, 1894, ch. 301, section 4, 28 Stat. 422; Paul W. Gates, *History of Public Land Law Development* (Washington D.C.: U. S. Government Printing Office, 1968), 647-652; and Robert G. Dunbar, *Forging New Rights in Western Waters* (Lincoln: University of Nebraska Press, 1983), 36-45; and Donald J. Pisani, *To Reclaim a Divided West: Water, Law, and Public Policy, 1848-1902* (Albuquerque: University of New Mexico Press, 1992), 252-303.

¹²⁵ *An Act Appropriating the receipts from the sale and disposal of public lands in certain States and Territories to the construction of irrigation works for the reclamation of arid lands*, June 17, 1902, chap. 1093, Public, No. 161, 32 Stat. 388; Gates, *Public Land Law Development*, 652-659; Dunbar, *Forging New Rights*, 51; Pisani, *To Reclaim a Divided West*, 298-325; and William D. Rowley, *The Bureau of Reclamation: Origins and Growth to 1945*, Bureau of Reclamation, United States Department of the Interior, vol. 1 (GPO, 2006), 100-101.

so claimed to beneficial use. Such law also provided for adjudication of existing rights and prescribed methods for the determination, regulation, and control of the rights to water in the future. Some states, such as California, looked to the judiciary to settle claims of appropriators, while others like Wyoming relied upon a state board or a state engineer to adjudicate claims before the courts became involved.¹²⁶

Reclamation supervising engineer and principal legal officer Morris Bien saw the US as having a unique status relative to all other appropriators, especially with regard to its reclamation projects.¹²⁷ At the first conference of Reclamation engineers and officials in Ogden, Utah, in September 1903, he articulated a position that shaped not only Reclamation's early approach to its projects, but also state and territorial water law in the early 20th century. Bien asserted that "[t]he control of the Federal Government over the public lands and the nonnavigable waters is that of a proprietor...." Put another way, as he did in a February 1904 memorandum prepared "in connection with the motion of U.S. to intervene in the case of *Kansas v. Colorado*" – an interstate dispute over the waters of the Arkansas River – the federal government was the "sole proprietor" of the public domain and was consequently "in sole control of the waters on such lands." Prior acts of Congress, specifically the 1891 right-of-way act and the 1897 organic act (which provided for the establishment of federal forest reserves), as well as the Newlands Act, "merely...recognize the system of state control, regulation, and recording" of water appropriation.

Bien found support in recent case law, most notably the US Supreme Court's ruling in favor of the federal government against the Rio Grande Dam and Irrigation Company. In the Rio Grande

¹²⁶ Morris Bien, "Relation of Federal and State Laws to Irrigation," in *Proceedings of First Conference of Engineers of the Reclamation Service with Accompanying Papers*, F.H. Newell, Chief Engineer, comp., Department of the Interior, United States Geological Survey, Water Supply and Irrigation Paper No. 93 (Washington: GPO, 1904), 233; Morris Bien, "Proposed State Code of Water Laws," in *Proceedings of Second Conference of Engineers of the Reclamation Service with Accompanying Papers*, F.H. Newell, Chief Engineer, comp., Department of the Interior, United States Geological Survey Water Supply and Irrigation Paper No. 146. (Washington: GPO, 1905), 29-30, and Morris Bien, Supervising Engineer, U.S. Reclamation Service, to Mr. Samuel C. Wiel, November 1, 1905, in Samuel C. Wiel, *Water Rights in the Western States* (San Francisco: Bancroft-Whitney Company, 1905), vi-ix. This development is also traced in Dunbar, *Forging New Rights*, 73-132.

¹²⁷ Morris Bien was a University of California, Berkeley-trained engineer who later earned a law degree from Columbian University (predecessor to George Washington University in Washington, DC). In 1903, at the request of Reclamation Chief Engineer F.H. Newell, he came to the Reclamation Service from the General Land Office in 1903. Over the next 20 years, he led Reclamation's Land and Legal Division. His "expansive view of the authority and prerogatives of the Reclamation Service," laid out here with specific reference to the Rio Grande Project, is discussed more broadly in William Rowley's official history of the Bureau of Reclamation. See Rowley, *Bureau of Reclamation*, 147-151.

Dam and Irrigation Company case, the high court identified “two limitations” to state control of waters “within its dominion.” The Reclamation official highlighted the first:

in the absence of specific authority from Congress a state cannot by its legislation destroy the right of the United States, as the owner of lands bordering on a stream, to the continued flow of its waters; so far at least as may be necessary for the beneficial uses of the government property.

This sentence, Bien maintained,

indicates clearly that the United States has the right to the continued flow of the waters that have not already been appropriated, for there has been no specific authority granted to the States to infringe upon this right, Congress having merely authorized the acquirement of rights by prior appropriation, and the States having undertaken to regulate this right of appropriation.

A “similar view was expressed” in *Gutierrez v. the Albuquerque Land and Irrigation Company* (188 U.S. 545) concerning “the utilization of water for irrigation purposes in the Territory of New Mexico.” Whether a state or territory was concerned, Bien saw “no reason why the same view should not be held....” He also pointed out that in *Howell v. Johnson* (89 Fed. Rep. 556), a dispute over the waters of Sage Creek, an interstate stream flowing from Montana to Wyoming, the US Circuit Court of Appeals “held in a similar way as to the rights of the Federal government over the unappropriated waters on the public domain.”¹²⁸

In 1904, following meetings with commissioners from Oregon and Washington seeking a “code of irrigation law,” Bien was asked to “prepare a draft” of his own. Bien’s draft reflected his views of federal dominion over public lands and waters, and made special provision for developing federal reclamation projects. As he explained to the second Reclamation conference in November 1904,

In order that the State may obtain the full benefit of this work and prevent serious interference with and perhaps the entire abandonment of the projects to be investigated, it is provided that the water supply for such projects shall be reserved from general appropriation until the investigations of the Reclamation Service shall determine the precise amount required for the project, the remainder being then released from such reservation.

¹²⁸ Bien, “Relation of Federal and State Laws to Irrigation,” 233-234; and Morris Bien, “Memorandum Concerning the Origin of the Right of Appropriation of the Public Domain,” February 6, 1904, 1-5. ff. 762. Legal Discussions -General. Thru December 31, 1907., Box 223 760F- -762, Entry 3, RG 115, NARA Denver. Bien also discussed the Rio Grande Dam and Irrigation Company case and *Howell v. Johnson* in “Relation of Federal and State Laws to Irrigation,” 234-236.

The “theory” behind this was

that the State regulates the appropriation of water, exercising this power and holding the land in trust for the public, and that when the interest of the public are so directly involved as in these large irrigation projects, and when further, there is no element of individual speculation and profit in the construction the works, which are for the purpose of establishing the maximum number of homes on the land, it is the duty of every State to which the reclamation act is applicable to assist with every resource under its control.¹²⁹

Bien insisted that the water supply for federal projects be protected against adverse claims by other appropriators. When Idaho Commissioner of Reclamation D.W. Ross “object[ed] to the proposition providing for the withholding of water for appropriation after the filing of the claim for it by the Reclamation Service,” the supervising engineer argued in January 1904 letter to F.H. Newell, Reclamation’s chief engineer, that Ross “fails to perceive...that a project might be completed and fail because of interference with water rights.” Reclamation, Bien believed, would in “nearly every project...develop the whole water resources of the stream.” It would “build better and must do more preliminary work on that account,” and thus could not “compete with private parties as to time of completion....” Instead, with this “safety against speculative water filings,” the federal government would “act in good faith and promptly release any claim to water which it does not propose to use.”¹³⁰

Elements of Bien’s draft water code were ultimately reflected in the New Mexico territorial water laws under which Reclamation made its filings for the Rio Grande Project in 1906 and 1908. In 1905, the states of Colorado, Idaho, Montana, Nebraska, Nevada, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming and the territories of Oklahoma and New Mexico all adopted new water codes. Each state and territory, as Bien noted to his colleagues at the second Reclamation conference in El Paso, made provision “for cooperation with the work of the United States in the construction of reclamation projects.” In some instances, this cooperation extended to the “Necessary water supply” along the lines that he had proposed in his draft code.¹³¹

This was certainly true for New Mexico. Section 22 of its new water code stated:

Whenever the proper officers of the United States authorized by law to construct irrigation works, shall notify the territorial irrigation engineer that the United States intends to utilize certain specified waters, the waters so described, and unappropriated at the date of such notice, shall not be subject to further appropriations under the laws of New Mexico, and no adverse claims to the use of such waters, initiated subsequent to the date of such notice, shall be recognized under the laws of the territory, except as to

¹²⁹ Bien, “Proposed State Code of Water Laws,” 32-33.

¹³⁰ Morris Bien, engineer, to Mr. F.H. Newell, Chief Engineer, January 5, 1904. ff. 110-E Legislation. Corres. Re Irrigation Laws; Water Codes; Etc., Box 91 110E- -110E-6, Entry 3, RG 115, NARA Denver.

¹³¹ Bien, “Proposed State Code of Water Laws,” 34; and Rowley, *Bureau of Reclamation*, 149.

such amount of the water described in such notice as may be formally released in writing by an officer of the United States thereunto duly authorized.

Section 22, as Reclamation “assistant examiner,” or attorney B.E. Stoutemyer later observed, did “not affirmatively provide that the U.S. shall acquire any rights by filing the notice described [in this section] but provides that after this notice is given, no other person shall acquire any right,” which presumably may have been adverse to the federal government’s.¹³²

As noted in Opinion I, on January 23, 1906, pursuant to the 1905 code, B.M. Hall, the engineer supervising Reclamation’s proposed reclamation projects in New Mexico, formally notified New Mexico Territorial Engineer David L. White through Reclamation’s chief engineer of Reclamation’s intent to construct the Rio Grande Project. The proposed project would “utilize...a volume of water equivalent to 730,000 acre feet per year requiring a maximum diversion or storage of 2,000,000 miner’s inches. This water would “be diverted or stored from the Rio Grande River,” in a 2 million acre-foot storage reservoir at Elephant Butte, “and diversion dams below at Palomas, Rincon, Mesilla and El Paso Valleys in New Mexico and Texas.” Hall “requested” that these “waters...be withheld from further appropriation and that rights and interests of the United States” as contemplated in the 1905 territorial statute “be otherwise protected.”¹³³

Hall found this filing “unsatisfactory.” It was prepared on the basis of a form provided by the chief engineer, and was used not only for the Rio Grande Project but also for filings for four other proposed storage projects in New Mexico. In forwarding these for approval, Hall lamented that he “would have greatly preferred filing on the entire unappropriated flow [original emphasis] in each case.”¹³⁴

¹³² Chapter 102, “An Act Creating the Office of Territorial Irrigation Engineer, to Promote Irrigation Development and Conserve the Waters of New Mexico for the Irrigation of Lands and for Other Purposes,” A.H.B. No. 98; Approved March 16, 1905, Section 22, *1905 Acts of the Legislative Assembly of the Territory of New Mexico, Thirty-Sixth Session* (Santa Fe: The New Mexican Printing Company, 1905), 277; and B.E. Stoutemyer, Assistant Examiner, to Mr. W. M. Reed, District Engineer, U.S.R.S., re Appropriation Notices in New Mexico, Nov. 8, 1907. ff. 41, Box 6, Entry 3, RG 115, NARA Denver. For more on the 1905 law, see Ira G. Clark, *Water in New Mexico: A History of Its Management and Use* (Albuquerque: University of New Mexico Press, 1987), 117-118.

¹³³ Hall to White, Jan. 23, 1906; B.M. Hall, Supervising Engineer, to Chief Engineer, U.S. Reclamation Service, re Appropriations, Jan. 23, 1906; and David M. White, New Mexico Territorial Engineer, to B. M. Hall, Supervising Engineer, U.S. Reclamation Service, February 16, 1906. ff. 41, Box 6, Entry 3, RG 115, NARA Denver.

¹³⁴ B.M. Hall to Chief Engineer, Jan. 23, 1906; and Acting Chief Engineer to B. M. Hall, January 29, 1906. ff. 41, Box 6, Entry 3, RG 115, NARA Denver. The other projects were Hondo, Urton Lake, Carlsbad, and Las Vegas

Hall's preference was in keeping with the conception of the project's water supply that he articulated at the same Reclamation conference at which Bien discussed his water code. "The 180,000 acres of land to be irrigated" by the project, Hall informed his colleagues, "are in a long, narrow valley, and the return water from the irrigation of the upper valley can be rediverted on lands lower down the valley." The "Engle Dam," as the engineer called it,

will hold back all of the floods and distribute them over the irrigation period of ten months. The water will be let out as needed and there will be no more disastrous floods below the dam. The river bed will never be dry at any time of year, as the return water from such a large irrigated area will form constant springs along the whole course of the river. Lastly, the supply of ground water for pumping will be greater and more constant than it now is, as the water entering the ground from the irrigated lands will form a constant supply.¹³⁵

As noted above, Hall emphasized in both his study and in his presentation to the National Irrigation Congress that "[a]ll of the water that comes down the river is needed for irrigation. We can not [*sic*] afford to waste any of it."¹³⁶

Responding to a question from a delegate regarding his proposal at the congress, Hall suggested that the water coming down the Rio Grande channel was a mix of surface and subsurface flows, and that Elephant Butte Dam would aggregate and control these waters for the beneficial use of downstream lands:

Question – As I understand it, you propose to bring that water [from the dam] down the river channel, is that true, Mr. Hall?

Mr. Hall – The water that you get now in the river, that is underneath the river bed and in the valley lands comes from the rains on the high lands and from floods down the river, and from the water that is flowing in the river at certain periods. The under gravel gets saturated. We estimate that when we get in that storage dam, that instead of injuring that condition we will better it. You will still get all of the rainfall that comes down below the dam; of course you will have the floods originated below the dam – they will not be disastrous floods – but you will at all times have a wet river bed, and considerable water flowing in it, while at present you have a river bed that is dry for five months – and longer this year – and I suppose the conditions ought to be better because of the percolation from the river bed more or less and there is always a flow from the rain-fall on the mesa.¹³⁷

¹³⁵ B.M. Hall, "Rio Grande Project," in *Proceedings of Second Conference of Engineers of the Reclamation Service*, 77.

¹³⁶ Mitchell, ed., *Official Proceedings*, 215-216; and Hall, "A Discussion of Past and Present Plans for Irrigation of the Rio Grande Valley," November 1904, 7-8. ff. 46, Box No. 792, Entry 3, RG 115, NARA Denver.

¹³⁷ Mitchell, ed., *Official Proceedings*, 219.

The work of Charles Slichter, a hydrologist consulting with USGS, informed Hall's response. Interested in learning more about the potential water supply to be derived from groundwater sources, particularly in the Mesilla Valley, the Reclamation engineer had contacted Slichter in July 1904, before the National Irrigation Congress meeting. Hall observed in a letter to the hydrologist that valley irrigators who pumped groundwater had found a "plentiful quantity of water at a short distance from the surface." Pumps with a capacity of 1,000 gallons per minute could operate "continuously for weeks without lowering the water plane." The water table might be drawn down as much as seven feet, observed Hall, but returned to its former level "within a few minutes after the pump stops." He therefore sought to know:

1st:- How much water per square mile can be pumped continuously from the ground at lowest season, without lowering the water table?

2nd:- What were the sources of supply of this underground water? Does the water all come down the river bed, or is there a large quantity coming from beneath the mesa country on each side?

3rd:- If there is a continuous under-flow along the river bed, what is its volume in cubic feet per second, during the time that the river is dry, so far as surface flow is concerned?

4th:- The river bed of the Rio Grande consists of coarse sand to a depth of 70 to 100 feet and more. Just above El Paso the bed rock is limestone and there is a narrow pass where the bluffs are only 400 feet apart at the river level, and the bed rock is at a depth of about 100 feet. If a submerged concrete dam or weir were constructed here with its crest at the level of the river bed surface, how much underflow would be brought to the surface by such a structure?

These were not idle questions for Hall. As he stressed to Slichter,

In order to irrigate the rich lands of the Rio Grande Valley in the Territory of New Mexico alone it will probably be necessary to use all of the floods and all of the underground water than can possibly be made available, and no time is to be lost in determining this vital question of underflow.¹³⁸

The hydrologist began his work the following month, and by October, a month before the National Irrigation Congress, he had completed his pumping plant tests. Slichter found a direct connection between the river and the ground water in the Mesilla Valley, as he told the assembled delegates following Hall's presentation:

I will not take up your time with any further matters except one point I observed in the Mesilla Valley, near Mesilla Park and Las Cruces, where we succeeded in measuring the amount of water lost by the river and contributed to the gravels. I think we have

¹³⁸ B. M. Hall, supervising engineer, to Charles E. Slichter, July 9, 1904. Folder 432 Rio Grande – Power Development – Slichters Reports as to Water Supply, Box 819 Rio Grande 430A – 458A, Entry 3, RG 115, NARA Denver.

established that the source of the water that is used by the pumping plants is the river itself; that the origin of the ground waters or the supply of ground waters which are used by the pumping plant, is the water contributed to the river itself or lost by the river.¹³⁹

Slichter made this same point when he published his work as USGS Water-Supply and Irrigation Paper No. 141, *Observations on the Ground Water of Rio Grande Valley* in 1905. According to his “observations of the test wells” in the Mesilla Valley,

the ground waters in the Mesilla Valley originate in the flood waters of the river. During times of low water the river bed is so thoroughly covered with mud that probably only a small amount of water escapes in the sand and gravels of the valley. During the period of flood, when the scour is deep, the contributions of the river to the underflow reach a maximum, as at that time the greatest amount of water is available for this purpose.¹⁴⁰

Federal reclamation plans for the Rio Grande Project thus from the outset anticipated utilizing all of the waters hydrologically connected to the river for the benefit of lands in New Mexico and Texas.

New Mexico’s adoption of a more comprehensive irrigation code in 1907 opened an opportunity to expand federal claims to Rio Grande waters as Hall had wished. Stoutemyer had a direct role in shaping this new water code, especially with respect to “the work of the Reclamation Service,” as he later informed Hall.¹⁴¹ The new code further drew upon aspects of Bien’s draft code. Section 40 of the 1907 act was virtually identical to Section 22 of the prior 1905 act, and the new law greatly expanded the authority of the territorial engineer. That office was soon filled by the appointment of Vernon L. Sullivan, who Stoutemyer noted to Bien in April was “well known to the Reclamation Service.” Under Sullivan, the office placed greater emphasis on the public interest, ascertaining the validity of old claims to water rights, determining the quantity of

¹³⁹ Charles S. Slichter to F. H. Newell, USGS Chief Engineer, October 25, 1904. Folder 432, Box 819, Entry 3, RG 115, NARA Denver; Mitchell, *Official Proceedings*, 218; and Charles S. Slichter, *Observations on the Ground Water of Rio Grande Valley*, Department of the Interior, United States Geological Survey Water-Supply and Irrigation Paper No. 141 (GPO, 1905), 1.

¹⁴⁰ Slichter, *Observations*, 27. Slichter further noted “that a small portion of the underflow reaches the river valley from the mesa and foothills to the north and east of Las Cruces.”

¹⁴¹ Stoutemyer had met with the New Mexico territorial governor and attorney general to “outline a plan” for the “proposed Irrigation Code” in 1907. He later met with various members of the territorial assembly and local attorneys to discuss “some features of the bill, particularly as to the territorial engineer and his work....” Stoutemyer believed that the new law would “be satisfactory to the Reclamation Service,” and that it was “a great improvement over the present [1905] law.” See B.E. Stoutemyer, Assistant Examiner, to Mr. B.M. Hall, Supervising Engineer, El Paso, Texas, Proposed Irrigation Code in New Mexico, March 4, 1907. ff. 110-E9, Legislation, Irrigation Laws; Water Codes; Etc., New Mexico, Transfer Case, Box 92 110E-7- -110E-12, Entry 3, RG 115, NARA Denver. See also Clark, *Water in New Mexico*, 118-122.

unappropriated water in the public streams of the territory, setting reasonable timetables for completion of large projects initiated prior to the adoption of the new water code.¹⁴²

In early November 1907, Stoutemyer wrote to Reclamation district engineer W.M. Reed, recommending a “supplemental” filing for the Rio Grande Project under the revised territorial water code. After reviewing copies of the various notices of water appropriations made for projects in the Office of the Territorial Engineer, the assistant examiner believed re-filing Reclamation’s notice of water right appropriation for Elephant Butte Reservoir and the Rio Grande Project was prudent. Stoutemyer was concerned about the highly variable flow of the Rio Grande from year to year, a flow that could be as small as 200,000 af to upwards of 2 million af per year. Hall’s 1906 filing for 730,000 af could thus become a significant limitation on project operations. If Reclamation desired “all the flow of the river,” then Stoutemyer favored amending the notice of appropriation to read “all the unappropriated water of the Rio Grande and its tributaries,” or if a definite number of acre-feet was required to “make it large enough to cover the entire flow of the largest year.” He cautioned that the filing must be made in a manner that did not forfeit any of the government’s existing rights under the 1906 notice, and recommended the inclusion of language that “clearly expressed” Reclamation’s “intention to preserve our rights under the former notice....” Stoutemyer noted there were a number of water right applications in the Rio Grande drainage pending in the territorial engineer’s office and undoubtedly more would be filed before the federal dam was completed.¹⁴³ Filing for all the unappropriated waters

¹⁴² Chapter 49, “An Act to Conserve and Regulate the Use and Distribution of the Waters of New Mexico; to Create the Office of Territorial Engineer; to Create a Board of Water Commissioners, and for Other Purposes,” H.B. No. 120; Approved March 19, 1907, *1907 Acts of the Legislative Assembly of the Territory of New Mexico, Thirty-Seventh Session* (Santa Fe: New Mexican Printing Company, 1907), 71-95; B. F. Stoutemyer to Morris Bien, April 2, 1907. ff. 110-E9, Box 92, Entry 3, RG 115, NARA Denver; and Clark, *Water in New Mexico*, 118-123.

¹⁴³ B.E. Stoutemyer, Assistant Examiner, to Mr. W. M. Reed, District Engineer, U.S.R.S., re Appropriation Notices in New Mexico, Nov. 8, 1907. ff. 41, Box 6, Entry 3, RG 115, NARA Denver.

Several applications for water rights on the Rio Grande and its tributaries that had the potential to adversely affect the Rio Grande Project were filed in late 1907. Stoutemyer responded with formal protests against each application. One application was for a partially constructed irrigation project with two failed dams on the Rio Puerco that flowed into the Rio Grande near Albuquerque. Some \$80,000 had been invested in the project, but no water had been applied to irrigate the land within the project. A second project was designed to divert water from the Rio Grande into the old La Union Community Acequia. This was a small project but its location was bothersome as it was located between Elephant Butte Reservoir and the Texas state line. The third, and largest, project was an application by the Red River Land & Water Company in Taos, New Mexico for development of a large irrigation project involving the La Plata River. Reclamation filed formal protests with the territorial engineer against the three applications, but later withdrew its protest against the Red River Land & Water Company as Reclamation’s La Plata River project had been abandoned. B.E. Stoutemyer, assistant examiner, to W. M. Reed, district engineer, U.S. Reclamation Service, December 20, 1907; Morris Bien, Acting Director, to B. E. Stoutemyer,

of the Rio Grande could check adverse competition by taking advantage of Section 28 of the 1907 law which declared that “If in the opinion of the territorial engineer there is no unappropriated water available, he shall reject the application.”¹⁴⁴

Reed forwarded Stoutemyer’s recommendation to the Reclamation director and Bien, serving as acting director, responded in late November. He agreed that the 1906 filing for “a volume of water equivalent to 730,000 acre feet per year” under the 1905 act was an insufficient quantity of water and should be expanded to include a supplemental filing for “all unappropriated water of the Rio Grande and its tributaries” under the 1907 act while “reserving all rights under notice of January 23, 1906.” The director’s office was nonetheless of the opinion that Reclamation’s 1906 filing was legally sufficient without further action. Bien specifically cited Section 22 of the 1905 act as constituting

a waiver by the Territory or a release to the Federal Government of all territorial rights over unappropriated waters upon the completion of certain acts by agents of the United States. By Section 22 of Chapter 102 of 1905, and the notice filed in pursuance thereof, the Territorial Legislature has relinquished claim to the waters of the Rio Grande in favor of the Federal Government, and there remains to be done only the filing of amendment of the notice as suggested.¹⁴⁵

As noted in Opinion I above, on April 14, 1908, Louis C. Hill, Hall’s successor as supervising engineer of the Rio Grande Project, filed a “supplemental notice” with Sullivan, pursuant to Section 40 of Chapter 49 of the laws of the 37th New Mexico territorial assembly enacted in 1907. The filing declared that the United States intended to utilize “[a]ll the unappropriated water of the Rio Grande and its tributaries” to be diverted or stored at a storage dam located 9 miles west of Engle, New Mexico, with a capacity of 2 million af and at diversion dams below in Palomas, Mesilla and El Paso valleys in New Mexico and Texas. Hill requested that these waters be withheld from further appropriation and that the rights of the United States be protected.¹⁴⁶

By the 1910s, however, Sullivan had embraced the idea that a large proportion of water diverted upstream would return to the Rio Grande – the “return water theory,” in the words of one Reclamation official – and thereby cause no material damage to the federal project. It was a stance that inclined the territorial engineer toward approval of most other filings for water on

February 18, 1908. ff. 41-D New Mexico. Water Appropriations. Rio Grande Project. THRU 1910, Box 9 41B-41D, Entry 3, RG 115, NARA Denver.

¹⁴⁴ Expressly reserving all of the unappropriated water in excess of 730,000 af per year would also tie the hands of an unfriendly territorial engineer who might favor private enterprises, Stoutemyer noted. Stoutemyer to Reed, Nov. 8, 1907. ff. 41, Box 6, Entry 3, RG 115, NARA Denver.

¹⁴⁵ W.M. Reed, District Engineer, to The Director, U.S. Reclamation Service, November 15, 1907; Acting Director [Morris Bien] to Reed, November 29, 1907. ff. 41, Box 6, Entry 3, RG 115, NARA Denver.

¹⁴⁶ Supervising Engineer to Sullivan, April 14, 1908. ff. 41-D, Box 9, Entry 3, RG 115, NARA Denver.

the Rio Grande and its tributaries. After carefully examining the issue, Reclamation and the Interior Department came out against such applications. Federal authorities believed that these filings would have an adverse effect on the water supply for Elephant Butte Reservoir. They asserted that approval would set a “precedent for the general allowance of such claims and the ultimate destruction of the Rio Grande Project,” abrogating treaty obligations to Mexico and contracts with water users dependent on the project water supply. These arguments, coupled with the Rio Grande “embargo” and the temporary 1929 compact, were sufficient to preclude significant developments upstream from Elephant Butte until the advent of the Middle Rio Grande Conservancy District’s proposed project.¹⁴⁷

Around this same time, Reclamation began asserting the right to “waste, seepage, spring, percolating water,” as well as “return flows” from project operations. As noted above, in proposing the Rio Grande Project in 1904, Hall had suggested that the project would make use of “return water.” Bien’s 1905 draft water code had also provided for the appropriation “of seepage water...in the same manner as other waters...provided that the seepage can be traced to such works beyond reasonable doubt.” The 1905 New Mexico territorial water law did not adopt such a provision, but Section 53 of the 1907 law did. There is no indication from the historical record reviewed that a formal filing for “seepage water” from the Rio Grande Project was made by either Reclamation or another party, pursuant to Section 53.¹⁴⁸

Federal authorities nevertheless saw such waters as an essential element of the overall supply for the Rio Grande Project as it developed into the 1930s. In 1912, four years prior to the completion of Elephant Butte Reservoir, a board of US Army engineers reporting on the progress of the project to Congress recognized that “losses in the distribution system,” estimated at 20

¹⁴⁷ P.W. Dent, Assistant Examiner, to Director, U.S. Reclamation Service, April 26, 1910. ff. 41, Box 6; William Reed, district engineer, to Director, U.S. Reclamation Service, April 28, 1910; F. H. Newell, Director, to Secretary of the Interior, May 11, 1910; and Secretary of the Interior to Vernon L. Sullivan, Territorial Engineer, May 12, 1910. ff. 41-D, Box 9, Entry 3, RG 115, NARA Denver. For more on the Rio Grande “embargo” and the 1929 temporary compact, see Opinion I.

¹⁴⁸ Bien, “Proposed State Code of Water Laws,” 33; and Chapter 49, Section 53, *1907 Acts of the Legislative Assembly of the Territory of New Mexico*, 89. Section 53 stated:

In the case of the seepage of water from any constructed works, the owner of such works shall have the first right to use thereof upon filing an application with the territorial engineer as in the case of an original appropriation, but if such owner shall not file said application within one year after the completion of such works, or the appearance upon the surface of such seepage water, any party desiring to use the same shall make application to the territorial engineer, as in the case of unappropriated water, and such party shall pay to the owner of such works reasonable charge for the storage or carriage of such water in such works; Provided, That the appearance of such seepage water can be traced beyond reasonable doubt to the storage or carriage of water in such works.

percent, would occur as a result of “transit between the reservoir and the diversion dams.” However, such “losses in transit,” these engineers maintained would “be partly offset by the return seepage in upper parts of the valley, which will be available for diversion lower down.”¹⁴⁹

The following year, in April 1913, Reclamation chief engineer A.P. Davis prepared for the new secretary of the interior a report on the Rio Grande Project and its water supply, “Water Supply of Rio Grande, from Official Records, 1912,” that again emphasized the importance of return flows:

In the irrigation development of a large river system, such as the Rio Grande, it is undoubtedly wise to use a considerable proportion of the water in the upper valleys soon after it leaves the mountains and before it has had much opportunity to evaporate. As more tributaries reach the river, the additional water supply justifies other diversions lower down, which can also utilize return seepage from the upper valleys.¹⁵⁰

The *Twelfth Annual Report of the Reclamation Service for 1912-1913*, released in 1914, offered this explicit statement with regard to the Rio Grande Project: “The United States claims all waste, seepage, spring, and percolating water arising within the project, and proposes to use such water in connection therewith.” Such claims for other Reclamation projects were asserted in the *Twelfth Annual Report* as well.¹⁵¹

Subsequent Reclamation annual reports repeated this claim within the context of the project’s “Irrigation Plan.” The 1914-1915 report, for instance, described the Rio Grande Project as 19.7 percent complete exclusive of storage and 50 per cent complete including the storage works at Elephant Butte Dam. The project at that time served 47,160 acres. No stored water was yet available to project lands in 1914, only direct diversions, but the following year stored water was. The report indicated that the project would increasingly rely on water now being stored at Elephant Butte Reservoir. Its “Irrigation Plan” nonetheless included a claim to “all waste, seepage, spring, and percolating water arising within the project and proposes to use such water

¹⁴⁹ United States Congress, House of Representatives, *Fund for Reclamation of Arid Lands: Message from the President of the United States, Transmitting a Report of the Board of Army Engineers in Relation to the Reclamation Fund*, H. Doc. No. 1262, 61st Cong. 3d sess. (1911-12), 106.

¹⁵⁰ A.P. Davis, Chief Engineer, Memorandum for Secretary Lane, April 17, 1913, and “Water Supply of Rio Grande, from Official Records, 1912,” 4-5. File 8-3 (Part 4) Reclamation Service, Rio Grande Project, New Mexico, Rio Grande River, Distribution of Waters, Nov. 21, 1912 – Apr. 17, 1914, Box No. 1639 8-3, Rio Grande D-E, CCF 1907-1936, RG 48, NARA II.

¹⁵¹ *Twelfth Annual Report of the Reclamation Service, 1912-1913* (GPO, 1914), 176. The plan for Colorado’s “Uncompahgre Valley project,” for instance, included “utilization of all the waste, seepage, spring, percolating, and return water arising within the project in the irrigation of lands in the Uncompahgre Valley.” The irrigation plan for the Minidoka Project in Idaho used the exact same language as used for the Rio Grande Project. Newell, *Twelfth Annual Report*, 78 and 95.

in connection therewith.” Three years later, in its 1917-1918 annual report, Reclamation again described its “Irrigation Plan,” which was estimated as 40 per cent complete excluding Elephant Butte Dam and 66.4 per cent including the dam. The project at that time was serving about 90,000 acres. As in the 1914-1915 report, Reclamation asserted “claims [to] all waste, seepage, spring, and percolating water arising within the project....”¹⁵²

In June 1919, Reclamation engineers Harold Conkling and Erdman Debler produced the first comprehensive assessment of the operations of the Rio Grande Project since the completion of Elephant Butte Dam, an assessment that emphasized the importance of “return flows.” Conkling and Debler noted that given the long irrigation season in the basin (from February to November) “conditions are favorable for a reuse of almost the entire return flow.” This return flow, according to the engineers, “consist[ed] of the transportation loss from canals and deep percolation from irrigated areas.” Such waters were often captured in project drains, and brought back to the river channel. The engineers maintained that unlike with most projects, such return flow did not pose much of a problem “because of immediate redirection by canal headings below,” and in fact the lowest units of the project – San Elizario Island and the Tornillo District – could “probably use the entire return from the El Paso Valley.” Although the amount of return flow from drains was then “uncertain,” Conkling and Debler estimated 1.5 af/a per year. They further anticipated that other than the return flow from the Tornillo unit (which would be lost to the project because Tornillo was the lowest unit) and return flow during the winter (which would be lost because of lack of use) return flow would be fully utilized on project lands.¹⁵³

Conkling prepared a separate memorandum report on the water supply for the San Luis Valley in Colorado, the Middle Rio Grande Valley in New Mexico, and the Rio Grande Project in New Mexico and Texas later that same month. He once again stressed that “on each...project conditions are favorable for re-use of return flow by the acreage on the lower end.” With specific reference to the Rio Grande Project, the engineer reiterated the analysis he and Debler offered in their larger report. Conkling assumed 4.32 af/a for the diversion duty for the project, and

¹⁵² U.S. Department of the Interior, *14th Annual Report of the Reclamation Service, 1914-1915* (Washington: Government Printing Office, 1915), 214-217; and U.S. Department of the Interior, *17th Annual Report of the Reclamation Service, 1917-1918* (Washington: Government Printing Office, 1918), 250-251, and 254-256.

¹⁵³ Harold Conkling, Engineer, and Erdman Debler, Asst. Engr., Water Supply for and Possible Developments on Irrigation and Drainage Projects on the Rio Grande River Above El Paso, Texas, June-1919, 105, 111-112. ff. 302.31, New Mexico. Report dated June 1919 by Conkling and Debler on Water Supply for and Possible Developments on Irrigation and Drainage Projects on the Rio Grande River Above El Paso, Texas, transmitted by letter July 15, 1919, Box 262 302.28–302.31 A. NV-NM, Entry 7, RG 115, NARA Denver.

believed that given the basin's 10-month irrigation season, "almost all of the return flow may be utilized on the project if this duty can be obtained."¹⁵⁴

The engineer took further note of the potential impact of non-federal groundwater development on project lands. He observed that the project was then assumed to serve 155,000 acres ("as estimated by the project office") but could be extended "privately [i.e., not by federal authorities] by pumping from ground water under assumed unirrigable acreage of 29,000 acres." "An additional draft of 70,000 acre feet annually," Conkling pointed out, would significantly worsen two prior years of shortages "without adverse effect in other years." Whether such expansion was advisable, he left to the "attitude of the government toward the question of allowing such possible shortages."¹⁵⁵

Conkling's observations highlight the interrelationship of surface, subsurface, and return flows upon which the Rio Grande Project and many other federal projects had come to rely. The claim to waters other than surface flow was, as Assistant Attorney General William D. Riter wrote to John F. Truesdell, Special Assistant to the Attorney General, in July 1921, a "matter of policy...for the Secretary of the Interior to decide." In Riter's view, as evidenced by the assertions made over the years in "annual reports and otherwise," the Interior Department had "announced the intention of reclaiming seepage and waste waters of government projects for further use thereon." At the time of Riter's writing, Truesdell was apparently uncertain of the efficacy of this position. While acknowledging that the question was not entirely settled from a legal perspective, Riter noted that both the Justice Department's Public Land Division and US Solicitor General Alexander Campbell King gave "careful consideration" to the issue. Both believed that the federal government was on firm ground, provided that it took the position

that when the Government makes an appropriation of water for a reclamation project, it is for the project as a whole, and not for particular farms comprising parts of the project; and the fact that a portion of the water, after serving to irrigate one farm escapes by seepage and finds its way to a piece of private land which happens to be inclosed [*sic*] by the project lands, is no evidence of an intent on the part of the Government to abandon that water, and does not in law amount to an abandonment; but the Government may recapture it and apply it to other parts of the same project.

¹⁵⁴ Memorandum, From: Engineer Harold Conkling, To: Chief of Construction, Subject: Water Supply – Rio Grande River, June 18, 1919 [hereafter Conkling Memorandum...June 18, 1919, 2 and 17. ff. 302.31, New Mexico. Surveys and Investigations. THRU 1929, Box 262, Entry 7 RG 115, NARA Denver. This report led to the modification of the Rio Grande "embargo" in 1923, as discussed in Opinion I.

¹⁵⁵ Conkling Memorandum, June 18, 1919, 17-19. ff. 302.31, New Mexico. Surveys and Investigations. THRU 1929, Box 262, Entry 7, RG 115, NARA Denver.

Riter later informed Reclamation chief counsel Ottamar Hamele, who steadfastly insisted upon the federal government's claim to these waters, "that the two Departments [Justice and Interior] are in accord."¹⁵⁶

The federal government's assertions of ownership over waters returning to or arising on project lands further won judicial approval in federal and state courts in the early 1920s. In the case of *United States v. Ramshorn Ditch Co.*, which concerned waters initially diverted for the North Platte River Project in Nebraska, the federal Circuit Court of Appeals in November 1920 reportedly "sustained the right of the Government to reclaim seepage waters from a part of the reclamation project and use them again upon other lands of the same project." The federal district court in Idaho likewise sustained "the right of the Government to recapture and again use seepage waters" for lands in the Boise Project in Idaho in *New York Canal Co. (Ltd.) v. Bond and Weinkauff*. US attorneys made similar arguments in 1921 for the recapture and reuse of water previously diverted to serve lands in the Shoshone Project in Wyoming in *United States v. Ide et al.*, and *The Lincoln Land Co. et al. v. Weymouth et al.*¹⁵⁷

Within the Rio Grande Project itself, Elephant Butte Irrigation District recognized the importance of what its president H.H. Brook termed "Drainage return flow." Brook, writing project superintendent L.R. Fiock to express concerns about the proposed inclusion of downstream lands in Hudspeth County into the project (discussed in Opinion IV below), observed that the "water supply of these arises from two sources":

- (1) The formally acquired unappropriated natural flow, flood and torrential waters of the Rio Grande including the ancient natural flow rights of the landowners of the present project and stored in the Elephant Butte Dam...
- (2) Drainage return flow artificially created by the expenditure of large sums by the United States under contract with the landowners giving a first lien on their land to secure repayment and which artificially created water supply, according to the law of the West, belongs to the landowners creating it to be used or disposed of by the United States as trustee for the benefit of the said land and water right owners.

¹⁵⁶ Assistant Attorney General [William D. Riter], For the Attorney General, to John F. Truesdell, Esq., Special Assistant to the Attorney General, July 21, 1921; Ottamar Hamele, Chief Counsel, to Hon. William D. Ritter, Assistant Attorney General, July 26, 1921; and W.D. Riter, Assistant Attorney General, For the Attorney General, to Ottamar Hamele, Esq., Chief Counsel, US Reclamation Service, July 27, 1921. ff. 030.1 General Correspondence re Return flow, Waste & Seepage Water Thru 1929, Box 33 023.6- -032, Entry 7, RG 115, NARA Denver.

¹⁵⁷ *Annual Report of the Attorney General for the United States, For the Fiscal Year 1921* (GPO, 1921), 86.

Brook further asserted in his letter that “the right to drainage and seep water was reserved in the water right filings” for the project.¹⁵⁸

Persistent interest in the issue of return flow into the late 1920s prompted Reclamation Commissioner Elwood Mead to suggest that an article be drafted for the agency’s *New Reclamation Era* publication, whose readership included farmers and water users on federal reclamation projects. This article would discuss “the utilization of the return flow of water in connection with various irrigation projects.” E.B. Debler, who had co-authored with Harold Conkling the 1919 study that identified the central importance of return flows to the Rio Grande Project, drafted the piece for the August 1927 issue.¹⁵⁹

In “Return Flow and Its Problems on Reclamation Projects,” Debler emphasized both the necessity of return flow while acknowledging the somewhat legally ambiguous status of such water. By way of introduction, he offered a detailed and inclusive definition of “return flow,” that seemed to embrace not only previously diverted surface flow that made its way back to the stream within the project but also water underlying project lands:

When water is applied to the earth’s surface naturally through rains and snow or artificially by irrigation it is disposed of in a number of ways. A part passes away immediately or very soon as surface run-off or evaporation from the surface of the snow, ground, or from the exposed surfaces of plants which catch the moisture. Another part enters the ground is in part returned to the surface by capillary action to replace water evaporated from the surface. Some is taken up through the roots of plants and evaporated in the growth processes of the plant or stored in the plant structure and hauled away as a plant product. The remainder passes beyond the limit of capillary action and joins the mass of water existing under the ground surface, there generally to form part of a moving stream seeking a lower level, and reappearing in the form of seepage, springs, or artesian flow, the particular name popularly applied being dependent on the concentration of flow and the pressure with which it reaches the surface. The reappearance of these waters may be but a few hundred feet from the source thereof, or it may be several hundred miles, depending entirely on the ground structure and topography.

Return flow in “arid regions” was thus

¹⁵⁸ Elephant Butte Irrigation District, (Signed) H.H. Brook, President & Manager to Mr. L.R. Fiock, Acting Project Manager, US Bureau of Reclamation, August 8, 1923, 1 and 3. Folder 222. Rio Grande Project. Corres. re Organization of Irrigation Districts and Execution of Contracts Guaranteeing Repayment of Construction Costs, Thru 1929. Transfer Case, Box 902, Rio Grande 212.—222, Entry 7, RG 115, NARA Denver.

¹⁵⁹ Memorandum, From: Commissioner [Elwood Mead], To: Chief Engineer, Denver, Colorado, Subject: Article for the New Reclamation Era on Return Flow, February 4, 1927. ff. 030.1, Box 33, Entry 7, RG 115, NARA Denver.

the increase therein due to the application of irrigation water. This includes waters lost by seepage from canals and reservoirs, as well as waters applied by the irrigator to his land. Such return flow is in these places particularly prominent, as the return flow from precipitation prior to irrigation development is usually so small that the stream in its passage through the region actually loses a part of the water it brings from its mountain sources, at times drying up completely. With irrigation development such conditions are materially changed and living stream often result therefrom.¹⁶⁰

Return flow was “heavily concentrated in the irrigation season,” with “large irrigation areas underlain to great depths with permeable deposits” experiencing nearly continuous return flow. Debler estimated that 60 percent of the water diverted for irrigating crops became return flow “and reenters streams for further use unless intercepted.” In some areas with diversions of up to 15 af /a return flow could be as much as 90 percent, and in other areas, concrete-lined canals and “favorable soils” could reduce return flow to 25 percent of the water diverted.¹⁶¹

Regardless of the amount, the engineer stressed the importance of return flow to federal reclamation projects. He argued that

return flow augments the irrigation water available in the late summer after the stream flow, due to melting snows, has declined to less than the irrigation requirements of lands dependent thereon, and in that way serves a similar purpose as do storage reservoirs, but with the advantage that there is no loss from evaporation. In practice the effect has been to materially improve water rights on the lower portions of stream systems due to irrigation development on the upper reaches. In some cases the irrigation systems that have produced such return flow have been able to benefit in that less water is thereafter necessary to be passed down the stream to care for prior rights.

Debler pointed out that return flow was vital to the water supply for both federal projects and beyond.¹⁶² For Texas specifically, he noted Hudspeth County water users (discussed in Opinion IV) who were not part of the Rio Grande Project were nonetheless “entirely dependent on return flow and waste water from project lands” upstream in the El Paso Valley. The El Paso Valley,

¹⁶⁰ E.B. Debler, Engineer, Bureau of Reclamation, “Return Flow and Its Problems on Reclamation Projects,” *New Reclamation Era* (August, 1927), 124. ff. 030.1, Box 33, Entry 7, RG 115, NARA Denver.

¹⁶¹ Debler, “Return Flow and Its Problems on Reclamation Projects,” *New Reclamation Era* (August, 1927), 124. ff. 030.1, Box 33, General Files, 1919-1929, Entry 7, RG 115, NARA Denver.

¹⁶² According to Debler, both the Notus Division of the Boise Project in Idaho and the “west extension division” of the Umatilla Project relied upon return flows from upstream project diversions. On the North Platte Project in Wyoming and Nebraska, utilization of return flow likewise enabled more efficient use of stored water.

which was within the project, “in turn uses return flow from Mesilla Valley in New Mexico and Texas.”¹⁶³

The importance of return flows to established reclamation projects aside, Debler observed that state law was neither entirely decided nor altogether antagonistic to the issue. Early water codes in western states were “generally...framed before return flow became a recognized factor in irrigation supply” and consequently were “in a rather unsatisfactory shape” with “decisions...in conflict.” “The general tendency, however,” according to the engineer, “is to regard return flow in all of its forms recoverable by the agent producing it until it enters a stream which in its natural condition supplied irrigation diversions, when it becomes a part of such stream and subject to appropriation therefrom as are other waters of the same stream.”¹⁶⁴

As the states of Colorado, New Mexico, and Texas moved forward with negotiations for a compact, federal and state engineers alike recognized that the Rio Grande project water supply encompassed a range of surface and return flows, both of which influenced and were influenced by waters lying beneath the surface of project lands. As early as 1924, Reclamation measured the groundwater in the Mesilla Valley, in the later words of the Rio Grande Joint Investigation report, or *JIR*, “chiefly to derive the annual increment or decrement of ground water as a necessary factor in computing the annual consumptive use of water in the valley by the inflow-outflow method.”¹⁶⁵

In an internal Reclamation report on silt issues prepared by Rio Grande Project Superintendent L. R. Fiock for Reclamation’s Chief Engineer in July 1931 (at the latter’s request), the superintendent yet again emphasized the importance of return flows in his discussion of project operations. Fiock observed that the reservoir retained the “entire flow or discharge of the Rio Grande reaching [it],” and fully controlled and regulated releases “to meet irrigation demand requirements.” According to the project superintendent,

The water as released is drawn from the river at the various diversion throughout the project. Part of the amount diverted at each respective diversion point is compensated for by waste return and drainage recovered flow which mingling with the remaining released reservoir water as it passes through each succeeding project division is available for rediversion at the diversion points on farther down.¹⁶⁶

¹⁶³ Debler, “Return Flow and Its Problems on Reclamation Projects,” *New Reclamation Era* (August, 1927), 124-125. ff. 030.1, Box 33, General Files, 1919-1929, Entry 7, RG 115, NARA Denver.

¹⁶⁴ Debler, “Return Flow and Its Problems on Reclamation Projects,” *New Reclamation Era* (August, 1927), 125. ff. 030.1, Box 33, General Files, 1919-1929, Entry 7, RG 115, NARA Denver.

¹⁶⁵ *JIR*, 62.

¹⁶⁶ L.R. Fiock, “Effect of the Operation of Elephant Butte Reservoir on the River through Rio Grande,” 1-2, enclosed with Memorandum, From Superintendent [signed L.R. Fiock], To Chief Engineer, Denver,

This was especially true for lands below El Paso in Texas (as Debler had previously suggested):

The flow required at El Paso to meet the normal irrigation requirements from April 1st to September 1st is from 800 to 1,000 second feet, this has required from 300 to 500 second feet in the river below Mesilla Dam, the difference being made up of waste return and drain recovery in the valley above between Mesilla Dam and El Paso....¹⁶⁷

The surface flow of the Rio Grande captured by Elephant Butte and the return flow from diversions – i.e., “waste return and drain recovery” – also fed and relied upon the groundwater underlying the project, as New Mexico engineer John Bliss found in the mid-1930s. Conkling’s observations about the potential impact of private groundwater pumping within the project notwithstanding, there were few investigations of groundwater below Elephant Butte prior to Bliss’s study in 1935-1936. Slichter’s study of the Mesilla Valley in 1904 had indicated a hydrological connection between the river and the valley’s groundwater, but it was made prior to the construction of the Rio Grande Project. Reclamation had made “[m]easurements” in 1917 and 1918, however, as Bliss pointed out, “the data were obtained prior to drainage construction and are not applicable to present day conditions.” In 1928, E.L. Barrows, working for the New Mexico State Engineer’s Office, made “a preliminary seepage determination” for the stretch between Elephant Butte Reservoir and the Leasburg Diversion Dam, yet a planned follow-up study ultimately was not undertaken. Later that same year, a study of river hydrographs by Middle Rio Grande Conservancy District Designing Engineer R.G. Hosea found no “evidence of an invisible underground flow tributary to the river.” He instead noted instead that “it is apparent that when the reservoir is not releasing water during the winter months, the Ft. Quitman flow is just about equal to the total drainage water from the project.”¹⁶⁸

Bliss’s investigation, by contrast, identified “a direct relation of seepage to ground water and irrigation”: at certain critical points between Elephant Butte and El Paso, underflow fed the groundwater table, providing basin lands with additional water that was recovered by project

Colorado, Subject: Effect of clear water on bed of Rio Grande below Elephant Butte Reservoir – Rio Grande Project, July 25, 1931. ff. 301.1 Rio Grande Project-Dams-Elephant Butte Dam 1930 thru, Box 928 Rio Grande Pro. 301.-301.12, Entry 7, RG 115, NARA Denver.

¹⁶⁷ Fiock, “Effect of the Operation of Elephant Butte Reservoir on the River through Rio Grande,” 2-3. ff. 301.1, Box 928, Entry 7, RG 115, NARA Denver.

¹⁶⁸ R.G. Hosea, Report on Irrigation in the Rio Grande Valley, State of New Mexico, The Rio Grande Valley Survey Commission, Albuquerque, New Mexico, December, 1928, 169. Folder 3 Report on Irrigation in the Rio Grande Valley-R.G. Hosea-December 1928 [EBID Item #20], December 1928, Box 02-D.003, MS 0235, RGHC, NMSU; and John H. Bliss, “Report on Investigation of Invisible Gains and Losses in the Channel of the Rio Grande from Elephant Butte to El Paso.” Feb. 1936, 1. Folder 1435, Bliss, Report on Investigation of Invisible Gains and Losses in the Channel of the Rio Grande from Elephant Butte to El Paso, February 1936, Box 55, State Engineer Reports: Rio Grande, Exps. 161-163, Nos. 1417-1437 [hereafter Box 55], NMSA.

drains and returned to the river channel for use on lands downstream. Bliss's study, presented to New Mexico State Engineer and Rio Grande Compact Commissioner Thomas McClure in February 1936 as "Report on Investigation of Invisible Gains and Losses in the Channel of the Rio Grande from Elephant Butte to El Paso" grew out of a suggestion for such an investigation made by Fiock in fall 1935. "[D]etermination of invisible gains and losses in the bed of the Rio Grande," as Bliss noted in his report, were "an important item in the study of the use and distribution of the waters of the river" yet "few such data are available below Elephant Butte Reservoir." Fiock had proposed that such an investigation be made prior to the construction of Caballo Dam; Caballo was a critical feature of international efforts to rectify the river's channel downstream from Elephant Butte, and pursuing a study before the dam was built would permit "work in the canyon above Percha Dam."¹⁶⁹ With the cooperation and assistance of USGS, Reclamation, and

¹⁶⁹ Caballo Dam, which today regulates the flow of the Rio Grande for flood control purposes, compensates for the loss of storage space in Elephant Butte due to silting, and generates hydroelectric power, came about as a result of international efforts to rectify the channel of the Rio Grande. The treaty of Guadalupe Hidalgo had established the river as the boundary between the two nations. Periodic high flow events since the treaty's ratification, however, altered the river's course, damaging land and property on both sides of the river and confusing the precise location of the border. Completion of Elephant Butte Dam in May 1916 brought greater control over the river, but the Rio Grande continued to meander into the 1920s. See Department of the Interior, *Fifteenth Annual Report of the Reclamation Service 1915-1916* (GPO, 1916), 324; and History and Development of the International Boundary and Water Commission, United States and Mexico, El Paso, Texas, April 1952, Revised April 1954, 45-49. Item 41, Box 1, MS042 International Boundary & Water Commission Records [MS042], UTEP Spec Coll.

A major flood in 1925 prompted the US and Mexico to enact a treaty eight years later that committed to the nations to stabilizing the river channel through the Rio Grande Rectification Project. A chief feature of this project was "the construction of [a] flood retention dam at Caballo, New Mexico" to enhance river regulation and prevent further meanders. Between 1934 and 1936, under pressure from local interests that had long sought a hydroelectric power facility at Elephant Butte as well as additional water for Rio Grande Project lands, the USBR in conjunction with the International Boundary Commission committed to building an 85-foot high and 4,250-foot long dam at Caballo. The proposed dam, according to the Interior Department:

will, through flood control, become a highly important feature of the International Boundary Commission's plan for rectification of the Rio Grande in El Paso and Hudspeth counties, Texas, and it will provide an afterbay for the Elephant Butte Dam of the Bureau of Reclamation. Elephant Butte Dam stores water for the Rio Grande Federal Reclamation project in New Mexico and Texas. Provision of an afterbay will provide additional storage for project lands and will make it possible to install hydroelectric generation equipment at Elephant Butt Dam in the future.

Caballo was substantially completed in September 1938. History and Development of the International Boundary and Water Commission, United States and Mexico, El Paso, Texas, April 1952, Revised April 1954, 45-49. Item 41, Box 1, MS042, UTEP Spec Coll; Chronology – Caballo Dam Construction, February 1, 1933-November 30, 1935, December 16, 1935. ff. B-8.2.4.2, Conservation, Power, Diversion & Drainage Projects, Caballo Dam, 5 of 6. August 1935 thru March 1937, Box 5, Accession Number 076-69A-0928, Records of the International Boundary and Water Commission, Record Group 76 [hereafter RG 76], National Archives and Records Administration at Fort Worth, Texas [hereafter NARA Ft. Worth]; and

the International Boundary Commission, Bliss embarked on the study in early January 1936 so as “to allow ground water and bank storage to reach a minimum” before water was released for the 1936 irrigation season.”¹⁷⁰

Bliss initially intended to examine that stretch of the Upper Rio Grande Basin between Elephant Butte and Ft. Quitman. Field work was to consist of two parties each making “complete series of measurements,” guided by Reclamation engineers. Reclamation also installed temporary recording gages at Percha and Leasburg diversion dams, and brought into service the “operation station at Mesilla Dam...during the investigation.” The methodology was like so:

River stations were selected at frequent intervals to localize channel gains and losses in order to determine their probable sources or causes. No diversions were being made in any of the canals during the period of the investigation. To speed the work, all drain flows were measured but once, which was felt to be sufficient as these discharges vary but slightly.

Conditions during the investigation, however, forced alterations. The ongoing channelization program limited Bliss’s work to the area between Elephant Butte and Courchesne, and unexpected rains soon after surveys began forced a “remeasurement of the entire river” – a “third series” of measurements starting February 1. High winds further affected this third series, “caus[ing] considerable variation in the discharge” as well as “preclude[ing] any reliable additional measurements.” Despite these issues, survey work was completed by February 7, and the three sets of measurements were tabulated and averaged. Discharges were ascertained “by comparison of the three series, those apparently in error being discarded,” and a “few measurements were corrected for change in river stage due to rain.” Other corrections were made for the rising river stage below Elephant Butte and evaporation.¹⁷¹

Whatever the limitations of the study, Bliss felt confident enough in the work to make several significant observations about the complicated dynamics of underflow, groundwater, irrigation, and gains and losses in the Rio Grande that affected the project. He noted, for instance, that there was a “consistent increase in the canyon from the [Elephant Butte] Dam to the Dona Ana-

Department of the Interior, Memorandum for the Press, Immediate Release, May 2, 1936. ff. 023.6 Rio Grande-Caballo Dam-Press Releases, Box 939, Rio Grande-Caballo Dam 011.-301.1, Entry 7, RG 115, NARA Denver; *Project History, Rio Grande Project, Calendar Year 1938*, 42-43. United States Bureau of Reclamation, Washington, DC, Project Histories of the Rio Grande Project, 1912-1988. Microfilmed by the Government Publications Department, General Library, University of New Mexico, Eulalie W. Brown, in cooperation with the United States Bureau of Reclamation, Rio Grande Project, El Paso, Texas, Dan N. Page, Project Superintendent, December, 1992, Southwest Micropublishing, Inc. [hereafter USBR PHRGP 1912-1988 (mf)]; and Robert Autobee, “Rio Grande Project,” (Bureau of Reclamation, 1994), 17.

¹⁷⁰ Bliss, “Report on Investigation of Invisible Gains and Losses,” 1-2 and 12. Folder 1435, Box 55, NMSA.

¹⁷¹ Bliss, “Report on Investigation of Invisible Gains and Losses,” 3-4, 7, and 14. Folder 1435 Box 55, NMSA.

Sierra Country line,” which Bliss ascribed “chiefly to underflow from the large intermittent streams entering [the Rio Grande channel] from the west.”¹⁷²

In the Rincon and Mesilla valleys, there were further fluctuations. “[W]ater lost in the Rincon Valley,” the engineer asserted, “feeds the ground water of the surrounding lands and is recovered largely by the [project] drains.” In the valley’s Selden Canyon, Bliss identified a “small increase” attributable to “several short arroyos and from seeps in the vicinity of Radium Springs.” In the Mesilla Valley, losses were greater “particularly in the section between Picacaho Flume and Mesquite, through which the large Del Rio Drain parallels the river at a short distance.” Yet, “above Vinton bridge where the rivers enters a canalized section,” he found an “increase.” Bliss hypothesized that this was caused either by “underflow in the old river channels on the west side of the valley entering the present channel above the bridge,” or “that the cut, which traverses an apparently undisturbed deposit of caliche and heavy clay, is effective in bringing a considerable underflow to the surface in this section.”¹⁷³

For the Mesilla Valley losses, Bliss made a further analysis of the data gathered. Taking a closer look at the drain measurements, the engineer noted that “much” of the Del Rio Drain flow was “drawn directly from the river channel through underflow.” This was less true of the Montoya Drain and the “the Chamberine which drains the old river channels on the west side of the valley below Las Cruces.”¹⁷⁴

Attempting to develop curves for his study in comparison to others previously made, Bliss acknowledged that the data sets all differed from each other and those differences were not fully explainable. “It is impossible to account for the eccentricities of the curves prior to the present one, as little is known of the conditions of flow, irrigation, etc., at the time the measurements were made,” he wrote. Bliss nevertheless argued that the curves demonstrated “a direct relation of seepage to ground water and irrigation.” He proposed further study of “seepage during the non-irrigation period” so as to compare “against gains and losses found during the summer at a period when river and canal flows can be kept in a stable condition.”¹⁷⁵

This “direct relation of seepage to ground water and irrigation” was not addressed in the testimony given in the original action between Texas and New Mexico in the mid-1930s. However, Bliss, Fiock, and Texas engineers Raymond Hill and J.Q. Jewett all gave testimony acknowledging that the Rio Grande Project relied upon return flows. These were the flows that Bliss’s study suggested intercepted groundwater, found their way to drains that fed the river

¹⁷² Bliss, “Report on Investigation of Invisible Gains and Losses,” 9. Folder 1435, Box 55, NMSA.

¹⁷³ Bliss, “Report on Investigation of Invisible Gains and Losses,” 9-10. Folder 1435, Box 55, NMSA.

¹⁷⁴ Bliss, “Report on Investigation of Invisible Gains and Losses,” 10. Folder 1435, Box 55, NMSA.

¹⁷⁵ Bliss, “Report on Investigation of Invisible Gains and Losses,” 12. Folder 1435, Box 55, NMSA.

channel below Elephant Butte, and would have served, either wholly or in part, downstream lands in Texas.

Fiock was among the first to affirm the importance of all the waters arising on the Rio Grande Project before Special Master Charles Warren. Confirming Warren’s understanding that “nearly double” the amount of water released from Elephant Butte Dam was needed to satisfy irrigation demands on the project, for instance, the project superintendent stated, “That is nearly, approximately the proportion, although we [federal Rio Grande Project officials and staff] do recover and redistribute water over and over down through the project.”¹⁷⁶

Fiock reiterated this point later when asked by Texas’s attorney Frank Clayton, “Now, in the upper reaches of the river, the sand traps, or sluice ways, go back into the river and the water is rediverted below, is that correct?”:

With successive operating diversion points, and operating divisions down the river, as the Rio Grande Project has, that water is available and is counted on as part of the supply for the succeeding diversion below.¹⁷⁷

The project superintendent not only testified that water released from Elephant Butte was used multiple times – such water variously identified by Fiock as “return flow from drainage,” “drain water,” “drain flow,” or “drain runoff” – but also reported the same officially, outside of the courtroom. From one project operations report, dated November 7, 1934, New Mexico’s attorney George Hannett read:

...the demand for water was high due to continued dry warm weather. There was eight thousand five hundred twenty-eight acre feet delivered with a release of nineteen hundred acre feet from storage. In 1933 all water used for satisfying irrigation demands was return flow from drainage, which was rediverted into various canals as demands required.

When asked if he could recall making this report, the federal Reclamation official replied: “I don’t recall the exact words, but that is the nature of our reports.”¹⁷⁸

¹⁷⁶ *Plaintiff’s Case in Chief*, Vols I & II, 312. CB-F-171A thru CB-F-1716: Transcripts of TX v. NM, Vol. 1-16, Box 4X219, RAHP, UTA.

¹⁷⁷ *Plaintiff’s Case in Chief*, Vols I & II, 327. CB-F-171A thru CB-F-1716: Transcripts of TX V. NM, Box 4X219, RAHP, UTA.

¹⁷⁸ *Plaintiff’s Case in Chief*, Vols. I & II, 343. CB-F-171A thru CB-F-1716: Transcripts of TX V. NM, Box 4X219, RAHP, UTA.

Later still, under cross examination, when asked “How do you deliver water down from the dam, the Elephant Butte Dam, to serve the Tornillo canal for mixing for this Tornillo area?” Fiock responded:

After being released from Elephant Butte reservoir, which is a hundred fifty miles above the heading of the Tornillo canal, it passes down the Rio Grande, which is utilized as a main carrier canal. In passing through the main Rio Grande Project, water is diverted at the successive diversion dams, and the drain discharge from the successive operating divisions of the Project discharges at the other end, lower end respectively of each division; and, each time one of the operating divisions is passed, then there is that much higher percent of drain water, so that when the water has arrived at Fabens, it has, some of it, been diverted and used, and is returned through the drains, as much as four times. A certain percent of it, of course, flows right on through, directly through the channel of the river.¹⁷⁹

Under further questioning from Warren about the measurement of drain flow within the project, Fiock explained

The drain flow over the Rio Grande Project constitutes a very important element in the irrigation supply, and must be taken account of in computing the release of water for irrigation from the reservoir, so we [Rio Grande Project staff] measure those drains frequently, that is once a week we meter the drains.¹⁸⁰

The project superintendent stressed again the importance of such water to the overall project water supply when the special master asked him about the reported 1934 reservoir release, which was substantially larger than in prior years. Fiock noted that project staff had estimated the delivery at farms in the project to be 1.5 af/a and thus twice that amount had been released to ensure this delivery. “There are other things,” he cautioned “to take into consideration” in making releases. One of these was the “drain runoff,” which was “to make up part of the irrigation supply.”¹⁸¹

Fiock was not alone in his conception of what constituted the water supply for the Rio Grande Project. Two other expert witnesses for the State of Texas similarly asserted the critical value of re-diverted water (to paraphrase Fiock). J.Q. Jewett testified that in his calculations “reservoir water” was “all the water reaching Courchesne station except the estimated tributary flow” – in other words, “a mixture of drain water and water released from Elephant Butte reservoir.” When

¹⁷⁹ *Plaintiff’s Case in Chief*, Vols. I & II, 399-400. CB-F-171A thru CB-F-1716: Transcripts of TX V. NM, Box 4X219, RAHP, UTA.

¹⁸⁰ *Plaintiff’s Case in Chief*, Vols. V, VI, VII, 1029. CB-F-171A thru CB-F-1716: Transcripts of TX V. NM, Box 4X219, RAHP, UTA.

¹⁸¹ *Plaintiff’s Case in Chief*, Vols. V, VI, VII, 1034. CB-F-171A thru CB-F-1716: Transcripts of TX V. NM, Box 4X219, RAHP, UTA.

asked a clarifying question as to whether this “reservoir water” was in fact the “reservoir release no matter how many times it has been used in the meanwhile,” Jewett replied in the affirmative.¹⁸²

Texas’s engineering advisor Raymond Hill likewise acknowledged the project’s reliance upon what Clayton called “drain waters,” and expressed concerns for the practice owing the diminishing quality of the water as it moved downstream (see Opinion II above):

[Clayton]: “The testimony adduced in the trial of this case has shown that drain waters in the valleys below Elephant Butte dam to Fort Quitman has been used and re-used progressively as you proceed down the stream. What is your conclusion, Mr. Hill, as to whether that is a proper use of those waters?”

[Hill]: “As a general principal [*sic*], the use of drainage waters at the successive points of diversion from Elephant Butte down through the valleys is proper; however it is my judgment that the process has been carried to an extreme in the case of the Rio Grande Project, or in other words there has been too great a use of the drainage waters and that additional dilution of these waters would have been better, and taken over a longer period of time some greater dilution of those waters will be necessary in order to insure continued production of a profitable nature.”¹⁸³

New Mexico’s own experts did not offer direct testimony on the issue of return flow. Bliss nevertheless acknowledged under cross-examination from Clayton that “drain water” was utilized on the lands below Elephant Butte:

[Clayton]: “You mean to say that drain water that enters the river in the Rincon and Mesilla Valleys is not used?”

[Bliss]: “It is altered – Yes.”

[Clayton]: “It is rediverted down below?”

[Bliss]: “Yes”

[Clayton]: “And used for irrigation?”

[Bliss]: “Yes”¹⁸⁴

The subsequent federal Rio Grande Joint Investigation likewise took note of the importance of return flows to the Rio Grande Project and lands beyond, as discussed in Opinion IV. With regard to groundwater, the *JIR* focused largely on the San Luis and Middle Rio Grande valleys.

¹⁸² *Plaintiff’s Case in Chief*, Vols. III & IV, 781. CB-F-171A thru CB-F-1716: Transcripts of TX V. NM, Box 4X219, RAHP, UTA.

¹⁸³ *Plaintiff’s Case in Chief*, Vols. V, VI, VII, 1307-1308. CB-F-171A thru CB-F-1716: Transcripts of TX V. NM, Box 4X219, RAHP, UTA.

¹⁸⁴ *Defendant’s Case in Chief*, Vols. X, XI, 2058. CB-F-171A thru CB-F-1716: Transcripts of TX V. NM, Box 4X219, RAHP, UTA.

Nonetheless, observations made in the report suggest federal engineers were aware of the relationship between surface and subsurface flows and groundwater in the basin. For the Middle Rio Grande, for instance, “Ground water in the Middle Valley” was identified as having several sources,” including “seepage from canals” and “seepage from irrigated lands.” For the basin overall, the *JIR* made three critical observations that underscore the complicated relationship between surface water and groundwater:

- 1) “extensive development of ground water for irrigation would add no new water to the Upper Rio Grande Basin...”,
- 2) “recharge of the ground-water basins would necessarily involve a draft on surface supplies which are now utilized otherwise”; and
- 3) “The chief element to be considered in such a development [of groundwater] would be the redistribution of the availability and use of present supplies and the resulting effect upon the water supply of lower major units [i.e., the Rio Grande Project and beyond to Ft. Quitman]”¹⁸⁵

The compact negotiations of the 1930s neither engaged with the issue of groundwater on Rio Grande Project lands nor the specific nature of the project water supply. However, as discussed above, both engineering advisors for New Mexico and Texas, Bliss and Hill, and the federal engineering advisor, Debler, were familiar with the project, its diverse water supply, and the hydrology of the Elephant Butte-Ft. Quitman section. The commissioners themselves believed the compact protected the project with the federal representative S.O. Harper insisting that the compact garnered “all water to which Federal irrigation projects are entitled.” This was water that as a matter of longstanding Reclamation policy and practice included surface, subsurface, tributary, and return flows – waters arising on project lands.¹⁸⁶

Reclamation’s broad conception of the Rio Grande Project water supply arose from the impulse to assure sufficient water for the project. Reclamation authorities leveraged New Mexico territorial law, which recognized a unique standing for the United States with regard to reclamation projects, to protect and support the project’s development. The project’s aim from the outset was to utilize as much of the Rio Grande’s flow, surface and subsurface, for the benefit of lands in New Mexico and Texas. In due course, Reclamation recognized that water released from Elephant Butte and diverted to project lands could be and necessarily must be reused. Such waters – characterized as “return flow,” “seepage,” “waste water,” and “drain water” – were

¹⁸⁵ *JIR*, 56, 59, and 62.

¹⁸⁶ S.O. Harper, Chairman, Rio Grande Compact Commission, to The Honorable, The Secretary of the Interior, Washington, D.C., Re: Rio Grande Compact, March 26, 1938, 2. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

captured in project drains. These waters, as New Mexico's engineering advisor John Bliss later found and explained to New Mexico State Engineer and Rio Grande Compact Commissioner Thomas McClure, intercepted basin groundwaters, joined with tributary flows before re-entering the river's channel, and ultimately supplied lands downstream within the project and (as discussed in Opinion IV) below the project. The engineers most involved in developing the compact thus knew and understood that the Rio Grande Project's water supply included more than the surface flow stored in Elephant Butte. Waters arising on project lands, including groundwater, tributary flows, and return flows, however defined, were as essential as storage waters to the project.

Opinion IV: Delivery of water by New Mexico to San Marcial, under the terms of the 1938 Rio Grande Compact, constituted the delivery of water to serve lands in Texas within the Rio Grande Project as well as downstream to Fort Quitman.

As discussed in Opinion III above, water released from Elephant Butte Reservoir and water arising on the Rio Grande Project was used and re-used throughout the project. Reclamation and other federal, state, and local authorities considered such waters part and parcel of the project's water supply. By the 1920s, these waters had also become important to several thousand acres of Rio Grande bottomlands that stretched downstream from the end of the project through Hudspeth County to Fort Quitman, an area historically known as the "Fort Hancock district." Under a Warren Act contract, in exchange for relinquishing claims to Rio Grande flow, Hudspeth county landowners – organized as Hudspeth County Conservation and Reclamation District No. 1 in 1923 – obtained the use of waters captured by Elephant Butte, used on project lands, and ultimately passed out of the project. This extra-project water supply figured into the technical studies leading to the 1938 compact, and thus formed part of the 790,000 af "normal release" from the federally-controlled Elephant Butte Reservoir that was apportioned to Texas for lands above Ft. Quitman by the compact. In an acknowledgement of federal control over the Rio Grande between Elephant Butte and Ft. Quitman, encompassing lands both within and without the Rio Grande Project, the compact commissioners eschewed a state-line delivery by New Mexico for Texas and instead made the delivery point for the Rio Grande water apportioned to Texas at San Marcial, above the federal reservoir.

Reclamation plans for the Rio Grande Project initially did not consider land beyond the El Paso Valley. As discussed in Opinion I above, the project's first supervising engineer, B.M. Hall, conceived of a project to water arid lands in southern New Mexico and the El Paso Valley in Texas. Reclamation subsequently executed contracts for the delivery of water to two local water users' associations, and later their successors, Elephant Butte Irrigation District (EBID) in New Mexico and El Paso County Water Improvement District No. 1 (EP #1). Reclamation's *Twelfth Annual Report* for 1912-1913 also plainly described that the project was to serve lands in the Palomas, Rincon, and Mesilla valleys in New Mexico, and the El Paso Valley in Texas.¹⁸⁷

Nevertheless, as construction of the federal project advanced in the late 1910s, individual Hudspeth County landowners began diverting water that flowed down the Rio Grande from the project. Reclamation, in response, executed annual rental contracts with these water users to deliver water into the Rio Grande "at the end of the project limits where four private and community ditches have their heads." This was done, as project superintendent L.R. Fiock later

¹⁸⁷ *Twelfth Annual Report*, 176.

explained, “under the theory that it was project developed water” – that is, having originated out of the project’s water supply, as surface flow, drainage water, or return flow.¹⁸⁸

By the early 1920s, according to one Reclamation estimate, this surplus water irrigated more than 10,000 acres downstream of the project, and area landowners sought to obtain a still greater supply. In April 1923, they met with Reclamation director A.P. Davis during his visit to the El Paso Valley to discuss extension of the project’s Tornillo Canal to serve their lands. The current Hudspeth-area diversion works were insufficient for taking water from the Rio Grande unless there was “a very large excess flow.” Davis, although concerned that additional project releases would encourage Mexican diversions on the opposite side of the river that would diminish the project water supply, was sympathetic to the Hudspeth landowners. Observing that their irrigated lands were “mainly in large holdings” and there was “no organization...thru which to act,” the director suggested the formation of a separate “irrigation district” and subdivision of agricultural holdings so as to conform with federal reclamation law. Davis also charged project officials to investigate the cost of extending Tornillo Canal, but he made no commitment to encumber government funds to do so. He further cautioned Acting Director F. E. Weymouth that any renewal of the surplus water contracts must contain “proper provision protecting the Government against adverse diversion, and against initiating a right to permanent water supply. However, as Rio Grande project manager L.M. Lawson recalled afterwards, Davis was of the opinion that “surplus waters recovered at the end of the project” would probably “take care of lands now under cultivation.”¹⁸⁹

Hudspeth-area landowners acted quickly following their meeting with Davis. In August, they organized their own water district, Hudspeth County Conservation and Reclamation District No. 1 (HCCRD #1). That same month, the district’s new president W.T. Young addressed petitions to both the secretary of the interior and EP #1 seeking to join the project through consolidation with the El Paso district.¹⁹⁰

¹⁸⁸ Memorandum, From: Project Manager [L.M. Lawson], To: Chief Engineer, Denver, Colorado, Subject: Disposition of Surplus Water – Rio Grande Project, April 28, 1923. Folder 303. Rio Grande Project. Petitions for Construction, Fort Hancock. THRU 1929, Box 919, Rio Grande 301.4—303; L.R. Fiock, Superintendent to Commissioner, Subject: Protest of Hudspeth County Conservation and Reclamation District No. 1 – Rio Grande Project, May 22, 1939, 1-2. ff. 301 Rio Grande Project - Board and Engineering Report on Construction Features, Jan 1, 1937, Box 927 Rio Grande Pro. 246. - 301., Entry 7, RG 115, NARA Denver.

¹⁸⁹ A.P. Davis, Director, to F.E. Weymouth, Acting Director, Reclamation Service, April 21, 1923; and Memorandum, From: Project Manager, To: Chief Engineer, April 28, 1923. Folder 303, Box 919, Entry 7, RG 115, NARA Denver.

¹⁹⁰ W.T. Young, President, Hudspeth County Conservation and Reclamation District No. 1, To the Honorable, The Secretary of the Interior, August 16, 1923; and W.T. Young, President, Hudspeth County

EBID and EP #1 were wary about the addition of these downstream lands to the project. Their concerns were similar to those articulated by Davis, that the project water supply would prove insufficient to irrigate land down to Ft. Quitman. EP #1 manager Roland Harwell, although like Davis sympathetic to Hudspeth landowners, consequently declined to accept the district's petition citing the need for "the consent of the Secretary of the Interior."¹⁹¹

Lawson, however, believed that efforts could be made to improve the water available to lands downstream without incorporating those lands into the project. Having received a forwarded copy of Harwell's reply to Young, the Rio Grande project manager observed in his own letter to the EP #1 manager that "recovered water from the Juarez and El Paso valleys below the International Dam [which turned water released from Elephant Butte into Mexico] if properly collected, would probably supply irrigation demands for the area now in cultivation in the Fort Hancock district." Additionally, given that current "methods employed by the Fort Hancock area in obtaining their water supply are entirely inadequate and wasteful," Lawson favored those area landowners undertaking "such construction work as will place them in a position to receive the beneficial use of such water as is available in the Rio Grande at the upper end of the area." Such an effort would leverage "the recently constructed intake works near Fabens for the [Rio Grande Project's] Tornillo Main Canal, which intake has the advantage of full river control," and would provide "for the collection of the lower project's recovered water and the delivery of this supply undiminished by river losses and unauthorized diversion to the Fort Hancock area." The Rio Grande Project manager also favored continuation of the delivery of such water to Hudspeth-area landowners on an annual contract basis "with the particular understanding that the quantity furnished is on a surplus basis and subject to prior project demands."¹⁹²

Lawson had made substantially the same suggestions in a memorandum to Reclamation Chief Engineer F.E. Weymouth back in August 1923, and in October, Weymouth furnished his endorsement. At the same time, the chief engineer noted the need for the approval of EBID and EP #1, and advised against a proposed plan for downstream landowners to pay for the canal

Conservation and Reclamation District No. 1, To the President and Board of Directors of El Paso County Water Improvement District No. 1, August 18, 1923. Folder 303, Box 919, Entry 7, RG 115, NARA Denver.

¹⁹¹ H.H. Brook, President & Manager, to Hon. D.W. Davis, US Bureau of Reclamation, August 23, 1923. Folder 303, Box 919; Brook to Fiock, Acting Project Manager, US Bureau of Reclamation, August 8, 1923; Roland Harwell, El Paso Co. Water Imp. Dist. No. 1, to Mr. L.M. Lawson, Project Manager, September 19, 1923. Folder 222, Box 902; El Paso Co. Water Imp. Dist. No. 1, By (SGD) Harwell, Manager to Mr. W.T. Young, President, Hudspeth Co. Conservation & Reclamation Dist No. 1, September 19, 1923. Folder 303, Box 919, Entry 7, RG 115, NARA Denver.

¹⁹² L.M. Lawson, Project Manager to Mr. Roland Harwell, Manager, El Paso County Water Improvement District No. 1, Subject: Water Supply for Fort Hancock Lands – Rio Grande Project, September 21, 1923. Folder 303., Rio Grande Project. Petitions for Construction, Fort Hancock. THRU 1929, Box 919 Rio Grande 301.4--303, Entry 7, RG 115, NARA Denver.

extension itself and thereby obtain an ownership interest and a legal claim to its use. Weymouth expressly cautioned that “no water can be turn out of the Elephant Butte Storage for its [Hudspeth’s] benefit.”¹⁹³

Reclamation Commissioner D.W. Davis approved of the plan in November, and after obtaining an assurance that it could enter into a temporary contract for “such waste water as would be available at the end of the Tornillo Canal,” HCCRD #1 agreed to the proposal. Financed through a bond issue of \$750,000, the district subsequently built a main canal with distribution laterals as well as a deep-well pump drainage system that was later replaced by an open drain system. In August 1924, Hudspeth executed a temporary contract which provided for the diversion of water from the river below the Rio Grande Project, as Fiock later reported, “through several private or community ditch headings which existed before the organization and development as a District.”¹⁹⁴

With the completion of the extension of Tornillo Canal, HCCRD #1 entered into a Warren Act contract with Reclamation in December 1924. Passed by Congress in 1911, the Warren Act authorized Reclamation to contract for impoundment, storage, or conveyance of non-project irrigation water in federal facilities, when excess waste was available. The Hudspeth district’s Warren Act contract permitted the district to purchase waste or other excess water available at the end of the Tornillo Canal, the last major project irrigation structure, but it did not expressly guarantee any quantity of water to the district. According to Fiock, the canal was to supply those lands between Fabens and Ft. Quitman with “such waste, return flow and developed water as was considered might be available at the lower end of the project.” It further defined the water delivered as “secondary and inferior to the right to use water for any purposed on the lands of the Rio Grande Federal Irrigation Project.” In executing the contract, HCCRD #1 “relinquish[ed] any and all right, title, interest, and claim to any and all waters of the Rio Grande, except...as provided” by the contract. Both EBID and EP #1 acquiesced to the canal’s construction, and paid for its construction. The two project districts viewed the arrangement with downstream

¹⁹³ Memorandum, From: Project Manager [L.M. Lawson], To: Chief Engineer, Denver, Colorado, Subject: Disposition of Surplus Water – Rio Grande Project, August 23, 1923; and Memorandum, From: Chief Engineer [F.E. Weymouth], To: Commissioner, Subject: Petition of the Hudspeth County Conservation and Reclamation District No. 1 – Rio Grande Project, October 29, 1923. Folder 303., Rio Grande Project. Petitions for Construction, Fort Hancock. THRU 1929, Box 919, Rio Grande 301.4--303, Entry 7, RG 115, NARA Denver.

¹⁹⁴ Memorandum, From: Commissioner [D.W. Davis], To: Chief Engineer, Subject: Petition of the Hudspeth County Conservation and Reclamation District No. 1 – Rio Grande Project, November 6, 1923. Folder 303., Rio Grande Project. Petitions for Construction, Fort Hancock. THRU 1929, Box 919 Rio Grande 301.4—303; and Fiock to Commissioner, May 22, 1939, 1. ff. 301, Box 927, Entry 7, RG 115, NARA Denver.

landowners as not only defraying their own project expenses, but also ensuring “beneficial use of such water [i.e., available waste, return flow, and developed water] at the end of the project.”¹⁹⁵

Starting with the 1925 irrigation season, water was delivered to land in Hudspeth County through the Tornillo Canal. The water supplied, however, remained inadequate. Both the Tornillo Canal and the Hudspeth district’s own main canal lacked the capacity to deliver all the water required for irrigable lands downstream of the project. Moreover, the amount of water within the Tornillo Canal available for diversion was limited to that which passed through unused by the Rio Grande Project above. HCCRD #1 had to supplement its supply by diverting directly from the Rio Grande below the end of the Tornillo Canal. This water, although not part of the supply to be delivered when available pursuant to the Warren Act contract, nonetheless consisted of project drainage water (from drains emptying below Tornillo Canal) and surplus water in the river that had not been diverted into the Tornillo Canal yet had passed through the project. The latter occurred typically when the water in the river exceeded the capacity of the Tornillo Canal at its heading.¹⁹⁶

That any water was available to Hudspeth County lands through Tornillo Canal was the result of project operations intended to supply the Tornillo district of the Rio Grande Project with water of sufficient quality (as noted in Opinion II above). This district was the last unit of the project, the furthest downstream. According to Fiock, a “50-50 mixture of upper valley irrigation water and the drain water discharging immediately above Fabens” was necessary to dilute the alkali in the water reaching this area, so Reclamation endeavored “to carry enough of the reservoir released water on through to Fabens” so that it could be “mixed with the drain water discharging immediately above Fabens.” This, consequently,

produced a total discharge at Fabens about equal to the capacity of the Tornillo Canal, or more than twice the amount necessary for the irrigation requirements of the Tornillo area alone, thus making available water for delivery to the heading of the Hudspeth District Canal at the terminus of the Tornillo Canal.

Moreover, when the amount of water – “a mixture of drain and upper valley irrigation water” – reaching Fabens exceeded “the capacity or requirements of the Tornillo Canal...[it] has been allowed to go on down the river.” This was particularly true during the fall, winter, and early spring irrigations, which required “as much of the upper valley irrigation water supply reaching Fabens in order to accomplish the dilution of drain water.” “[A] large part of the mixed water”

¹⁹⁵ C.M. Newman to Dr. Elwood Mead, April 19, 1924. Folder 303., Rio Grande Project. Petitions for Construction, Fort Hancock. THRU 1929, Box 919, Rio Grande 301.4–303, Project Files, 1919-1929, General Administrative and Project Records, 1919-1945; and Fiock to Commissioner, May 22, 1939, 2-3. ff. 301, Box 927, Entry 7, RG 115, NARA Denver.

¹⁹⁶ Fiock to Commissioner, May 22, 1939, 3. ff. 301, Box 927, Entry 7, RG 115, NARA Denver.

thus went “to waste” below the project and became available to lands downstream, between Fabens and Ft. Quitman.¹⁹⁷

In the negotiations leading to the 1929 temporary compact, the water received by Hudspeth County lands was a focus of discussion. Various parties maintained that this water had to be considered in drafting a compact that would equitably apportion the waters of the Rio Grande above Ft. Quitman. Major Richard Burges, an El Paso attorney who represented EP #1, HCCRD #1, and the City of El Paso, established the geographic boundaries for the commission’s consideration at the first compact commission meeting in October 1924. Burges was deeply interested in a compact as lands in both El Paso and Hudspeth counties depended upon Rio Grande water. As no representative for Texas had yet been selected, he attended the meeting with Texas Governor Pat Neff’s blessing. Burges stressed to the Colorado and New Mexico commissioners, Delph Carpenter and Julian O. Seth, respectively, that “the problem of the Rio Grande, as it affects the state of Texas,” principally concerned “the El Paso Valley, which includes the irrigable lands in El Paso County and Hudspeth County.” This was a point of view that Carpenter heartily accepted and Seth was willing to entertain once a Texas commissioner was formally appointed.¹⁹⁸

Burges reiterated this stance in December 1928 after T.H. McGregor had been appointed the commissioner for Texas. Serving as special counsel, he delivered at McGregor’s request Texas’s opening statement, and in that statement, he made clear that Texas claimed not only “its rights under the federal Rio Grande Project” but also waters for some 20,000 acres between the project and Fort Quitman that was “under successful cultivation today by irrigation” – land in Hudspeth County.¹⁹⁹

For Colorado, excess water beyond the project, the water for Hudspeth that Burges identified, was objectionable. Provided the state secured its own water project for San Luis Valley, however, that water could be tolerated. Corlett, for instance, complained that the “return water” received by Hudspeth lands “would some three or four times supply all of the water that was conceded to Mexico” yet was denied Colorado. Colorado’s engineering advisor R.I. Meeker, supported Corlett’s contention in his presentation to the commission, noting “that there are large wastes passing the lower end of the Rio Grande Project at Fort Quitman,” and among the beneficiaries

¹⁹⁷ Fiock to Commissioner, May 22, 1939, 4. ff. 301, Box 927, Entry 7, RG 115, NARA Denver.

¹⁹⁸ First Meeting, Rio Grande River Compact Commission, Breadmoor Hotel, Colorado Springs, Colo., Sunday, October 26, 1924, 3-4, 9-12, and 24-25. Folder 1, Box 02-D.003:1, MS 0235, RGHC, NMSU Spec. Coll.

¹⁹⁹ Proceedings of Rio Grande Compact Commission, Held December 19-20-21, 1928, At Santa Fe, New Mexico, 13. Folder Rio Grande Compact Commission Records, 1924-1941, 1970, Richard F. Burges Papers, Proceedings of Rio Grande Compact Conference Held Dec. 19-20-21, 1928 at Santa Fe, N.M., Box 2F471, RGCCR, 1924-1941, 1970, UTA.

of this water was land in Hudspeth County. Nevertheless, in calculating an equitable quantity for Texas that made possible development of Colorado's San Luis Valley, Meeker included the water received by land downstream of the project along with the water demands of lands within the Rio Grande Project and the obligations to Mexico under the 1906 treaty, even though the water diverted by Hudspeth landowners was "junior in every respect."²⁰⁰

Harwell likewise sought to condition the rights of landowners downstream of the project before the commission, although he did not dismiss the fact that those in Hudspeth obtained water via the project and would in the future. He explained that "the Hudspeth District is entitled to no more water than the surplus waters which may exist at the Tornillo canal." Put another way, "Hudspeth District was entitled to receive no more water from the project than this unavoidable waste which is bound to occur through this 150 miles of operation between the dam [Elephant Butte] and the point of lowest delivery." Any additional water that Hudspeth landowners could obtain, according to Harwell, would be "by their own pumping operations for drainage...putting to use water which would otherwise be put to use in the stream bed by them or anyone else interested." He believed that with increased efficiencies in water use by the project and its completion to serve the full irrigable acres within the project, future water use downstream of the project would be "limited to... [that] which can be called legitimately unavoidable waste."²⁰¹

The temporary compact of 1929 did not specifically address the relative water needs of the three states, save to endorse federal construction of a "closed basin drain" and "State line reservoir" in Colorado. Nevertheless, as noted above, Article XII acknowledged the importance of Elephant Butte Reservoir to lands below, lands that as the federal project was operated included lands in Hudspeth, and attempted to safeguard the reservoir's water supply:

New Mexico agrees with Texas with the understanding that prior vested rights above and below Elephant Butte Reservoir shall never be impaired hereby, that she will not cause or suffer the water supply of the Elephant Butte Reservoir to be impaired by new or increased diversions or storage within the limits of New Mexico unless and until such

²⁰⁰ Proceedings of Rio Grande Compact Commission...December 19-20-21, 17, 37-38, 40-41, and 43. Folder Rio Grande Compact Commission Records, 1924-1941, 1970, Richard F. Burges Papers, Proceedings of Rio Grande Compact Conference Held Dec. 19-20-21, 1928 at Santa Fe, N.M., Box 2F471, RGCCR, 1924-1941, 1970, UTA.

²⁰¹ Proceedings of Rio Grande Compact Commission...December 19-20-21, 1928, 52-58. Folder Rio Grande Compact Commission Records, 1924-1941, 1970, Richard F. Burges Papers, Proceedings of Rio Grande Compact Conference Held Dec. 19-20-21, 1928 at Santa Fe, N.M., Box 2F471, RGCCR, 1924-1941, 1970, UTA.

depletion is offset by increase of drainage waters [i.e., through development of Colorado's Closed Basin].²⁰²

The water supply and needs of the lands between Fabens and Ft. Quitman were more specifically analyzed and considered in 1930s as Colorado, New Mexico, and Texas sought to arrive at a permanent compact.²⁰³ As first discussed in Opinion I, critical to the development of the compact was the federal Rio Grande Joint Investigation of the National Resources Committee. This investigation provided much of the technical data for the drafting of the compact. Endeavoring to scope that work for the Rio Grande Compact Commission in December 1935, University of Chicago historical geographer Harlan H. Barrows and agricultural economist Frank Adams, both with NRC, suggested confining the study to “the water resources and irrigable and irrigated lands of the Rio Grande Basin above El Paso.” Colorado, however, insisted that any investigation “should include the area between El Paso and Ft. Quitman” – an area inclusive of Hudspeth County – as the “duties of the Rio Grande Compact Commission relate to that area of the Rio

²⁰² Francis C. Wilson, Rio Grande Compact Commissioner, *Rio Grande Compact: Report of Commissioner for New Mexico and Memorandum of Law on Interstate Compacts on Interstate Streams* 2/19/29, 9. ff. 032.1, Rio Grande Basin. Water Rights: Rio Grande Compact. THRU 1929., Box 924 Rio Grande Basin 023.-032.02, Entry 7, RG 115, NARA Denver.

²⁰³ There is some historical evidence that water users downstream of the Rio Grande Project did not figure into the compact negotiations of the 1930s. In the early 1950s, EP#1 retained Raymond Hill as a technical expert in a lawsuit filed in US District Court for the Western District of Texas, El Paso Division, by HCCRD #1. HCCRD #1 sued several parties, including EP#1, over the availability of water in the Rio Grande for appropriation. The district insisted that the construction of Caballo Reservoir had increased the water supply in the basin. EP #1, however, argued that despite Caballo's construction there was no water to be appropriated from the river; the federal Rio Grande Project had already fully appropriated the stream. Hill, Texas's engineering advisor, was called upon to submit an affidavit supporting this position. According that document, signed and dated by Hill on January 20, 1953 (but stamped as received on January 19), he

participated in the negotiation of the Rio Grande Compact and particularly in the negotiations conducted by the engineers representing the Federal Government and the several States. At no time in such negotiations were the needs of the Hudspeth County Conservation and Reclamation District No. 1 in Texas considered. On the contrary, the representatives of Colorado and New Mexico consistently and emphatically refused to consider any rights or uses of water in the Hudspeth District.

In the United States District Court, for the Western District of Texas, El Paso Division, *Hudspeth County Conservation and Reclamation District No. 1, et al., Plaintiffs v. Howard E. Robbins, et al, Defendants*, Civil Action No. 1342, Affidavit of Raymond A. Hill in Support of Defendants' Cross-motion for Summary Judgment, January 20, 1953. ff. El Paso County Water Impr. Dist. No. 1 a/c Hudspeth CCRD No. 1 G3330, Box 4X189, RAHP, UTA. This single statement stands in stark contrast to a larger body of evidence discussed in this opinion that indicates that downstream water users were a consideration in the negotiations.

Grande Valley above Ft. Quitman.” After some deliberation, the commission adopted a resolution that identified the study area as “the Rio Grande Basin above Ft. Quitman.”²⁰⁴

The reliance of downstream water users on Rio Grande project water was also noted and intended to be a focal point in Texas’s suit against New Mexico and the Middle Rio Grande Conservancy District before the US Supreme Court. In testimony before Special Master Charles Warren in November 1936, Fiock explained that under current operations Hudspeth received the waste water from the project, below the Tornillo district. By December 1936, with the hearings continuing, Frank Clayton, who was not only Texas’s attorney in its original action and the state’s Rio Grande Compact Commissioner but also the attorney for HCCRD #1, sought to demonstrate “that millions of dollars were added to tax valuations in Hudspeth County as a result of irrigation development under this project, commencing about 1918 and reaching its culmination about 1928.”²⁰⁵

This information was apparently not introduced before Warren (as noted in Opinion I above) placed the proceedings on hold to enable the Rio Grande Joint Investigation to complete its work. Delayed by several months, a copy of the investigation’s report, the *JIR*, was distributed to the compact commission in September 1937. In presenting the *JIR*, Barrows expressed his belief “that the report provides a basis, a factual basis, for an allocation of the waters of the river above Ft. Quitman that would be fair and just to each of the three states and to its citizens [*sic*] dependent upon the river.”²⁰⁶

The *JIR* recognized the dependence of lands downstream of the project on the water captured, stored, and released from the Rio Grande Project’s Elephant Butte Reservoir. It specifically included HCCRD #1’s current water needs in its assessment of the available diversions necessary from the reservoir to supply the stretch of the Rio Grande between the reservoir and Ft Quitman. The investigation was truly a series of studies of the Upper Rio Grande Basin, undertaken by federal agencies that included Reclamation as well as the USGS and the US Department of Agriculture’s Bureau of Agricultural Engineering. The summary report produced by the investigation noted that the Hudspeth district was located within the Elephant Butte-Fort Quitman section of the basin, and “maintenance of an adequate water supply for irrigation” of its lands and “maintaining satisfactory control of salinity” were both major problems. The latter

²⁰⁴ Proceedings of the Rio Grande Compact...December 2-3, 1935, 24-43. ff. 032.1 (2/3), Box 1326, Entry 7, RG 115, NARA Denver.

²⁰⁵ *Plaintiff’s Case in Chief*, Vol. I, II, 399-406. CB-F-171A thru CB-F-1716: Transcripts of TX v. NM, Vol. 1-16, 4X219, RAHP; and Frank B. Clayton, Rio Grande Compact Commissioner for Texas, to Milam H. Wright, Tax Assessor and Collector, December 1, 1936. [1936], Box 2F467, RGCC-FBCP, UTA.

²⁰⁶ Proceedings of the Rio Grande Compact, Held in Santa Fe, New Mexico, September 27 to October 1, 1937, 5. Unnamed folder 5, Box 2F463, RGCC-FBCP, UTA.

issue of salinity, in particular, was “an important consideration” in assessing the section’s needs. The summary acknowledged that the district received “return water” below the Tornillo Canal heading. This water was “a direct diversion of drainage and waste waters of the Rio Grande Project” under a Warren Act contract. The contract applied “only to the return water as it occurs in the normal operation of the Rio Grande Project and puts no obligation upon the latter for delivery of any specific amounts of water.”²⁰⁷

The report of the USDA Bureau of Agricultural Engineering specifically recognized the vital importance of this water for Hudspeth. It noted the “drain and tail water from the El Paso Valley system [of the project] becomes the irrigation supply for most of the remaining valley lands above Fort Quitman.” Diversions to Hudspeth County lands were thus factored into the investigation’s calculation of net diversion and stream-flow depletion between 1930 and 1936 for the Elephant Butte-Fort Quitman section. These diversions formed an essential part of the “necessary allowances for drain flow, wastes, arroyo inflow, and salinity control to derive the required diversion demand on Elephant Butte Reservoir.” That diversion demand amounted to 736,000 af, but given the acres “actually irrigated” in the late 1920s into the early 1930s, 773,000 af was recommended to “be used as conservative estimate.”²⁰⁸

As discussed in Opinion II above, the need to ensure a water supply of sufficient quality through the project lands and downstream to Ft. Quitman was precisely the reason Texas insisted upon 800,000 af from Elephant Butte. For the remainder of the compact negotiations, although no designated representatives from Hudspeth addressed the proceedings, Clayton and Hill advocated for both for the Rio Grande Project and the entire Elephant Butte-to-Ft. Quitman stretch. Barrows also included Hudspeth in his call for a dependable supply of low-alkali water for lands above Ft. Quitman.

Drafting of the compact itself focused on the “present uses of water” in the Rio Grande Basin above Ft. Quitman, a geographical area that included lands in Hudspeth County. New Mexico’s own engineering advisor, John Bliss, recognized that Hudspeth was a part of the demand on Elephant Butte. In his own calculations of that demand, presented during the December 1937 meetings, he estimated the need for these lands between the project and Ft. Quitman as 70,000 af. As discussed in Opinion I above, at the commission’s direction, the engineering advisors collectively prepared a report suggesting the schedule of deliveries to be specified in the compact, and in doing so “avoided discussion of the relative rights of water users in the three

²⁰⁷ *JIR*, 7, 12, 23, 49, 62, 74, and 85-86.

²⁰⁸ *JIR*, 99, 103-104, and 403.

States,” and instead sought to protect the “present uses of water in each of the three States...because the usable water supply is no more than sufficient to satisfy such needs.”²⁰⁹

When New Mexico State Engineer and Rio Grande Compact Commissioner Thomas McClure challenged some of the engineers’ recommendations, Clayton defended their work as safeguarding Texas’s entitlements to the waters of the Rio Grande. He argued in a January 1938 letter to Harper that “in the protection of Texas’ water supply that the report contains no recommendations for the benefit of Texas than what she is plainly entitled to.” Texas’s commissioner insisted that the engineers had developed “a fairly workable basis for the equitable apportionment of the waters of the Rio Grande, without permitting further encroachments upon Texas’ already inadequate supply.” Indeed, Texas was “unwilling to recede from what we conceive to be the minimum requirements for the protection of Texas’ water supply as embodied in the report.”²¹⁰

Texas eventually conceded to a lesser figure of 790,000 af, yet Clayton believed that he had secured the water to which all of the lands in Texas down to Ft. Quitman were entitled. As noted in Opinion II, after the conclusion of the compact negotiations, in a pamphlet “To Water Users Under The Rio Grande Compact,” Clayton sought to reassure Texans anxious over the compact’s provisions. The compact commissioner, the “engineering consultants who represented Texas in its lawsuit with New Mexico over the waters of the Rio Grande,” and “the managers and attorneys of the Elephant Butte Irrigation District and the El Paso County Water Improvement District No. 1” were convinced “the Compact protects the water supply of users in New Mexico and Texas between Elephant Butte and Fort Quitman, and that it [the Compact] represents a fair and equitable solution of the controversy which has long existed between various interests in the three states.” Clayton maintained that the compact “seeks primarily to protect vested uses of water above Fort Quitman, and guard them against future impairment, both as to quantity and quality.” The commissioner explained further,

Since the Rio Grande is essentially a torrential stream and its discharge varies widely from year to year, it is physically impossible to establish fixed and determinate deliveries into Elephant Butte Reservoir in terms of acre-feet per year. However, engineering

²⁰⁹ [Raymond Hill], “TEXAS COMPACT: John Bliss Estimate of Project Requirements at Elephant Butte,” 12/17/37. CB-F-137-34, Box 4X215, RAHP, UTA; and “Report of Committee of Engineers to Rio Grande Compact Commissioners,” December 27, 1937, in Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 1, 40. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

²¹⁰ Frank B. Clayton, Rio Grande Compact Commissioner for Texas, to Mr. S.O. Harper, Chairman, Rio Grande Compact Commission, January 27, 1938, in Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 3, 50-51. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

investigation has shown that there have been in the past reasonably reliable relationships between the flow of the river and its tributaries above all principal points of diversion in Colorado and New Mexico, and at other points below all principal diversions in Colorado and New Mexico above Elephant Butte Reservoir. These relationships have been expressed in the Compact in tabular form, and this instrument imposes an obligation upon Colorado and New Mexico to maintain these schedules of relationship, regardless of any future development above the Rio Grande Project.

Colorado's obligation was to the Colorado-New Mexico state line (reflected in Article III), and New Mexico's was to San Marcial (reflected in Article IV). Clayton noted that the Compact established a debit-and-credit system, in recognition "that there will probably be departures from time to time from the schedules of relationship." A "definite limitation," however, existed on debits and credits "to insure a normal average release from the [Elephant Butte] Reservoir of 790,000 acre-feet of water per year, including the deliveries to Mexico."²¹¹

Clayton reiterated many of these same points at a May 1938 meeting of the Lower Rio Grande Water Users Association. Members of the association came from Cameron and Hidalgo counties, below Hudspeth County and Ft. Quitman. They were concerned that their water supply was not adequately protected by the compact. "From the legal standpoint," however, as Clayton explained, "our negotiations related to the division of the waters above Fort Quitman." Identifying the need to satisfy Mexican claims to water from the Rio Grande through the 1906 treaty as the essential background to the 1906 and 1908 filings made by Reclamation, he asserted that those filings were "for the purpose of impounding them in a storage dam [Elephant Butte] in the vicinity of Engle, New Mexico for the benefit of lands between that point and Fort Quitman" – not just for the lands within the project. He believed his "duty, as commissioner for Texas, [was] to see that Texas got every drop of water originating in Colorado and New Mexico that she was entitled to and to see that that water was delivered into the Elephant Butte Reservoir," and that he was successful: "By that compact Texas got all she is entitled to."²¹²

Moreover, that water Texas received for its lands above Ft. Quitman was the same water that irrigated lands in New Mexico. "[A]s far as the Rio Grande project is concerned," Clayton told the attendees

²¹¹ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 24. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver; and Frank B. Clayton, "To Water Users Under The Rio Grande Project," El Paso, Texas, March 25, 1938. Folder 1, Memos of Interior Department, 1913-1915, Box 14, APDP 1896-1952, AHC.

²¹² *Proceedings of Meeting Held on Friday, May 27, 1938 at El Paso, Texas, between Representative of Lower Rio Grande Water Users and Representatives of Irrigation Districts Under the Rio Grande Project of the Bureau of Reclamation*, 10. ff. Proceedings and Minutes 1935-1938, Box 2F463, RGCC-FBCP, UTA; and Littlefield, *Conflict on the Rio Grande*, 209-210.

the interests of the Elephant Butte District, in New Mexico, and the districts in Texas above Fort Quitman are common interests ... and because our interests are common we determined long ago that no satisfactory, practical, legal, or engineering way could be devised by which the waters could be allocated between these districts at the Texas line. As far as they and we are concerned, our source is the same. If the supply is impaired above Elephant Butte, we all suffer alike.²¹³

Harwell also tried to clarify matters for the association. In the process, he emphasized both Reclamation's control over the waters that entered Elephant Butte Reservoir, and the dependence of lands downstream of the project on releases from the federal reservoir. The EP #1 manager stressed that while the water supply below Ft. Quitman was "wholly without our control," the "supply of water at the end of this project [i.e., the Rio Grande Project]...will be substantially as it has been in the past." He acknowledged that there would be "a certain amount of operating water and a certain amount of summer runoff" entering the river "entirely beyond our control." Roughly 16,000 acres of land in Hudspeth County benefitted from the water passed beyond the project; these lands were irrigated "in part by surplus waters which we [EP #1] deliver into their canal for a consideration, and in part by diversion from the river." Harwell went on to invoke the argument that Hill had made for water quality: "it is necessary to pass excess amounts of water in order to maintain the salt balance." Lands below the project and above Ft. Quitman were the beneficiaries of this operational necessity.²¹⁴

Following the meeting with the Lower Rio Grande Water Users Association, Clayton yet again emphasized that Texas obtained all that it was entitled from the compact negotiations in an August 1938 letter to Homer L. Leonard, a state representative from McAllen on the lower Rio Grande. The compact commissioner sought to secure Leonard's support for ratification of the compact in the face of opposition from his constituents. "It was the opinion," Clayton explained, "of every one of the Texas representatives attending the meeting that by the Compact Texas secured all that she was entitled to, and, indeed, all that could physically be delivered to her." He acknowledged that the "upper and lower water users in Texas" differed "as to whether the districts under the Rio Grande Project were obligated to deliver any water past Fort Quitman and if so, the amount." Clayton and the rest of the Texas delegation to the compact proceedings nonetheless believed this "was a matter of internal negotiation" and raising before the Colorado and New Mexico commissioners and their advisors "would gravely prejudice our case and

²¹³ *Proceedings of Meeting, held on Friday, May 27, 1938*, 11. ff. *Proceedings and Minutes 1935-1938*, Box 2F463, RGCC-FBCP, UTA.

²¹⁴ *Proceedings of Meeting, held on Friday, May 27, 1938*, 16, 17, and 25. ff. *Proceedings and Minutes 1935-1938*, Box 2F463, RGCC-FBCP, UTA.

perhaps result in the collapse of the negotiations.” “Obviously,” he attempted to reassure Leonard,

Colorado and New Mexico could not be asked to guarantee that any certain quantity of water would be delivered to any particular locality in Texas. Their only responsibility was to see that Texas’ equitable share was delivered at the state line, or, rather, delivered into Elephant Butte reservoir, which is the point of control.²¹⁵

Federal control of Elephant Butte Reservoir as well as the water needs served by releases from the reservoir were two essential points that Clayton also stressed to attorney Sawnie B. Smith in October 1938. Smith had been hired by lower Rio Grande water users to file suit to stop ratification of the compact. In a letter to Clayton in late September 1938, he questioned the absence of provisions in the signed-yet-unratified compact concerning the “division of waters below Elephant Butte between the States of New Mexico and Texas” and “the amount of water to which Texas is entitled.” Smith could “not find anything in the compact...which ties down and limits the use or division of the waters according to present usage and physical conditions, and nothing that would prevent controversy between the two States in the future regarding the division of the waters between the two States.” “This omission,” the attorney bluntly wrote, “is too obvious to have been inadvertent, and therefore unquestionably, the Commissioners had what they considered valid reason for it.” On behalf of his clients, Smith asked for that reason.²¹⁶

Writing back to Smith, Clayton insisted that New Mexico’s delivery of water above Elephant Butte constituted the delivery of water to Texas and that all of the releases from Elephant Butte made in the course of federal project operations served requirements below the dam down to Ft. Quitman. As far back as the negotiations for the temporary compact, the commissioner noted, Elephant Butte had been the focus for deliveries to Texas. The parties had, in Clayton’s words, “decided...that New Mexico’s obligations as expressed in the compact must be with reference to deliveries at Elephant Butte reservoir, and this provision was inserted in the temporary compact [i.e., Article XII of the temporary compact].” He insisted that that the “reasons” for this were “numerous,” and “the obstacles in the way of providing for any fixed flow at the Texas were considered insuperable.” Clayton drew specific attention to federal operational control of Elephant Butte and the flow of the water through the project’s canals and down the river itself:

The Rio Grande Project, as you know, is operated as an administrative unit by the Bureau of Reclamation, and the dam and releases from the reservoir are controlled by the Bureau and will continue to be at least until the federal government is repaid its investment, and

²¹⁵ Frank B. Clayton, Rio Grande Compact Commissioner for Texas, to Hon. Homer L. Leonard, August 3, 1938, 2. Box 2F466, RGCC-FBCP, UTA.

²¹⁶ Sawnie B. Smith to Mr. Frank B. Clayton, Rio Grande Compact Commissioner for Texas, September 29, 1938. Box 2F466, RGCC-FBCP, UTA.

very probably even beyond that time. Obviously, neither Colorado nor New Mexico could be expected to guarantee any fixed deliveries at the Texas line when the operation of the dam is not within their control but is in control of an independent government agency.

Moreover, measurements of the water passing the Texas state line would be very difficult and expensive, if not impossible. This, for the reason that irrigation canals, ditches and laterals cross the line, which is of a very irregular contour, at many different points, carrying water in addition to what is carries in the river itself, and it would require continual measurements in these various channels to make any reasonably accurate computations of the total flow.

Texas's commissioner nevertheless indicated that federal management of Elephant Butte facilitated ultimate delivery of the Rio Grande water allocated to Texas above Ft. Quitman. Clayton observed that lands below Elephant Butte Reservoir received water through project operations by either contract or treaty – lands in New Mexico in EBID; lands in El Paso County, in EP #1; lands in Hudspeth County in HCCRD #1; and lands in Mexico. Contractual arrangements between the two project districts, EBID and EP #1, established the irrigable acreages in each, and Clayton expressed his conviction “that there will never by any difficulty about the allocation of this water” as a result.²¹⁷ As for the “lands above Fort Quitman and below the Rio Grande Project,” the commissioner observed, they

²¹⁷ According to Clayton, under “contracts between the districts under the Rio Grande Project [i.e., EBID and EP#1] and the Bureau of Reclamation...the lands within the Project have equal water rights, and the water is allocated according to the areas involved in the two States.” “By virtue of the contract recently executed” – the so-called interdistrict agreement of February 16, 1938 – he explained to Smith,

the total area is “frozen” at the figure representing the acreage now actually in cultivation: approximately 88,000 acres for the Elephant Butte Irrigation District, and 67,000 for the El Paso County Water Improvement District No. 1, with a “cushion” of three per cent. [sic] for each figure.

This “arrangement,” Clayton acknowledged, was “of course a private one between the districts involved, and for that reason it was felt neither necessary nor desirable that it be incorporated in the terms of the Compact.”

Historian Douglas Littlefield argues that the interdistrict agreement “rendered irrelevant” a New Mexico-Texas state line delivery. Characterizing the congressional authorization of the Rio Grande Project in 1905 as providing for a de facto “allocation” of water between New Mexico and Texas, he contends that the agreement “verified the Bureau of Reclamation’s determination that the maximum irrigable acreage of the Elephant Butte Irrigation District was 88,000 acres and that of El Paso County Water Improvement District No. 1 was 67,000 acres.” Littlefield, *Conflict on the Rio Grande*, 203 and 207.

The agreement was nonetheless “private” as Clayton recognized. While it was given Interior Department approval, the agreement was executed solely by the two districts, and it was concerned with the allocation of costs for the Rio Grande Project. Federal law obligated project water users to repay the costs incurred by the United States in building, operating, and maintaining a reclamation project. The original 1906 joint construction contract between EBWUA and EPVWUA, and the United States had specified “ten equal annual payments,” “apportioned equally per acre among those acquiring such rights [i.e., the water users].” In 1918 and 1920, following the dissolution of the water users’ associations and

their reconstitution as quasi-municipal entities with the power to tax individual members, new contracts were drafted that made irrigated acreage the basis for allocating shared projects costs between EBID and EP#1, respectively. Eight years later, in the summer of 1928, at the insistence of the water users and at the direction of Congress, the Interior Department extended the repayment schedule for the districts but retained acreage as the basis for repayments. See Construction Contract of Rio Grande Project, 6/27/06, section 4, page 4. ff. 430-A, Rio Grande Project. Joint Contract with Two Water Users Ass'ns, Box 818 Rio Grande 430--430A, Entry 7; Department of the Interior, Bureau of Reclamation, Rio Grande Project-New Mexico-Texas, Contract Dated June 15, 1918 – between The United States of America and The Elephant Butte Irrigation For Repayment of Construction and Operation and Maintenance Charges, Article 6, Article 8, and Article 10; Department of the Interior, Bureau of Reclamation, Rio Grande Project-New Mexico-Texas, Contract Dated January 17, 1920 between The United States of America and The El Paso County Water Improvement District No. 1, For Repayment of Construction and Operation and Maintenance Charges, Article 7, Article 8, and Article 9, in Department of the Interior, Bureau of Reclamation, Rio Grande Irrigation Project, New Mexico-Texas, Contracts with Water User's Organizations (Copies), Compiled November 1, 1929. 232-29 RG Separate Folder, 249-H, Contracts with Water Users, Box 716 Old Box 509-510, Code 104.RG 37 through Code 402.RG 28, Engineering and Research Center, Project Reports, 1910-55, RG 115, NARA Denver; and *An Act Extending the time of construction payments on the Rio Grande Federal irrigation project, New Mexico-Texas*, May 28, 1928, chap. 815, 45 Stat. 785.

In early February 1929, facing the prospect of constructing additional drainage works for EP #1, Reclamation Chief Engineer R.F. Walter sought to determine more precisely the districts' respective obligations. He met with acting Rio Grande Project superintendent L.R. Fiock and EP #1 manager Roland Harwell; neither EBID's president nor its manager was able to appear but they made their opinions known. Harwell insisted that his district "wished to pay on 67,000 acres," with the caveat that nearly 2,000 acres currently in need of "river rectification or other work not provided by the district contract be delayed a reasonable length of time to permit such work being done by the land owners." As for EBID, its president "informally advised that 88,000 acres was desired by the district," and its manager telegraphed the same to Walter. Satisfied, federal reclamation officials agreed to a distribution of costs on the basis of these acreages: 88,000 acres for EBID and 67,000 acres for EP #1. Before a formal arrangement could be made, however, the global financial collapse precipitated by the US stock market crash of October 1929 cast into doubt the ability of any federal reclamation project's water users to meet their repayment obligations. See Elephant Butte Irrigation District, B.P. Fleming, Manager, telegram to R. F. Walter, Chief Engineer, Bureau of Reclamation, Feb. 16, 1929; Memorandum, From: Chief Engineer, To: Commissioner, Subject: Determination of irrigable acreage and total construction liability of the irrigation districts – Rio Grande Project, February 18, 1929. ff. 301. Rio Grande, Board & Engineering Reports on Construction Features, Oct. 1926 thru July 1929, Transfer Case, Box 913 Rio Grande 241.27—301; and Memorandum, From: Commissioner, To: Chief Engineer, Denver, Colo., Subject: Determination of irrigable acreage and total construction liability of the irrigation districts – Rio Grande Project, March 16, 1929. ff. 330. Rio Grande Project, Corres re Drainage of Seeped Lands. Thru December 31, 1928, Transfer Case, Box No. 921 Rio Grande 322.--430., Entry 7, RG 115, NARA Denver; and Donald J. Pisani, *Water and American Government: The Reclamation Bureau, National Water Policy, and the West, 1902-1935* (Berkeley: University of California Press, 2002), 149.

Congress twice extended the schedule for EBID and EP#1's repayments in the early 1930s, permitting continued deferment, and through 1936 both districts availed themselves of this opportunity. Execution of "adjustment contracts" in 1937, in which the districts relinquished their rights to hydroelectric power revenue at the newly-constructed Caballo Dam below Elephant Butte, reduced their obligations – but the allocation of repayment costs between the two districts remained outstanding. *An*

receive only ‘tail-end’ or waste water, the land in the Hudspeth County district taking it water by virtue of a contract and the lands privately owned below the district lower boundary only by taking by gravity or pumps what happens to be in the river channel.

This was the “unavoidable waste” from the project-irrigated valleys above.²¹⁸

Additional evidence that New Mexico’s delivery of water at San Marcial was the delivery of water to Texas may be found in an undated “Analysis of the Terms of the Compact,” authored by New Mexico State Engineer and Rio Grande Compact Commissioner Thomas B. McClure. In the piece, which summarizes the compact, McClure agrees with the explanation offered by Clayton to Smith regarding the absence of a state-line delivery to Texas, analogous to the state-line delivery to New Mexico from Colorado. “The subdivision of the basin at San Marcial,” he stated

Act For the temporary relief of water users on irrigation projects constructed and operated under the reclamation law, April 1, 1932, 47 Stat. 75, chapter 94; An Act To extend the operation of the Act entitled, “An Act For the temporary relief of water users on irrigation projects constructed and operated under the reclamation law,” approved April 1, 1932, March 3, 1933, 47 Stat. 1427, chapter 200; Project History, Rio Grande Project, Calendar Year 1932, 20; and Project History, Rio Grande Project, Calendar Year 1933, 16; Project History, Rio Grande Project, Calendar Year 1934, 16; Project History, Rio Grande Project, Calendar Year 1935, 16; Project History, Rio Grande Project, Calendar Year 1936, 15. USBR PHRGP 1912-1988 (mf); Department of the Interior, Bureau of Reclamation, Contract Dated Nov. 9, 1937, Ilr-982, Elephant Butte Irrigation District (Adjustment of project construction charges and other purposes). ff. 222.- Rio Grande Project. Contracts with Elephant Butte Irrigation District, Separate Folder, Box No. 917, Rio Grande Pro. 222._222.-; Department of the Interior, Bureau of Reclamation, Contract Dated Nov. 10, 1937, Ilr-981, El Paso County Water Improvement District No. 1 (Adjustment of project construction charges and other purposes). ff. 222.- Rio Grande Project. Irrigation Districts, El Paso County Water Improvement District No. 1, Separate Folder, Box No. 918 Rio Grande Pro. 222._222.-, Entry 7, RG 115, NARA-Denver.

Resolution of the cost apportionment question finally came with signing of the interdistrict agreement, six months of negotiations between the districts and Reclamation and Interior Department officials. The agreement memorialized the historical distribution of repayment costs for storage and general project features between EBID and EP#1 on the basis of the respective irrigated acreages that the districts themselves had committed to back in 1929 and which Reclamation agreed to serve in proportion to the available water supply: 88,000 acres in New Mexico, in EBID, and 67,000 acres in Texas, in EP #1. Contract between Elephant Butte Irrigation District of New Mexico and El Paso County Water Improvement District No. 1 of Texas, signed February 16, 1938, and approved by Assistant Secretary of the Interior Oscar L. Chapman, April 11, 1938. ff. 400. Rio Grande, Lands-General, 1930 thru, Box 932 Rio Grande Pro. 400.__400.08, Entry 7, RG 115, NARA Denver.

Whether the interdistrict agreement accomplished a de facto allocation of water between New Mexico and Texas as Littlefield maintains or was focused solely on the allocation of the cost of the federal project between the districts, this agreement, prior contracts between the federal government and EBID and EP #1, the Hudspeth Warren Act contract, and the 1906 Mexican treaty all underscore federal management and control over the waters delivered by New Mexico at San Marcial.

²¹⁸ Frank B. Clayton, Rio Grande Compact Commissioner for Texas, to Mr. Sawnie B. Smith, October 4, 1938. Box 2F466, RGCC-FBCP, UTA; and Littlefield, *Conflict on the Rio Grande*, 213-214.

unequivocally, “is necessary because the Rio Grande Project of the Bureau of Reclamation must be operated as a unit.”²¹⁹

As these statements by Clayton and McClure, and the service to lands beyond the Rio Grande Project down to Ft. Quitman make plain, New Mexico’s San Marcial delivery per the compact was the state-line delivery to Texas. Water captured and stored in Elephant Butte Reservoir on release and re-use served lands not only within the Rio Grande Project but also downstream to Ft. Quitman. Calculations of the demands on the federal reservoir by federal engineers and the engineering advisors to the Rio Grande Compact commissioners recognized the dependence of these lands on the reservoir’s water supply. The commissioners themselves understood that that water delivered to the reservoir would be under federal control, and thus a state-line delivery by New Mexico to Texas, similar to the state-line delivery by Colorado to New Mexico, was impractical.

²¹⁹ Thomas B. McClure, State Engineer, “Analysis of the Compact,” undated, 21-22. NM_00164500 – NM_00164501.

Opinion V: Although irrigation water was the prime concern of compact commissioners and their engineering advisors in the 1920s and 1930s, the 1938 Rio Grande Compact ultimately did not limit the uses to which water in the Upper Rio Grande Basin could be put in the future.

As noted at various points in the opinions above, irrigation for agricultural development was a central theme of the negotiations leading to both the temporary 1929 and permanent 1938 compacts. The recorded compact proceedings are filled with discussions of how much land could be irrigated in the San Luis Valley in Colorado with the construction of a drain or other works, for instance, and the impact that the Middle Rio Grande Conservancy District could have on the Rio Grande Project and the need to prevent a decline in the quantity and quality of water reaching already irrigated lands within the federal Rio Grande Project and beyond were of equal concern. However, other uses – domestic, industrial, and municipal – were addressed in those proceedings and the federal Rio Grande Joint Investigation. Actions and statements by federal and state negotiators and engineers following the compact, moreover, indicate that the drafters both recognized the potential for non-agricultural uses of the Rio Grande’s waters and intended for the three states, pursuant to the schedules of delivery established by the compact, to have autonomy in the development of the waters within their borders, post-1938.

At the first meeting of the Rio Grande Compact Commission in October 1924, the possibility of El Paso seeking a water supply from the Rio Grande as part of a compact was raised. Joseph Taylor, an attorney with EBID, in fact argued for the inclusion of Texas in the compact negotiations initiated between Colorado and New Mexico precisely for this reason. He insisted,

In my District, the one warning I get from the water users, in going ahead with this procedure, is the possibility that our interests at sometime may be different from the interest of the El Paso Valley, and that unless we are very careful, that we proceed with the full acquiescence of the people of the lower valley, there may be question of water supply which may at some time limit the project, and which might be interpreted by our friends below as being a limitation which would effect [sic] New Mexico’s interests only. We have the City water supply of El Paso that may come up, and our people are a little doubtful of the propriety of going ahead unless Texas is fully and legally represented in every respect.²²⁰

²²⁰ First Meeting, Rio Grande River Compact Commission...October 26, 1924, 18-19. Folder 1. First Meeting Rio Grande Compact Commission. Oct. 26, 1924, Box 02-D.003, MS 0235, RGHC, NMSU Spec. Coll. As early as 1921, at the suggestion of consulting engineer John Lippincott, the City of El Paso was looking to the Rio Grande, and specifically the water stored in Elephant Butte Dam, to supplement its reliance on groundwater. For a brief overview of the early history of El Paso’s municipal water development see A.N. Sayre and Penn Livingston, *Ground-water Resources of the El Paso Area, Texas*, prepared in cooperation with the El Paso Water Board and the Texas State Board of Water Engineers, United States Department of the Interior, Geological Survey, Water-Supply Paper 919 (GPO, 1945), 3 and 5-7.

Taylor was correct in his belief. When the Rio Grande Compact Commission met again in December 1928 with Texas “fully and legally represented,” Major Richard F. Burges, legal advisor to Texas’s compact commissioner T.H. McGregor and attorney for the City of El Paso, indicated that at the behest of “the municipal authorities at El Paso” he was there to present “before the commission the claims of the City of El Paso to a municipal water supply from the waters of the Rio Grande.”²²¹

Those claims were made in full at the next commission meeting in January 1929. El Paso mayor R.E. Thomason, appearing in person, read a statement asking for “consideration, recognition and establishment of [El Paso’s] legal right to the municipal water supply from and out of the waters of the Rio Grande River....”²²² Noting that El Paso fronted on the river, the statement emphasized that the Rio Grande was “for many years...the source of the water supply of El Paso.” It explained that “in recent years the City has obtained its water from wells, because the same could be more economically obtained than from the flow of the river.” The supply from the wells was “limited

EBID was aware of the city’s interest, with president and manager H.H. Brook noting in March 1923 letter to the US Reclamation Service (more than a year before Taylor made his remarks) that it was (in the later words of Reclamation Chief Engineer F.E. Weymouth) “probable the City of El Paso, Texas will request water from the Rio Grande project for domestic purposes.” In his letter, Brook had sought additional information on “contracts in existence between the United States and municipalities within and without Reclamation Service projects where water is furnished for similar purposes.”

Weymouth obliged. In his reply, he enclosed a copy of a “standard form of contract for water service to incorporated towns,” and pointed out that Section 4 of the 1906 Town Sites and Power Act (34 Stat. 116) “provides for water rights for towns and contracts therefor....” Reclamation was therefore authorized to supply water “for municipal purposes which would include the watering of lawns and such general irrigation as may be practiced within the town limits.” Towns, the chief engineer emphasized, had to pay for such water as agricultural areas and could not secure “more favorable” terms. A handwritten note on the letter, most likely made by Brook, indicates that this letter was read to the EBID board, who expressed their desire to oppose such “schemes...as unsatisfactory.” F.E. Weymouth, Chief Engineer, to Mr. H.H. Brook, President & General Manager, Elephant Butte Irrigation District, March 31, 1923. Folder 3, Box 023.016, Subject File, 1906-1925. Unclassified. H.H. Brook [9.21], MS 0235, RGHC, NMSU Spec. Coll. Federal reclamation authorities later determined that the 1920 Miscellaneous Purposes Act was the pertinent federal legislation, and as briefly discussed in footnote 234, the United States, EP #1, and one instance, EBID, entered into water service contracts with the City of El Paso in the 1940s, pursuant to that act.

²²¹ Proceedings of the Rio Grande Compact Conference...1928, 11-13. ff. ff. Proceedings of the Rio Grande Compact Conference Held Dec. 19-20-21, Box 2F471, RGCCR, 1924-1941, 1970, UTA.

²²² Thomason had telegraphed Burges on December 20, 1928, during the first meeting, asking him that “If water rights of City of El Paso are to be in any affected by proposed treaty or if any definite action is to be taken at present session please advise me so I can send McBroom or Woods to represent city.” R.E. Thomason, Mayor, to Major Richard F. Burges, telegram, Dec. 20, 1928. ff. Rio Grande Compact Commission Records, 1927-1941, 1970, Richard Burges Papers: Correspondence, 1924-1935, 1927, Box 2F468, RGCCR, UTA.

and uncertain,” which was why the City of El Paso believed “it will become necessary again to obtain its water supply from the waters of the Rio Grande River.” El Paso had grown steadily since the turn of the nineteenth century, and within a generation was projected to “attain a population of at least 250,000,” which would “require an annual municipal water supply of twelve billion gallons.” Citing Texas’s “riparian rights doctrine,” the city asserted its rights to the waters of the Rio Grande as “necessity” to which it may have “to resort...in the future from failure or inadequacy of such other present available source of supply or from deleterious changes that may occur in such present source of supply.”²²³

²²³ Proceedings of Rio Grande Compact Conference, Held January 21 to , 1929, At Santa Fe, New Mexico, 64-65. ff. Rio Grande Compact Commission Records, 1924-1941, 1970, Richard F. Burges Papers, Proceedings of Rio Grande Compact Conference, Held Jan. 21-, 1929 at Santa Fe, N.M. (84 pp.), Box 2F471, RGCC Records, UTA.

Thomason’s efforts on behalf of his city were not limited to the submission of this statement. In December 1927, more than a year before he addressed the Rio Grande Compact Commission, Thomason and city water works superintendent A.H. Woods met with Interior Secretary Hubert Work to discuss the matter. Work advised him and Woods to meet with former Rio Grande Project superintendent and US International Boundary Commissioner L.M. Lawson. Lawson, in turn, recommended that the city wait until elections in EBID and EP#1 had been held. He also suggested that the city seek water within the project’s operational 155,000-acre irrigable-acreage framework.

This suggestion, as Woods later explained to Work, was embodied in a letter that Thomason wrote to Work in February 1928. In that letter, Thomason noted that as much as 4,000 acres of the 67,000 acres allotted to Texas had not been brought under irrigation. He proposed for the City of El Paso to acquire those lands and thus obtain a right to water through the federal reclamation project. Woods for his part believed that this “should raise no objection on the part of the irrigation district, because of the fact that the City of El Paso would be expected to relieve the district of the construction repayments for such an area.” Although the acting Rio Grande Project superintendent L.R. Fiock and EP#1 manager Roland Harwell were generally supportive of the city’s proposal, before any further arrangements could be made, the temporary 1929 compact was adopted and progress towards the city obtaining Rio Grande water came to a halt. Footnote 234 below briefly discusses how the idea of securing Rio Grande project water was revived in 1940. See R.E. Thomason to Honorable Hubert Work, Secretary of the Interior, February 16, 1928; A.H. Woods to Hon. Hubert Work, Secretary of the Interior, February 17, 1928; Hubert Work, Secretary, to Hon. R.E. Thomason, Mayor of El Paso, Texas, Feb. 25, 1928; P.W. Dent, Acting Commissioner to Mr. A.H. Woods, Superintendent, City Water Works, March 2, 1928; Memorandum, From: Acting Superintendent [L.R. Fiock], To: The Secretary (Thru The Commissioner, Washington, D.C.), Subject: Water Supply for City of El Paso – Allotment of Irrigable Area to The Texas District – Rio Grande Project, El Paso, Texas, March 27th, 1928; A.H. Woods to Honorable Hubert Work, Secretary of the Interior, Department of the Interior, El Paso, Texas, April 13, 1928; Hubert Work, Secretary, to Mr. A.H. Woods, Superintendent, City Water Works, Apr. 20, 1928; Memorandum, From Commissioner [Elwood Mead], To Superintendent, El Paso, Tex., Subject: Proposed purchase of water by City of El Paso, April 21, 1928; and Memorandum, From: Acting Superintendent [L.R. Fiock], To: The Secretary (Thru The Commissioner, Washington, D.C.), Subject: Proposed purchase of water by City of El Paso – Rio Grande Project., El Paso, Texas, June 26th, 1928. ff. 223.02 Rio Grande, Corres re Lease or Sale of Water thru 1929, 1 of 2, Transfer Case, Box 907 Rio Grande 223.02, Entry 7, RG 115, NARA Denver.

Although there is no record of the commissioners discussing or deliberating El Paso's claim prior to congressional ratification of the 1929 temporary compact, the compact was intended to preserve existing water uses within the basin. It therefore recognized "domestic" and "municipal" purposes of water along with the "agricultural." Article XI, in particular, offered a strong statement of the relative importance of "domestic" and "municipal" uses:

Subject to the provisions of this Compact, water of the Rio Grande or any of its tributaries, may be impounded and used for the generation of power, but such impounding and use shall always be subservient to the use and consumption of such waters for domestic, municipal and agricultural purposes. Water shall not be stored, detained nor discharged so as to prevent or impair use for dominant purposes.

For Colorado's compact commissioner and the father of the Colorado River Compact Delph Carpenter, the provision's meaning was clear. Article XI "provides for the development of power by use of waters of the Rio Grande but makes such use subservient to uses for domestic, municipal and agricultural purposes which are made dominant."²²⁴

When discussions towards a permanent compact resumed in December 1934, existing or present uses and needs of water for agriculture remained centerstage. Former Colorado governor George Corlett, for instance, under questioning from Texas commissioner T.H. McGregor argued for "parity" among the three states on the basis of "the present acreage now under cultivation." Pushed further by McGregor about what "parity" meant, Corlett clarified: "Present requirements, then."²²⁵

The federal Rio Grande Joint Investigation pushed the commissioners to think more expansively about the basin's water needs. In his first appearance before the commission in December 1935 to offer the assistance of the National Resources Committee, University of Chicago historical geographer and consultant Harlan H. Barrows posed pertinent questions as to future uses of the water to be equitably apportioned among the three states:

What, in the long run, will be your needs for water, not for irrigation supply, but for all other purposes, for city and town water supply, for industry, and the like? What are the prospects with respect to growth in population, and the prospects for now and greater needs for water associated with that growth? What are the possibilities for decentralized

²²⁴ *An Act Giving the consent and approval of Congress to the Rio Grande compact signed at Santa Fe, New Mexico, on February 12, 1929*, June 17, 1930, Public, No. 370, chap. 506, 46 Stat. 767; and Report of Delph E. Carpenter, Commissioner for the State of Colorado in re Rio Grande River Compact, March 1, 1929, 5. ff. WDEC 16-12, Rio Grande 1934, WDEC Box 16, Series 1: DEC Correspondence, 1895-1949 and undated, Subseries 1.2 Loose Correspondence, 1895-1949 and undated, PDECF, WRA, CSU-FC.

²²⁵ Proceedings of the Rio Grande Compact Conference held at Santa Fe, New Mexico, December 10 & 11, 1934, 12-13. ff. 1 Proceedings of the Rio Grande Compact Conference held at Santa Fe, New Mexico, 1934-1935, Box 62, Series 7, Subseries 7.1, PDECF, WRA, CSU-FC.

industry, involving the use of more or less water? What are your prospective, no less than your existing, aggregated needs? To what extent can these prospective needs be met effectively?²²⁶

The commissioners were not dismissive of learning more about their respective states' future needs, but did not immediately embrace a study as wide ranging as Barrows sought. Colorado State Engineer and compact commissioner M.C. Hinderlider, for one, expressed his desire to obtain

all factual data...of an engineering character, as Mr. Barrows has intimated, having to do with availability of water supply, the demands upon those supplies, the deficiencies, the surpluses, when they occur, and, in fact, all matters pertaining to the efficient, and I believe, ultimate utilization of this entire natural resource provided by the Rio Grande.²²⁷

Texas's commissioner Frank Clayton, McGregor's successor, while concerned mostly with safeguarding the water supply to Texas via the Rio Grande Project, supported the idea of a federal study of the Rio Grande. The resolution he introduced to provide for that study emphasized "a determination of all salient facts bearing on the present and potential water resources of the Rio Grande Basin above Ft. Quitman, and bearing on past and present uses therein."²²⁸

Barrows and fellow NRC consultant and agricultural economist Frank Adams pressed the issue, seeking a more open investigative mandate. Their suggested resolution called for an "investigation of the water resources and of the irrigable and irrigated lands of the Rio Grande Basin above El Paso, and of the present and prospective uses of water for agricultural and other purposes in such basin." Hinderlider largely accepted this, but Clayton remained more interested in focusing the federal efforts. In a second draft resolution, the Texas commissioner acknowledged that the compact commission sought "a thorough finding of all facts," including those "relevant to the use of water for irrigation and other beneficial purposes," but he proposed

that such investigation be restricted to the findings of facts relevant to the water supply available in said [Rio Grande] Basin, and which could be made available from outside thereof, and relative to the use and consumption of water within said basin....

²²⁶ Proceedings of Rio Grande Compact Commission...December 2-3, 1935, 6. ff. 032.1 (2/3), Box 1326, Entry 7, RG 115, NARA Denver.

²²⁷ Proceedings of Rio Grande Compact Commission...December 2-3, 1935, 9. ff. 032.1 (2/3), Box 1326, Entry 7, RG 115, NARA Denver.

²²⁸ Proceedings of Rio Grande Compact Commission...December 2-3, 1935, 20. ff. 032.1 (2/3), Box 1326, Entry 7, RG 115, NARA Denver.

Adams was concerned that this resolution, if adopted, would severely circumscribe the investigation and he instead urged “a broader study of this whole basin problem....”²²⁹

New Mexico State Engineer and compact commissioner Thomas McClure was more inclined to Clayton’s position, that the federal investigation be directed to a “factual survey” that would address more directly the issue of equitable apportionment of the Rio Grande among the three states. Yet, he too recognized “other purposes” for the river’s waters. McClure’s proffered resolution read, in part,

that the National Resources Committee, through the Water Resources Committee, be hereby requested to arrange immediately for some investigation of the water resources and of the irrigable and irrigated lands in the Rio Grande Basin, and of the respective uses for agricultural and other purposes in such Basin....²³⁰

The compromise resolution adopted by the commission expressly “limited” the “cooperative investigation...to the collection, correlation and presentation of factual data,” unless the commissioners unanimously requested “recommendations.” An early version defined that investigation to be “of the past, present and prospective uses of water for agricultural and other beneficial purposes in such basin.” When Texas’s engineer advisor Raymond Hill expressed concern that such language may “be construed as omitting consideration of natural losses,” a consideration that he believed was “a major factor in any investigation,” Barrows suggested that the phrase be revised to “read ‘of the past, present and prospective uses of water and other consumption of water in such basin.’” Hill explained to the commissioners that this language was inclusive of “Domestic uses, and then consumption, which takes place naturally, striking out ‘for agricultural and other beneficial uses.’”²³¹

The resulting report of the federal investigation, the *JIR*, consequently considered “Uses and requirements other than for irrigation.” These uses included municipal purposes, for “cities, towns, and villages” as well as “power purposes.” The “General Report,” which summarized the individual reports by various federal agencies, observed that these uses were “but a small fraction of the irrigation use” that was common from the Rio Grande’s headwaters in Colorado to Fort Quitman, Texas. “As general average,” the report noted, “the water requirement of cities and towns corresponds closely to the irrigation requirement of agricultural lands of an equivalent area.” Nearly all the area cities, towns and villages derived their water supply from “pumping

²²⁹ Proceedings of Rio Grande Compact Commission...December 2-3, 1935, 25-28 and 30. ff. 032.1 (2/3), Box 1326, Entry 7, RG 115, NARA Denver.

²³⁰ Proceedings of Rio Grande Compact Commission...December 2-3, 1935, 31-32. ff. 032.1 (2/3), Box 1326, Entry 7, RG 115, NARA Denver.

²³¹ Proceedings of Rio Grande Compact Commission...December 2-3, 1935, 37-38 and 42-43. ff. 032.1 (2/3), Box 1326, Entry 7, RG 115, NARA Denver.

ground water which, in turn, has its source in stream flow and in precipitation on the floor of the valleys,” and the report determined that “[f]rom a basin-wide standpoint...this use constitutes a stream-flow depletion.” To the USDA Bureau of Agricultural Engineering fell the task of assessing these depletions within the various sections of the basin. The agency included these urban and semi-urbanized areas within the “total area for which consumptive requirement [were] estimated,” and thus “no special consideration of this use or allowance for it” was made. The City of Albuquerque, for example, was “included in the figures [of stream flow depletion]” for the so-called “Middle section” of the basin that extended “from the Colorado-New Mexico state line to San Marcial at the head of Elephant Butte Reservoir.”²³²

The City of El Paso was excluded from this calculation of urban water consumption in the basin (which totaled 21,000 af) because of its dependence on wells located east of the city. These were, wells that drew upon groundwater fed by precipitation. Albuquerque likewise relied upon groundwater. Yet, the calculation of water consumption for the Middle section included the city because engineers involved with Albuquerque’s proposed Jemez Creek development (which aimed to replace municipal wells with a direct diversion from one of the Rio Grande’s tributaries) believed that the city’s groundwater use was “undoubtedly a draft, direct or indirect, on Rio Grande; that therefore construction of the Jemez project amounts only to a change in point of diversion....”²³³

The *JIR* nevertheless made note that “the future of the water supply for El Paso” could include a direct diversion from the Rio Grande. It quoted at length from a letter that Harlowe Stafford, the federal engineer in charge of the investigation, received from the superintendent of El Paso’s municipal waterworks:

We are contemplating the drilling and construction of three additional wells within the very near future, said construction to be contingent upon the recommendations and advice which will be contained in a report of a survey of the underground water resources of El Paso and vicinity which was made during 1935 and 1936 by the United States Geological Survey.

The records which this department has maintained over a period of years indicate that the static level of our ground-water supply is slowly receding. This, of course, can mean but one thing; that is, that the pumping in this area exceeds recharge.

Should the static level continue to drop during the next 10 or 20 years as it has during the last 15 years, we believe that we shall find it necessary to seek another source of supply. Of course, there is but one other source of supply available and that is the Rio Grande.

²³² *JIR*, 1, 20, and 104-105. The Bureau of Agricultural Engineering’s data is offered in Part 3: Water Utilization: Report of the United States Bureau of Agricultural Engineering, Section 7 – Consumptive Use of Water Requirements, in *JIR*, 368, 370-371, and 422-423.

²³³ *JIR*, 105-106.

However, we do not think that it will be necessary for us to use water from that source for several years, it at all.²³⁴

²³⁴ *JIR*, 106.

The superintendent may have been optimistic in his assessment. In the summer of 1940, El Paso city officials, having had to cut back on water use on city-owned properties and confronting the possibility of having to supply the nearby US Army post, Fort Bliss, with additional water, approached federal reclamation authorities again. El Paso's new proposal was much like its previous proposal from the 1920s: to purchase land within EP#1 and thereby obtained water from the project. Working with the EP #1 manager Roland Harwell and El Paso City Attorney and former Texas compact commissioner Frank Clayton, Rio Grande Project Superintendent L.R. Fiock and Reclamation District Counsel H.J.S. Devries drafted a contract, pursuant to the 1920 Miscellaneous Purposes Act in November 1940. That contract, which EBID approved but did not join as a party, was finalized in February 1914 by the United States, EP #1, and the City of El Paso. A supplemental contract, with EBID as a party, was approved in 1944, and a third supplemental contract between EP #1 and the city (without either EBID or the US as a party, although the US approved the agreement) was prepared in 1949. See Ashley G. Classen and J.N. Hinyard, *Report on the Use of Rio Grande River Water as a Supplemental or Total Supply for the City of El Paso*, Lance Engineers, Inc., May, 1940), 1-8 and 13-124. 090-2000-028-W054, Box 090 028 W044-W054, El Paso Historical Society, El Paso, Texas; W.E. Robertson, Chairman, Water Development Commission of the City of El Paso, To the Honorable John C. Page, Commissioner, Bureau of Reclamation, June 8, 1940; Memorandum, From: Superintendent [L.R. Fiock], To: The Commissioner (Through Chief Engineer, Denver, Colorado), Subject: Negotiations by City of El Paso for municipal water supply from project sources – Rio Grande Project., El Paso, Texas, June 20, 1940; H.W. Bashore, Acting Commissioner, to Mr. W.E. Robertson, Chairman, Water Development Commission of the City of El Paso, Jul 25, 1940; City of El Paso, Texas, to The Honorable, The Secretary of the Interior, Statement as to the Water Supply of the City of El Paso in connection with its application for permission to supplement its supply from the Rio Grande, August 31, 1940; Memorandum, From: Acting Commissioner [H.W. Bashore], To: District Counsel, El Paso, Texas, Subject: Desire of city of El Paso to secure a municipal water supply from Rio Grande Project, September 30, 1940; H.J.S. Devries, District Counsel, to Hon. Edw. Mechem, October 5, 1940; Memorandum, From Superintendent [L.R. Fiock], To Commissioner (Through Chief Engineer, Denver, Colorado), Subject: Water supply for City of El Paso from project sources – Rio Grande Project, November 26, 1940; and United States Department of the Interior, Bureau of Reclamation, Rio Grande Project, New Mexico-Texas, Contract for Supplemental Water Supply for the City of El Paso, El Paso draft 11/18/40, Dec-9'40. ff. 223.02 - Rio Grande - Leases, Sales & Rentals of Water, El Paso, City of, thru Dec 1941. Box 920, Rio Grande Pro. 223.02, Entry 7, RG 115, NARA Denver; Memorandum, To: Secretary J.A. Krug, From: Commissioner [Michael W. Strass], Subject: Proposed supplemental contract with City of El Paso for municipal water supply – Rio Grande Project, May 13, 1949, Approved: May 19, 1949, (sgd) William E. Warne, Assistant Secretary of the Interior; Memorandum, To: The Solicitor, From: Acting Commissioner [Wesley R. Nelson], Subject: Proposed contract arrangements to supplement City of El Paso water supply--Rio Grande project, Sep 2 1949; and Memorandum, To: The Solicitor, From: Bruce Wright, Subject: Arrangements to supplement City of El Paso water supply--Rio Grande Project, Sep 14 1949. File No. 8-3 (Part 8), Reclamation Bureau - Rio Grande – Distribution of Waters, General. January 27, 1937 thru February 10, 1950, 8-3 Rio Grande – Distribution of Waters - General, Box 3623, 8-3 Rio Grande—Contracts-Nelson, J.P. 8-3 Rio Grande Flood Control, CCF 1937-1953, RG 48, NARA II; and Contract between the City of El Paso and El Paso County Water Improvement District Number One, dated August 10, 1949, approved J.A. Krug, Sec'y of the Interior, Sept. 23, 1949. ff. B-12.2.12.1 Water Control &

Neither in the December 1937 “Report of Committee of Engineers” nor in the recorded proceedings leading up to the formal drafting and signing of the permanent compact in March 1938 is there explicit discussion of other possible or future uses of compact water. As addressed in Opinion I, “present uses of water” was the focus of the engineering advisors’ report and the predominant use of water in the basin circa 1938 was irrigation. The compact itself references “irrigation demands” and “irrigation.”²³⁵

There is no language in the compact, however, explicitly precluding the use waters of the Rio Grande for domestic, municipal, and industrial uses. Historical evidence exists, moreover, that those most involved with the negotiations did not see the compact as foreclosing opportunities to use water for purposes other than irrigation within the basin. Bliss, for one, in reviewing the general outlines of the technical basis of the compact to McClure in December 1937, noted “Developments in the three valleys [i.e., the San Luis Valley, the Middle Rio Grande, and the Elephant Butte-Ft. Quitman section of the upper basin] will be limited only by certain restrictions in reservoir storage during period of extremely low run off and by limitation of debits which may be incurred at any time.”²³⁶

Clayton, for another, construed his responsibility as Texas’s commissioner to secure all the waters to which Texas was entitled – not just water for irrigation. A little over two months after signing the compact, at a May 1938 conference of water users below Ft. Quitman, he unequivocally stated that it was his duty “to try and get every drop of water Texas had a right to claim, irrespective of how or where it was to be used in Texas.” Such a statement indicates that Clayton saw the uses to which the waters Texas obtained under the compact were put were immaterial.²³⁷

New Mexico’s pursuit of the Jemez Creek project in the wake of the compact’s signing similarly suggests that interests in that state did not see the waters of the Rio Grande as dedicated exclusively to agriculture. Clayton’s response to that project also bolsters the notion that he and others saw other possible uses for the water within the confines of the compact. After the compact’s signing but before its ratification by the states and Congress, the City of Albuquerque sought funds from the Public Works Administration to initiate the Jemez Creek Project. Federal

Accounting 1 of 4, City & County of El Paso; El Paso, Hudspeth County Conservation District; Hudspeth County Conservation & Reclamation District No. 1; Elephant Butte Irrigation District, January 1906 thru September 1960, Box 22, Accession Number 076-69A-0928, RG 76, NARA Ft. Worth.

²³⁵ “Rio Grande Compact,” in Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 11, 73, 80. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

²³⁶ Bliss to [McClure], December 22, 1937. Rio Grande Compact – July 7, 1937 to June 30, 1938, 26th Fiscal Year, NM_0015692 – NM_00156929.

²³⁷ *Proceedings of Meeting, held on Friday, May 27, 1938*, 10. ff. Proceedings and Minutes 1935-1938, Box 2F463, RGCC-FBCP, UTA.

funds for water development within the Rio Grande Basin had been frozen by executive order pending the Rio Grande Joint Investigation, but now with the compact nearly in place long-contemplated projects were pushed forward in New Mexico and Colorado. Albuquerque consulting engineer H.C. Neuffer (who also played a pivotal role in the development of the compact as consultant to the Middle Rio Grande Conservancy District, as discussed in Opinion I) urged Clayton – as the Texas commissioner later related to engineering advisor Raymond Hill – “to clear the Jemez Creek water supply project for the City of Albuquerque.”

Clayton demurred on giving Neuffer assent, not so much on the basis of the project itself but because the compact had not yet been adopted. This was a position that the Texas commissioner reportedly shared with EBID and EP #1 representatives, all of whom likewise opposed Colorado’s Wagon Wheel Gap project for the same reason. For Wagon Wheel Gap, Clayton wrote Hill, “Our attitude was that until the compact had been ratified, we could not give clearance to any project involving the use of water of the Rio Grande,” and he gave Neuffer “the same answer” as to Jemez Creek. Although the engineer and Colorado’s representative Ralph Carr both “threaten[ed] to defeat ratification if our refusal to clear these projects result in the loss of federal funds,” the Texas commissioner informed his engineering advisor that he could “not see my way to give them clearance, and this was the unanimous attitude of the officials of the Elephant Butte and El Paso County district.” Should federal monies be “earmarked pending ratification of the compact,” however, “we shall probably have no objection.” For Clayton, EBID, and EP #1, it would appear that so long as the compact was in place, the nature of water use within the states was irrelevant.²³⁸

More compelling evidence of water use agnosticism in the compact comes from statements and analyses prepared by the compact drafters themselves following the compact’s signing. As noted in Opinion I above, both Colorado commissioner M.C. Hinderlider and New Mexico commissioner Thomas McClure in letters to their respective governors urging adoption of the compact stated that the agreement safeguarded “present and future uses” of the Rio Grande waters in their states.

An undated “Analysis of the Terms of the Compact,” authored by McClure, twice made the point that future, unspecified water uses were protected by the compact. Citing the “schedules of delivery of water at the Colorado-New Mexico State Line and at San Marcial at the head of Elephant Butte Reservoir,” the New Mexico state engineer wrote,

they provide that the three major basins [i.e., Colorado’s San Luis Valley, New Mexico’s Middle Rio Grande, and the Elephant Butte-Fort Quitman stretch] may make the best use

²³⁸ Frank B. Clayton, Rio Grande Compact Commissioner for Texas, to Mr. Raymond Hill, August 24, 1938. Box 2F466, RGCC-FBCP, UTA.

of their available supplies by the conservation and use of waters now being beneficially consumed and particularly by the construction of additional reservoirs to make use of waters which would otherwise spill from Rio Grande Project storage and be lost to the entire area [i.e., the Upper Rio Grande Basin, above Ft. Quitman].

Further in the “Summary” to the piece, McClure noted that among the compact’s accomplishments,

It permits each State to make the best possible use of her available supply and by means of storage, to conserve considerable flood waters which must otherwise spill from Project storage and be lost to the basin.²³⁹

Raymond Hill, recalling the compact negotiations three decades later, agreed. For a Supreme Court original action involving the three Rio Grande states in the late 1960s, Hill prepared a narrative account, “Development of the Rio Grande Compact of 1938,” and sat for a deposition. His narrative largely summarizes the available engineers’ reports and commission proceedings, yet much like the compact itself does not expressly deny water uses other than irrigation. In fact, in reviewing the events leading to the compact, Hill’s narrative suggests that future water developments were not tied exclusively to irrigation:

The Committee of Engineering Advisers was instructed to prepare schedules of deliveries by Colorado and by New Mexico that would insure [*sic*] maintenance of the relationships of stream inflow to stream outflow that had prevailed under the conditions existent when the Compact of 1929 was executed. The Committee of Engineering Advisers was also instructed to provide for freedom of development of all water resources in the drainage basin of Rio Grande above Elephant Butte subject only to compliance with these schedules.²⁴⁰

An exchange that Hill had with United States attorney Donald Redd at a December 1968 deposition further clarified the engineer’s meaning as to “freedom of development”:

By Mr. Redd:

Q. Mr. Hill, I call your attention to your statement on page 20 and on page 62 of your report [i.e., “Development of the Rio Grande Compact of 1938”] and on page 62 where you stated that the objective in the negotiations was to base the use on the 1929 conditions [i.e., the passage quoted above], is that correct?

A. Yes, the primary instructions to the Committee of Engineers, of which I was a member, were to develop a relationship between the supply entering the valleys, each valley, and the outflows from the valley, and to development schedules which would reflect that relationship as near as possible. That was the first instruction.

²³⁹ McClure, “Analysis of the Compact,” undated, 21 and 29. NM_00164500, NM_00164509.

²⁴⁰ Hill, “Development of the Rio Grande Compact of 1938,” 62.

Q. But in doing so, you contemplated improvements that would make more water available or could make more water available?

A. Yes, that's exactly what I referred to in the second instruction, and it was the clear intent, I am positive, that we were instructed in the development of the schedules and in the provision for operation. Article VI [of the compact, which addressed debits and credits for the states of Colorado and New Mexico], for example, as drafted by the engineers, almost no change in the final text, was to provide for freedom of development between these points of upper index and lower index in each case, so that each State would be free to change its use and the manner of use, each State would be free to provide storage, but subject always to the delivery in accordance with the schedules.

Colorado, for example, had been promoting the Wagon Wheel Gap Reservoir for many, many years, and all of the provisions in the Compact that referred to storage of water in the Reservoirs and how they would be operated were all to make it possible – for example, Wagon Wheel Gap – so the 200,000 acre-feet could be stored in Wagon Wheel Gap that otherwise would have passed over Elephant Butte and down the river and have been of no value to anybody. Obviously, you could not store that flood water in Elephant Butte, then pump it back to San Luis, it had to be stored in Wagon Wheel Gap.

So the whole theory of the thing, the premise under which the Compact was negotiated, that subject only to the maintenance of depletions that had occurred, subject only to not increasing those overall depletions, there is a freedom in each State to store, develop, improve or do anything else within that State. That was the whole intent.²⁴¹

Hill's understanding of the intent of the compact aligned with McClure's: each state was free to utilize the waters of the Rio Grande within their borders as they saw fit, pursuant to the schedules of delivery adopted in the compact that allocated the available water supply of the Upper Rio Grande Basin.

The December 1937 report of the compact engineering advisors and the compact proceedings themselves indicate that “only present needs” within the basin could be considered in the formulation of a compact given the “usable water supply.” Irrigation was the predominant use of water in the basin at time. The compact references “irrigation demands” and “irrigation,” yet it does not specifically prohibit other uses of the Rio Grande water it apportioned. There is evidence, moreover, from direct participants in the negotiations that, pursuant to the schedules of delivery established by the 1938 compact, Colorado, New Mexico, and Texas were to have autonomy in the development of the waters within their borders – both at the time of the compact and in the future.

²⁴¹ In the Supreme Court of the United States, October Term 1967, No. 29, Original, *State of Texas and New Mexico, Plaintiffs, vs. State of Colorado, Defendant*, Deposition of: Raymond A. Hill, Taken December 4, 1968, Denver, Colorado, 35-36. ff. Texas & New Mexico v. Colorado, w. Texas vs. Colorado 66-1061, Box 1989 41-240, LF-TAG, TSA.

Opinion VI: The Special Master fairly described the background history leading to the 1938 Rio Grande Compact on pages 31 through 187 and 203 through 209 of the *First Interim Report of the Special Master*, dated February 9, 2017.

Having reviewed the background history leading to the 1938 Rio Grande Compact presented on pages 31 through 187 and 203 through 209 of the *First Interim Report of the Special Master*, dated February 9, 2017 as well as the materials appended to it, it is my expert opinion that the Special Master fairly described that history. I base my opinion not only on my professional knowledge and expertise, but also on the historical records that I examined in the course of researching and analyzing the history of the 1938 Rio Grande Compact, many of which are cited in the opinions above.

Appendix

Resume of Scott A. Miltenberger, Ph.D. – May 31, 2019

Scott A. Miltenberger, Ph.D.

Partner / Consulting Historian



Summary

Dr. Miltenberger is a professional consulting historian, specializing in environmental and natural resources issues. Since joining JRP in 2006, he has researched alleged riparian and appropriative water rights, historical ground water rights, and Native American and federal reserved water rights in California and throughout the American West. Dr. Miltenberger has also led historical investigations of flood events, land ownership, survey / boundary disputes, and potentially-responsible parties for toxic clean-up under the provisions of CERCLA. His clients have included local, state, and federal agencies, as well as private parties. Dr. Miltenberger has qualified as an expert historian and given expert witness testimony in Sacramento County Superior Court, Santa Clara County Superior Court, and in Arizona's San Pedro-Gila River Adjudication.

Selected Professional Experience

Expert Witness Work, Deposition, and Trial Testimony over the Past 4 Years

State of Texas v. State of New Mexico and State of Colorado, No. 141, Original, Supreme Court of the United States. Preparation of expert historian report and anticipated expert witness deposition and trial testimony concerning the development of the Rio Grande Compact of 1938. Sacramento, CA: Somach Simmons & Dunn, 2012-Present.

Matt Pear and Mark Pear, Plaintiffs, vs. City and County of San Francisco, a municipal corporation, Does, 1-50, inclusive, Case No. 112CV227801, Superior Court of the State of California, County of Santa Clara. Provided expert witness testimony concerning historical land use and urban/suburban/industrial development of Santa Clara County in the 1950s as related to the Hetch Hetchy Aqueduct Right of Way. San Francisco, CA: City and County of San Francisco, City Attorney's Office, San Francisco Public Utilities Commission, 2017.

In Re the General Adjudication of All Rights to Use Water in the Gila River System and Source. Civil Nos. W-1, W-2, W-3, and W-

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Ph.D., United States History, University of California, Davis, 2006.
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Academic Honors, Fellowships, and Grants

Agricultural History Center Dissertation Grant, University of California-Davis, 2005-2006
Reed-Smith Dissertation-Year Fellowship, University of California-Davis, 2004-2005
Jacob K. Javits Graduate Fellowship, United States Department of Education, 2000-2004
Legacy Fellowship, American Antiquarian Society, 2004
Distinction, Ph. D. Comprehensive Examinations, University of California-Davis, December 2001
Reed-Smith Graduate Fellowship, University of California-Davis, 1999.
Alumni Memorial Scholarship, Colgate University, 1995-1999
Charles A. Dana Fellowship, Colgate University, 1997-1999
Phi Beta Kappa, Colgate University, September 1998 (inducted)
Phi Alpha Theta, Colgate University, September 1997 (inducted)

Professional Affiliations

American Historical Association (Pacific Coast Branch)
American Society for Environmental History
National Council on Public History (Consultants' Committee)
National Trust for Historic Preservation

4, Contested Case No. W-1-11-605, Maricopa County Superior Court, State of Arizona. Preparation of expert historian report, and expert witness deposition and trial testimony concerning the history of Fort Huachuca, Arizona, its changing missions, population, and water use, for the purposes of a federal reserved water right claim. Washington, DC and Denver, CO: United States Department of Justice, 2012-2016.

Modesto Irrigation District vs. Heather Robinson Tanaka, et al. Case No. 34-2011-00112886, Superior Court of the State of California, County of Sacramento. Expert witness deposition and trial testimony concerning the riparian status of a parcel in San Joaquin County and the historical land and water uses on that parcel. Sacramento, CA: O’Laughlin & Paris LLP for Modesto Irrigation District, 2014-2015.

Consulting Historian Services Since 2006

Clear Lake Littoral Rights Analysis, Lake County, CA. Woodland: Yolo County Flood Control and Water Conservation District, 2019-Present.

Riparian and Pre-1914 Appropriative Water Rights Investigation of Parcels along Merced River, Merced County, CA, 2018-Present.

Investigation of Historical Water Right Entitlements within the Kern River Basin, Kern County, CA, 2018-Present.

Riparian Water Rights Investigation of Parcels in San Joaquin County, 2018-Present.

Investigation of Historical Water Right Entitlements within the Stanislaus River Basin, 2018-Present.

Riparian and Pre-1914 Appropriative Water Rights Investigation of an Agricultural Parcel in Merced County, CA, 2017-Present.

Riparian and Pre-1914 Appropriative Water Rights Investigation of Agricultural Lands in the Kings River Basin, Fresno County, CA, 2017-Present.

Historical Research of Water Rights for a Parcel in Stanislaus County. Sacramento, CA: O’Laughlin & Paris, LLP, 2017-Present.

Riparian and Pre-1914 Appropriative Water Rights Investigation of Sacramento-San Joaquin Delta Islands, 2016-Present.

In Re the General Adjudication of Rights to the Use of Water from the Coeur d’Alene-Spokane River Basin Water System. District Court of the Fifth Judicial District of the State of Idaho, Twin Falls, ID. Assisted in the research, data management, and preparation of an expert report

regarding water rights claims made in the general adjudication of water rights in the Coeur d'Alene-Spokane River Basin, Idaho. Boise, ID: Natural Resources Division, Office of the Attorney General, State of Idaho, 2010-Present.

Historical Research of California Public Utilities Records, 2018.

Historical Research of Military Operations at McClellan United States Air Force Base, Sacramento, CA, concerning use of chromium and chromium products, 2018.

Historical Research of Native American / Federal Reserved Water Rights Claims. Humboldt County, CA, 2017-2018.

Potentially Responsible Parties (CERCLA) Title Research for a Parcel in Tulare County. Rancho Cordova, CA: Geocon Consultants, Inc., 2017.

Historical Research of Water Rights acquired by the City of Santa Cruz. Santa Cruz, CA: Atchison, Barisone, Condotti & Kovacevich, 2016-2017.

Historical Research on Dams and Flood Control Operations on the Boise River. Boise, ID: Natural Resources Division, Office of the Attorney General, State of Idaho, 2015-2017.

Historical Research Concerning Reclamation District Assessments in Colusa County. Sacramento, CA: Somach Simmons & Dunn, 2016.

In Re the General Adjudication of Rights to the Use of Water from the Snake River Drainage Basin Water System, State of Idaho v. United States; State of Idaho; and all unknown claimants to the use of water from the Snake River Drainage Basin Water System, District Court of the Fifth Judicial District of the State of Idaho, Twin Falls, ID. Assisted in the research, data management, and preparation of several expert and consultant reports related to Idaho state water rights from statehood to the present of the more than 158,000 water claimants in the Snake River Drainage Basin, Idaho. These studies involved reservoir storage rights, appropriative water claims, groundwater use, submerged lands, hydro-electric power generation, municipal water uses, federal reserved water rights for military, forest, and Indian reservations, tribal water claims, and legislative histories. Boise, ID: Natural Resources Division, Office of the Attorney General, State of Idaho, 2006-2016.

Research regarding Pre-1914 Water Rights of Woods Irrigation Company, San Joaquin County, CA. Sacramento, CA: State Water Contractors and San Luis and Delta-Mendota Water Authority, 2015-2016.

Riparian Water Rights Investigation for Agricultural and Wetlands in the Cosumnes River watershed, Sacramento County, CA. Sacramento, CA: Sacramento County Counsel, 2015-2016.

Riparian and Pre-1914 Appropriative Water Rights Investigation of Agricultural Lands in the Salinas River Basin, Monterey County, CA, 2015-2016.

Riparian and Pre-1914 Appropriative Water Rights Investigation of Agricultural Lands adjacent to the Sacramento River, Yolo County, CA, 2015-2016.

Historical Research and Analysis of the Construction of Cline Falls Dam and Power Plant on Deschutes River, Oregon. Bend, OR: Holland & Knight, LLP, 2015.

Historical Research of Shipbuilding Operations at Swan Island Shipyards, Port of Portland, Oregon. San Francisco: Bassi, Edlin, Huie and Blum, 2015.

Historical Research of Land Uses and Development West of Hunters Point, San Francisco. San Francisco, CA: Bassi, Edlin, Huie and Blum, 2015.

Research Regarding Historical Background of Groundwater Pumping and Litigation in the 1950s among Orange County, Riverside, and San Bernardino Area Water interests in the Upper Santa Ana River Basin in Southern California. Redlands, CA: Thomas McPeters, Esq., McPeters McAlearney Shimoff & Hatt, 2013-2015.

Historical Investigation of Riparian and Pre-1914 Appropriative Water Right Claims for Three Parcels in eastern Contra County, CA, 2014.

Gallo Cattle Company v. Lincoln White Crane Hunter Farms; Merced Irrigation District, et. al. Case No. CV00105, Superior Court, State of California, County of Merced. Assisted in the collection of historical documentation in support of an expert witness deposition and planned testimony regarding Crocker Huffman Land and Water Company history, development of its irrigation and drainage system (later acquired by MID), and the background of a 1918 agreement to flow water from Merced County Drainage District (later acquired by MID) to a private landowner. Walnut Creek, CA: Miller Starr Regalia; and San Francisco, CA: Duane Morris, LLP, 2013-2014.

Land Use History, Union Lumber Company and adjacent properties, Fort Bragg, CA. San Francisco, CA: Bassi, Edlin, Huie and Blum, 2013-2014.

Reclamation and Land Use History Investigation: Roberts Island, San Joaquin Delta, CA. Sacramento, CA: O’Laughlin & Paris LLP for Modesto Irrigation District; Kronick, Moskovitz, Tiedemann & Girard for State Water Contractors; and Diepenbrock Harrison for San Luis and Delta-Mendota Water Authority, 2010-2014.

History of Groundwater Development and Use in Antelope Valley to Fulfill the Changing Military Missions of Edwards Air Force Base, Kern, San Bernardino and Los Angeles Counties, CA. Denver, CO: US Department of Justice, 2009, 2012-2014.

Research on a Pre-1914 Appropriative Water Rights Claim for a Ranch in Merced County, 2013.

Cortopassi Partners v. California Department of Water Resources, et al. Case No. CV034843, Superior Court, State of California, County of San Joaquin. Assisted in the collection of historical documentation in support of an expert witness deposition and planned testimony concerning public and private dredging on the Mokelumne River. Sacramento, CA: California Department of Justice, 2012-2013.

Investigation of Historical Reclamation and Land Use of Union Island, San Joaquin Delta, CA. Sacramento, CA: O’Laughlin & Paris LLP for Modesto Irrigation District; Kronick, Moskovitz, Tiedemann & Girard for State Water Contractors; and Diepenbrock Harrison for San Luis and Delta-Mendota Water Authority, 2011-2013.

Investigation of Historical Delineations of the Rialto Groundwater Basin, San Bernardino, CA. Redlands, CA: Thomas McPeters, Esq., McPeters McAlearney Shimoff & Hatt, 2010-2013.

Investigation of Historic Water Development at Two Well Sites: Chino Groundwater Basin. Rancho Cucamonga, CA: Cucamonga Valley Water District, 2010-2012.

Historical Research of Water Development on the Merced River for Irrigation, Mining, and Power Purposes Prior to the Organization of the Merced Irrigation District, 1860-1926. Merced, CA, 2008-2012.

Historical Research of US Army Corps of Engineers’ dredging and flood control activities on the Yuba River. Sacramento: MBK Engineers, 2012.

Sacramento River and San Joaquin River Levees: Research on history of construction, maintenance, repair, and performance, California. Sacramento: Kleinfelder, 2008-2012.

Research related to Water Storage, Diversion and Use by American Falls Reclamation District No. 2, *In Re the General Adjudication of Rights to the Use of Water from the Snake River Drainage Basin Water System, State of Idaho v. United States; State of Idaho; and all unknown claimants to the use of water from the Snake River Drainage Basin Water System*, Subcase No. 39576, District Court of the Fifth Judicial District of the State of Idaho, Twin Falls, ID. Boise, ID: Natural Resources Division, Office of the Attorney General, State of Idaho, 2011.

Historical Research regarding Operation of and Water Use at a Power Plant on Lytle Creek, San Bernardino County, CA for California Public Utilities Commission Hearings. Fontana, CA: Fontana Water District, and Rosemead: San Gabriel Water District, 2011.

Historical Water Rights Investigation – San Joaquin, Amador, and Calaveras counties, CA, 2011.

Susan River Pre-1914 Water Rights Investigation, Lassen County, CA. Chico, CA: O’Laughlin & Paris LLP, 2010.

Lower Lytle Creek Power Plant and Appurtenant Facilities: Construction and Water Use History. Redlands, CA: Thomas McPeters, Esq., McPeters McAlearney Shimoff & Hatt, 2010.

Due Diligence Research of Historical Land Uses, and Pre-1914 Appropriative and Riparian Water Rights associated with an 8,000-acre Historic Ranch in Madera County, CA, 2009-2010.

Legislative history of California’s “Area of Origins” laws (County of Origin, Water Code Sections 10500-10506, and the Watershed Protection Statute, Water Code Sections 11460-11465). Stockton, CA: Herum/Crabtree Attorneys, 2009-2010.

History of Fontana Union Water Company’s Lytle Creek Diversion on the San Bernardino National Forest. Fontana, CA: Fontana Union Water Company; Rancho Cucamonga: Cucamonga Valley Water District; and Rosemead, CA: San Gabriel Water District for submission to the Chief Counsel for Natural Resources, US Department of Agriculture, 2009.

Oakdale Irrigation District Water Rights Investigation. Chico, CA: O’Laughlin & Paris, 2008–2009.

Riparian Lands and Agricultural Land Uses Investigation for Major Reclaimed Islands in the southern San Joaquin Delta, San Joaquin County, CA. Chico, CA: O’Laughlin & Paris LLP, 2007-2009.

Historic Meandering of the River Bend Section of the Russian River, Sonoma County, CA. Sacramento, CA: Lennihan Law, APC, 2008.

Delta Risk Management Strategy, Franks Tract Levee Research: Historical research into the original condition of levees around Franks Tract, and collection of aerial photographs showing how the levees deteriorated over time after the island flooded, Contra Costa County, California. Benjamin & Associates, 2007–2008.

Pre-1914 Water Rights Investigation for Idyllwild Water District regarding Strawberry Creek, a tributary to the San Jacinto River. California State Water Resources Control Board, Complaint No. 33-05-01 In Re Strawberry Creek, Riverside County, CA. Sacramento, CA: Ellison, Schneider & Harris, Attorneys at Law, LLP, 2007 – 2008.

Fort Boise Military Reservation Federal Reserved Water Rights Investigation. Boise, ID: Natural Resources Division, Office of the Attorney General, State of Idaho, 2007.

Historical Property Ownership Research for a Mine in Lake County, CA. Houston, TX: El Paso Corporation, 2006.

Publications Authored in the Previous 10 Years

“Viewing the Anthrozootic City: Humans, Domesticated Animals, and the Making of Early Nineteenth-Century New York,” in *The Historical Animal*, ed. Susan Nance (Syracuse, NY: Syracuse University Press, 2015), pp. 261-271.



December 30, 2019

EXPERT REBUTTAL / SUPPLEMENTAL REPORT OF:

Scott A. Miltenberger, Ph.D.

In the matter of:

No. 141, Original

In the Supreme Court of the United States

State of Texas v. State of New Mexico and State of Colorado

Prepared for:

Somach Simmons & Dunn
500 Capitol Mall, Suite 1000
Sacramento, CA 95814

Prepared by:

A handwritten signature in blue ink, reading "Scott A. Miltenberger". The signature is fluid and cursive, written over a horizontal line.

Scott A. Miltenberger, Ph.D.

JRP HISTORICAL CONSULTING, LLC

2850 Spafford Street

Re: CA 95618

TX v. NM # 141

New Mexico Exhibit

NM_EX-129

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Introduction

I, Scott A. Miltenberger, Ph.D., am a partner at JRP Historical Consulting, LLC (JRP), located at 2850 Spafford Street, Davis, California. This expert rebuttal / supplemental report was prepared by me for Somach Simmons & Dunn, attorneys representing the State of Texas before the Supreme Court of the United States in *State of Texas v. State of New Mexico and State of Colorado*, No. 141, Original. I have been asked to address the following questions:

1. In her expert report, Dr. Jennifer Stevens opines, in part, that “The scientific understanding of connections between groundwater and surface water was too nascent in the first decades of the 20th century for Reclamation to have intended” appropriation of “the Upper Rio Grande Basin’s groundwater” (Opinion 5, p. 11), and that “Scientific understanding of the relationship between surface and groundwater supplies in the Upper Rio Grande Basin was still in its infancy at the time of the 1938 Rio Grande Compact negotiations....” (Opinion 6, p. 11). Based on your research, what is your opinion as to the “scientific understanding” of the relationship between surface flow and groundwater in the Upper Rio Grande Basin and why?
2. Can you determine from your research what period of record formed the bases for the delivery schedules set forth in Articles III and IV of the 1938 Rio Grande Compact, and if so, what is the relevant period of record relied on by the Compact negotiators?

In formulating my responses, as with my expert report, I have relied upon my education and nearly 13 years of experience as a professional historian, primarily of western water and land use, as well as my review and analysis of historical documents, published sources, and academic monographs collected by me or those at my firm in connection with this action. I have further examined Dr. Jennifer Stevens’ report, Mr. Nicolai Kryloff’s expert report for the United States, and documents produced by the states of Texas, Colorado, and New Mexico, and the United States in this action.

Sources upon which I relied are cited in the history profession’s preferred footnote citation format as detailed in the *Chicago Manual of Style*. If any other historical material is presented or made known to me, or if I review any additional documents, it may have some effect on the specific opinions offered herein.

Rebuttal Opinion I: The historical record discloses several studies that explored the relationship between surface flow and groundwater in the Upper Rio Grande Basin prior to and following ratification of the 1938 Rio Grande Compact, and those studies provide an essential context for understanding what waters were apportioned by the Compact.

This rebuttal opinion does not offer an assessment of the quality of the “scientific understanding” of the relationship between surface flow and groundwater in the Upper Rio Grande Basin in the early twentieth century. Rather it reviews the historical record regarding studies made of that relationship, and finds that several investigations and analyses of Rio Grande surface flow and subsurface waters – variously identified in the collected record as “underflow,” “underground waters,” and “ground water” or “groundwater” – were made by the US Geological Survey (USGS), the US Reclamation Service (later the Bureau of Reclamation, or Reclamation), and the State of New Mexico over the course of the twentieth century. My expert opinion as a historian, having examined these studies, is that an inter-relationship between surface flow and groundwater was observed for lands below Elephant Butte prior to ratification of the Rio Grande Compact. Furthermore, with the advent of groundwater pumping in the Upper Rio Grande Basin in the mid-to-late 1940s, concerns emerged first among federal engineers and later within New Mexico’s Office of the State Engineer (OSE) that development of groundwater for irrigation put the Rio Grande Project and the terms of the 1938 Rio Grande Compact at risk.

USGS hydrologist Charles Slichter in 1904 was the first to study and document a relationship between surface flow and subsurface waters within the Mesilla Valley – the largest valley in New Mexico downstream from Elephant Butte Reservoir site. As discussed in my expert report (p. 63), B.M. Hall, the supervising engineer for the Rio Grande Project, requested that Slichter investigate “the underground water” in the valley as part of Hall’s efforts to develop a plan for the federal reclamation project.¹ The hydrologist began his work in August 1904, and by October (a month before the National Irrigation Congress in El Paso at which Hall unveiled that plan) Slichter had completed his assessment.² He found a direct connection between the river and the “ground waters” of the Mesilla Valley, telling the assembled delegates following Hall’s presentation that

¹ Hall was aware of a “plentiful quantity of water at a short distance from the surface,” and believing that to realize the Rio Grande Project “it will probably be necessary to use all of the floods [of the Rio Grande] and all of the underground water,” he sought to learn more about the underlying hydrological conditions. B. M. Hall, supervising engineer, to Charles E. Slichter, July 9, 1904. ff. 432 Rio Grande – Power Development – Slichters Reports as to Water Supply, Box 819 Rio Grande 430A – 458A, Entry 3 General Administrative and Project Records, 1902-1919 [hereafter Entry 3], Record Group 115 Records of the Bureau of Reclamation [hereafter RG 115], National Archives at Denver [hereafter NARA Denver].

² See Charles S. Slichter to F. H. Newell, USGS Chief Engineer, October 25, 1904. Folder 432, Box 819, Entry 3, RG 115, NARA Denver.

I think we have established that the source of the water that is used by the pumping plants is the river itself; that the origin of the ground waters or the supply of ground waters which are used by the pumping plant, is the water contributed to the river itself or lost by the river.³

Slichter made this same point when the USGS released his work as Water-Supply and Irrigation Paper No. 141, *Observations on the Ground Water of Rio Grande Valley* in 1905. According to his “observations of the test wells” in the Mesilla Valley,

the ground waters in the Mesilla Valley originate in the flood waters of the river. During times of low water the river bed is so thoroughly covered with mud that probably only a small amount of water escapes in the sand and gravels of the valley. During the period of flood, when the scour is deep, the contributions of the river to the underflow reach a maximum, as at that time the greatest amount of water is available for this purpose.⁴

Two years after the release of Slichter’s findings (and a year before the second of the two water filings made for the Rio Grande Project), the USGS published Willis Lee’s investigation, *Water Resources of the Rio Grande Valley in New Mexico and Their Development* as Water-Supply and Irrigation Paper No. 188. Lee’s study was, as he explained himself, “undertaken for the purpose of gathering information which might aid in the development of the water resources of the Rio Grande Valley in New Mexico.” He explicitly pursued two lines of inquiry: “one pertaining to underground waters and their utilization, the other to the storage and conservation of the surface waters.” Field work was pursued during roughly the same time period as Slichter in 1904 and 1905. With specific regard to “[u]nderground water” within the “Mesilla District,” an area Lee defined for his study as “Mesilla Valley,” the hydrologist observed that such waters were “found throughout Mesilla Valley at practically the river level,” and that “[t]he water table changes position to some extent, according to changes in the volume of the water in the river.” Lee gave credit to Slichter’s already released work, writing “Professor Slichter has shown that the ground water of the valley is derived largely from the river....” The hydrologist further noted, drawing on Slichter’s work, that there was “underflow in Mesilla Valley” above El Paso, and that “[t]he waters of the underflow are derived mainly from the Rio Grande.” Neither rainfall nor tributary streams contributed much to this underflow, “leaving,” in Lee’s words, “the Rio Grande as the main source of supply.” “Measurements of the flow of the Rio Grande,” he went on, “demonstrate the fact that the river is continually losing water, the greater volume of flow being measured at the upstream rather than the downstream gaging stations.” Lee stated succinctly:

³ Guy Elliott Mitchell, ed., *The Official Proceedings of the Twelfth National Irrigation Congress, Held at El Paso, Texas, Nov. 15-16-17-18, 1904* (Galveston, TX: Clarke & Courts, 1905), 218. See also Charles S. Slichter, *Observations on the Ground Water of Rio Grande Valley*, Department of the Interior, United States Geological Survey Water-Supply and Irrigation Paper No. 141 (GPO, 1905), 1.

⁴ Slichter, *Observations*, 27. Slichter further noted “that a small portion of the underflow reaches the river valley from the mesa and foothills to the north and east of Las Cruces.”

“All known facts point to the conclusion that a large amount of water is continually passing from the river into the underflow, and must either return to the surface and evaporate or find some underground passage by which to escape.” Precisely how and where the water escaped Lee could not determine with certainty, although he opined that the “more probable means...[was] by evaporation.”⁵

Slichter and Lee were not the only ones to identify and study this hydrological phenomenon in the early 1900s. According to Lee, the International (Water) Boundary Commission was making “[a]n effort...to determine what percentage of the known loss [in the Rio Grande]” was attributable “to irrigation and what to seepage and evaporation” at around the same time as his study. Lee reported the Commission found “a notable loss of water over and above that diverted for irrigation” – as much as “13 per cent of the San Marcial flow was lost by seepage and evaporation above El Paso.”⁶

Recognition of the connection between surface flow and groundwater in the Upper Rio Grande Basin was likewise reflected in Reclamation’s opposition toward other water projects as the Rio Grande Project itself was in development in the 1910s. My expert report discusses the broad claims federal reclamation authorities made as to the water supply for the project as well as for other projects throughout the west (pp. 67-71), but with specific reference to groundwater development on the Rio Grande Project, Reclamation Chief Engineer A.P. Davis’ response to F.L. Bixby, a New Mexico irrigation engineer working out of New Mexico Agricultural College (today New Mexico State University) in September 1912 is notable.⁷ Bixby had requested annual reports from the US Reclamation Service, and had questioned whether pumping either “from the Rio Grande in the neighborhood of the Government dams” or “on the bank of the river” was permissible. As to the first question, Davis replied was that “[t]here would be no difference in law or morals between taking the water by means of a canal and by means of a pump.” The second question was more complicated in Davis’ view. He was less sure about the law, but his comments suggest that the chief engineer understood the filings made for the Rio Grande Project

⁵ Willis T. Lee, *Water Resources of the Rio Grande Valley in New Mexico and their Development*, Department of the Interior, United States Geological Survey Water-Supply and Irrigation Paper No. 188 (GPO, 1907), 7, 41, and 49-50.

⁶ Lee, *Water Resources in the Rio Grande Valley*, 50. He noted on this same page that “The discussion [on this issue] may be found in the Proceedings of the International (Water) Boundary Commission, United States and Mexico, vol. 2, pp. 405-424.” These published International (Water) Boundary Commission proceedings were not collected in the course of JRP’s research.

⁷ At this time of his letter to Davis, Bixby was involved with the cooperative irrigation investigation sponsored by the US Department of Agriculture’s Office of Experiment Stations. His area of responsibility was New Mexico. See “Office of Experiment Stations,” in F.W. Roeding, *Irrigation in California*, Prepared under the Direction of Samuel Fortier, Chief of Irrigation Investigation, US Department of Agriculture, Office of Experiment Stations – Bulletin 237 (GPO, 1911), (2).

were sufficiently broad as to provide legal protections against groundwater development that could impair the appropriated supply. “This [the second question] is a matter which would be less easily proved,” Davis wrote:

Of course, the appropriation of the United States is for the entire flow of the river and the storage reservoir now under construction is, beyond question, of a magnitude to justify this blanket appropriation, as there would be wastewater in very few years. If wells were so located as to infringe on the supply of the river they would be an infringement of a Government right, but I suppose, as a matter of law, the burden of proof would be upon the United States and would be very difficult.⁸

The then-hypothetical situation notwithstanding, of greater concern to Reclamation authorities was a rising water table on the project as a result of irrigation and analyses of this problem pointed to the relationship between surface flow and subsurface waters identified by Slichter and Lee. An April 1915 “Board of Engineers” memorandum report offered the following observation: “Generally the water in the Rio Grande is but little below the adjacent lands on either side. This condition permits waters from the river being carried under the irrigable lands through more or less porous sand strata.” Application of irrigation water project lands, in the Mesilla Valley in particular, thus had the effect of bringing subsurface flow to the surface, so the engineers recommended construction of drainage works to manage the level of the water table.⁹

A February 1917 “Report on Mesilla & El Paso Valley Drainage, Rio Grande Project,” focused on “expediting the drainage work” endorsed by the April 1915 Board of Engineers, explicitly took note of Slichter and Lee’s findings:

These studies [i.e., by Slichter and Lee] indicated that little water comes into the valley from the side hills, that a movement of underground waters exists down the valley, that the river along certain stretches loses water, that only a small portion of the water proceeds under ground through the narrow valley west of El Paso, that the underground flow may continue from the lower end of the valley in a southwesterly direction away from the river under high mesa lands towards Mexico and that more probably the outflow

⁸ A. P. Davis, Chief Engineer, to Mr. F.L. Bixby, Irrigation Engineer, September 11, 1912. ff. 41-D, New Mexico, Water Appropriations, Rio Grande Project. 1911-1912, Box 9 41B- -41D, Entry 3, RG 115, NARA Denver.

⁹ Memorandum, From: Board of Engineers: E.H. Baldwin, Rio Grande Project Supervising Engineer; L.C. Hill, Consulting Engineer; D.W. Murphy, Engineer in charge of Drainage and L.M. Lawson, Project Manager, To: Reclamation Commission, Subject: Report on Drainage – Rio Grande Project, April 7, 1915. 2. Vol. 495, New Mex.-Texas, Rio Grande, Board of Engineers Report, ff. Rio Grande, 1904, Box 474, Box 474 Rio Grande (NM-TX), Entry 10 Project Histories, Feature Histories, and Reports 1902-32, RG 115, NARA Denver.

is largely disposed of through evaporation from ponds and wet soil surfaces within the valley itself.¹⁰

In connection with this drainage work, Reclamation engineers in 1917 and 1918 scrutinized ground-water levels, prepared water-table maps, and studied fluctuations in surface flow relative to drainage.¹¹

As discussed in my expert report (p. 70), at least one Reclamation engineer took note of the possible use of groundwater. In a June 1919 memorandum report on the water supply for the San Luis Valley in Colorado, the Middle Rio Grande Valley in New Mexico, and the Rio Grande Project in New Mexico and Texas, Harold Conkling specifically “consulted” the reports by Slichter and Lee, as well the various Reclamation drainage studies of the mid-to-late 1910s. He described a hydrologic dynamic involving irrigation water, return flows, and groundwater that other engineers would likewise observe in subsequent years. Return flow, according to the engineer,

consists of the transportation loss from canals and deep percolation from irrigated areas. In most projects these items are of considerable importance because they are lost to the project, but on the Rio Grande are comparatively unimportant if diversion is approximately as assumed, because of immediate rediversion by canal headings below. Deep percolation on the Rio Grande Project will maintain the ground water at such depth that the plant roots can take advantage of it and relieve, to some extent, the necessity of surface irrigation. On the other hand, if irrigation is lavish, it may raise the ground water so much that an unduly large amount will be wasted by surface evaporation from untilled areas.¹²

While stressing the “re-use of return flow by the acreage on the lower end” of the Rio Grande Project, Conkling suggested that the irrigable acreage within the basin could be expanded

¹⁰ “Report on Mesilla & El Paso Valley Drainage, Rio Grande Project, February, 1917, 2-3. ff. Report on Mesilla & Rio Paso Valley Drainage Feb 1917, Box 723 [Old box 512] Code 520 RG 14 through Code 550 RG 42, Project Reports, 1910-55, Engineering and Research Center, RG 115, NARA Denver.

¹¹ See L.R. Fiock, Ass’t Engineer, History of Drainage on the Rio Grande Project, To December 31st, 1918, Investigations, Plans and Estimates, Surveys and Construction, Chapter VI, Department of the Interior, United States Reclamation Service, Rio Grande Project – New Mexico, Texas, Annual History – 1918, in Department of the Interior, US Reclamation Service, Rio Grande Project, Texas New Mexico, Drainage. 530-18 RG, Box 723 [Old Box 512] Code 520 RG 14 through Code 550 RG 42, PR 1910-55, RG 115, NARA Denver; and L.R. Fiock, Assistant Engineer, Drainage Results on the Rio Grande Project to Oct. 1, 1919 (Oct. 1919). United States Bureau of Reclamation Library, Denver. See also C.S. Conover, *Ground-Water Conditions in the Rincon and Mesilla Valleys and Adjacent Areas in New Mexico*, Geological Survey Water-Supply Paper 1230, Prepared in cooperation with the Elephant Butte Irrigation District, United States Department of the Interior, Douglas McKay, Secretary, Geological Survey, W.E. Wrather, Director (United States Government Printing Office, 1954), 6, 53-54, and 69.

¹² Memorandum, From: Engineer Harold Conkling, To: Chief of Construction, Subject: Water Supply – Rio Grande River, June 18, 1919 [hereafter Conkling Memorandum, June 18, 1919], 99a and 111. ff. 302.31, New Mexico. Surveys and Investigations. THRU 1929, Box 262, Entry 7 RG 115, NARA Denver.

through groundwater pumping. He estimated that some 29,000 acres could be served with such waters – at a cost. “An additional draft of 70,000 acre feet annually,” the engineer pointed out, could be pumped but would significantly worsen two prior years of shortages “without adverse effect in other years.” Whether such expansion was advisable, Conkling left to the “attitude of the government toward the question of allowing such possible shortages.”¹³

As noted by Mr. Nikolai Kryloff in his expert report for the United States (pp. 30-31), D.C. Henny, a Reclamation engineer turned consulting engineer, in correspondence with Elephant Butte Irrigation District (EBID) president J.W. Taylor in January 1926 considered this very issue – and pointed out that groundwater development within Rio Grande Project lands above El Paso would materially affect surface flow. In December 1925, Taylor had contacted Henny to solicit his opinion “as to the inclusion of pumped mesa lands” to expand the project’s irrigated acreage. The consulting engineer believed that “pumped lands” could be added to the project without “affect[ing] the project water supply” either “by transfer of reservoir rights from less valuable valley lands to pumped lands” or “by pumping from underground water sources below [emphasis in original] El Paso.” “Pumping from underground source [sic] above El Paso,” Henny believed would

diminish practically to the same extent the flow reaching the International dam as would pumping from project canals. Pumping from such source below [emphasis in original] El Paso is equivalent to diversion from drains and will ultimately affect Hudspeth County lands only.

Henny ultimately dismissed the idea of adding “pumped lands” at all, including those “which will not affect the project water supply,” in his analysis of whether EBID and the other project irrigation district, El Paso County Water Improvement District #1, ought to consider expanding their collective irrigated acreage.¹⁴

New Mexico engineers undertook their own hydrological studies of surface flow and subsurface waters in lands below Elephant Butte in the 1910s, 1920s, and 1930s. In late October 1913, New Mexico State Engineer James French launched a “seepage investigation of the Rio Grande.” In this study four hydrographers measured “seepage gains and loss from the State Bridge, near Lobatos, Colorado, to El Paso, Texas.” The study ultimately “found [it] extremely difficult to draw conclusions below Elephant Butte and in view of the fact that the Elephant Butte dam will soon

¹³ Conkling Memorandum, June 18, 1919, 17-19. ff. 302.31, New Mexico. Surveys and Investigations. THRU 1929, Box 262, Entry 7 RG 115, NARA Denver

¹⁴ D.C. Henny to Mr. J.W. Taylor, President, Elephant Butte Irrigation District, January 9, 1926, 1-2. 19260109_NMSU-EBID_02-G_001_07.

control the flow to the New Mexico-Texas state line more attention was given to that part of the stream above this point.”¹⁵

New Mexico’s chief hydrographer E.L. Barrows and Middle Rio Grande Conservancy District (MRGCD) Designing Engineer R.G. Hosea in 1928, as noted in my expert report (p. 75), both considered this reach of the Rio Grande. Barrows’ investigation was made in late November 1928, and specifically concentrated on the river basin between Elephant Butte and Leasburg dams. Part of series of hydrographic studies of the Rio Grande under the supervision of then-New Mexico State Engineer Herbert Yeo, the resulting “Report of Seepage Study on Rio Grande Between Elephant Butte Dam and Leasburg Dam” was, in Barrows’ words, “the first...since completion of the drainage works [of the Rio Grande Project] and the stabilization of the river.”¹⁶ He aimed to learn more about “the actual gains or losses of the river below Elephant Butte Dam,” an outgrowth of “[a]n analysis of data available relative to the water supply and the use of water for irrigation purposes of the Rio Grande in New Mexico.” Barrows sought to test the notion “that there were large losses by seepage from the reservoir into the river and also that there was a large invisible inflow to the river from the tributaries having their source in the Black Range to the west of the valley.” To facilitate his study, irrigation releases from Elephant Butte were terminated for five days in November “in order to allow the flow [of irrigation water] to become stabilized and for the bank storage along the river to be depleted....” Barrows then made a series of measurements of flow in the river’s channel at seven points between Elephant Butte and Leasburg as well as “of all visible contributing flows between those points.” The hydrographer further computed areas of water surface, making several assumptions regarding area, and used “the average daily evaporation [rate] for November” to determine “the loss in stream flow by

¹⁵ Rio Grande Basin, Seepage Investigation of the Rio Grande, October 20 to 30, 1913, New Mexico, 1913, 81, excerpt included with E.L. Barrows, Chief Hydrographer, “Report of Seepage Study of Rio Grande Between Elephant Butte Dam and Leasburg Dam,” November 26-28, 1928. Folder 1405, Barrows, Report on Seepage Study of Rio Grande Between Elephant Butte Dam and Leasburg Dam, 1928, Box 54, State Engineer Reports: Rio Grande, Exps. 158-160, Nos. 1393-1416 [hereafter Box 54], New Mexico State Archives, Santa Fe [hereafter NMSA]. An online search of library collections indicated that this excerpt comes from James A. French, State Engineer, *Report on the Surface Water Supply of New Mexico, 1913* (Albuquerque: Albright & Anderson, Printers-Binders, 1913), available at <https://catalog.hathitrust.org/Record/012370302>, last accessed November 12, 2019. This official New Mexico State Engineer’s report was not collected in JRP’s research.

¹⁶ The “Graph Showing Invisible Gains and Losses of the Rio Grande, from Elephant Butte Dam to Leasburg Dam,” included with Barrows’ study identifies the hydrographer’s work as part of Yeo’s “Hydrographic Studies of the Rio Grande.” Barrows’ report was reproduced, uncredited to the chief hydrographer, as “Seepage Study on Rio Grande between Elephant Butte Dam and Leasburg Dam, November, 1928,” in Herbert W. Yeo, State Engineer, *Ninth Biennial Report of the State Engineer of New Mexico for the 17th and 18th Fiscal Years or From July 1st, 1928 to June 30th, 1930* (Santa Fe, New Mexico, 1930), 22-26. New Mexico Office of the State Engineer Library.

evaporation from the water surface....” Barrows prepared three tables which reflected his calculations and findings of “invisible” gains and losses in the Rio Grande channel, and “[a] graphical representation of the facts and resulting computations....” The hydrographer offered no clear conclusions in the text of his report, although both his tables and his graph appear to show that there were gains and losses in the stream at various points between Elephant Butte and Leasburg dams.¹⁷

Hosea’s December 1928 “Report on Irrigation in the Rio Grande Valley,” by contrast, offered a definitive statement as to the existence and influence of subsurface waters. Working not for the state but instead for MRGCD, his report was intended to provide New Mexico’s Rio Grande Valley Survey Commission “certain data...upon the status of the water rights and claims to water existing in the Rio Grande Basin.” “It was deemed essential,” Hosea wrote to the Commission in forwarding his report, that the “Commission be fully informed of the conflicting rights and claims to water, of the interstate phases of the situation, and of the menace to water supply for project constructed and proposed on the lower river by reason of progressively increasing depletion of the river by the State of Colorado.”¹⁸

As such, Hosea’s work had a broader focus than Barrows. Nonetheless, in a section of his report devoted to the “Water Requirement for Project Lands” – i.e., Rio Grande Project lands – Hosea examined river hydrographs and concluded that these did not “show evidence of an invisible underground flow tributary to the river.” This conclusion appears to have been based solely on his analysis of these hydrographs; there is no indication from his report that he embarked on any field investigation. According to Hosea,

it is apparent that when the reservoir is not releasing water during the winter months, the Ft. Quitman flow is just about equal to the total drainage water from the project. This drainage the farmers refuse to use in an undiluted condition, and consequently any underground flow that could come in would be shown by an excess in the Ft. Quitman record, over the total drainage return after taken account of river channel losses. Such an excess is not apparent.¹⁹

¹⁷ Barrows, “Report of Seepage Study on Rio Grande Between Elephant Butte Dam and Leasburg Dam,” np [1-5] and “Graph.” Folder 1405, Box 54, NMSA.

¹⁸ R.G. Hosea to The Rio Grande Valley Survey Commission, Albuquerque, New Mexico, December 1, 1928, in R.G. Hosea, “Report on Irrigation in the Rio Grande Valley,” State of New Mexico, The Rio Grande Valley Survey Commission, Albuquerque, New Mexico, December, 1928. Folder 3 Report on Irrigation in the Rio Grande Valley-R.G. Hosea-December 1928 [EBID Item #20], December 1928, Box 02-D.003, MS 0235 Elephant Butte Irrigation District Records, 1883-198 [hereafter MS 0235], Rio Grande Historical Collections [hereafter RGHC], New Mexico State University Archives and Special Collections [hereafter NMSU].

¹⁹ R.G. Hosea, “Report on Irrigation in the Rio Grande Valley,” 169. Folder 3 Report on Irrigation in the Rio Grande Valley-R.G. Hosea-December 1928 [EBID Item #20], December 1928, Box 02-D.003, MS 0235, RGHC, NMSU.

John Bliss's 1936 investigation, however, came to a different conclusion based on his own field work, as discussed in my expert report (pp. 75-78). Bliss, the technical advisor to New Mexico State Engineer Thomas McClure during the Rio Grande Compact negotiations of the 1930s, embarked on the study at the apparent suggestion of Rio Grande Project Superintendent L.R. Fiock. In his "Report on Investigation of Invisible Gains and Losses in the Channel of the Rio Grande from Elephant Butte to El Paso," presented to McClure in February 1936, Bliss acknowledged the previous work of Barrows and Hosea, but noted a paucity of "data" for the reach of the Rio Grande "below Elephant Butte Reservoir." The engineer identified from his study "a direct relation of seepage to ground water and irrigation": at certain critical points between Elephant Butte and El Paso, underflow fed the groundwater table, providing basin lands with additional water that was recovered by project drains and returned to the river channel for use on lands downstream. He proposed an additional investigation of "seepage during the non-irrigation period" so as to compare "against gains and losses found during the summer at a period when river and canal flows can be kept in a stable condition."²⁰

The historical record reviewed does not disclose evidence that either Bliss or another engineer with New Mexico undertook this proposed supplemental study in the 1930s. As noted in my expert report (p. 81), the federal Rio Grande Joint Investigation, which overlapped Bliss's investigation, focused largely on groundwater conditions in the San Luis Valley in Colorado and the "Middle Valley" of the Upper Rio Grande Basin in New Mexico. The investigation's resulting report, or *JIR*, was – as also noted in my expert report (pp. 21-22) – a critical source of information for the engineering advisors who crafted the technical basis for the Compact.²¹ According to the *JIR*'s "General Report" (Part I) a summary of the entire investigation, "no study of ground-water conditions in them [i.e., the Rincon, Mesilla, and El Paso valleys] was included in the Rio Grande Joint Investigation."²²

That same "General Report," however, noted the interconnection of irrigation water from the project, return water, and ground waters. It pointed out that lands in the Rincon, Mesilla, and El Paso valleys "comprise the Rio Grande Project, which is well provided with open drains that satisfactorily maintain ground-water levels at the depths below ground surface required to prevent waterlogging and seeping of the lands." Reclamation engineers since 1921, moreover, made "[p]eriodic measurements of the depth to ground water in 55 to 88 wells in Mesilla Valley" annually. "The observations were made and the results were used chiefly," according to the

²⁰ Bliss, "Report on Investigation of Invisible Gains and Losses," 1-2 and 12. Folder 1435, Box 55, NMSA.

²¹ Part I of the *JIR*, the "General Report," notably identified the "Ground water in the Middle Valley" as having several sources," including "seepage from canals" and "seepage from irrigated lands." National Resources Committee, *Regional Planning Part VI – The Rio Grande Joint Investigation in the Upper Rio Grande Basin in Colorado, New Mexico, and Texas 1936-1937* (GPO, 1938) [hereafter *JIR*], 59.

²² *JIR*, 62.

“General Report, “to derive the annual increment or decrement of ground water as a necessary factor in computing the annual consumptive use of water in the [Mesilla] valley by the inflow-outflow method.” The US Bureau of Agricultural Engineering (BAE) further used this “data...in its study of the consumptive use of water in Mesilla Valley.”²³

An early version of that data was in fact made available to Raymond Hill, the engineering advisor to Texas Rio Grande Compact commissioner Frank Clayton, in late 1936 prior to the release of the *JIR*. Hill, focusing on Table 21, which “was a calculation of consumptive use by means of the difference between the flow at Leasburg [Dam] and Courchesne [above El Paso] adjusted for changes in groundwater levels,” and an accompanying “graph showing depth to groundwater,” identified a “series of errors.” He proceeded to correct those errors and forwarded a new graph showing “the fluctuations in the groundwater level” to Harry Blaney, the engineer responsible for the BAE report.²⁴

Hill, moreover, was apparently aware of Conkling’s 1919 analysis that touched on groundwater within the Rio Grande Project. In his papers, deposited at the Briscoe Center for American History of the University of Texas at Austin, is an undated bound volume, “Extracts from Report of Harold Conkling to Chief of Construction, U.S. Reclamation Service on Water Supply of the Rio Grande River, Report dated June 18-1919.” On page 9 of this volume, Conkling’s observations about possible extension of irrigated lands within the project through groundwater development are reproduced. The Reclamation engineer’s analysis that “[d]eep percolation on the Rio Grande Project,” attributable to return flows, “will maintain the ground water at such depth that the plants roots can take advantage of it and relieve, to some extent, the necessity of surface irrigation” appears on page 34 of the volume.²⁵

The USGS senior geologist Kirby Bryan, in charge of the federal investigation’s study of groundwater conditions in the Upper Rio Grande Basin was similarly familiar with Slichter’s investigation. Although Bryan did not study the Mesilla Valley as part of the investigation, in Part II of the *JIR*, “Ground Water Resources: Report of the United States Geological Survey,” he nonetheless commented on groundwater conditions there, referencing Slichter’s work:

Mesilla Valley is almost closed at both ends, but is open to the sides. It seems from the somewhat meager information available that ground-water levels in Las Mesa are higher than the floor of the valley and that there must be a ground-water gain. Loss of ground

²³ *JIR*, 62.

²⁴ Raymond A. Hill to Mr. Harry Blaney, U.S. Department of Agriculture, November 5, 1936. ff. Elephant Butte-El Paso Dists. Other Official Agencies-Correspondence. G-352., Box 4X190, Raymond A. Hill Papers [hereafter RAHP], Briscoe Center for American History, University of Texas at Austin [hereafter UTA].

²⁵ “Extracts from Report of Harold Conkling to Chief of Construction, U.S. Reclamation Service on Water Supply of the Rio Grande River, Report dated June 18-1919,” 9 and 34. Box 4X213 & 4X231 & 4X231a, RAHP, UTA.

water in Mexico west of El Paso seems unlikely as the enclosed basins to the south appear, according to a reconnaissance by A.N. Sayre, of the United States Geological Survey, to have altitudes higher than the valley floor above El Paso. The gorge at El Paso has at least 86 feet of alluvium above bedrock and Slichter's measurements show that underflow is small.²⁶

Bryant also acknowledged Lee's 1907 study. He counted it among other several others "of the geology and geomorphology of New Mexico" made "over a long period by many observers."²⁷

Overall, as pointed out in my expert report (p. 82), the "General Report" made three critical observations for the entire Upper Rio Grande Basin that underscore the relationship between surface and subsurface waters as suggested by the work of Slichter, Lee, and Bliss:

- 1) "extensive development of ground water for irrigation would add no new water to the Upper Rio Grande Basin...";
- 2) "recharge of the ground-water basins would necessarily involve a draft on surface supplies which are now utilized otherwise"; and
- 3) "The chief element to be considered in such a development [of groundwater] would be the redistribution of the availability and use of present supplies and the resulting effect upon the water supply of lower major units [i.e., the Rio Grande Project and beyond to Ft. Quitman]"²⁸

The pioneering work of Bryan's supervisor C.V. Theis informed these observations.²⁹ In the early 1930s, after fieldwork in New Mexico and on the High Plains, Charles Vernon Theis – who earned a doctorate in Geology from the University of Cincinnati in 1929 – developed a formula, later known as the "Theis equation," that described groundwater flow and impact of groundwater

²⁶ *JIR*, 225.

²⁷ *JIR*, 197.

²⁸ *JIR*, 56. Prior to the meetings of the Committee of Engineering Advisors, the group that developed the technical basis for the Compact, in late 1937 Reclamation engineer E.B. Debler reportedly expressed concern for the impact of groundwater development on Colorado's deliveries to New Mexico to Hill. Debler, according to a November 11, 1937 letter from Hill to Texas compact commissioner Frank B. Clayton,

was...worried by the development of the sentiment in Colorado from pumping from the groundwater basin in lieu of storage reservoirs. If Colorado should elect to put in a number of wells and supplement their gravity supply with pumped water, the effect upon the flow of Rio Grande at Lobatos would be very adverse, especially in dry years.

Raymond A. Hill to Mr. Frank B. Clayton, November 16, 1937. [1937], Box 2F46, Rio Grande Compact Commission – Frank B. Clayton Papers [hereafter RGCC-FBCP], UTA.

²⁹ Bryan, a USGS senior geologist and associate professor of geology at Harvard University, carried out his study "under the direction of C.V. Theis...." *JIR*, 197.

pumping on aquifers. First published in 1935, and then again in 1938 and 1940, Theis' work, according to USGS hydrologists and Theis' biographers Robert R. White and Alfred Clebsch, "revolutionized the science of ground-water hydrology" and "provided a foundation for the application of well hydraulics to aquifer evaluation that would be used by hydrogeologists to come." By the 1940s, in White and Clebsch's estimation, his ideas had been "given wide distribution."³⁰

Those ideas can be seen in the observations of the "General Report." In the May 1940 version of his paper, published by the American Society of Civil Engineers, "The Source of Water Derived from Wells: Essential Factors Controlling the Response of an Aquifer to Development," Theis pointed out, in part, that "[a]ll water discharged by wells is balanced by a loss of water somewhere," and that "prior rights to the surface water may be injured" if wells drew on "natural discharge [that] fed surface streams."³¹

This was subsequently brought out for the Rincon and Mesilla valleys in New Mexico by USGS hydrologist Clyde S. Conover's investigation of potential groundwater development in the late 1940s. Struggling through a sustained period of drought, EBID approached the federal agency for such a study. Conover, whose supervisor was Theis, understood the district's need for this information as arising "from indications that the Rio Grande Project of the Bureau of Reclamation...would be seriously short of surface water supplies." The situation had become particularly dire as the 1947 irrigation season drew to a close, and the outlook for 1948 was "poor."³²

Conover's investigation was initiated in 1946, and in September 1947 he produced a "preliminary memorandum" as there was "imminence of some action regarding pumping," presumably on the district's part. The memorandum was forwarded to EBID manager John L. Gregg by Theis, in October 1947, and "officially approved for release...to the [New Mexico] State Engineer." A copy was also circulated to the USGS Chief Hydraulic Engineer. Whether the state engineer received

³⁰ Robert R. White and Alfred Clebsch, "C.V. Theis, The Man and His Contributions to Hydrogeology," in *Selected Contributions to Ground-Water Hydrology by C.V. Theis, and a Review of His Life and Work*, ed. Alfred Clebsch, United States Geological Survey Water-Supply Paper 2415 (GPO, 1994), 51 and 52. Bryan, in fact, used Theis' equation in his study. *JIR*, 237 and 254.

³¹ C.V. Theis, "The Source of Water Derived from Wells: Essential Factors Controlling the Response of an Aquifer to Development," United States Department of the Interior, Geological Survey, Water Resources Division, Ground Water Branch, Ground Water Notes, Hydraulics, No. 34 (December 1957), 10. This document is a reprint of the May 1940 paper.

³² Clyde S. Conover, U.S. Geological Survey, Preliminary memorandum on ground-water supplies for Elephant Butte Irrigation District, New Mexico, September 1947, 1. NM_00124167.

and reviewed Conover's work is unknown, although as the memorandum was produced in this litigation by New Mexico, it was likely found in OSE records.³³

The focus of the hydrologist's work was on "the possibilities of pumping ground water for irrigation, mainly from the standpoint of productiveness of wells and the effect of pumping upon the surface-water supply in the rivers and drains" within EBID. In his memorandum, Conover surveyed project operations, noting the reliance on return flows from the Rincon Valley ("discharged into the river above the Leasbury [sic] Dam") and from the Mesilla Valley ("discharged into the river below Mesilla Dam to be diverted for re-use in the El Paso Valley portion of the project and Mexico"). He also provided approximations of the "quantities involved in the present irrigation with surface water," before considering the "Ground-water conditions."³⁴

Regarding "present conditions in the Rincon and Mesilla Valleys," Conover observed – as had Slichter in 1904, Lee in 1907, and Bliss in 1936 – an inter-relationship between "surface" and "ground waters." The two types of waters were in "an approximate state of balance" in the two valleys, as he explained:

Surface water released from Caballo Dam [as part of Rio Grande Project operations] is diverted to the canals and irrigated land mainly from April through August of each year. The part that is not lost by transportation and evaporation seeps underground from the canals and irrigated lands to return to the river as drain flow which is re-used in lower divisions of the Project. A large part of the drain water is return seepage from the surface-water supply, mainly from the canals and irrigation lands but in part directly from the river. A small part of the drain flow is ground water from the higher mesa lands that border the valleys. Because of the drains, the amount of ground water in storage each year at the beginning of the irrigation season is approximately constant, small variations from year to year occurring as a result of the varying amounts and time of application of irrigation water to the lands in the preceding year and to the condition of the drains. The low flow of the drains occurs approximately a month later than the minimum diversion, and the maximum flow of the drains usually occurs in the same month as the maximum diversions.³⁵

Groundwater development within the two valleys since completion of Elephant Butte Dam in 1916 was modest. Conover observed that as of 1946 there were only 10 irrigation wells in the Rincon Valley, "about 13 wells...on the alluvial fans of the arroyos west of the valley," and "[v]ery few...in operation at present in the Mesilla Valley." The Rio Grande Project itself had seemingly

³³ Conover, Preliminary memorandum, 1. NM_00124167; and Chas. V. Theis, District Geologist, to Mr. John L. Gregg, Manager, Elephant Butte Irrigation District, October 23, 1947, attached to Conover, Preliminary memorandum. NM_00124166.

³⁴ Conover, Preliminary memorandum, 1-3, and 7. NM_00124167-NM_00124169, and NM_00124173.

³⁵ Conover, Preliminary memorandum, 8. NM_00124174.

forestalled ground water extraction, according to the hydrologist: “A number of irrigation wells were in operation in the early 1900’s but were abandoned after a water supply was assured by Elephant Butte Dam.” The anticipated shortfall in project water deliveries in 1948 had prompted some drilling of wells in the Mesilla Valley, but as of Conover’s preliminary memorandum, no pumps had been connected to these wells.³⁶

Assessing “the coefficient of transmissibility and the storage coefficient” permitted Conover to draw several conclusions regarding “the amount of flow of underground water and the long-term effects of pumping.”³⁷ The most notable of these was the anticipated impact on the Rio Grande Project water supply, given the nature of project water delivery operations and the then-static relationship between surface flows and groundwater in EBID. The hydrologist, acknowledging that groundwater pumping resulted “in lowering of the water table, at first in the vicinity of the well but as times goes on at greater and greater distances from the well,” pointed out

All water pumped from wells is balanced by a loss of water from somewhere else in the ground-water system, either from the amount stored underground, from the amount seeping out of the aquifer, or, less commonly in arid countries, from the amount of surface water that the system is unable to absorb (rejects) because the aquifer is overfull under non-pumping conditions. Places of ground-water discharge in the Rincon and Mesilla Valleys are the drainage ditches, where lowering of the water table would result in a decrease in the pickup of the drains, and the relatively small areas of waterlogged land where a lowering of the water table would decrease the evaporation and transpiration now taking place. Areas of rejected recharge are sections of the river where the water level in the river is above and in direct contact with the ground water. A lowering of the water table in such areas induces a larger amount of water to seep away from the river.

The increased seepage from the river to the aquifer and the decreased drain-flow resulting from the effects of pumping would not make more water available to the Project as a whole but instead would divert to the pumps water that would otherwise be available as surface supply lower down the valley.³⁸

Put another way, as Conover did after making several calculations,

³⁶ Conover, Preliminary memorandum, 9. NM_00124174.

³⁷ Conover determined the “coefficient of transmissibility...from pumping tests on wells, and from the correlation of slopes of the water table to various drains with the flow of the drains.” The “storage coefficient” was “approximately equal to the specific yield under water-table conditions,” but the “specific yield of an aquifer...[was] difficult to determine accurately, either in the field or the laboratory.” Using “[d]eterminations of the specific yield in other localities of unconsolidated alluvial fill” – much like was found in the Rincon and Mesilla valleys – Conover estimated the specific yield at “probably about 25 percent.” See Conover, Preliminary memorandum, 11-12. NM_00124177- NM_00124178.

³⁸ Conover, Preliminary memorandum, 12-13. NM_00124178-NM00124179.

Little net water can be gained to the Rio Grande Project as a whole by pumping ground water in the Elephant Butte District and the total amount of water received by the Elephant Butte District under a pumping system is practically no more than would have been obtained from surface supplies, if the customary interest of the El Paso District [i.e., El Paso County Water Improvement District No. 1, or EP #1] is preserved. The reason for this is, of course, that the drain water is used again in the Project and the District would be physically responsible for any decrease of the flow of the drains resulting from pumping.³⁹

This issue extended beyond the legal boundaries of EBID, as the hydrologist further argued:

Pumping of ground water in the [Mesilla] valley by individual farmers would of course have the same effect upon the flow of the drains as would pumping by Elephant Butte Irrigation District. Any water pumped on the land that does not return to the ground-water body would be water lost to the Project, even though a gain of water might accrue to an individual farm.⁴⁰

Conover thus foresaw the Project water supply for lands downstream from EBID as being compromised by pumping, even as EBID or other lands in New Mexico benefitted. Although he conceded that pumping could retain water otherwise “now lost by evapo-transpiration in the waterlogged areas” with “an actual increase in water supply for beneficial use in the project,” Conover was skeptical of the utility of this as “the amount of water saved would be very small.”⁴¹

The hydrologist similarly acknowledged new land could be brought into production by groundwater pumping, but not without diminishing return flow captured by drains. Conover estimated that “about 15,000 acres” within the district and not currently served and outside the district “might eventually be irrigated from ground water....” Much of this acreage was “on the high ground along the edges of the valley” where the impact to drain and river flows would be minimal. “However,” he cautioned,

as all the ground water in the valleys and mesas is connected and contributes to the drains, any pumping must eventually mean a decrease in the drain-flow, in the long run equal to the amount that had been pumped, less any small amount saved by reduction of evapo-transpiration losses.⁴²

At the end of his memorandum, Conover distilled his then-findings into 14 conclusions. Conclusions 3, 4, 5, 6, 7, 13, and 14 all underscored the inter-related nature of surface flow and subsurface waters within the Mesilla Valley:

³⁹ Conover, Preliminary memorandum, 20-21. NM_00124186-NM00124187.

⁴⁰ Conover, Preliminary memorandum, 24. NM_00124190.

⁴¹ Conover, Preliminary memorandum, 13. NM_00124179.

⁴² Conover, Preliminary memorandum, 25. NM_00124191.

3. Pumping of ground water would divert water from the drains and the river. The drains would be dried the first summer if enough pumps were installed to furnish an adequate water supply for all lands in a dry year.
4. On a long-term basis all water removed from storage must be replaced before the drain system returns to normal.
5. If water diverted from the drains were made up to the lower district [i.e., EP #1] by additional releases from the dams [i.e. Elephant Butte and Caballo], a corresponding reduction in the diversions to the Elephant Butte Irrigation District would be necessary.
6. As there is no unused ground-water recharge, and very little unused ground-water discharge, only a small amount of water can be salvaged to the Rio Grande Project as a whole over a period of years by pumping in the Elephant Butte District [.]
7. Assuming that the El Paso Division [i.e., EP #1] continues to get diversion in the same proportion to reservoir releases as in the past, pumping of ground water will not result in any additional water for the District [i.e., EBID] on a year-to-year basis unless the amount of pumping exceeds the amount of the diverted drain flow, thus pumping from storage.
13. Pumping of ground water on individual farms would ultimately reduce the water supply of the Rio Grande Project. If such a reduction were borne by the Elephant Butte Irrigation District, deliveries of surface water to farms with pumps might be reduced in order to maintain the expected deliveries to farms without pumps.
14. About 15,000 acres of presently undeveloped land and suspended land could be irrigated by ground water. Water pumped to these lands will, in a few years, reduce the water available to the existing irrigated lands by a nearly like amount.⁴³

Seven years later, the USGS released the final report of Conover's investigation in 1954 as USGS Water-Supply Paper 1230, *Ground-Water Conditions in the Rincon and Mesilla Valleys and Adjacent Areas in New Mexico* (WSP 1230).⁴⁴ Whereas the 1947 preliminary memorandum was an interim set of findings, WSP 1230 presented the full results of the hydrologist's work into 1948, and included numerous illustrations and tables. Conover also noted in WSP 1230 the prior work that informed his conclusions. He specifically cited Slichter and Lee's reports, and noted the drainage work undertaken by federal reclamation authorities in the mid-to-late 1910s. Conover characterized the work of the JIR with regard to "groundwater conditions in the Mesilla Valley" as "casual," but took note of Bryant's comments on "ground-water levels" and the "flow of ground water" in Mesilla Valley. He further used federal reclamation studies of drainage from

⁴³ Conover, Preliminary memorandum, 26-27. NM_00124192-NM_00124193.

⁴⁴ Prior to the publication of WSP 1230, an "open-file report" was produced in 1950: Open-File Report 50-66 (OFR 50-66). Open-file reports are internal agency drafts, subject to revision. It is possible that Conover's 1947 preliminary memorandum became OFR 50-66, or that it served as the basis for a slightly different document. Searches of the online USGS Publications Warehouse (<https://pubs.er.usgs.gov/>), a digital library of most USGS publications identified the existence of OFR 50-66 – but JRP was unable to obtain a copy. The link to the report instead directs to WSP 1230, which superseded OFR 50-66.

1917 and 1918 along with Bliss's unpublished 1936 work to analyze surface flow and assess the contributions of "Seepage from the Rio Grande."⁴⁵

WSP 1230 was thus a more thoroughly researched and considered work than the 1947 preliminary memorandum, but the conclusions were substantially the same. Conover provided a greater historical perspective on "previous" and "present development" of ground water in the Rincon and Mesilla valleys. Drawing Slichter's work, he pointed out

[t]he variable nature of the flow of the Rio Grande in the years prior to construction of Elephant Butte Dam caused much crop loss and inducted a number of farmers to install irrigation wells in order to have a dependable water supply.⁴⁶

These "older wells were of small capacity," and were limited in their ability to extract subsurface waters by "well construction and equipment." By the time the hydrologist embarked on his investigation in the late 1940s, "[t]he principal use of ground water in the Rincon and Mesilla Valleys...[was] for domestic purposes."⁴⁷

Drilling of irrigation wells, however, increased in 1947 and 1948. According to Conover, "at the end of 1946 about 11 irrigation wells were in operation in the Rincon and Mesilla Valley, 5 of which had been in operation for a number of years." Within a year, approximately 45 more wells had been drilled, and by February 1948, nearly 70 wells.⁴⁸

Much as the earlier studies by Slichter, Lee, and Bliss had indicated, Conover's first conclusion offered in his "Summary" was

The ground water in the valley fill originates mainly from surface water, that is, from seepage of the canals and the river, and from excess water applied to irrigated lands, but partly from ground water from the adjoining high lands, and, occasionally, from precipitation upon the valley floor.⁴⁹

Conclusions 5, 6, 7, 8, 9, 15, and 17, moreover, were nearly identical to conclusions 3, 4, 5, 6, 7, 13, and 14 presented in 1947:

5. Pumping of ground water will divert water from the drains and the river. The drains may practically stop flowing by the end of the first summer in a dry year if enough pumps are installed to furnish an adequate water supply for all lands.

⁴⁵ Conover, *Ground-Water Conditions*, 5-6, 39, 69, and 71. See also footnote 8 regarding the federal drainage studies and footnote 14 regarding Bryant's contribution to the *JIR*. Conover acknowledged that, "[v]ery few seepages runs have been made on the Rio Grande below Elephant Butte" prior to his work (p. 69); the federal studies and Bliss's were the only ones he noted.

⁴⁶ Conover, *Ground-Water Conditions*, 103.

⁴⁷ Conover, *Ground-Water Conditions*, 105.

⁴⁸ Conover, *Ground-Water Conditions*, 107.

⁴⁹ Conover, *Ground-Water Conditions*, 133.

6. If an increase portion of releases from the reservoir were made up to the lower district as compensation for the reduction in flow of the drains, caused by pumping in the Rincon and Mesilla Valleys, a corresponding reduction in the diversions to the Elephant Butte Irrigation District would be necessary.
7. As no unused ground-water recharge escapes from the project, and there is very little unused ground-water discharge, only a small amount of water can be salvaged to the Rio Grande project as a whole over a period of years by pumping in the Elephant Butte district.
8. Assuming that the El Paso division [i.e., EP #1] continues to get diversions in the same proportion of reservoir releases as in the past, pumping of ground water will not result in any additional water for the Elephant Butte Irrigation District on a year-to-year basis unless the amount of pumping exceeds the amount of the diverted drain flow, when this excess will come from storage.
9. On a long-term basis nearly all water removed from storage must be replaced before the flow of the drains returns to normal....
15. Pumping of ground water on individual farms in years of deficient gravity water supply would ultimately reduce the water supply of the Rio Grande project. If such a reduction were born by the Elephant Butte Irrigation District, it would be necessary to reduce deliveries of surface water to farms with pumps in order to maintain the expected deliveries to farms without pumps....
17. About 15,000 acres of now undeveloped land and suspended land could be irrigated by ground water. Water pumped on these lands will, in a few years, reduce the water available to the existing lands by an amount equal to the consumptive use by the lands and crops irrigated.⁵⁰

Most importantly, Conover retained his negative assessment of groundwater pumping in EBID on the Rio Grande Project water supply, particularly to lands in Texas. As he stated succinctly in the opening abstract to his 200-page report, “Ground water obtained by pumping in the Rincon and Mesilla Valleys does not represent an additional supply or new source of water to the project, but rather a change of method, time, and place of diversion of the supplies already available.” Expressed more fully towards the end of the report,

...water pumped by wells in the Rincon and Mesilla Valleys is not an additional or new supply but, instead, is water that would normally flow to the drains and be diverted for use in a lower part of the project. Pumping of ground water, therefore, is essentially a change in point of diversion of an existing supply. In times of normal or adequate supply of surface water to the project, pumping obtains water that would otherwise be available by gravity. In a year of surface-water shortage, pumping results in an adequate supply of water to those farmers having pumps but may reduce the amount of surface water available for diversion in the lower part of the district or project. Pumping water from

⁵⁰ Conover, *Ground-Water Conditions*, 133-135.

wells upon new lands, either in or bordering the valleys, will result in reducing to some extent the supply of water to the project.⁵¹

Groundwater development in the Rincon and Mesilla valleys thus came at a cost to the project's water supply, in Conover's analysis.

Conover's concerns, first expressed in 1947, were borne out even before the results of his investigation were finalized in 1954. A July 1952 Reclamation study of "river loss" on the project between Caballo Dam and El Paso, noted groundwater pumping was already having a negative impact the river's flow, imperiling the project water supply. Examining "available records and data for the six year period 1946-51," this study found "an increase in loss from the river between Caballo Dam and El Paso for 1951 compared to the previous five years." In fact, the "loss during 1951...[was] about twice the average for the period 1946-50." Groundwater pumping, coupled with unseasonably high temperatures, was to blame, in the Reclamation analysis:

The indicated increase in river loss during 1951 over the period 1946-50 probably reflects the effects of (a) increased irrigation pumping; (b) increase in evaporation in river channel, due to unusually high summer temperatures and below average precipitation during 1951; (c) reduced accretion to river in those segments where in the past the river may have been effluent or gaining; (d) decreasing ground-water elevation during 1951, which was 1.2 feet lower than the previous five years' average. The rate of decline of the ground-water per year for 1950-51 was over seven times that for any two years during 1946-50, as evidence by reading from 38 test wells in the Mesilla Valley. The major factor is undoubtedly the increased irrigation pumping resulting from the shortage in the water supply of the Project.

Drain flows, upon which lands lower on the project relied, were similarly diminished but were perhaps

prevented from showing a larger decrease by appreciable interception of seepage from the river. This, coupled with the fact seepage loss from the distribution system continued high and to possibility that pumping may have temporarily created a suspended water table, may account for drain return maintaining a ratio to releases and diversion nearly the same in 1951 as the previous five years.

This was not expected to continue, with both losses to the river and the drains anticipated to worsen in the upcoming irrigation season and beyond:

A further increase in loss may occur from the river in 1951, since 53 new irrigation wells were installed up to May 1, 1952. Pumping from all wells will commence at an earlier date, since all wells installed during 1951 were put down throughout the year, and not available at start of irrigation season. Also a decrease in drain discharge would be expected under the foregoing conditions.

⁵¹ Conover, *Ground-Water Conditions*, 2 and 132.

Furthermore,

under the conditions of a continually dropping water table with resulting decrease in drain flows, the losses from the river instead of being recovered in part by the drains will be principally recharge to the subsurface water table.

At such time as drain flows would cease, with no consequent recovery of river seepage for return to the river, a major problem of water distribution on the Project will exist. The present trend of increasing loss from the river, if continued, will require a change in water distribution policy in order that all divisions of the Project receive their proportionate share of storage water.⁵²

The Reclamation study acknowledged that these “conclusions” were made in part from “many estimated wasteway records, the accuracy of which is questionable.” However, it pointed to “the actual river operation” as “[f]urther proof”: “more storage release was required in 1951 to obtain required flows at diversion points than was necessary during the normal period 1946-50.”⁵³

As for the irrigation wells themselves, the Reclamation study tallied a greater number within the Rincon and Mesilla valleys than in the El Paso Valley. Of the nearly 900 wells within the Rio Grande Project as of December 31, 1951, 170 were in the Rincon Valley, 535 were in the Mesilla Valley, and 188 in the El Paso Valley. Collectively, the Rincon and Mesilla wells had extracted an estimated 95,390 acre-feet (af) of water as opposed to 33,275 af by the El Paso wells in 1951 – a little less than three times as much water. Reclamation concluded that because of pumping nearly 30,000 af “was diverted directly from the river between April 1, 1951 and December 31, 1951, between Caballo Dam and El Paso” – approximately “31 percent of the estimated total water pumped from wells.” “This pumping,” moreover, “further diverted water from the drains; and assuming none of these dried up, the river and drains were effected by at least 76,630 acre-feet diverted from them during the same period and for the same river reach,” and consequently diminishing the overall supply to project lands.⁵⁴

Circulation of this study, WSP 1230, or any of the other studies discussed above, cannot be known for certain. While federal reclamation engineers would have had access to internal drainage investigations, river loss studies, and published USGS work, including Theis’ pioneering hydrogeological study, New Mexico materials – Bliss’s unpublished investigation, in particular – may not have been as available prior to Conover’s investigation. Similarly, New Mexico engineers could more readily obtain published USGS studies and previous work out of the State Engineer’s

⁵² United States, Department of the Interior, Bureau of Reclamation, Rio Grande Project – New Mexico-Texas, River Loss, Caballo Dam to El Paso and Irrigation Wells, El Paso, Texas, July 1, 1952, Summary, Part I, A. NM_00138516.

⁵³ Rio Grande Project – New Mexico-Texas, River Loss, Summary, Part I, B. NM_00138517.

⁵⁴ Rio Grande Project – New Mexico-Texas, River Loss, Summary, Part II, B and C. NM_00138517-NM_00138518.

office than they could internal federal reclamation reports from the early 1910s. Yet, setting aside the New Mexico 1913 seepage study, which predated completion of Elephant Butte Reservoir did not scrutinize lands below the dam; Barrows' November 1928 investigation, which only studied the reach of the Rio Grande between Elephant Butte and Leasburg dams; and Hosea's 1928 examination of available river hydrographs, with no apparent fieldwork, federal and state investigations appear to point to an inter-relationship between surface flow and groundwater in the Rincon and Mesilla valleys in New Mexico, prior to the project and Compact and following the Compact. The published USGS reports in 1905, 1907, and 1954 examined this hydrological phenomenon, and WSP 1230 elaborated on and confirmed the findings of Conover's 1947 "preliminary memorandum" that was provided to EBID and likely OSE.

Later actions by New Mexico State Engineer S.E. Reynolds suggest that he came to accept these findings over time, whether he examined Conover's work or any other study. In the mid-1950s, Reynolds recognized a connection between surface flow and subsurface waters in the lands above Elephant Butte in the "Middle Valley" between the Colorado-New Mexico state line and the federal reservoir. Two years after publication of WSP 1230, in 1956, citing a "scientific investigation" of the issue, the state engineer declared an "underground water basin," the "Rio Grande Underground Water Basin" for the Middle Valley. In making this declaration, he noted that "the waters of said basin are interrelated with the flow of the Rio Grande Stream System, so that such underground waters are a substantial source of the flow of said stream system," and that "the waters of the Rio Grande Stream System are fully appropriated."⁵⁵

Twelve years later, Reynolds reiterated his understanding of the relationship between surface flow and "ground water" in the Upper Rio Grande Basin. In "The Rio Grande Compact," a paper prepared in April 1968 for a symposium on "International Water Law Along the Mexican-American Border," held at the University of Texas at El Paso.⁵⁶ Reynolds' remarks, made in the context of a dispute over the waters of the Rio Grande between Colorado on the one hand and

⁵⁵ S.E. Reynolds, State Engineer, Order Declaring the Rio Grande Underground Water Basin, November 29, 1956. ff. 245 Public Works Committee, Middle Rio Grande River - Elephant Butte Dam. 1957-58, 85th Cong, Box 6, Serial No. 6401. File 235-245, 246-254, 255-257, John Dempsey Papers, NMSA.

⁵⁶ The copy of Reynolds' paper collected by JRP came from the State Engineer's records deposited at the New Mexico State Archives and Records Center, as cited below. Subsequent research revealed that the paper had been given at this symposium and published by the University of Texas at El Paso as well as the Southwestern and Rocky Mountain Division of the American Association for The Advancement of Science. See S.E. Reynolds, State Engineer, State of New Mexico, "The Rio Grande Compact," in Clark S. Knowlton, ed., *International Water Law Along the Mexican-American Border*, Contribution No. 11 of The Committee on Desert and Arid Zones Research, Southwestern and Rocky Mountain Division, A.A.A.S. (El Paso: University of Texas, 1968): 48-62.

New Mexico and Texas on the other, acknowledged that the Compact “makes no specific reference to ground water.” “However,” the state engineer went on,

the inflow-outflow mechanism for determining delivery obligations makes the control of ground water appropriations in the upstream states essential for the protection of existing surface water rights in these states and the preservation of their ability to meet the compact commitments.

Surface waters and ground water in the Rio Grande Valley are intimately related. At some points, the surface flow feeds the ground water reservoirs and, at other points, the ground water reservoirs discharge into the stream. Along the mainstem of the river, the situation is one in which groundwater discharge contributes to surface flow.⁵⁷

Pointing out that “[a]nnual ground water accretions to the river’s mainstem in the reach between the Colorado line and Elephant Butte Reservoir amounts to 200,000 to 300,000 acre-feet,” Reynolds justified his decision to establish an underground water basin above the reservoir to safeguard the supply of water to the reservoir:

Heavy, sustained pumping from the groundwater reservoir would cut off this accretion and ultimately would reverse the water table gradient so that the water now flowing into the stream and constructed drains would disappear into the groundwater reservoir. These hydrologic facts of life, couple with imminent large-scale developments of groundwater for agricultural and municipal and industrial uses in New Mexico above Elephant Butte led the State Engineer in 1956 to assume jurisdiction over appropriations of ground water in the Rio Grande Valley along the river’s mainstem and lower reaches of its tributaries by proclaiming the boundaries of an underground water basin which extends from the Colorado line to Elephant Butte Dam. The action was taken, both to protect the existing water rights in New Mexico and to preserve the state’s ability to meet its compact obligations.⁵⁸

The state engineer did not declare a similar underground basin for lands below Elephant Butte until 1980. After the City of El Paso sought to appropriate groundwater from the Mesilla and Hueco bolsons in New Mexico, he established the Lower Rio Grande Underground Water Basin for the former and the Hueco Underground Water Basin for the latter. El Paso made filings for more than 350 wells in the two basins, and Reynolds denied the applications based on New Mexico’s prohibition of the export of groundwater out of the state.⁵⁹

⁵⁷ S.E. Reynolds, State Engineer, The Rio Grande Compact (April 29, 1968), 20-21. Folder 2062, Reynolds, The Rio Grande Compact, April 29, 1968, Box 78, Exps. 231-233, Nos. 2016-2085, State Engineer Reports: Basic/Rio Grande, NMSA.

⁵⁸ Reynolds, The Rio Grande Compact, 21. Folder 2062, Box 78, State Engineer, NMSA.

⁵⁹ Ira G. Clark, *Water in New Mexico: A History of Its Management and Use* (Albuquerque: University of New Mexico Press, 1987), 675.

This denial brought to a boil a simmering legal dispute in US District Court, *City of El Paso v. Reynolds*, in which Reynolds as New Mexico State Engineer defended in his action in part on the Compact and on the hydrological connections between surface flow and groundwater.⁶⁰ Presiding judge Howard C. Bratton ultimately ruled in favor of El Paso. According to Bratton's decision in January 1983, the state engineer's arguments were predicted upon

three factual assertions: (1) all of the waters in which El Paso has asserted an interest [i.e., the water within the two bolsons] are Rio Grande waters; (2) the Rio Grande Compact apportions the surface waters of the Rio Grande between the states of New Mexico and Texas and controls the use of hydrologically related ground water; and (3) any taking of ground water is ultimately fully reflected in the flow of the river.

Bratton dismissed these contentions as “labyrinthine,” citing in part the history of the Compact prepared by New Mexico historian Myra Ellen Jenkins for the case, Raymond Hill's *Development of the Rio Grande Compact of 1938*, and statements made at Rio Grande Compact Commission proceedings. He was further critical of the fact that both Reynolds and New Mexico had previously denied the Compact apportioned water to Texas, and that the former only changed his position, articulated in 1956, with El Paso's lawsuit.⁶¹

⁶⁰ As Clark notes, El Paso had filed suit prior to Reynolds' declaration of the two basins and ahead of its filings for groundwater in September 1980. Clark, *Water in New Mexico*, 675 and 676.

⁶¹ United States District Court for the District of New Mexico, *The City of El Paso*, By and Through Its Public Service Board, Ray Pearson, Carlton C. Homan, Jr., Louie Giallanza, Clinton E. Wolf, and Thomas D. Westfall, Plaintiffs, v. S. E. Reynolds, individually and as State Engineer of New Mexico, Jeff Bingaman, individually and as Attorney General of New Mexico, Lalo Garza, individually and as New Mexico District Attorney for Dona Ana County, Defendants, *Elephant Butte Irrigation District, The City of Las Cruces, New Mexico, and Stahmann Farms, Inc.*, Defendant-Intervenors, Civ. No. 80-730 HB, January 17, 1983. 563 F. Supp. 379, 383 and 385-387; 1983 U.S. Dist. LEXIS 19988, 9 and 19-24; 13 ELR 20755. Provided by Somach Simmons & Dunn.

Notably for the original action at hand, Bratton also opined,

Contrary to defendants' contention, a decision that the Compact does not apportion the river below Elephant Butte does not mean that New Mexico, having made its delivery, could undermine it by pumping down the surface flow of the river below the point of delivery. This opinion does not address that issue at all.

City of El Paso v. Reynolds, Civ. No. 80-730 HB, 563 F. Supp. 387; 1983 U.S. Dist. LEXIS 19988, 26; 13 ELR 20755.

Following Bratton's decision, the New Mexico legislature repealed the export ban and introduced a new statute that made out-of-state water transfers possible. Such applications required a permit from the state engineer who was required to consider several factors including present water right holders and New Mexico's commitment to water conservation. The State of New Mexico subsequently filed an appeal to the United States Tenth Circuit Court of Appeals, arguing that the new law rendered the issue moot. Clark, *Water in New Mexico*, 678-680.

Reynolds' shifting views, however, may be less indicative of a legal strategy and more indicative that by the 1980s the state engineer had come (or was coming) to recognize what Slichter, Lee, Bliss, and Conover had found for the Rincon and Mesilla valleys earlier in the century and which he himself had acknowledged to be the "hydrologic facts of life" for the Upper Rio Grande Basin above Elephant Butte in 1956: that surface flow and groundwater were hydrologically connected. In 1982, OSE produced a brief paper, entitled "Rio Grande, Elephant Butte Dam to El Paso, Texas," that summarized the result of "[a] study of streamflow depletion in the Rio Grande Valley between Elephant Butte Dam and El Paso, Texas," plotted on four figures.⁶² Figure 1, a double

In late 1983, the appeals court vacated Bratton's ruling and remanded the case back to the lower court for reconsideration. New Mexico in February 1984, in Bratton's later words, "enacted a two year moratorium on new appropriations of groundwater hydrologically connected to the Rio Grande below Elephant Butte." The US district judge once again found for El Paso in August 1984, deciding that the moratorium violated the Interstate Commerce Clause and reaffirming his prior ruling. The legal battle dragged until 1989 when the US Court of Appeals for the District of Columbia Circuit ruled that no live controversy remained. United States District Court for the District of New Mexico, *Ray Pearson, Carlton C. Homan, Jr., Louie Giallanza, Clinton E. Wolf, and Thomas D. Westfall*, Plaintiffs, v. *S. E. Reynolds*, individually and as State Engineer of New Mexico, *Paul Bardacke*, individually and as Attorney General of New Mexico, *Lalo Garza*, individually and as New Mexico District Attorney for Dona Ana County, Defendants, *Elephant Butte Irrigation District, The City of Las Cruces, New Mexico, and Stahmann Farms, Inc.*, Defendant-Intervenors, Civ. No. 80-730 HB, August 3, 1984. 597 F. Supp. 694; 1894 U.S. Dist. LEXIS 24568; 15 ELR 20259; United States District Court for the District of New Mexico, *Ray Pearson, Carlton C. Homan, Jr., Louie Giallanza, Clinton E. Wolf, and Thomas D. Westfall*, Plaintiffs, v. *S. E. Reynolds*, individually and as State Engineer of New Mexico, *Paul Bardacke*, individually and as Attorney General of New Mexico, *Lalo Garza*, individually and as New Mexico District Attorney for Dona Ana County, Defendants, *Elephant Butte Irrigation District, The City of Las Cruces, New Mexico, and Stahmann Farms, Inc.*, Defendant-Intervenors, Civ. No. 80-730 HB, August 17, 1984. 1984 U.S. Dist. LEXIS 24276; and United States Court of Appeals for the District of Columbia Circuit, *In re Applications of El Paso*, No. 88-5357, September 22, 1989, Argued; October 20, 1989, Decided. 887 F. 2d 1103; 1989 U.S. App. LEXIS 15897; 281 U.S. App. D.C. 112; 15 Fed. R. Serv. 3d (Callaghan) 22. Provided by Somach Simmons & Dunn.

⁶² The paper discussed below, for which an author is unidentified, was collected from the Joseph F. Friedkin Papers (MSS 555), deposited at the C. L. Sonnichsen Special Collections Department, University of Texas, El Paso (UTEP), University Library. The Friedkin Papers consist of correspondence, memoranda, studies and reports, and other historical materials previously maintained and in the possession of Joseph F. Friedkin, head of the US Section of the IBWC from 1962 to 1986. The commission is an international bilateral organization with representatives and technical staff from the US and Mexico, charged with overseeing the various boundary and water treaties between the two countries, particularly with regard to the Rio Grande. Assuring the delivery of 60,000 acre-feet of water from the Rio Grande annually to Mexico in accordance with the Convention of 1906 is a central responsibility of the IBWC.

At the time of JRP's research, the Friedkin Papers were only partially described and organized to archival standards. From an "initial inventory" of the collection (developed by special collections staff), I identified relevant boxes and folders. The document in question was located in box 1, folder 11 – a folder described in the "initial inventory" as "Correspondence and data concerning Mesilla Valley pumping, 1982." "Rio Grande, Elephant Butte Dam to El Paso, Texas" was included with a group of three other documents in the folder dating to July 1985. Of these other documents, a July 15, 1985 memorandum to

mass diagram, charted “the relationship between the flow of the Rio Grande below Elephant Butte Dam and the flow of the Rio Grande at El Paso, Texas, since storage began in Elephant Butte in 1915,” across three periods of time. The paper took special note of the third period, which began in 1951, “the start of the period of lowest water supply available from Elephant Butte Reservoir” and coincided with “extensive groundwater development...undertaken to offset shortages to Rio Grande Project lands.” Echoing the findings of the July 1952 Reclamation study of “river loss” between Caballo Dam and El Paso, the paper stated, “This groundwater development has changed the flow regime established prior to 1951 such that a greater release is required from Elephant Butte Reservoir to achieve the same flow at El Paso.”⁶³

The three other figures demonstrated much the same. “The effects of the drought of the 1950’s and increased groundwater development...[was] clearly evident” in Figure 2, a double mass diagram focused on the reach of the Rio Grande between Caballo Dam and El Paso:

Friedkin from Thomas P. Wootton, Chief, Special Studies Branch of the IBWC, routed through George R. Baumli, PE, Inv. & Planning Division, with the subject “Effects of Pumping on Rio Grande Flows,” clearly identifies the document in question:

The Commissioner and staff met with Technical Advisor Harshbarger on June 25, 1985, to discuss the U.S. Section’s position on the paper from the New Mexico State Engineer’s Office, “Rio Grande, Elephant Butte Dam to El Paso, Texas” (copy attached).

The author of the paper concludes “...that the effects of the groundwater development below Elephant Butte Dam induced by the drought of the 1950’s have significantly affected the amount of water reaching El Paso (emphasis added [in original]).”

The title of “the paper from the New Mexico State Engineer’s Office” is identical to the document in question, and the quoted passage matches a sentence in the “Rio Grande” document found on page 3. The other two documents included in the “Rio Grande” document further support the contention that OSE authored the piece. In both a July 10, 1985 letter from John W. Harshbarger – the Technical Advisor mentioned in the July 15 memorandum – to Wootton, and a July 16, 1985 letter from Wootton to Baumli, forwarding the July 10 Harshbarger-Wootton letter, the “Rio Grande” document is identified as the “New Mexico State Engineer’s office paper, ‘Rio Grande, Elephant Butt Dam to El Paso, Texas.’” See John W. Harshbarger to Mr. Thomas P. Wootton, Chief, Special Studies Branch, International Boundary and Water Commission, July 10, 1985; and International Boundary and Water Commission, United States and Mexico, Memorandum, For Information, To: George R. Baumli, PE, Inv. & Planning Division, From: Thomas P. Wootton, Chief, Special Studies Branch, Subject: Effects of Pumping on Rio Grande Flows, July 16, 1985. Folder 11 Correspondence and data concerning Mesilla Valley pumping. 1982., Box 1, MS 555 Joseph F. Friedkin Papers, C.L. Sonnichsen Special Collections Department, University of Texas at El Paso [hereafter UTEP].

As for dating the document to 1982, all of the diagrams end with 1982 and the final sentence on page 3 of the document states: “The new relationship [between “groundwater development below Elephant Butte Dam” and “the amount of water reaching El Paso”] is well defined and has been continuous to the present (1982).” This strongly indicates that the document was authored in 1982.

⁶³ [Office of the New Mexico State Engineer,] Rio Grande, Elephant Butte Dam to El Paso, Texas [1982], 1. Folder 11, Box 1, MS 555, UTEP.

Since 1951 there had been a cumulative decrease in the streamflow reaching El Paso totaling 3.7 million acre-feet when compared to the pre-1951 relationship, an average of 112,500 acre-feet per year. Since 1951, the cumulative decrease in streamflow reaching El Paso has averaged 106,000 acre-feet.

Figure 3, a double mass diagram concentrating on the reach between Leasburg Dam and El Paso, “show[ed] that the greatest portion of the decrease in streamflow at El Paso since 1951 is the result of activities occurring below Leasburg Diversion dam, which is located 45 miles below Caballo Dam.”

During the period 1951-1982, there has been a cumulative decrease in the streamflow reaching El Paso of 3.9 million acre-feet when compared to the pre-1951 relationship, an average of 94,000 acre-feet per year. Since 1957, the cumulative decrease in streamflow reaching El Paso has averaged 88,000 acre-feet per year.⁶⁴

Figure 4, a streamflow correlation, further depicted “the effects of the drought of the 1950’s on the river.” Of particular note,” according to the paper, was

the year 1958, the first year of normal water supply after the drought of the 1950’s. The discharge at Leasburg in 1958 was comparable to flows during the 1938-1950 period, yet the amount of water reaching El Paso was about 120,000 acre-feet less than would have been delivered in the period prior to 1951.

From this, the paper concluded,

all four figures used in this analysis show that the effects of the groundwater development below Elephant Butte Dam induced by the drought of 1950’s have significantly affected the amount of water reaching El Paso. The new relationship is well defined and has been continuous to the present (1982).⁶⁵

⁶⁴ Rio Grande, Elephant Butte Dam to El Paso, Texas [1982], 2-3. Folder 11, Box 1, MS 555, UTEP.

⁶⁵ Rio Grande, Elephant Butte Dam to El Paso, Texas [1982], 3. Folder 11, Box 1, MS 555, UTEP. Both Harshbarger and Wootton were skeptical of this analysis when they reviewed it in July 1985. Harshbarger, a hydrogeologist, found “the statements given in the New Mexico State Engineer’s office paper, ‘Rio Grande, Elephant Butte Dam to El Paso, Texas’ very confusing and difficult to understand.” Writing to Wootton on July 10, 1985, he explained “[t]he basic data do not support the conclusion given in the paper.” The IBWC’s technical advisor did agree with Wootton’s own analysis of the “basic data; annual Rio Grande flows and estimated groundwater pumpage.” This analysis, as Wootton explained in a separate memorandum to the IBWC Commissioner Joseph Freidkin five days later, was “that there is no data presently available that indicates that groundwater development (pumping) has significantly affected the quantity of water reaching El Paso.” The Special Studies Branch chief presented that data in a series of tables and a graph. Wootton further elaborated on Harshbarger’s assessment, stating that the technical advisor found “that since there has been no apparent effect of pumping on the shallow aquifer and the Rio Grande, is an indication that recharge is equal or greater than the average annual pumping.” He did conclude his memorandum with a portend: “At some point in time the pumping will exceed the recharge and the effects should be noticeable in the shallow aquifer and the Rio Grande flows.” See

The relationship between this study and Reynold's arguments in the El Paso lawsuit cannot be determined from the available documentation reviewed. The preponderance of historical evidence considered here nonetheless suggests that by the 1980s Reynolds had come to such a recognition. Within the past 15 years, OSE staff appear to have further acknowledged what early-twentieth century USGS studies had observed, and which mid-twentieth century hydrological investigations had warned: that surface and subsurface waters were intimately related in the Upper Rio Grande Basin, and that extensive groundwater development threatened the water supply for Rio Grande Project lands and raise the possibility of a Compact dispute with Texas.⁶⁶

For its part, the USGS continues to recognize that groundwater pumping has the potential to affect surface flow significantly. In the forward to Circular 1376, entitled *Streamflow Depletion by Wells – Understanding and Managing the Effects of Groundwater Pumping on Streamflow* and

Harshbarger to Wootton, July 10, 1985; and International Boundary and Water Commission, United States and Mexico, Memorandum, For Information, To: Commissioner, Thru: George R. Baumli, PE, Inv. & Planning Division, From: Thomas P. Wootton, Chief, Special Studies Branch, Subject: Effects of Pumping on Rio Grande Flows, July 15, 1985. Folder 11, Box 1, MS 555, UTEP.

⁶⁶ In a May 15, 2003 memorandum to then-New Mexico State Engineer John R. D'Antonio, Jr., regarding EBID's Emergency Application for Permit for Supplemental Wells, OSE Lower Rio Grande Basin Supervisor Erik H. Fuchs pointed out:

Given the interrelated nature of the surface and groundwater system in question, groundwater diversions of the magnitude potentially necessary to serve the application or that may occur for years to come despite the application as discussed herein are such that much of the available or remaining mainstem flows of the Rio Grande below Caballo Reservoir, beginning with drain flows within the EBID, could be negatively and substantially affected almost immediately, although it is uncertain how severe these effects might be.

Fuchs expressed concern that

the EBID pumping program as it is proposed may strain already tenuous relations with Texas and others and could result in many problems, including the increased potential for a challenge under the Rio Grande Compact due to the uncertain extent of effects of this large scale pumping on the quantity and quality of the mainstem flows of the Rio Grande below Caballo Reservoir.... Similar to and in some respects worse than the effect documented during the drought of the 1950's, groundwater diversions of the magnitude suggested above would rapidly create a large, negative hydraulic gradient throughout the Rincon and Mesilla Valley's [sic] such that virtually all surface water drains within the EBID would soon go dry. In turn, much of the available or remaining mainstem flows of the Rio Grande below Caballo Reservoir, if there are any for all practical purposes, would be negatively and substantially affected almost immediately, however it is uncertain how severe these effects might be and for how long even after drought conditions eventually subside.

Memorandum, Office of the State Engineer, District 4, May 15, 2003, File: LRG-1776, To: John R. D' Antonio Jr., State Engineer, Paul Saavedra, Water Rights Division Chief, John Romero, WRAP Director, Through: Calvin Chavez, District Supervisor, From: Erik H. Fuchs, Lower Rio Grande Basin Supervisor, Re: Emergency Application for Permit for Supplemental Wells, Local impairment analysis and issues for consideration, Applicant: Elephant Butte Irrigation District, 2-3, and 11-12. Provided by Somach Simmons & Dunn.

released in 2012, USGS Associate Director for Water (Acting) Jerad D. Bales, acknowledged the benefits of groundwater while taking stock of the impact of its use by recalling Theis' work:

Groundwater withdrawals also can lead to a reduction in streamflow, affecting both human uses and ecosystems. The first clear articulation of the effects of groundwater pumping on surface water was by the well-known USGS hydrologist C.V. Theis. In a paper published in 1940 entitled "The Source of Water Derived from Wells," Theis pointed out that pumped groundwater initially comes from reductions in aquifer storage. As pumping continues, the effects of groundwater pumping can spread to distant connected streams, lakes, and wetlands through decreased rates of discharge from the aquifer to those surface-water systems. In some settings, increased rates of aquifer recharge occur in response to pumping, including recharge from the connected surface-water features. Associated with this decrease in groundwater discharge to surface waters is an increased rate of aquifer recharge. Pumping-induced increased inflow to and decreased outflow from an aquifer is now called "streamflow depletion" or "capture."⁶⁷

In conclusion, as a historian without academic or professional credentials as a hydrologist, hydrogeologist, or water engineer, I cannot assess the *quality* of the "scientific understanding" of the relationship between surface flow and groundwater. Nor can I opine, as Dr. Stevens has done, that the "scientific understanding" of the relationship between surface flow and groundwater "was too nascent" at the time of the 1906 and 1908 filings for the Rio Grande Project (Opinion 5, p. 11) and "still in its infancy at the time of the 1938 Rio Grande Compact negotiations" (Opinion 6, p. 11). Nonetheless, the available historical record that I have examined indicates that federal and New Mexico engineers documented a hydrological connection between Rio Grande surface flows and groundwater in the Rincon and Mesilla valleys in New Mexico from the early 1900s through the 1930s, and this is essential context for understanding what waters were ultimately apportioned by the Compact.

As pointed out in my expert report (p. 64), Reclamation plans for the Rio Grande Project from the outset envisioned utilizing all the available water within the basin below Elephant Butte Dam. This was predicated, in part, on Charles Slichter's 1904 investigation that found a relationship between water in the river's channel and groundwater within the Mesilla Valley itself. Leveraging New Mexico territorial law and as a matter of practice and policy not only on the Rio Grande Project but also on other federal projects throughout the arid west, Reclamation authorities further asserted control over waters arising on project lands. There were waters that originated from the Rio Grande, were applied to those lands, interacted with subsurface waters, and returned by project drains to the channel for additional use downstream.

⁶⁷ Jerad D. Bales, forward to *Streamflow Depletion by Wells – Understanding and Managing the Effects of Groundwater Pumping on Streamflow*, by Paul M. Barlow and Stanley A. Leake, Groundwater Resources Program, Circular 1376, US Department of the Interior, US Geological Survey (Reston, VA: US Geological Survey, 2012), iii.

This dynamic, as noted in my expert report (p. 82), was understood and recognized by those engineers involved in crafting the technical basis for the Compact. Federal engineers engaged with the Rio Grande Joint Investigation did not make a dedicated study of groundwater in the Rincon and Mesilla valleys in the mid-to-late 1930s. Yet they were aware of the pioneering hydrogeological work of C.V. Theis, which exposed the potential of groundwater development to affect surface flow. The resulting *JIR* reiterated some of Slichter's findings regarding Mesilla Valley hydrology; acknowledged the necessity of return flows to downstream land; took note of Reclamation's groundwater monitoring activities in the Rincon and Mesilla valleys and its drainage operations; and made pointed observations about the state of the Upper Rio Grande Basin water supply that recognized groundwater development would not add water to the basin. Data regarding groundwater conditions within the Mesilla Valley, gathered by Reclamation, was scrutinized by Texas's engineering advisor Raymond Hill, and Hill himself appears to have had on hand at least one federal analysis of return flow and groundwater. Perhaps more importantly, more than 30 years after Slichter's investigation and following nearly two decades of project operations, New Mexico's engineering advisor John Bliss appears to have arrived at similar conclusions as Slichter, finding a "direct relationship" between surface and subsurface waters below Elephant Butte.

Whatever the quality of this work or the limitations that these early investigations may possess – especially when evaluated with contemporary measuring systems and analytical methods by technical experts – a throughline is apparent in them and in subsequent studies and assessments to the end of the twentieth century. When water users in the Rincon and Mesilla valleys in New Mexico looked to augment a diminished supply of Rio Grande surface flow with groundwater and sought the expertise of the USGS in the late 1940s, they were cautioned as to the impact of groundwater development on the available surface flow. This analysis was based in part on prior investigations that identified a direct relationship between the two sources of water in the basin. In a detailed study, initiated at the request of EBID in 1946, carried through 1948, and published in 1954, USGS hydrologist Clyde S. Conover confirmed findings made Slichter and Bliss. He observed that groundwater extraction would deplete surface supplies available to lands within the Rio Grande Project. As early as 1952 Reclamation began observing this impact, and by the mid-1950s, New Mexico State Engineer S.E. Reynolds accepted the existence of a hydrological connection between surface flow and subsurface waters for lands above Elephant Butte. By the early 1980s, there is evidence that he and his office came to a similar recognition for lands below Elephant Butte and attributed a diminished surface supply from the Rio Grande for lands below El Paso to the expansion of pumping in New Mexico.

Supplemental Opinion I: Available historical evidence indicates that two periods of streamflow record, reflecting then-present conditions of water use in the Upper Rio Grande Basin, were used to formulate the delivery schedules set forth in Articles III and IV of the 1938 Rio Grande Compact: the period 1928 to 1937 for Colorado’s delivery to New Mexico (Article III), and “the period prior to 1930,” approximately 1890 to 1929, for New Mexico’s delivery to Texas (Article IV).

This supplemental opinion offers a historical not technical analysis. Focused on documents that contributed to and captured the substance of the discussions among the engineering advisors as they worked toward a technical basis for the Compact in late 1937 and early 1938 – most notably, the *Rio Grande Joint Investigation* report, the proceedings of the Rio Grande Compact Commission following the report, and the notes, reports, and other materials produced by the engineering advisors during and after the Compact negotiations – it traces how the delivery schedules of the 1938 Rio Grande Compact were developed. As addressed in my expert report (pp. 29-30, 32, and 38-39), the Committee of Engineering Advisors who formulated the technical basis for the Compact recognized that without the introduction of water from outside the Upper Rio Grande Basin, no additional water existed within the basin to be apportioned. The engineers thus sought to protect existing developments, such as the Rio Grande Project, while providing for new projects in Colorado and New Mexico through the establishment of delivery schedules tied to measurements of inflow and outflow at various points in the basin. Armed with data from the Rio Grande Joint Investigation, they based Colorado’s deliveries to New Mexico (Article III of the Compact) on tabulations of inflow and outflow of the Conejos River and the inflow and outflow of the main stem of the Rio Grande above Lobatos near the Colorado-New Mexico state line, and New Mexico’s deliveries to Texas (Article IV of the Compact) on tabulations of Rio Grande inflow at Otowi Bridge and Rio Grande outflow at San Marcial above Elephant Butte Reservoir. Unstated in the Compact, however, was the period of record used to derive these inflow and outflow figures. My expert opinion as a historian is that the engineering advisors ultimately relied upon two different time periods, reflecting then-present conditions of water use in the Upper Rio Grande Basin: the period 1928 to 1937 for Colorado’s delivery to New Mexico (Article III), and “the period prior to 1930,” approximately 1890 to 1929, for New Mexico’s delivery to Texas (Article IV).

The *Rio Grande Joint Investigation* report, or *JIR*, as discussed in my expert report (pp. 21-22), provided an essential compilation of information for the engineering advisors. Colorado’s engineering advisor Royce Tipton reported that from the data in the *JIR* he and his fellow engineers were able to ascertain “the discharge of the river at various points under present development in the basin,” and “schedules of water delivery which would insure each section of

the basin against injury by acts of water uses in another section and yet would permit of the construction and operation of additional reservoirs above Elephant Butte Reservoir.”⁶⁸

Similarly, Texas’ engineer Raymond Hill recalled the importance of the federal investigation to the development of the Compact some three decades following the Compact’s ratification. The *JIR*, in his words, assembled “all essential data as to the sources and quantities of water available for use in the several States, the needs for water in these States, and means for development and use of those supplies.” Where it specifically came to development of delivery schedules that were at the heart of the compact, Hill stressed that the report brought together “all pertinent data.” With this data provided to the commission, the engineering advisors crafted the technical basis for the Compact.⁶⁹

The “pertinent data” from the *JIR* regarding stream flow or run off in the Upper Rio Grande Basin covered the period from approximately 1890 to January 1936, and that data was analyzed in the report with reference to the prevailing water use conditions. Most of the stream-flow measurements presented in the report were obtained from the United States Geological Survey (USGS), which had established several stations in the basin in the late-nineteenth century. Other measurements for the investigation were made by “the State Engineering Departments of Colorado and New Mexico, the Bureau of Reclamation (Reclamation), the International Boundary Commission, and other public and private agencies.”⁷⁰ The gaging station “near Del Norte [Colorado], where Rio Grande enters San Luis Valley, was established in July 1889.” Ten years later, measurements of the Rio Grande began at El Paso, Texas, and “near Lobatos, Colo., [a station] which records the Rio Grande flow below the San Luis Valley and near the Colorado-New Mexico State line.” “The station at Otowi Bridge, formerly referred to as ‘near Buckman,’ located at the head of White Rock Canyon and below the confluence of the Rio Chama,” began recording flow in February 1895. The San Marcial station, “at the lower end of the Middle Valley and upper

⁶⁸ R.J. Tipton, *Analysis of Report of Committee of Engineers to Rio Grande Compact Commissioner, Dated December 27, 1937* (February, 1938), 1-4. ff. 70, Box 44-70, MSS 312 Michael Creed Hinderlider Collection, 1897-1987 [hereafter MCHC 1897-1987], History Colorado, Denver [hereafter HC].

⁶⁹ Raymond A. Hill, Consulting Civil Engineer, “Development of the Rio Grande Compact of 1938,” 14 and 21. In re: Rio Grande Project AG No. 011504362, Copies from the Center for American History, Raymond A. Hill Papers & The Rio Grande Compact Commission Collection. See also same cited pages in Raymond Hill, Consulting Engineer, “Development of the Rio Grande Compact of 1938.” ff. 49 Development of Rio Grande Compact of 1938, good history on water conflict, Texas, New Mexico, Colorado, prepared in context of 1966 Supreme Court Case, Box 4, MS 555 Joseph F. Friedkin Papers, C.L. Sonnichsen Special Collections Department, University of Texas at El Paso [hereafter UTEP Spec Coll]. Additionally, this narrative was published posthumously in the *Natural Resources Journal* in 1974. See Raymond A. Hill, “Development of the Rio Grande Compact of 1938,” *Natural Resources Journal* 14:2 (April 1974): 64-200.

⁷⁰ Plate 4 of “General Report” “lists the upper basin gaging stations for which records are available, indicates the source or agency which has published the records, gives the drainage areas in square miles above the stations, and shows the period for which the records are available.” *JIR*, Plate 4, 27.

end of the present Elephant Butte Reservoir” was established in January 1895. The tributary with the “longest record” was “the Conejos River near Mogote in Colorado,” which began in May 1903.⁷¹

The *JIR* acknowledged that records for these stations and many others in the basin were incomplete, “but the gaps do not seriously impair the utility of the record.” The largest gap existed “in the Embudo record, a period of 8 ½ years from 1904 to 1912.” Both the Otowi Bridge and El Paso stations had “maximum gaps of 3 ½ years each” while Del Norte had a 1 ½ year gap, “and the other stations of a few months only.” For some tributaries, the period of record was short. For Pinos Creek, near Del Norte, Colorado (Table 134), for instance, only a portion of the years 1919 through 1924 were available, and for some months, the flow was estimated. This was similarly true for the Rio Chama, at Chama, New Mexico (Table 172), which only had the years 1912 and 1916, and some monthly figures for those years were estimated. Where it came to the Rio Grande, however, the tables ran through December 1935.⁷²

The federal report further identified “main-river stations which record the inflow to and outflow from the San Luis, Middle, and Elephant Butte-Fort Quitman sections” – the three major geographical areas of the Upper Rio Grande Basin – “and those near the sites of major reservoir developments, present and proposed” as “key stations.” These were: Rio Grande at Wason, Del Norte, Alamosa, and Lobatos in Colorado; at Embudo, Otowi Bridge, and San Marcial in New Mexico; at El Paso, Texas; and at the Conejos River near Mogate and the Rio Chama above El Vado Reservoir in New Mexico. The *JIR* developed tables (Tables 14 and 15) that depicted “the mean annual and mean monthly run-off for the 46-year period 1890-1935, the monthly mean in percent of the mean annual, and the annual run-off in percent of the mean annual” for the Del Norte, Lobatos, Embudo, Otowi Bridge, and San Marcial stations. Stream-flow data from each, the report pointed out, “[did] not wholly represent direct mountain run-off but record the flow which has passed or is returned from upper irrigated areas plus intermediate tributary flow.” The report also offered a figure (Figure 5) that presented the “characteristics of run-off for a maximum, mean, and minimum year for Del Norte, Otowi Bridge, and San Marcial stations, as representative of the run-off at the head, respectively, of the main irrigated areas of the San Luis, Middle, and Elephant Butte-Fort Quitman sections.”⁷³

This data was vital to the determination of water production from run off in the basin – in the words of the *JIR*, “[t]o arrive at a comprehensive and adequate knowledge of the available water supply....” Federal engineers, utilizing “all available stream-flow records” calculated that “mean

⁷¹ *JIR*, 26.

⁷² *JIR*, 26 and Appendix A – Precipitation, Evaporation, and Stream Flow Records, 139-171 (Table 134 on p. 151 and Table 172 on p. 165).

⁷³ *JIR*, 28.

annual water production was slightly more than 3 million acre-feet (af), and originated principally and nearly equally in Colorado and New Mexico.⁷⁴

Having made that calculation, however, adjustments in run-off had to be made “for Present Development” at the head of the San Luis and Middle valley sections in the basin. The *JIR* explained,

the run-off of Rio Grande near Lobatos represents the residual flow below the San Luis Valley irrigation development. The run-off at Embudo and Otowi Bridge represents this same residual flow plus or minus intermediate tributary inflow or losses, respectively. The run-off at San Marcial represents the residual flow below the Middle Valley irrigation development. In estimates of the water supply for given future conditions it become important to determine what the flow, 1890 to 1935, would have been at these gaging stations under present conditions of development. Put in another way, this means a determination of what the consumption of inflow was in the San Luis and Middle Valleys in this period [i.e., 1890-1935].⁷⁵

For the San Luis Valley, this determination was based on a slightly narrower time period – between 1927 and 1935. The *JIR* noted that irrigation development in the valley had occurred before 1890, but the temporary Rio Grande Compact of 1929 had limited “increased use of Rio Grande water in Colorado to an amount offset by drainage return.” Surveys of irrigated acreage by Colorado and New Mexico engineers indicated that acreage had remained “substantially constant” between 1927 and 1935, “except for variations due to the availability of water.” “[T]his period” was therefore “taken as representative of present irrigation development. and of the use of water in San Luis Valley and that use in the past may be referred to use in this period to derive corrections to past stream flow for present conditions.” Moreover,

the run-off to the southeast area of San Luis Valley is practically all consumed in irrigation and does not reach the river, the difference between the total outflow to the southwest area and the flow of Rio Grande near Lobatos may be taken to represent the total consumption of southwest area inflow which includes that of Rio Grande near Del Norte. Although this difference does not represent the total depletion of water in San Luis Valley, it does represent a very substantial part of it, and with respect to correction to the Lobatos flow for past use, may be taken as a complete index of the use factors governing the river flow at that station. In any one year the water consumption and hence outflow at Lobatos is influenced to a substantial degree by the extent of available inflow. It was necessary, therefore, to establish the present consumption, or that in the period 1927-35, as related to the inflow.⁷⁶

⁷⁴ *JIR*, 28-29.

⁷⁵ *JIR*, 29.

⁷⁶ *JIR*, 30.

The *JIR* went on to present a series of curves that plotted inflow and outflow using the 1927-1935 time period (Figures 8 through 11), acknowledging flood peaks that were undivertible and unusable as compared with discharge records for the Rio Grande Del Norte and Conejos River stations. It produced two tables from this effort that offered “Corrections to recorded of Rio Grande near Lobatos, Colo., to give flow under present irrigation developing in San Luis Valley” (Table 17) and “Estimated run-off of Rio Grande near Lobatos, Colo., under present irrigation development in San Luis Valley” (Table 18), both for the period 1890-1935.⁷⁷

Adjustment for present development in the Middle Valley was more challenging. This was because of “the meagerness and uncertainty of records of tributary inflow between Otowi Bridge and San Marcial, the controlling upper and lower river stations, respectively, for the principal unit of water consumption in the Middle section.” Without better data, the difference of inflow between the two stations could not be simply taken; “some estimate of this total consumption of inflow” had to be made. To assess tributary inflow, federal engineers first derived “gains in the river flow between intermediate stations,” using the recorded Rio Grande flow at the San Felipe station for the ten-year period between 1926 and 1936, expanded to encompass the 1890-1935 period. The gains shown on the resulting tables (Tables 20 and 21) “represent[ed] the excess tributary inflow, surface and seepage, over consumption of inflow....”⁷⁸

Federal engineers next assessed the “the relation between Otowi Bridge-San Marcial losses and the Otowi Bridge flow,” concentrating on those days in the Otowi Bridge-San Marcial record where tributary inflow was minimal. Through a variety of calculations, analysis of four different period of record – 1890-1905, 1906-19, 1920-29, and 1930-35 (which encompassed “construction of the irrigation and drainage works of the Middle Rio Grande Conservancy District”) – plotting of curves (Figures 16 and 17) and adjustments for side inflow, estimates of “monthly consumption of inflow” (Table 22) and “monthly tributary inflow” (Table 23) were obtained for the period 1890 to 1935.⁷⁹

The engineers further used “progressive 5-year weighed means” (Figure 18) to “smooth the effect of annual irregularities and to bring out more clearly the relation.” The results, however, did not expose any “marked long-time trend in consumption.” Rather, much like for the San Luis section, the analysis “indicated that little change in this consumption, except that due to variation in water supply, has occurred since 1890.”⁸⁰

⁷⁷ *JIR*, 31-35.

⁷⁸ *JIR*, 37, 38 (Tables 20 and 21), and 39 (Table 21 continued).

⁷⁹ *JIR*, 37-39, 40 (Figure 16), 41 (Tables 22 and 23), and 42 (Table 23 continued and Figure 17).

⁸⁰ *JIR*, 42 and 43 (Figure 18). Separate from this analysis, federal engineers explored the utility of using a “deduced flow” for San Marcial rather than the available record as a means of correcting for possible

The analysis performed for the Middle Valley, however, was ultimately not as determinative as for the San Luis Valley. According to the *JIR*, the work did not permit an assessment of “the effect on the regimen of the river of the works and operations of the Middle Rio Grande Conservancy District” – which, as noted above, spanned the period from 1930 to 1935 – nor “the effect of certain conditions obtaining in particular years.”⁸¹

The inability of federal engineers to assess the impact of the Middle Rio Grande Conservancy District (MRGCD) on the Rio Grande was significant. Development of the district, as noted in my expert report (pp. 16-17), had precipitated the original action that Texas filed against New Mexico and MRGCD in the US Supreme Court in late 1935; this litigation was subsequently stayed, pending the results of the Rio Grande Joint Investigation. New Mexico’s experts in hearings before Special Master Charles Warren had argued, in part, that the district would not impinge upon the Rio Grande Project water supply. For instance, studying Otowi and San Marcial flows for 1929 and 1936, former Reclamation engineer Harold Conkling testified that there would in fact be a net gain in water above San Marcial as a consequence of MRGCD’s works – as much as 118,000 af “more water reaching San Marcial each year than would have reached that point if such works had not been constructed and operated....”⁸²

Texas disputed this point. In his testimony on behalf of the downstream state, Hill offered “three general conclusions” arising from his analysis of the district’s effect on Elephant Butte Reservoir:

1. “the water supply which was available prior to the construction of the works of the Middle Rio Grande Conservancy District are no greater in amount than that needed to satisfy the proper beneficial uses in the water served with water from Elephant Butte reservoir.”
2. “...by the construction and operation of the works of the Middle Rio Grande Conservancy District, there has been caused some impairment of the water supply of the Elephant butte reservoir by reduction in quantity, and a very substantial impairment of quality has taken place....”
3. “...if the Middle Rio Grande Conservancy District is developed to the extent of the total area which can be served from existing canal systems, and which is served by existing drain systems, and if fifty thousand acres of new lands are thereby placed in cultivation, the water supply in Elephant Butte reservoir will further be impaired as to quantity and quality, and in order to offset these conditions there will be required a total of at least

inaccuracies in that record. The resulting study, however, found a minimal difference between recorded and deduced flow when assessing the Otowi Bridge-San Marcial relation. *JIR*, 43-46.

⁸¹ *JIR*, 43.

⁸² *State of Texas vs. State of New Mexico, et al, Defendants' Case in Chief*, Volumes XII, XIII & XIV, 2443-2448. CB-F-171A thru CB-F-1716: Transcripts of TX v. NM, Vol. 1-16, Box 4X219, RAHP, UTA. The quoted text are the words of a New Mexico attorney who questioned Conkling; Conkling replied in the affirmative.

one hundred fifty thousand acre feet per annum of water in addition to that which has been accustomed to enter Elephant Butte Reservoir.”⁸³

Despite leaving this issue unresolved and for all the limitations of the available streamflow data, the *JIR* expressed a guarded confidence in the federal investigation’s analysis of the Otowi Bridge-San Marcial relation:

Although subject to relatively wide variation in derivation because of the indeterminate character of available data, this estimate [i.e., of Otowi Bridge-San Marcial flow] is believed to approach within reasonable limits the actual consumption of inflow which occurred, and to be adequate for purposes of analysis if, based thereon, a reasonably wide latitude is maintained in determining the sufficiency of water supplies or additional requirements for water.⁸⁴

In determining “the available water supply in the Upper Rio Grande Basin,” the stream flow analyses for the San Luis and Middle Valley sections were a critical component of the *JIR*’s ultimate assessment of the “Availability and Use of Water Under Given Conditions.”⁸⁵ Eleven different “conditions” were considered, involving various scenarios of water storage development (principally in the San Luis Valley and involving MRGCD in the Middle Valley), estimates of diversion demand in the three sections of the basin (including for the Rio Grande Project, Mexican deliveries under the 1906 Convention, and MRGCD), and return flows in the three sections. For each condition, the “period of analysis” was slightly different but all included the years from 1911 to 1935.⁸⁶

In assessing the various conditions through 1935, presented largely through a series of tables (Tables 109 to 116) and figures (Figures 40 to 43), the *JIR* focused on three items. These were:

(1) annual run-off of Rio Grande at Lobatos and San Marcial and of Conejos River at mouth; (2) monthly run-off at Lobatos for maximum, minimum, and mean years; and (3) amount and year of occurrence of shortages in San Luis, Middle, and Elephant Butte-Fort Quitman sections.⁸⁷

With the data and analysis from the Rio Grande Joint Investigation available in late summer 1937, the engineering advisors for the three states proceeded to develop delivery schedules to

⁸³ *State of Texas vs. State of New Mexico, et al, Plaintiff's Case in Chief*, Volumes V, VI & VII, 1349-1350. 599a-603. CB-F-171A thru CB-F-1716: Transcripts of TX v. NM, Vol. 1-16, Box 4X219, RAHP, UTA.

⁸⁴ *JIR*, 43.

⁸⁵ Others included “estimates of the required diversion demand of the major units of the basin; the opportunities for water storage; and the possibilities of additional water supplies by transmountain diversion and by salvage of present losses.” *JIR*, 127.

⁸⁶ *JIR*, 127-130.

⁸⁷ *JIR*, 130, 131 (Tables 109 to 111), 132 (Figure 40), 133 (Figure 41), 134 (Tables 112 and 113), 135 (Tables 114 and 115), 136 (Figures 42 and 43), and 137 (Table 116)

apportion the Rio Grande water supply. Those schedules depended upon streamflow relationships at key gaging stations on the main stem of the Rio Grande and in Colorado on Conejos River, a Rio Grande tributary, described in the *JIR*, and these relationships, in turn, were viewed as describing or reflecting then-current water supply conditions.⁸⁸

As discussed in my expert report (p. 24), at the first meeting of the compact commission on September 28 following a presentation on the investigation, Colorado compact commissioner and state engineer M.C. Hinderlider explicitly used data from the *JIR* to support his state's longstanding view that there was sufficient water in the basin for the development of lands in Colorado. The state's "position" was that

an adequate supply of water exists in the Upper Rio Grande Basin above Fort Quitman which, if properly regulated and used, will meet the requirements of present irrigation development in the Basin at the date of the signing of the Compact, and under present conditions to the extent indicate by the report of the Rio Grande Joint Investigation.⁸⁹

Hinderlider preceded to offer a series of "graphs prepared from certain tables appearing in Part I, Vol. I, of the report of the Rio Grande Joint Investigation" that focused on "shortages in irrigation requirements which exist under present conditions of development" for the three sections of the basin. These tables from the *JIR*, as noted above, covered the available period of record to 1935. Colorado nevertheless extended the data set to 1937 to make its case that the San Luis Valley did not have "parity" with the Middle Valley or the Elephant Butte-Fort Quitman sections at present and should.⁹⁰

Neither New Mexico nor Texas at that meeting used the *JIR* to support their positions, but on September 30 the engineering advisors began to discuss bases for possible delivery schedules that used relationships studied in the Rio Grande Joint Investigation. Hill presented "an analysis of the relation between the historical flow at San Marcial and the historical flow at Otowi less the historical flow at Lobatos." This relationship, expressed as both a table and curve, the engineer offered as defining a quantity of flow to reach San Marcial for the benefit of Texas.⁹¹

When questioned by Tipton as to the "period...covered in setting up the relationship," Hill explained, "We took all the historical years first and applied them." "[T]he earlier years,"

⁸⁸ As noted in my expert report (p. 21), although the *JIR* was not officially released until 1938, the compact commissioners and their engineering advisors were given a final draft in August 1937.

⁸⁹ Proceedings of the Meeting of the Rio Grande Compact Commission Held in Santa Fe, New Mexico, September 27, to October 1, 1937, 11. Unnamed folder 5, Box 2F463, RGCC-FBCP, UTA

⁹⁰ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 12. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

⁹¹ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 16. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

however, proved to be “more erratic...because of the inaccuracy of the records” – a circumstance that the *JIR* had likewise observed. He therefore focused on “the last 20 years...from 1912 when Elephant Butte was started, up to the last five years, inclusive; and the relationship is particularly accurate as to the last 10 or 12 years” – i.e., 1925 or 1927 to 1937.⁹²

Tipton thought that this “relationship might reflect more water at San Marcial than actually would occur under present conditions,” but Hill insisted it did capture those present conditions. He echoed the *JIR*’s observation that the flow at Lobatos had remained substantially unchanged for several years:

The practical angle is this – that over the past ten years the points [on the curve] representing progressive five-year averages are almost squarely on the curve with the maximum departure, being 200,000 out of four million. During that ten years the conditions at Lobatos have been substantially frozen. For the larger years where points become erratic, if we were to get seven million acre-feet at San Marcial in five years, there would be a period of spill that would interrupt it anyway. If you go beyond the conditions prevailing from 1920 to 1935, you run into conditions from 1920 to 1935, during which time the flow at Lobatos has not been materially affected.⁹³

John Bliss, the engineering advisor for New Mexico, did not participate in this discussion of deliveries to Texas but did offer a schedule of delivery for Colorado to New Mexico. His schedule was predicated on a comparison of “the natural flow of the Rio Grande at Del Norte” with the flow passing the Colorado-New Mexico state line. This relationship was expressed in a table similar to Hill’s.⁹⁴

Bliss’s schedule, also like Hill’s, was “merely an interpolation between the control points set forth in this [Bliss’s] table” – yet, he was more vague as to the period of record he used. New Mexico’s engineer advisor explained that the intention of the schedule was to reflect the operation of Wagon Wheel Gap Reservoir in the San Luis Valley, “an operation which would return to the state line the same amount of water which presumably would be returned under present day conditions.”⁹⁵

⁹² Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 20. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

⁹³ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 20-21. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

⁹⁴ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 22. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

⁹⁵ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 23. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

Tipton separately suggested that Bliss “bring Conejos [River] in as part of the yardstick as a method of determining water supply,” pointing the “long-time station on the Conejos” and the contribution to the river made to the Rio Grande flow above Lobatos. This latter point, as noted above, was also made in the *JIR*. New Mexico’s engineering advisor expressed “No objection” to this.⁹⁶

When the commission convened the following day, October 1, Hinderlider offered a revised schedule for Colorado’s deliveries to New Mexico that reflected the discussion from the previous day and expressly defined a roughly 10-year period of record to be used. Broadly, the commissioner offered:

Deliveries of water shall be made by Colorado at Lobatos gaging station near the Colorado-New Mexico state line in accordance with the following schedule, which indicates the relation under present conditions (1928-1937) of development, between the recorded flow of the Rio Grande at the gaging station near Del Norte, plus the recorded flow of the Conejos at the Mogote gaging station, and the recorded flow of the Rio Grande at the Lobatos gaging station.⁹⁷

Tipton subsequently elaborated on this outline. Colorado’s engineering advisor insisted that the schedule “was designed with the idea of protecting both lower basin states [i.e., New Mexico and Texas] absolutely against any depletion at the state line by reservoir construction which would adversely affect present uses in those area.” The schedule, moreover, was “built on the relationship between recorded flows for the years 1928 to 1935.” Tipton explained, “The last two years [i.e., 1936 and 1937] is not in that [the schedule] as that data was not available.”⁹⁸

Following Colorado’s presentation, as addressed in my expert report (p. 25), considerable discussion was had largely among the engineers regarding various aspects of the proposed schedule of delivery. No one clearly challenged or debated the period of record Colorado was relying upon for the deliveries at the Colorado-New Mexico state line, and no one addressed the period of record for deliveries from New Mexico to Texas. The commissioners instead elected to

⁹⁶ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 26. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

⁹⁷ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 31. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA. This schedule was presented in full on p. 32 and appears as Exhibit No. 4, on p. 61 of the Proceedings.

⁹⁸ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 33. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

adjourn to provide their advisors an opportunity to develop the “technical basis” for a compact as a group, and report back to the full commission.⁹⁹

As discussed in my expert report (pp. 25-32), over the course of two meetings – in Santa Fe between November 22 and 24, and in Los Angeles between December 15 and 27 – the engineers developed that technical basis by crafting delivery schedules for Colorado and New Mexico. At the November meeting, Tipton reportedly offered a “tentative schedule of deliveries at the state line which could have been satisfied under natural conditions during the past eight or nine years,” or approximately 1928 or 1929 to 1937. This range was consistent with the Colorado schedule considered at the October 1 commission meeting.¹⁰⁰

There is no clear indication if a period of record for New Mexico’s deliveries was discussed in Santa Fe. According to Hill, Bliss was “very fearful of any fixed schedule, on account of uncertainty of physical conditions, particularly as to the amount of tributary inflow between Ottiwi [*sic*] and San Marcial.” This was, yet again, the same issue that had been brought out in the *JIR*. Provided that “some formula can be developed that will protect them against under-deliveries through causes beyond their control,” Hill nonetheless thought that New Mexico “will accept a schedule of deliveries corresponding to actual inflow in past years.”¹⁰¹

A December 2, 1937 letter from Hill’s associate Alan Laflin to Texas’ engineering advisor suggests Bliss had “New Mexico schedules” – presumably for Colorado’s delivery to New Mexico, and New Mexico’s to Texas – at or around the time of the November meeting. According to Laflin, those schedules had been influenced by MRGCD consulting engineer H.C. Neuffer, who Laflin had encountered in the office of USGS chief hydrologist C.V. Theis on December 1:

Your [Hill’s] guess that Neuffer had a hand in drawing up the New Mexico schedules as presented by Bliss are evidently well founded as he and Bliss have spent four days in discussing the last engineers conference, and at present are giving their whole attention towards the coming meeting.¹⁰²

The December meeting, as noted in a “Preliminary Draft of Report of Committee to Rio Grande Compact Commissioners,” dated December 22, 1937 was focused on the development of

⁹⁹ Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 31-42, 53. See also Douglas Littlefield, *Conflict on the Rio Grande: Water and the Law, 1879-1939* (Norman: University of Oklahoma Press, 2000), 201.

¹⁰⁰ Raymond A. Hill, Memo to Mr. Clayton: In re Meeting of Committee of Engineers, at Santa Fe, November 22 to 24, 1937, November 26, 1937, 1-2. [1937], Box 2F467, RGCC-FBCP, UTA.

¹⁰¹ Raymond A. Hill, Memo to Mr. Clayton: In re Meeting of Committee of Engineers, at Santa Fe, November 22 to 24, 1937, November 26, 1937, 2. [1937], Box 2F467, RGCC-FBCP, UTA.

¹⁰² Alan Laflin to Mr. Raymond A. Hill, December 2, 1937. ff. Elephant Butte - El Paso Co. Dist. Laflin Correspondence, July-Dec. 1937. G 351, Box 4X19, RAHP, UTA.

“definite schedules of deliveries.”¹⁰³ This draft report – prepared a week after the Los Angeles meetings opened – and other documents leading to the formal December 27 report were obtained from the Raymond Hill Papers at the Briscoe Center for American History at the University of Texas at Austin, and offer a window into the December deliberations. Several documents were either hand-annotated by Hill or were handwritten by Hill; they appear to reflect decisions the engineers made as they were working out those schedules.

According to this preliminary draft report, the engineers were “guided...by the general policy – expressed at the meeting of the Compact Commission in October – of maintenance in the future of the same conditions of flow at the State Line and into Elephant Butte Reservoir as those which prevailed in recent years.” In acknowledgement of the limitations of their work, the preliminary draft report included the following statement before delving into the delivery schedules that had been formulated:

It must be recognized that precise determination of past conditions and close estimates of future changes are not possible. Accordingly, in submitting the following for your favorable consideration and inclusion in a permanent Compact to govern the future administration of the Rio Grande above Fort Quitman, we suggest that provision be made for review of these matters [added “after five years”] and for adjustments within the intent of the Compact.¹⁰⁴

With reference to “the same conditions of flow...which prevailed in recent years,” “recent years” appears to have been the past decade. The “Scheduled Deliveries at Lobatos,” the Colorado-New Mexico state-line delivery outlined in the preliminary draft report, reflected Colorado’s proposed schedule from the October commission meeting. It used measurements of flow of the Conejos River at Mogote and of the Rio Grande at Del Norte to derive the delivery requirement at Lobatos. Two tables, one for the Conejos and another for the Rio Grande above Del Norte, were offered. The Conejos table had a column for “Conejos Index Supply” and “Conejos River at Mouths.” The index supply was the sum of “the natural flow of Conejos River at the gaging station near Mogote”

¹⁰³ Three different versions of the December 22 preliminary draft report were found in folder CB-F-137-34, Box 4X215 of the Raymond Hill Papers at the Briscoe Center for American History, University of Texas, Austin. One of these appears to be earlier than the other two; it is shorter (at eight pages long, it stops with the schedule of deliveries to Elephant Butte Reservoir), and handwritten corrections and changes noted on it are reflected in the other two versions. Those other two have the same additional corrections, changes, and marginalia but those annotations appear to be in two different hands – one of which is likely Hill’s. The copy believed to be annotated by Hill is the copy cited in this discussion, and where appropriate those annotations are reproduced in brackets within quoted statements. All three preliminary drafts contain the same information regarding the period of record used to derive the delivery schedules. The December 27 report incorporates the changes in the latter two.

¹⁰⁴ Preliminary Draft of Report of Committee to Rio Grande Compact Commissioners, December 22, 1937, 1 and 2. CB-F-137-34, Box 4X215, RAHP, UTA.

and the Los Pinos and San Antonio rivers for the months April to October. “Conejos River at Mouths” was “the combined discharge of branches of this river....” The Rio Grande above Del Norte had columns for “Rio Grande at Del Norte” and “Rio Grande at Lobatos less Conejos at Mouths.” The “values” given in the columns for both tables were taken “from a smooth curve expressing the relationship for the past ten years” – presumably from 1928 to 1937.¹⁰⁵

Further support for this conclusion may be found in another document entirely in Hill’s hand, entitled “Tiptons Relation Curves for Natural Flow at Lobatos.” Initialed “R.A.H.,” and dated “12/18/37,” this document was a series of three tables on three pages. The first table listed a set of figures under two broad columns. “Curve 4A” had figures for both “Del Norte” and “Lobatos minus Conejos,” and “Curve 4B” had figures for “Conejos Index” and “Conejos at Mouth.” The following two tables were devoted to the Conejos and the Rio Grande at Del Norte. The Conejos table had columns for Conejos at Mogote, San Antonio and Los Pinos for the months of April to October, inclusive, the “Total Index Supply” and “Conejos at Mouth”; the Rio Grande at Del Norte table, in turn, had columns for “Del Norte,” “Lobatos,” “Conejos at Mouth,” and “Lobatos minus Conejos at Mouth.” There are 12 figures in each of the columns for these two tables; each column ends with a figure, and this final row is identified as “1937.” It is unclear if figures appearing in the columns above the final “1937” row are in fact a sequence of years from 1926 to 1936 but the arrangement of this data strongly suggests it may be. The document itself is most likely either Hill’s analysis of Tipton’s work, or Hill’s reproduction of Tipton’s work – although the figures given do not match the figures in the typescript December 22 preliminary report.¹⁰⁶

A similar 10-year period appears to have been used to derive the New Mexico delivery schedule for water for Elephant Butte Reservoir. The preliminary draft report acknowledged that “[t]he relation between the amount of water in the Rio Grande above the principal agricultural areas in New Mexico and inflow to Elephant Butte Reservoir is quite erratic,” and attributed this “to wide variations in the discharge of tributary streams.” Although the engineers endeavored “to eliminate the influence of such tributary flow through “many devices,” as a group they settled on a partial record of “discharge of Rio Grande at Otowi Bridge and the inflow to Elephant Butte Reservoir,” one that did not include the months of July, August, and September, as the basis for a New Mexico delivery schedule. In their “opinion...no more precise relationship can be developed from present information, and that is use as a schedule will be practicable.”¹⁰⁷

¹⁰⁵ Preliminary Draft of Report of Committee to Rio Grande Compact Commissioners, December 22, 1937, 3-4. CB-F-137-34, Box 4X215, RAHP, UTA.

¹⁰⁶ R.A.H., “Tiptons Relation Curves for Natural Flow at Lobatos,” 12/18/37. CB-F-137-34, Box 4X215, RAHP, UTA.

¹⁰⁷ Preliminary Draft of Report of Committee to Rio Grande Compact Commissioners, December 22, 1937, 5. CB-F-137-34, Box 4X215, RAHP, UTA.

The engineers initially developed a curve based on an Otowi Bridge-San Marcial relation. However, owing to both the operational cost of the San Marcial station and the “physical condition” of the station that made “it difficult to obtain accurate records,” they looked to releases from Elephant Butte Reservoir which could “be measured with considerable precision.” Comparing the “normal net loss from the river below San Marcial and from the reservoir,” the engineers “found that for more than ten years” – presumably from 1937 back – such “losses have borne a very close and consistent relation to the discharge of the river at San Marcial.” According to the preliminary draft report,

The third step was then the subtraction of the normal losses so found from the curve of relationship between the flow at Otowi and that at San Marcial. The net result was to give a curve which expresses the relation between the flow of the Rio Grande at Otowi and the usable supply of water at Elephant Butte, both exclusive of July, August, and September.

“The final relationship” that the engineers “recommend[ed] be used as the schedule of deliveries” was expressed in a single table entitled “Deliveries into Elephant Butte Reservoir Exclusive of July, August, and September” with a column for “Otowi Index Supply” and “Elephant Butte Index Supply.”¹⁰⁸

Aside from the individual discussions of delivery schedules, additional evidence appears in the preliminary draft report that indicates the engineers had a 10-year period of record, roughly 1928 to 1937, in mind as they formulated the technical basis for a compact. The “Normal Release from Elephant Butte” was defined

as an average of 800,000 acre feet per annum drawn out of Elephant Butte Reservoir, adjusted for any gain or loss in usable water resulting from the operation of any reservoir below Elephant Butte; provide that this amount shall be adjusted by two-thirds of any change in aggregate diversions and loss to Mexico between Courchesne gaging station and the lowest point of diversion to lands of Rio Grande Project.

“[T] average annual diversion and loss to Mexico,” for the period “from 1928 to 1937, inclusive” was to be used as the “basis” for assessing “the amount of such change.”¹⁰⁹

Development of the delivery schedules does not seem to have posed the same challenges for the engineers that other aspects of the Compact – such as the quantity of water to be released from Elephant Butte and safeguards against diminished water quality, both discussed in my expert

¹⁰⁸ Preliminary Draft of Report of Committee to Rio Grande Compact Commissioners, December 22, 1937, 6. CB-F-137-34, Box 4X215, RAHP, UTA.

¹⁰⁹ Preliminary Draft of Report of Committee to Rio Grande Compact Commissioners, December 22, 1937, 8-9. CB-F-137-34, Box 4X215, RAHP, UTA.

report (pp. 28-29, and 52-53) – did. In fact, two days after the date of the preliminary draft report, Hill telegraphed Clayton to inform him that

except for Debler [the engineering advisor for the compact commissioner chair and Reclamation assistant chief engineer S.O. Harper] reasonable schedules for deliveries at Lobatos agreed upon and schedules of deliveries into Elephant Butte. Allowable departures likewise agreed upon but we are hung up on allowance to be made for bad quality of Middle Rio Grande water.¹¹⁰

There were some differences in language between the December 22 preliminary draft report and the final “Report of Committee of Engineers to the Rio Grande Compact Commissioners,” dated December 27, 1937. At the outset of the final report, for instance, the engineering advisors characterized their meetings slightly differently. As stated in my expert report (p. 29), the engineering advisors noted that they had “avoided discussion of the relative rights of water users in the three States.” Instead, they “were guided...by the general policy – expressed at the meeting of the Compact Commission in October – that present uses of water in each of the three States must be protected in the formulation the Compact,” as “the usable water supply is no more than sufficient to satisfy such needs.” The engineers further recognized that “precise determination of past conditions and close estimates of future changes” were “not possible,” so they recommended “review of these matters” by the commission “after five years and for adjustments within the intent of the Compact.” Where it came to the chronological basis for the delivery schedules, however, the same references to a roughly 10-year period of record, approximately 1928 to 1937, appear in the final report.¹¹¹

Tipton’s February 1938 *Analysis of Report of Committee of Engineers to Rio Grande Compact Commissioners, Dated 27, 1937* provides some further clarity as to the period of record used by the engineering advisors. This report was prepared for Hinderlider and was an assessment of “the effect of a compact,” predicated upon the recommendations made in the December 27 report, “on present and prospect water uses in the San Luis Valley.”¹¹²

¹¹⁰ Raymond [Hill] to Frank B. Clayton, Telegram, 1937 Dec 24. [1938-1940], Box 2F466, RGCC-FBCP, UTA.

¹¹¹ “Report of Committee of Engineers to Rio Grande Compact Commissioners,” December 27, 1937, in Proceedings of the Meeting of the Rio Grande Compact Commission, Held at Santa Fe, New Mexico, March 3rd to March 18th, inc., 1938, Appendix No. 1, 40, 41 (reference to “past ten years” in “Schedule Deliveries at Lobatos” section), 43 (reference to “more than ten years” in “Scheduled Deliveries into Elephant Butte Reservoir”), and 45 (reference to “average annual diversion and loss to Mexico from 1928-1937” under “Definitions,” paragraph (e) “Normal Release from Elephant Butte”). ff. 032.1 Rio Grande Basin. Corres. re Compact Between States of Colorado; New Mexico & Texas re Rio Grande Basin Water Rights, Jan. 1938 THRU May 1939, Box No. 936 Rio Grande Basin 023._246, Project Correspondence file 1930-1945, RG 115, NARA Denver.

¹¹² Royce J. Tipton to Mr. M.C. Hinderlider, February 19, 1938, in Tipton, *Analysis*, i. ff. 70, Box 44-70, MCHC 1897-1987, HC.

While the focus of Tipton's *Analysis* was on Colorado, he nevertheless addressed the chronological bases for both delivery schedules. The engineering advisor noted that "the agreement of the engineering committee" reflected in its report

recognized the impracticability of encroaching upon the present legitimate use of water in any section of the basin. The proposal was designed to permit not only present uses of water, but also to allow increased diversion and consumption of water above Elephant Butte Reservoir by utilizing water which otherwise would spill from that reservoir.

...To accomplish this end, the agreement recommends the setting up schedules of delivery of water at the Colorado-New Mexico stateline and into the Elephant Butte Reservoir, the first to represent present conditions based on the period 1928 to 1937, and the second based essentially on the period 1915 to 1937.¹¹³

Tipton's comments indicate that instead of using the same 10-year period of record, the engineers used two slightly different periods for the schedules – each "represent[ing] present conditions" in the two sections of the Upper Rio Grande Basin above Elephant Butte. The 1915-1937 timeframe is notably similar to the period of record that Hill used in making his initial September 30 proposal for deliveries to Texas, discussed above.

Although all the engineering advisors signed off on the December 27 report and recommended its adoption by the compact commission, as addressed in my expert report (pp. 33-35, and 37-38), Neuffer (in spite of whatever influence he may have exercised over Bliss, as noted above) and New Mexico compact commissioner and state engineer Thomas McClure objected to the report's recommendations and ultimately forced a revision. Neuffer and McClure's objections centered mostly on the recommended 800,000 af release for Elephant Butte, which Neuffer notably questioned based on his calculation of the average release from the reservoir over the past decade, 1927 to 1936.¹¹⁴ MRGCD's consulting engineer also could not replicate the curves used to develop the Otowi Bridge-Elephant Butte Reservoir relation and urged it be reconsidered.¹¹⁵

¹¹³ Tipton, *Analysis*, 5-6. ff. 70, Box 44-70, MCHC 1897-1987, HC.

¹¹⁴ As noted in my expert report (p. 33), when the New Mexico state engineer and compact commissioner learned the general outlines of the report on December 22 from Bliss, McClure confidentially told his advisor that the 800,000 af release "will not be agreeable." Bliss to [McClure], December 22, 1937; and T.M. McClure to John H. Bliss, telegram, 1937 Dec 24 AM 10 27. Rio Grande Compact – July 7, 1937 to June 30, 1938, 26th Fiscal Year, NM_0015692 – NM_00156929 and NM_00156927.

¹¹⁵ H.C. Neuffer, Consulting Engineer, to Mr. John H. Bliss, State Engineer's Office, Re: Report of Committee of Engineers to Rio Grande Compact Commissioners, December 27, 1937, January 7th, 1938. NM_00054005; H.C. Neuffer, Memorandum, Subject: Report of Committee of Engineers to Rio Grande Compact Commissioners, December 27, 1937, np [1-3, and 6]; JHB, Engineer, to Mr. R.J. Tipton, Consulting Engineer, January 14th, 1938. Rio Grande Compact – July 7, 1937 to June 30, 1938, 26th Fiscal Year, NM_00156900 – NM_00156902, NM_00156905, and NM_00156892 – NM_00156894.

McClure likewise stressed this point to his fellow compact commissioners, when the group assembled again in March 1938. He informed the commission that an analysis by his office found the Otowi-Elephant Butte indexing to be inaccurate and characterized the recommended relation to define New Mexico's delivery obligations as a "compromise" among the engineers.¹¹⁶

New Mexico's compact commissioner therefore asserted that an Otowi-San Marcial index (the months of July, August, and September excluded) be used instead. In his formal objections, McClure argued

The best relationship which existed in the past is expressed by a curve showing the relationship of Otowi to San Marcial. The numerous indeterminate factors that enter into the picture of usable supply in the reservoir will reflect greater inaccuracies than will the San Marcial method in using this as a basis for deliveries. These factors are bank storage, the determination of silt content on an annual basis, and losses occurring from the San Marcial gaging station to the reservoir.

And further,

New Mexico objects to natural flow at the Otowi station and insists upon recorded flow. Natural flow debits us with El Vado storage during the spring months, with no credit when this stored water is released during the months of July, August, and September.¹¹⁷

The engineering advisors, following a discussion among the commissioners and separately among the advisors themselves, agreed to re-visit both the Otowi Bridge-San Marcial relation and the 800,000 af release for Elephant Butte and revise their report accordingly. For his part, Texas compact commissioner Frank Clayton insisted that New Mexico "furnish the data and other figures on which they predicate their demands," which McClure was willing to oblige.¹¹⁸

The engineers worked in isolation, joined only by Neuffer. As addressed in footnote 84 of my expert report (p. 38), Neuffer's attendance was prompted by a suggestion by one of McClure's legal advisors, former New Mexico governor Arthur T. Hannett in a stated bid to "save a lot of time." Edwin Mechem, counsel to Elephant Butte Irrigation District (EBID) and a legal advisor to Clayton, immediately objected to what he saw as MRGCD engineering consultant being "substituted for the State's [New Mexico's] expert." Mechem asserted that EBID's interests were greater and that "Mr. Neuffer doesn't represent us." Hannett countered that his suggestion was not to replace Bliss but simply to include Neuffer. It was a "practical matter," because MRGCD's

¹¹⁶ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 1, 4-5, 7, 9, and 13. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

¹¹⁷ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 13. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

¹¹⁸ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 11-12 and 15, and Appendix No. 6, 56-57. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

support for the compact was essential to compact ratification by New Mexico's legislature. "For that reason the engineering expert of that district," he asserted, "has got at least to have the opportunity to check our figures before we bind ourselves, and that's all we ask." At Hinderlider's suggestion, Neuffer was therefore designated a "witness" rather than a direct participant in the engineering discussions with the commissioners agreeing that his contributions would be at the discretion of the engineers.¹¹⁹

The revised report took a week to complete. Dated March 9, 1938 and signed by all the engineering advisors with Neuffer "concur[ring]," it was presented to the compact commissioners the following day. The report reflected the two key changes sought by New Mexico: an Otowi Bridge-San Marcial index (excluding the months of July, August, and September), and a lesser figure of 790,000 af for the "normal release from Elephant Butte."¹²⁰

In returning to the Otowi Bridge-San Marcial relation that the engineering advisors had previously rejected, they also made a notable change to the period of record. The March 9, 1938 report, as the December 22, 1937 preliminary draft and the December 27, 1937 report, acknowledged the difficulties in assessing streamflow above Elephant Butte Reservoir in nearly the same language:

The relation between the amount of water in the Rio Grande above the principal agricultural areas in New Mexico and inflow to Elephant Butte Reservoir is quite erratic, due primarily to wide variations in the discharge of tributary streams.

Yet, whereas previously the engineers "had tried many devices to minimize the influence of such tributary inflow," only to be unable to do so and embraced an Otowi-Elephant Butte relation, with this revised report, they

found that there was a reasonable relationship between the discharges of Rio Grande at the Otowi Bridge and San Marcial gaging stations when the months of July, August, and September were excluded.

The revised report presented a new table, "Discharge of Rio Grande Exclusive of July, August, and September at Otowi Bridge and San Marcial," with a column for "Otowi Index Supply" and "San

¹¹⁹ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 15, and 18-22. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

¹²⁰ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 24, and Appendix No. 7, 61-62, and 65. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver. Ironically, in 1947, following recommendations by the Rio Grande Compact Commission engineering advisors, the commission elected to adopt a new Otowi-Elephant Butte relation as the basis for the New Mexico delivery schedule and to base that relation on a full year, rather than nine months. See Hill, "Development of the Rio Grande Compact of 1938," 33.

Marcial Index Supply.” The report also identified that the “values” in the column “express that relationship [between Otowi Bridge and San Marcial] for the period prior to 1930.”¹²¹

Precisely what was meant by “the period prior to 1930” and why such a change was made is not apparent from the immediate historical record produced at the time of the Compact negotiations. Although as discussed in my report (pp 39-40) the commissioners had additional questions for the engineers (which prompted a March 11 clarification report) none of those concerned the Otowi Bridge-San Marcial index or the period of record for the relation. This change, moreover, is in stark contrast to the period of record used for the “Scheduled Deliveries at Lobatos.” For both the “Discharge of Conejos River” and the “Discharge of Rio Grande Exclusive of Conejos,” reference continued to be made to “the past ten years,” which as discussed above was likely 1928 to 1937.¹²² Finally, without further clarification and without reference to periods of record, the Rio Grande Compact of March 18, 1938 incorporated the relationships worked out for both Lobatos and San Marcial as Article III and Article IV, as defining Colorado and New Mexico’s delivery obligations respectively.¹²³

Statements by Tipton, Bliss, McClure, and Hill following the signing of the Compact and decades later, however, shed further light on the periods of record used for both schedules. With regard to Article III, in early December 1966, in a signed statement to Texas Assistant Attorney General Vince Taylor, Tipton unequivocally declared that the period of record used to define Colorado’s delivery schedule was the period 1927 to 1938. This statement was given “in connection with the States of Texas and New Mexico versus Colorado, No. 29 Original in the Supreme Court of the United States.”¹²⁴ Colorado’s former compact engineering advisor admitted to Taylor that he “was actually the author of the formula found in Article III.” Tipton explained that the “reason” for the two indices, one for the Conejos and another for the Rio Grande, “were [sic] primarily for the purpose of Colorado and its internal measurement.” “The formula,” in his words, “was based

¹²¹ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, Appendix No. 7, 61. ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver.

¹²² Even when in the course of the Compact drafting the engineers noted an error in the curve for the “Discharge of Conejos River” and recommended different “values,” there is no indication that they abandoned “the past ten years” timeframe. See Committee of Engineering Advisors to The Rio Grande Compact Commission, March 17, 1938, 2. CB-F-169 E, Box 4X218, RAHP, UTA.

¹²³ Proceedings of the Meeting of the Rio Grande Compact Commission...March 3rd to March 18th, inc., 1938, 25-27, Appendix No. 7, 59, Appendix No. 8, 66, and Appendix No. 11, 74-76 (Article III of the Rio Grande Compact and 76-77 (Article IV). ff. 032.1, Box No. 936, Entry 7, RG 115, NARA Denver

¹²⁴ This statement, while signed, was undated. According to the document it was made at conference with Taylor “in the office of Tipton and Kalmbach, Inc.” in Denver, Colorado, December 8 and 9. Statement by Mr. Royce J. Tipton, 1. ff. Rio Grande Compact Commission Re suit against Colorado, w. 66-1061 Texas vs. Colorado, Box 1989 41-240 Litigation Files, Texas Attorney General [hereafter LF-TAG], Texas State Archives, Austin [hereafter TSA].

on 1927 to 1938 experience.” Other than to assert that “a terrific amount of work [was] done” for “the tables contained in Article III and Article IV,” Tipton offered nothing more in his statement on the derivation of the schedules in the March 9 report.¹²⁵

A discussion of the Compact provisions by Bliss nearly 30 years prior to Tipton’s statement supports the Colorado engineer’s assertion about the time period used for Article III and further explains the time period “prior to 1930” used for New Mexico’s delivery schedule. In an April 2, 1938 report, entitled “Provisions of the Rio Grande Compact,” New Mexico’s engineering advisor pointed out that the “two schedules” – “(1) at the Colorado-New Mexico State Line, and (2) at San Marcial at the head of Elephant Butte Reservoir” – provided for “[t]he division of the waters of the Rio Grande between the three states.” “The Colorado obligation,” according to Bliss, was “based upon two schedules of discharge, the sum of which equals the conditions of flow of the Rio Grande at the State Line during the past 10 years,” that is, 1927 to 1938.¹²⁶ New Mexico’s “obligation,” in turn,

to deliver water at San Marcial is based upon the index inflow of the Rio Grande at Otowi at the head of the Middle Valley and the index outflow at San Marcial at the lower end thereof, the relationship between the two representing conditions prior to 1930 when reclamation and drainage in the Middle Rio Grande Conservancy District was started.¹²⁷

Bliss’s observation that the Otowi-San Marcial index captured “conditions prior to 1930 when reclamation and drainage in the Middle Rio Grande Conservancy District was started” would seem to imply that the New Mexico delivery schedule was predicated upon basin conditions as those existed at the time of the 1929 temporary compact.

McClure’s undated “Analysis of the Terms of the Compact” confirms Tipton and Bliss’s observations about the differing chronological bases for the two delivery schedules. According

¹²⁵ Statement by Mr. Royce J. Tipton, 1-2. ff. Rio Grande Compact Commission Re suit against Colorado, w. 66-1061 Texas vs. Colorado, Box 1989 41-240, LF-TAG, TSA. Referenced by Tipton and more clearly explained by Hill, “the overall obligation of Colorado to deliver water at Lobatos” was later “reduced by 10,000 acre feet per annum...to avoid an impasse arising out of a conflict between water users along Conejos River and users of water from the Rio Grande.” Hill, “Development of the Rio Grande Compact of 1938,” 25.

¹²⁶ Likewise, Hinderlider in his “Analysis of Compact” from late 1938, makes the point with regard to Article III that the Colorado-New Mexico delivery schedule was “as determined by conditions of inflow and outflow since 1928 (the former temporary compact provided that the conditions on the river should remain as of 1929).” M.C. Hinderlider, “Analysis of Compact,” in *Rio Grande Compact [and Analysis Thereof by M.C Hinderlider in Address to Colorado Legislature and to Gov. Teller Ammons on Nov. 15-1938]*, 23. ff. 58, Box 44-70, MCHC 1897-1987, HC.

¹²⁷ J.H. Bliss, Engineer, “Provisions of the Rio Grande Compact,” Santa Fe, N.M., April 2, 1938, 1. ff. Rio Grande Compact Engineer-Adviser Data, 1937-1938, Box No. 27, Accession Number 7978, John H. Bliss Collection, American Heritage Center, University of Wyoming, Laramie.

to the New Mexico state engineer and compact commissioner, “The Colorado schedule of water deliveries is based upon the relation found to exist between the annual inflow into, and the outflow from, the San Luis Valley for the years 1928 to 1937, both inclusive.” As for “The New Mexico schedule of water deliveries,” it was predicated “upon the relationship between the inflow to the Middle Valley at Otowi gaging station for the years of record prior to 1930.” “The period 1930 to 1937,” McClure elaborated, “could not be included because of the changed conditions of discharge at San Marcial due to the works of the Middle Rio Grande Conservancy District.”¹²⁸

Hill had a slightly different but not contradictory view on the timeframes upon which the two schedules were based. As discussed in my expert report (p. 112), in a 1968 narrative account of the Compact negotiations prepared for the same original action Texas and New Mexico filed against Colorado in which Tipton offered his views on Article III, Texas’ engineering advisor opined:

The Committee of Engineering Advisers was instructed to prepare schedules of deliveries by Colorado and by New Mexico that would insure [*sic*] maintenance of the relationships of stream inflow to stream outflow that had prevailed under the conditions existent when the Compact of 1929 was executed.

This was done because

[t]he Rio Grande Compact Commissioners, during their meetings in 1937 and 1938...had to divide an insufficient supply among three groups of water users, each of which was antagonistic to the other two. Their solution was to hold to the principles of the 1929 Compact and to depart as practicable from its provisions.

In the engineer’s opinion,

The Rio Grande Compact should thus be looked upon as an expansion of the Compact of 1929, designed to provide for the maximum beneficial use of water in the basin of Rio Grande above Fort Quitman without impairment of any supplies beneficially used under the conditions prevailing in 1929.¹²⁹

Given the streamflow data compiled by the Rio Grande Joint Investigation and the engineering advisor’s positive assessment of the work for their negotiations, it seems likely that the data used by the engineers to capture “the conditions prevailing in 1929” for the New Mexico delivery schedule would have been for the period 1890 to 1929.

¹²⁸ Thomas B. McClure, State Engineer, “Analysis of the Compact,” undated, 21. NM_00164500.

¹²⁹ Hill, “Development of the Rio Grande Compact of 1938,” 62 and 63.

Yet, where it came to Colorado, judging from Tipton's 1966 statement, Bliss's 1938 report, and McClure's undated analysis, a different time period was used. Hill himself acknowledged in his 1968 narrative that the schedule initially developed by Tipton and presented at the September 1937 meetings of the compact commission was based on

the relationship, under 1928-1937 conditions of development, between the recorded flow of the Rio Grande at the gaging station near Del Norte plus the recorded flow of the Conejos at the Mogote gaging station and the recorded flow of the Rio Grande at the Lobatos gaging station.¹³⁰

This apparent departure from "the conditions prevailing in 1929" for the Colorado delivery schedule could very well have been a "practicable" decision, reflecting the exigencies of the Compact negotiation. As discussed above and in Opinion I of my expert report (pp. 3-43), in apportioning the waters of the Rio Grande equitably, the purpose of the 1938 Rio Grande Compact was to enable new water projects above Elephant Butte while protecting the water supply of the federal Rio Grande Project below the reservoir. The *JIR*'s 1937 analysis of stream flow above Lobatos under then-present conditions focused on the period 1927 to 1935 and provided Tipton with the data necessary to make the case for Colorado. As negotiations continued among the engineers, he shifted that period of record to 1928 to 1937 and there is little in the historical record to counter the conclusion that Tipton's fellow engineers rejected his use of this timeframe for establishing Colorado's delivery schedule. For them, as suggested by Hill's December 24, 1937 telegram to Clayton, it was "acceptable," and as indicated in Tipton's February 1938 *Analysis*, it "represented present conditions" for Colorado.

Use of a period of record "prior to 1930" for the New Mexico delivery schedule was line with Hill's stated understanding of the commissioners' direction to their engineering advisors and may have been a "practicable" decision of its own that "represented present conditions." This schedule seemingly balanced the two competing water projects within New Mexico: the Middle Rio Grande Conservancy District and the federal Rio Grande Project. MRGCD, as discussed in my expert report (pp. 16), was organized in 1925 and by the mid-1930s, was seen by Texas as a threat to the Rio Grande water supply below Elephant Butte.¹³¹ As also noted in my expert report (pp.

¹³⁰ Hill, "Development of the Rio Grande Compact of 1938," 23.

¹³¹ See State of New Mexico, County of Bernalillo, In the District Court, In the Matter of the Middle Rio Grande Conservancy District, No. 14157, First Report of the Board of Directors, G.E. Cook, President, Ramon Baca y Chavez, Director, Robert E. Dietz, Director, E.G. Watson, Secretary. Dated at Albuquerque, New Mexico, August 27th, 1926, 2-5, and 13. ff. 222. Rio Grande Basin Irrigation Districts Middle Rio Grande Transfer Case Thru 1929, Box 928 Rio Grande Basin-Lower Rio Grande 301.- -545., Middle Rio Grande 222.- -223., Entry 7, RG 115, NARA Denver; *Supreme Court of the United States, October Term 1936, No. 12 Original, State of Texas vs. State of New Mexico, et al., Ad Interim Report of the Special Master*, received Mar. 26, 1937, 4-5. ff. RG 267, Entry 26, TX v NM #10, Box 401 1939 to 1939 PI 139, Entry

24-25), prior to the engineering advisors' meetings, McClure insisted that the district's development be protected in a compact, and Neuffer's subsequent objections to the Otowi-Elephant Butte relation (reiterated by McClure) and his later inclusion in the engineering advisors' meetings is further evidence of New Mexico's interest in supporting its Middle Valley.¹³²

Texas negotiators nevertheless insisted that the Rio Grande Project water supply, which served lands in New Mexico and Texas, be safeguarded and the resulting schedule aimed to do that without preventing development of lands above Elephant Butte. The *JIR*'s streamflow analysis of the Otowi Bridge-San Marcial relation, as discussed above, had focused on the period from 1890 to 1935. Although available records for both stations only went back to 1895, federal investigators had extrapolated a relationship back to 1890 and had concluded that that little had changed in water consumption within this part of the Upper Rio Grande Basin since then (except for "variations in the water supply"). Yet, those engineers had also been unable to determine the impact of MRGCD's works on the Rio Grande between 1930 and 1935. Adopting a timeframe prior to the advent of the district's operations would appear to side-step the issue, preserving a water supply condition as of 1929 when the temporary compact took effect. While this might have left to New Mexico and Middle Rio Grande Conservancy District the challenge of demonstrating that the district would not diminish the river's flow and harm the Rio Grande Project, it may also have insured that the federal project would not obtain any more water than a longer period of record, or a more recent one, based on a different relationship (Otowi-Elephant Butte) might provide. This historical interpretation would further tend to support the finding in the Special Master's *First Interim Report* (pp. 197-198) that

New Mexico's duties to relinquish control of the water at Elephant Butte and to *refrain from post-Compact depletions of water below Elephant Butte* [emphasis added] do not arise from any implied covenant or implied term, but from the very meaning of the text of the Compact.

In conclusion, in my expert opinion as a historian, available historical evidence indicates that the engineering advisors responsible for developing the technical basis for the 1938 Rio Grande Compact used two different periods of record for the Compact's delivery schedules: the period 1928 to 1937 for Colorado's delivery to New Mexico, and the period "prior to 1930," or approximately 1890 to 1929, for New Mexico's delivery to Texas. This evidence further suggests that these schedules were based on streamflow analyses of Rio Grande and tributary flow at key

26, Original Jurisdiction Case Files, 1792-2005, Records of the Supreme Court of the United States, Record Group 267, National Archives Building, Washington, DC; and Littlefield, *Conflict on the Rio Grande*, 198-199.

¹³² For McClure's statement in support of MRGCD, see Proceedings of the Meeting of the Rio Grande Compact Commission...September 27, to October 1, 1937, 12. Untitled folder 5, Box 2F463, RGCC-FBCP, UTA.

stations within the Upper Rio Grande Basin made by the federal Rio Grande Joint Investigation. These schedules were intended to reflect then-present conditions of water use within the San Luis Valley in Colorado and the Middle Valley in New Mexico for their respective time periods – thus providing an equitable apportionment of the waters of the Rio Grande that would permit new water developments within the basin without compromising the water supply of the existing Rio Grande Project.

Context of the 1938 Rio Grande Compact

Submitted to:

U.S. Department of Justice



Submitted by:
Nicolai Kryloff

Historical Research Associates, Inc.
Washington, D.C.

May 31, 2019



HISTORICAL
RESEARCH
ASSOCIATES, INC.

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NM_EX-130

**EXHIBIT
NK-02**

the water users within its boundaries the charges assessed against them and pay it over to the United States Government.”⁴⁸

In all, Special Master Grimsal found that the Rio Grande Compact Commission, in negotiating the 1938 Rio Grande Compact, “fully relied upon the existing Rio Grande Project to impart Texas’ and lower New Mexico’s respective equitable apportionments of Rio Grande waters.” He observed that New Mexico did not dispute this conclusion. It was “unfathomable,” he wrote, that Texas would have agreed to the 1938 Compact if New Mexico had been allowed to “simply recapture the water it delivered to the Project, destined for Texas, upon its immediate release from the Reservoir.”⁴⁹ To Special Master Grimsal, the Rio Grande Compact parties understood that water for Texas would be apportioned through the Rio Grande Project.

Supreme Court Opinion

On March 5, 2018, the U.S. Supreme Court issued an opinion that agreed with Special Master Grimsal’s general proposition: The 1938 Rio Grande Compact incorporated the Rio Grande Project as the vehicle for delivering Texas’ apportionment. In the opinion, Justice Neil Gorsuch noted that “downstream contracts,” between the federal government and the irrigation districts under the Rio Grande Project, resolved apportionment issues between New Mexico and Texas below Elephant Butte Reservoir, based on irrigable acres in each state under the project—roughly 57 percent for New Mexico and 43 percent for Texas.⁵⁰

The Supreme Court viewed the 1938 Compact as being “inextricably intertwined with the Rio Grande Project and the Downstream Contracts.” Gorsuch wrote that the compact could only achieve its purpose of “equitable apportionment” of the Rio Grande, because at the time of the compact’s signing, the federal government had assumed a legal responsibility to deliver a certain amount of water to Texas through the downstream contracts.⁵¹ Additionally, the Court pointed out that New Mexico conceded that the United States had an integral role in compact operations, by virtue of its responsibility for water delivery under the downstream contracts.

In the Supreme Court’s opinion, the United States served as a sort of “agent” of the Rio Grande Compact, with the downstream contracts implicitly incorporated into the compact’s terms. These contracts were, in the opinion of the Court, “themselves essential to the fulfillment of the compact’s

⁴⁸ Proceedings of Meeting between Representatives of Lower Rio Grande Water Users and Representatives of Irrigation Districts Under the Rio Grande Project of the Bureau of Reclamation, May 27, 1938, 14.

⁴⁹ First Interim Report, 209.

⁵⁰ *Texas v. New Mexico et al.*, 583 U.S. ____ (2018), 2.

⁵¹ *Texas v. New Mexico et al.*, 583 U.S. ____ (2018), 5–6.

parties? How was it regulated, if at all? How did this activity fit within Rio Grande Compact administration? These questions present avenues for further historical research, to determine whether developments after 1938 confirm, supplement, or otherwise affect my opinions about information available to the compact parties regarding project operations and conditions below Elephant Butte Reservoir.

A handwritten signature in black ink, appearing to read 'Nicolai Kryloff', is positioned above a horizontal line.

Nicolai Kryloff

Project Historian, HRA



May 31, 2019

EXPERT REPORT OF ROBERT J. BRANDES

In the matter of:

No. 141, Original

In the Supreme Court of the United States

State of Texas v. State of New Mexico and State of Colorado

Prepared for:

Somach Simmons & Dunn

500 Capitol Mall, Suite 1000

Sacramento, CA 95814

Prepared by:

A handwritten signature in black ink that reads 'Robert J. Brandes'. The signature is written in a cursive style with a large 'R' and 'B'.

Robert J. Brandes, P.E., Ph.D.

Robert J. Brandes Consulting

6000 Maurys Trail

Austin, Texas 78730



MAY 31, 2019

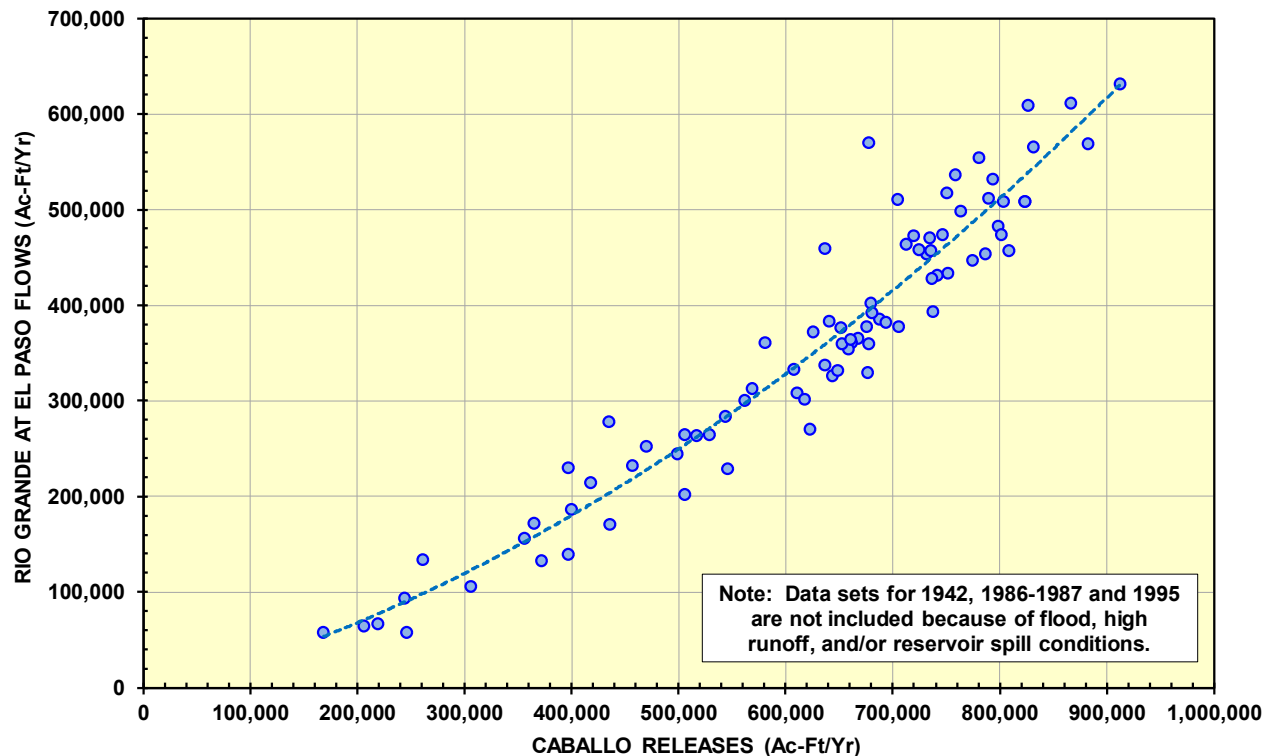
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NM_EX-131

relationship between flows in the Rio Grande at El Paso and releases from Caballo Reservoir is illustrated by the plot in Figure 5.1 [15,21,27].

Figure 5.1 1930-2017 Annual Rio Grande Flows at El Paso versus Releases from Elephant Butte and Caballo Reservoirs



These data represent annual values for the period from 1930 through 2017, with Elephant Butte releases used for the 1930-1937 period prior to the time Caballo Dam was constructed, and, as expected, they demonstrate the general increase in the flows of the Rio Grande at El Paso as the annual reservoir releases increase. As shown, as the magnitude of the annual flows increases, the flows in the river at El Paso represent a greater fraction of the Caballo release, ranging from around a third on the lower end up to about two-thirds for the higher flows. This is due partly to the fact that losses from the Rio Grande and diversions in New Mexico represent a smaller proportion of the river flow under high-flow conditions.

5.1 Time Series Observations

Because of the dominance of the releases from Caballo Reservoir on the flows of the Rio Grande downstream, time series of annual reservoir releases provide a useful independent dataset against which corresponding river flows and other hydrologic parameters can be compared and examined for trends and changes in trends. Annual values of hydrologic variables often exhibit considerable variation in response to wet/dry conditions; therefore, sometimes it is more informative to examine cumulative summations of these quantities over time. Since groundwater pumping in the Rincon and Mesilla basins in New Mexico began to significantly develop in the early 1950s in response to drought conditions, cumulative plots beginning well before the 1950s are necessary in order to show any perturbations that may have been caused by the historical groundwater withdrawals.

just upstream of El Paso. The inflows to the Rio Grande from this drain, like that from many others upstream in the Rincon and Mesilla basins, are an important source of Project water for downstream users, in this case those in Texas. The use of these return flows to meet Project water demands has been an integral component of the Rio Grande Project since the early 1900s [19], and without these return flows, the water budget for the Project is significantly altered.

As shown on the graph, the historical data exhibit a drastic change of slope beginning during the early 1950s and then continuing with a flatter slope through 1995. This flattening of the slope of the historical data compared to the straight-line extension of the pre-1950 data trend (red dashed line) indicates that the flow discharging from the drain was significantly reduced – by an average of approximately 39,000 acre-feet per year from 1951 through 1995. While some of this flow reduction may be attributed to improved irrigation efficiency, it more likely than not was due to the loss of groundwater inflows to the drain that resulted from the lowering of groundwater levels caused by irrigation pumping that began in the early 1950s. With lower groundwater levels, any irrigation tailwater or excess irrigation water flowing in the drain seeped into the underlying soil thus reducing or eliminating flows in the drain and subsequent discharges of return flows into the Rio Grande. Hutchison illustrates this with his groundwater model [29,30].

5.2 Rio Grande Flows at El Paso

As discussed in Subsection 4.3, reductions in the flow of the Rio Grande at El Paso coinciding with the development of groundwater pumping in the Rincon and Mesilla basins have been of concern for many years. While there is a multitude of approaches for examining these changes ranging from simple time-series graphs to complex modeling procedures, the double-mass graphical method provides one of the most useful means for analyzing historical data to gain insight into understanding the causes of changes in hydrologic phenomena. This technique involves graphical presentations of time series data expressed as cumulative values of a dependent variable plotted against the cumulative values of an independent variable, with the resulting curve beginning on a specified date and proceeding in time to an ending date.

This double-mass approach is applied to historical flow data for the Rio Grande at El Paso on the graph in Figure 5.4, where the historical cumulative flows in the Rio Grande at El Paso (dependent variable), beginning in 1930, are plotted against the corresponding cumulative releases from Caballo Reservoir (independent variable) [15,21,27]. This is the same form of graph that was previously discussed in Subsection 4.3 with regard to the 1982 report [6] for examining similar trends. As shown in Figure 5.4, the historical data are plotted in three groups corresponding to three different time periods; one for 1930 through 1950 before the 1950s severe drought, a second covering the 1950s drought from 1951 through 1957 when significant groundwater development began in the Rincon and Mesilla basins, and a third for 1958 through 2017 after the 1950s drought as groundwater pumping continued to develop.

The curve depicted by the combined data sets representing the entire 1930-2017 period exhibits a distinct change in slope beginning during the early 1950s (green squares), with the curve following a generally uniform but flatter slope after the 1950s (blue triangles). This change in the slope of the historical data curve during the 1950s could be partially a result of the drought of the 1950s when releases from Caballo Reservoir were reduced because of the limited supply of stored water in Elephant Butte Reservoir and when channel losses along the Rio Grande may have been more

Table 6.2 Baseline Normal Supply Conditions for Rio Grande Project Based on 1938 JIR

		(1)	(2)
	PARAMETER DESCRIPTION	BASED ON 1938 JOINT INVESTIGATION	EXTENDED TO RIO GRANDE COMPACT
	Normal-Supply Release from Reservoirs (ac-ft/year):	773,000	790,000
(1)	Rincon Valley		
(2)	Irrigated Lands (acres)	13,423	13,423
(3)	Net Diversions of Reservoir Releases, ac-ft	69,463	71,434
(4)	Net Diversions of Arroyo Inflow, ac-ft	1,496	1,496
(5)	Net Diversions of Drain Flow & Seepage, ac-ft	217	223
(6)	Total Net Diversions of Rio Grande Project Water, ac-ft	71,176	73,154
(7)	Drainage Return Flow, ac-ft	37,182	38,215
(8)	Calculated Streamflow Depletion, ac-ft	33,995	34,939
(9)	Unit Area Streamflow Depletion, ac-ft/acre	2.53	2.60
(10)	Total Riverbed Loss (Caballo to Leasburg)	30,974	30,974
(11)	Riverbed Loss of Reservoir Releases (Caballo to Leasburg)	30,200	30,200
(12)	Mesilla Valley - EBID and EPCWID		
(13)	Irrigated Lands (acres)	78,179	78,179
(14)	Net Diversions of Reservoir Releases, ac-ft	380,125	390,886
(15)	Net Diversions of Arroyo Inflow, ac-ft	11,090	11,090
(16)	Net Diversions of Drain Flow & Seepage, ac-ft	31,173	32,056
(17)	Total Net Diversions of Rio Grande Project Water, ac-ft	422,389	434,033
(18)	Drainage Return Flow, ac-ft	204,824	210,470
(19)	Calculated Streamflow Depletion, ac-ft	217,565	223,563
(20)	Unit Area Streamflow Depletion, ac-ft/acre	2.78	2.86
(21)	Total Riverbed Loss (Leasburg to Courchesne)	29,844	29,844
(22)	Riverbed Loss of Reservoir Releases (Leasburg to Courchesne)	26,800	26,800
(23)	Mesilla Valley - EBID		
(24)	Irrigated Lands (acres)	68,645	68,645
(25)	Net Diversions of Reservoir Releases, ac-ft	333,769	343,217
(26)	Net Diversions of Arroyo Inflow, ac-ft	9,738	9,738
(27)	Net Diversions of Drain Flow & Seepage, ac-ft	27,372	28,147
(28)	Total Net Diversions of Rio Grande Project Water, ac-ft	370,878	381,102
(29)	Drainage Return Flow, ac-ft	179,845	184,803
(30)	Calculated Streamflow Depletion, ac-ft	191,033	196,299
(31)	Unit Area Streamflow Depletion, ac-ft/acre	2.78	2.86
(32)	Total Riverbed Loss (Leasburg to Mesilla Dam)	10,927	10,927
(33)	Riverbed Loss of Reservoir Releases (Leasburg to Mesilla Dam)	9,812	9,812
(34)	Mesilla Valley - EPCWID		
(35)	Irrigated Lands (acres)	9,534	9,534
(36)	Net Diversions of Reservoir Releases, ac-ft	46,357	47,669
(37)	Net Diversions of Arroyo Inflow, ac-ft	1,352	1,352
(38)	Net Diversions of Drain Flow & Seepage, ac-ft	3,802	3,909
(39)	Total Net Diversions of Rio Grande Project Water, ac-ft	51,511	52,931
(40)	Drainage Return Flow, ac-ft	24,978	25,667
(41)	Calculated Streamflow Depletion, ac-ft	26,532	27,264
(42)	Unit Area Streamflow Depletion, ac-ft/acre	2.78	2.86
(43)	Total Riverbed Loss (Mesilla Dam to Courchesne)	18,917	18,917
(44)	Riverbed Loss of Reservoir Releases (Mesilla Dam to Courchesne)	16,988	16,988
(45)	El Paso Valley		
(46)	Irrigated Lands (acres)	53,398	53,398
(47)	Net Diversions of Reservoir Releases, ac-ft	157,412	161,679
(48)	Net Diversions of Arroyo Inflow, ac-ft	8,421	8,421
(49)	Net Diversions of Drain Flow & Seepage, ac-ft	110,376	113,395
(50)	Total Net Diversions of Rio Grande Project Water, ac-ft	276,209	283,496
(51)	Drainage Return Flow, ac-ft	145,692	149,535
(52)	Calculated Streamflow Depletion, ac-ft	130,518	133,961
(53)	Unit Area Streamflow Depletion, ac-ft/acre	2.44	2.51
(54)	Total Riverbed Loss (Courchesne to Tornillo Heading)	12,039	12,039
(55)	Riverbed Loss of Reservoir Releases (Courchesne to Tornillo H.)	7,000	7,000
(56)	Indivertible Reservoir Releases Bypassed below Project	65,000	65,000
(57)	Total Indivertible Water Bypassed below Project	202,900	202,900
(58)	Mexico		
(59)	Total Diversions of Rio Grande Project Water, ac-ft	60,000	60,000
(60)	Diversions of Reservoir Releases, ac-ft	37,000	37,000
(61)	Diversions of Drain Flow & Seepage (balance), ac-ft	21,000	21,000
(62)	Diversions of Arroyo Inflow (nearest 1,000), ac-ft	2,000	2,000

IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLO

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

REMOTE ORAL AND VIDEOTAPED DEPOSITION OF
NICOLAI KRYLOFF
AUGUST 6, 2020

REMOTE ORAL AND VIDEOTAPED DEPOSITION of NICOLAI KRYLOFF, produced as a witness at the instance of the Defendant State of New Mexico, and duly sworn, was taken in the above-styled and numbered cause on August 6, 2020, from 9:02 a.m. to 2:52 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of HEATHER L. GARZA, CSR, RPR, The Woodlands, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

TX v. NM # 141

New Mexico Exhibit

NM_EX-253

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1 Q. If you turn to Page 2 of your report, under
2 the heading, "Basis for Historical Inquiry."

3 A. Okay.

4 Q. Under the second paragraph, under that
5 heading on Page 2, the second sentence reads, "The
6 Special Master concluded that the structure of the
7 1938 fully incorporated the Rio Grande Project, which
8 functioned as the vehicle by which Texas and part of
9 New Mexico would receive their equitable
10 apportionments of the Rio Grande above Fort Quitman,
11 Texas." Do you see that?

12 A. Yes.

13 Q. Based on the work that you did, does the
14 historic records support the conclusion of the Special
15 Master that you are identifying there?

16 A. The historic record, you mean the documents
17 that I collected?

18 Q. Correct.

19 A. I don't know. I -- I think that opinion is
20 based more on the Special Master's Interim Report and
21 the Supreme Court.

22 Q. In other words, the -- the statement that
23 you're including here on Page 2, that's based on the
24 First Interim Report and the opinion released by the
25 Supreme Court in 2018?

1 A. Primarily. I think there's some archival
2 documents that speak to that issue, as well.

3 **Q. What archival documents speak to that issue?**

4 A. There's at least one that comes to mind,
5 which you're probably familiar with. I think it was a
6 1938 document from Frank Clayton to Sawnie Smith.

7 **Q. You've cited that in your report; is that**
8 **right?**

9 A. Yes.

10 **Q. I think we'll have a chance to look at that**
11 **letter in a little bit. Are there any other archival**
12 **documents that you would point to as particularly**
13 **relevant to this issue identified that we just were**
14 **talking about?**

15 A. That the Rio Grande Project is the vehicle or
16 mechanism --

17 **Q. Right.**

18 A. -- by which the water is allocated between
19 New Mexico and Texas beyond -- below Elephant Butte?

20 **Q. Correct.**

21 A. I can't think of any.

22 **Q. And so when I asked you earlier if the**
23 **historic record supported the statement and you**
24 **said, "I don't know," what were you meaning to convey**
25 **by saying "I don't know"? Are you saying that you're**



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December 11, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of: **Nicolai Kryloff**
8/6/2020
State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein that the deposition **has not been** signed by the witness.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65021

cc:
Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Robert B. Hoffman
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

STATE OF TEXAS)
)
)
 Plaintiff,)
) Original Action Case
 VS.) No. 220141
) (Original 141)
 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
)
 Defendants.)

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, NICOLAI KRYLOFF, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. WECHSLER - 03:45:49

MR. HOFFMAN - 00:00:00

9 MR. DUBOIS - 00:04:48

MR. WALLACE - 00:01:27

10 MS. BARNCASTLE - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 2nd day of September, 2020.

14 

HEATHER L. GARZA, CSR, RPR, CRR

15 Certification No.: 8262

Expiration Date: 04-30-22



16
17 Worldwide Court Reporters, Inc.

Firm Registration No. 223

18 3000 Weslayan, Suite 235

Houston, TX 77027

19 800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLO

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

REMOTE ORAL AND VIDEOTAPED DEPOSITION OF
SCOTT MILTENBERGER

JUNE 8, 2020

REMOTE ORAL AND VIDEOTAPED DEPOSITION of SCOTT MILTENBERGER, produced as a witness at the instance of the Defendant State of New Mexico, and duly sworn, was taken in the above-styled and numbered cause on June 8, 2020, from 9:03 a.m. to 3:30 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of HEATHER L. GARZA, CSR, RPR, The Woodlands, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

TX v. NM # 141

New Mexico Exhibit

NM_EX-254

Worldwide Court Reporters, Inc.
(800) 745-1101

1 A. I'm not certain if I understand what you mean
2 by methodology.

3 Q. A mechanism, a way. I mean, we've looked at
4 documents you agreed to this morning both from Texas'
5 complaint and also this letter from Mr. Smith -- I'm
6 sorry -- Mr. Clayton. We can look at that language
7 again. Mr. Clayton actually says the question of the
8 division of the water released by Elephant Butte is
9 taken care of by contracts between the districts under
10 the Rio Grande project and the Bureau of Reclamation?

11 A. What --

12 Q. I'm sorry?

13 A. No, I'm sorry.

14 Q. I mean, that's what we discussed this
15 morning, right?

16 A. Yes.

17 Q. Is there some piece of that, that you
18 disagree with?

19 A. I'm not certain if I follow what you mean
20 by "piece of that." Piece of Mr. Clayton's letter?

21 Q. Yeah. We're talking about the way in which
22 the water -- the historic record reflects that the
23 water was divided below Elephant Butte?

24 A. Well, I think that's reflected in how the
25 project operated and how water was used and reused

1 down and throughout the project. To me, it's not
2 surprising that the figure that was arrived at for
3 delivery into Elephant Butte was 790,000 acre-feet.
4 That's only 10,000 acre-feet off of what Texas asked
5 to be released in part of the Compact negotiations,
6 and Raymond Hill elaborates on ultimately what the 790
7 constitute. So, again, approaching this from a
8 different orientation, different interpretive
9 orientation, that 790,000 acre-feet of water would
10 seem to be water -- seem to be molecules that were
11 intended to serve lands not only in New Mexico, but in
12 Texas all the way down to Fort Quitman with, of
13 course, the understanding, and as is reflected in
14 Mr. Clayton's letter, that the Rio Grande project,
15 Elephant Butte was an essential control point for all
16 the other reasons he elaborates in the letter having a
17 measurement that state line would be difficult. So
18 the mechanism, as you say, asking about the
19 apportionment was the Compact itself, the 790,000
20 acre-feet that had to be delivered to Elephant Butte
21 by New Mexico.

22 **Q. Which then served those lands in New Mexico**
23 **and Texas?**

24 A. All the way down to Fort Quitman.

25 **Q. Well, the project serves to Fabens, right?**

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS)
)
 Plaintiff,)
) Original Action Case
 VS.) No. 220141
) (Original 141)
 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
)
 Defendants.)

THE STATE OF TEXAS :
 COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, SCOTT MILTENBERGER, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

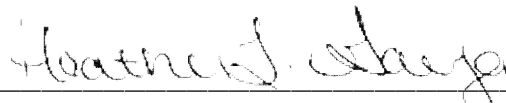
I further certify that I am not, in any capacity, a regular employee of the party in whose

behalf this deposition is taken, nor in the regular
employ of this attorney; and I certify that I am not
interested in the cause, nor of kin or counsel to
either of the parties.

That the amount of time used by each party at
the deposition is as follows:

MR. WECHSLER - 04:26:04
MR. HOFFMAN - 00:00:00
MR. DUBOIS - 00:00:00
MR. WALLACE - 00:01:59
MS. O'BRIEN - 00:00:00
MS. BARNCASTLE - 00:00:00

GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
this, the 22nd day of June, 2020.


HEATHER L. GARZA, CSR, RPR, CRR
Certification No.: 8262
Expiration Date: 04-30-22



Worldwide Court Reporters, Inc.
Firm Registration No. 223
3000 Weslayan, Suite 235
Houston, TX 77027
800-745-1101

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
81/17	Add "Not" before "limited"	Intended meaning
85/14	"Constitute" for "institute"	Intended meaning / clarity
103/6	"salient" for "saline"	Intended meaning / mis transcribed

 4/13/2020
SCOTT MILTENBERGER

S I G N A T U R E O F W I T N E S S

I, SCOTT MILTENBERGER, solemnly swear or affirm
under the pains and penalties of perjury that the
foregoing pages contain a true and correct transcript
of the testimony given by me at the time and place
stated with the corrections, if any, and the reasons
therefor noted on the foregoing correction page(s).

A handwritten signature in blue ink, reading "Scott Miltenberger 7/13/2020", is written over a horizontal line.

SCOTT MILTENBERGER

Job No. 63391

IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLO

STATE OF TEXAS, :
 :
 :
 Plaintiff, :
 :
 VS. : Original Action Case
 : No. 220141
 STATE OF NEW MEXICO AND : (Original 141)
 STATE OF COLORADO, :
 :
 Defendants. :

ORAL AND VIDEOTAPED DEPOSITION OF
HERMAN ROBERT SETTEMEYER
JULY 30, 2020
VOLUME 1

ORAL AND VIDEOTAPED DEPOSITION OF HERMAN ROBERT SETTEMEYER, produced as a witness at the instance of the Defendant State of New Mexico, and duly sworn, was taken in the above-styled and numbered cause on July 30, 2020, from 9:18 a.m. MDT to 4:10 p.m. MDT, via Zoom, before PHYLLIS WALTZ, RMR, CRR, CRC, Texas CSR, TCRR, Louisiana CCR, in and for the State of Texas, recorded by machine shorthand, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed before any Notary Public.

TX v. NM # 141

New Mexico Exhibit

NM_EX-255

Worldwide Court Reporters, Inc.
(800) 745-1101

1 any work duties related to the Rio Grande basin?

2 A. I don't -- I don't recall. During this period
3 of time, I don't recall.

4 Q. Did the -- did the agency split up the state
5 into different geographic areas that different engineers
6 would work in?

7 A. Only -- only for the adjudication process. So
8 during -- for the enforcement and the permitting
9 process, you know, when those -- when those applications
10 or those issues came before the agency, then they
11 were -- they were assigned to various individuals
12 working on -- on -- on -- in that field.

13 Q. Okay. We're going to jump forward, then, to
14 the next entry where you spent 25 years, and the entry
15 listed is "Texas Commission on Environmental Quality
16 Engineer Advisor/Manager." Do you see that entry on
17 your screen?

18 A. Yes.

19 Q. Actually, before we go to that, just one other
20 follow-up question related to when you were doing one of
21 the water rights work. Did you ever, as part of any of
22 your duties, have to look at impacts to the surface
23 water stream from groundwater pumping?

24 A. No.

25 Q. So then on the -- the next entry that I just

1 mentioned for the next 25 years, is what you've entered
2 here, the "Engineer Advisor/Manager," are those two
3 separate duties or two separate titles that you held?

4 A. Well, beginning in 1987 is when I started
5 doing the work related to the interstate compacts, and I
6 was the Engineer Adviser for the Canadian, Pecos, Red,
7 Rio Grande, and Sabine River Compacts. Although for a
8 portion of that time, I only became the, quote, official
9 Engineer Adviser on the Rio Grande during the tenure of
10 the commissioner before Pat Gordon. We used to have
11 a -- a staff out in El Paso of an engineer and
12 administrative assistant and -- and that was the
13 official -- that engineer was the official Engineer
14 Adviser for the Rio Grande up until, like I said, during
15 the tenure of the commissioner preceding Pat Gordon,
16 whose name escapes me at the moment.

17 But, anyway, but I was always Engineer Adviser
18 for the Canadian, Pecos, Red, and Sabine River Compacts
19 and then for the Rio Grande for I don't know how long
20 that was, 18 years, ten years, something like that.
21 But -- but even during that period of time, from 1987
22 forward, while I was not the official Engineer Adviser,
23 I was kind of -- I was -- I was an additional Engineer
24 Adviser, and the -- the other gentleman would actually
25 sign the Engineer Adviser's reports during that time,

1 until, like I said, during the time when that position
2 was done away with under the commissioner previous to
3 Commissioner Gordon.

4 Q. Okay. So when you say you were an additional
5 Engineer Adviser, what I may use sometimes the shorthand
6 of EA, does that mean you attended all of those EA
7 meetings?

8 A. Yes. Yeah.

9 Q. And then would you help develop the Engineer
10 Adviser reports?

11 A. Yes.

12 Q. And during this time when you were working on
13 the interstate compacts, did you have separate duties as
14 a manager that you've listed here?

15 A. There was -- yeah, there was a short -- there
16 was a period of time, I don't remember exactly how long
17 it lasted, where I was the section manager of the --
18 of -- of the -- of that -- of a group that included
19 water rights permitting and other -- other issues, and
20 it became -- it became too much of a burden. I could --
21 I couldn't do it all is what I -- is, basically, what
22 I'm saying. So I gave up the management of the section
23 to continue to be the Engineer Adviser to all the
24 compacts. But I was -- I was section manager of the --
25 of the permitting group for a period of time and section

1 manager of all these compacts, I guess section manager
2 of myself for that time. Anyway, if that makes sense.

3 **Q. Sounds like you were --**

4 A. I, basically -- yeah, I basically decided I
5 didn't want to do the section manager job because it --
6 it was going to get in the way of doing the compacts.

7 **Q. Is there a specific division of TCEQ that --**
8 **that you worked within for the interstate compacts?**

9 A. Well, the ans- -- simple answer is yes.

10 **Q. Do you remember what the name of that division**
11 **was?**

12 A. No. I mean, it -- it changed periodically.

13 **Q. Describe for me how your role as the EA varied**
14 **between these different compacts.**

15 A. I mean, generally, they were -- they were
16 pretty much the same. I provided technical engineering
17 advice to the -- to the Texas Compact Commissioner. So
18 I was the Engineer Adviser, and I would provide
19 technical advice to the Compact Commissioner.

20 **Q. And so for each one of these compacts, would**
21 **you have to attend an annual EA meeting?**

22 A. No. The only one that had an official EA
23 meeting, Engineer Adviser meeting, was the Rio Grande.
24 Well, and then the -- the Red River Compact would
25 actually have a -- an EA meeting, but it was, like, the

1 day before the Compact Commission meeting. So -- so,
2 you know, peri- -- periodically the EAs would -- of all
3 these compacts might get together and have a phone call
4 or something like that, but the -- the EA meeting
5 associated with the Rio Grande was much more extensive
6 than any of the Engineer Adviser meetings associated
7 with the others.

8 **Q. Okay. Did you generally, for each of these**
9 **compacts, review Compact accounting?**

10 A. Not -- not in the extent that the Rio Grande
11 does. I mean, the -- the Canadian is a storage Compact.
12 The Pecos -- the Pecos River Compact does -- I'm sure
13 you know, is -- the accounting is done by the -- by the
14 River Master. The Red -- the Red and Sabine really
15 don't -- don't have issues that require Compact
16 accounting.

17 **Q. So it sounds like, overall, for the Rio**
18 **Grande, the duties were somewhat more extensive than**
19 **they were for the other compacts?**

20 A. That's -- that's correct, except early on the
21 Pecos was rather extensive. As you -- as you can see,
22 in 1987 was kind of the end of the Pecos River
23 litigation.

24 **Q. And as part of your duties as the Engineer**
25 **Adviser, did you have to review each of the compacts and**

1 have a general understanding of what the Compact
2 required?

3 A. Yes.

4 Q. And if there were rules or regulations
5 associated with the Compact, did you need to review and
6 have a general understanding of those as well?

7 A. Yes.

8 Q. You mentioned that you didn't become the
9 official Engineer Adviser for the Rio Grande Compact in
10 1987. And when I was looking back at the Engineer
11 Adviser reports, the first one I saw that you had
12 signed, I believe, was in 1999. Does that sound about
13 right?

14 A. Did I sign each and every one of them
15 subsequent to that?

16 Q. I believe so, but I don't want to misrepresent
17 anything. So I -- I can't say for a hundred percent
18 certain.

19 A. I didn't -- I didn't re- -- I guess I -- yeah,
20 I would think that's probably right. I didn't really
21 think it was that long ago, but probably was. Time
22 flies.

23 Q. So under this entry for your -- your resume
24 that we're looking at, there is also an entry for
25 "Manage administrative, technical, and budget issues

1 **the Compact?**

2 A. It had state line delivery --

3 **MR. HOFFMAN:** Which state are you talking
4 about?

5 **Q. (BY MS. THOMPSON) The New Mexico-Texas state**
6 **line.**

7 A. Well, the Compact incorporate -- the
8 Rio Grande Compact incorporated the Rio Grande Project.
9 And by the Compact incorporating the Rio Grande Pro- --
10 Project, it provided water to Texas.

11 **Q. And how did it do that?**

12 A. How did it -- be more -- can you be more
13 specific?

14 **Q. Sure. I was just following up on your**
15 **statement that, "And by the Compact incorporating the**
16 **Rio Grande Project, it provided water to Texas." When**
17 **you say "it provided water to Texas," I assume you mean**
18 **the Rio Grande Project provided water to Texas; is that**
19 **right?**

20 A. No. The -- the Rio Grande Compact
21 incorporated the Rio Grande Project and -- and the water
22 use associated with the Rio Grande Project by Texas and
23 New Mexico. So by incorporating that project, it
24 provided water to Texas associated with its portion of
25 the Rio Grande Project.

1 **Q. And what portion, then, was allocated to**
2 **Texas?**

3 A. Well, the Rio Grande Project is apportioned
4 57 -- 57 percent to -- to New Mexico and 43 percent to
5 Texas. So the portion that Texas got associated with
6 the Rio Grande Project was the -- was the 43 percent.

7 **Q. And describe for me what that's 43 percent of.**
8 **Is it 43 percent of the water in storage?**

9 A. No, the -- the Bureau of Reclamation operates
10 the Rio Grande Project and, as such, they make an
11 allocation each and every year to -- to New Mexico and
12 to Texas, EBID EP No. 1, they make an allocation and
13 those -- that allocation is split 57/43 between the two
14 districts, basically, between the two states.

15 **Q. Is that 43 percent, though, of the deliveries,**
16 **or is it of the storage?**

17 A. Well, there are -- there are curves used by
18 the Bureau of Reclamation that determine under various
19 conditions when you release X amount of water out
20 Elephant Butte, then that produces X amount of water for
21 EBID and EP No. 1. You know, during a full allotment
22 year, a release of water will provide, actually, more
23 than that release to the -- to the two districts based
24 on return flows that come back from the project.

25 **Q. And so it's 43 percent of that whatever is on**

1 Texas because it was measured at the various streamflow
2 gauges, so... But -- but, you know, the -- the issue
3 obviously came up that Texas wasn't getting its fair
4 share.

5 Q. And when do you recall that that issue came
6 up?

7 A. Initially?

8 Q. Yes.

9 A. I -- I think I heard -- I heard allegations to
10 that my entire career.

11 Q. Did you personally raise that at any of the
12 Engineer Adviser meetings for the Rio Grande?

13 A. I don't recall.

14 Q. Do you recall whether or not you personally
15 included concerns about Texas not receiving its water in
16 the Engineer Adviser reports?

17 A. I don't -- I don't recall. It's possible that
18 they may have been included in some of the later
19 Engineer Adviser's reports.

20 Q. So on the -- the Pecos Compact, we were just
21 talking about 1947 condition. Was there anything
22 similar for the Rio Grande, a similar type of year
23 condition?

24 MR. HOFFMAN: Objection; calls for a legal
25 conclusion.

1 A. I don't recall. I don't think so.

2 Q. (BY MS. THOMPSON) And when you say "I don't
3 think so," why is that?

4 MR. HOFFMAN: Objection. The answer
5 speaks for itself.

6 Q. (BY MS. THOMPSON) You can go ahead.

7 A. Repeat the question, please.

8 Q. When you said "I don't think so," I was just
9 asking you --

10 MR. HOFFMAN: The question is
11 argumentative, also.

12 Q. (BY MS. THOMPSON) So I just asked you the
13 question, do you recall whether or not you personally
14 included -- sorry, hang on. My realtime is stuck.

15 Oh, I just asked, so on the Pecos Compact, we
16 were just talking about the 1947 condition, was there
17 anything similar for the Rio Grande, a similar type of
18 year condition?

19 And you said, "I don't recall. I don't think
20 so."

21 And I was just asking you to explain more why
22 you said, "I don't think so."

23 MR. HOFFMAN: The question is
24 argumentative.

25 A. There is not a specific date similar to the

1 Pecos in the Rio Grande.

2 Q. (BY MS. THOMPSON) And then as far as your
3 duties as an Engineer Adviser, did you ever apply a 1938
4 condition, as far as when you were looking at Compact
5 accounting?

6 A. Not during the normal Compact accounting.

7 Q. And what do you mean by "Not during the normal
8 Compact accounting"?

9 THE WITNESS: I'm waiting for the siren.

10 MS. THOMPSON: Oh, sorry, that's here at
11 my office, outside.

12 A. Repeat the question. I got distracted.

13 Q. (BY MS. THOMPSON) Sure. I just asked what
14 you meant by "Not during the normal Compact accounting."

15 A. Well, during the -- during the -- the normal
16 annual Compact accounting, you know, we would calculate
17 the deliveries by Colorado, New Mexico and New Mexico
18 to -- to Elephant Butte and then the releases from
19 Elephant Butte, you know, and the -- the credits and the
20 debits and those kind of things. And so, you know, the
21 issue was always floating out there about the equitable
22 division of water within the Rio Grande Project and the
23 impacts that activities were having on that -- on that
24 water as it was released downstream.

25 Q. Did you personally ever investigate what type



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September 14, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Herman Robert Settemeyer, Volume 1**
07/30/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 64896

cc:

Samantha R. Barncastle
Preston V. Hartman
Renea Hicks
Stuart L. Somach
Lisa M. Thompson
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLO

STATE OF TEXAS, :
 :
 Plaintiff, :
 :
 VS. : Original Action Case
 : No. 220141
 STATE OF NEW MEXICO AND : (Original 141)
 STATE OF COLORADO, :
 :
 Defendants. :

I, PHYLLIS WALTZ, a Texas Certified Shorthand Reporter, Texas Certified Realtime Reporter, Louisiana Certified Court Reporter, Registered Merit Reporter, Certified Realtime Reporter, and Certified Realtime Captioner, in and for the State of Texas, do hereby certify the following:

That the witness, HERMAN ROBERT SETTEMEYER, was duly sworn by the officer and that the transcript of the oral deposition is a true record of the testimony given by the witness;

I further certify that the signature of the deponent:

 X was requested by the deponent or a party before the completion of the deposition and is to be returned within 30 days from the date of receipt of the transcript. If returned, the attached Changes and Signature Page contains any changes and the reasons

therefor;

_____ was not requested by the deponent or a party before the completion of the deposition.

I further certify that I am neither counsel for, related to, nor employed by any of the parties or attorneys to the action in which this proceeding was taken. Further, I am not a relative or employee of any attorney of record in this cause, nor am I financially or otherwise interested in the outcome of the action.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, on this, the 21ST day of AUGUST, 2020.



Phyllis Waltz

PHYLLIS WALTZ, RMR, CRR, CRC

Expiration Date: 12/31/20

TEXAS CSR, TCRR NO. 6813

Expiration Date: 12/31/21

LOUISIANA CCR NO. 2011010

Expiration Date: 12/31/20

Worldwide Court Reporters, Inc.

Firm Certification No. 223

3000 Weslayan, Suite 235

Houston, Texas 77027

(713) 572-2000

WITNESS CORRECTIONS AND SIGNATURE

HERMAN ROBERT SETTEMEYER

JULY 31, 2020

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
24/17	EBID should be GPI	Correction
65/4	take out "a"	Correction
65/5	insert credit after accrual	correction
76/21	Glenn should be New Mexico	Correction
77/22	take out why	Correction
83/24	insert New Mexico before Engineer	Correction
89/12	change whatever to one every	Correction
91/17	Kathy Lane should be Kothlow	Correction
136/25	1978 should be 1938	Correction

HERMAN ROBERT SETTEMEYER, VOLUME 2

1 I, HERMAN ROBERT SETTEMEYER, have read the
2 foregoing deposition and hereby affix my signature that
3 same is true and correct, except as noted above.
4

HERMAN ROBERT SETTEMEYER, VOLUME 2

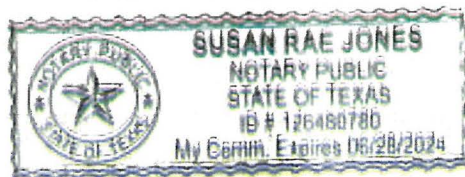
5
6 STATE OF TEXAS)
7 COUNTY OF Llano)

8 Before me, Susan Rae Jones, on
9 this day personally appeared HERMAN ROBERT SETTEMEYER,
10 known to me, or proved to me under oath or through
11 Ta Drivers License (description of identity card or
12 other document)), to be the person whose name is
13 subscribed to the foregoing instrument and acknowledged
14 to me that they executed the same for the purposes and
15 consideration therein expressed.

16 Given under my hand and seal of office on
17 this, the 2nd day of September, 2020.

18 Susan Rae Jones
19 NOTARY PUBLIC IN AND FOR THE
20 STATE OF TEXAS

21 My Commission Expires: 06-28-2024



IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS, :
 :
 :
 Plaintiff, :
 :
 VS. : Original Action Case
 : No. 220141
 STATE OF NEW MEXICO AND : (Original 141)
 STATE OF COLORADO, :
 :
 Defendants. :

ORAL AND VIDEOTAPED DEPOSITION OF
HERMAN ROBERT SETTEMEYER
JULY 31, 2020
VOLUME 2

ORAL AND VIDEOTAPED DEPOSITION OF HERMAN ROBERT SETTEMEYER, produced as a witness at the instance of the Defendant State of New Mexico, and duly sworn, was taken in the above-styled and numbered cause on July 31, 2020, from 9:03 a.m. MDT to 3:50 p.m. MDT, via Zoom, before PHYLLIS WALTZ, RMR, CRR, CRC, Texas CSR, TCRR, Louisiana CCR, in and for the State of Texas, recorded by machine shorthand, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed before any Notary Public.

1 Q. Okay.

2 A. When was this written? 1990 what?

3 Q. Let me scroll up and just double-check.

4 1997.

5 A. Okay.

6 Q. All right. Let's go to the CLE conference,
7 2004. Exhibit 22.

8 A. Okay.

9 Q. All right. Would you please identify this
10 document.

11 A. Well, it appears to be a document presented by
12 myself. I don't know who it's presented to. I can't
13 tell who it's presented to.

14 Q. Does that help at all?

15 A. I guess it was to the CLE Rio Grande
16 conference. That's what it says at the bottom of the
17 page.

18 (Audible yawn.)

19 THE WITNESS: Sorry.

20 MS. THOMPSON: It's afternoon, huh.

21 Q. (BY MS. THOMPSON) So on the first full
22 paragraph, there's a statement, the second sentence. A
23 1937 contract between Reclamation, EBID, and EP1
24 specifies the distribution of Project supplies as 88/155
25 for EBID and as 67/155 for EP1. This percentage was

1 based on irrigated acreage within each District.

2 And I just want to know, do you still believe
3 that to be true?

4 A. Yes, to the best of my...

5 Q. And then you say, This is the only instrument
6 I know of which specifies any division of Project Water
7 between EBID and EP1 or between New Mexico and Texas.
8 And, again, do you still believe that's true?

9 A. Well, I -- I believe that's true, but I also
10 believe that the Compact incorporated that into -- into
11 the -- I think that was incorporated into the Compact.
12 So, anyway.

13 Q. And that percentage that you're referring to
14 here, that would be for the -- the surface water that's
15 released out of Elephant Butte Reservoir, correct?

16 A. That's the surface water and associated return
17 flows and any other water entering the system which
18 could be used by the project.

19 Q. Okay. And then the paragraph that starts,
20 "The operating procedures Reclamation currently uses..."
21 And I'll represent to you that there is a handwritten
22 notation of 2004 on this document. I did not put that
23 there. I have no reason to confirm or deny 2004. But I
24 just wanted to make sure you knew that.

25 A. Okay.

1 Q. But this says here, The operating procedures
2 Reclamation currently uses provides for a delivery of
3 water to the diversion dams. A full allocation for the
4 Project is 931,840 acre-feet, which breaks down into
5 949,980 acre-feet for EBID, 736 acre-feet for EP1, and
6 60,000 acre-feet for Mexico. This allocation includes
7 storage releases, runoff, return flows, and operational
8 wastes. It's the return flow that creates concerns and
9 problems for Texas users.

10 The -- the first statement, though, "The
11 operating procedures Reclamation currently uses,"
12 assuming this is 2004, would that be a reference to the
13 D-1, D-2 operating procedures that we looked at
14 yesterday?

15 A. I don't recall.

16 Q. Do you recall whether or not these numbers
17 come from that D-1, D-2 operation?

18 A. It -- I don't recall exactly where the numbers
19 came from.

20 Q. On the next page you mention under Conversion
21 of Rio Grande Water -- Project Water and Municipal Use,
22 so a discussion here about that conversion. And,
23 specifically, at the bottom you say, "As more and more
24 water is being used for municipal purposes, water
25 quality becomes an increasing concern." Why would it

1 become an increasing concern?

2 A. I don't recall.

3 Q. Would municipal use require different water
4 quality than irrigation use?

5 A. Well, that's -- that's a -- that's -- that's a
6 possibility.

7 Q. Can you think of any other reasons why water
8 quality would be an increasing concern for, you know,
9 municipal uses?

10 A. Well, municipalities typically have to have a
11 higher quality of water for their municipal purposes
12 because of the treating issues as opposed to just plain
13 irrigation water.

14 Q. And the next sentence down, there is a -- you
15 say, Allocation of the Project Water - Do We Need a
16 Change? And you ask a number of questions in here.

17 A. Do you want me to read that?

18 Q. Oh, sorry, I just was losing my place. Give
19 me one second here.

20 I'm sorry. You are welcome, of course, to
21 read the whole thing. I was just going to ask you about
22 one specific item about the state line delivery again.
23 And it says here, "Should there be a state line delivery
24 of Rio Grande Project Water?" And "What should that
25 state line delivery be?" Is that a question that you

1 have come to form an opinion on?

2 A. No. That's an option, but it's not one I had
3 an opinion on.

4 Q. We talked about this a little bit yesterday.
5 But then you state here that the "Rio Grande Project
6 water users enjoyed full allocations of water from 1979
7 until 2003." I think yesterday you couldn't recall what
8 years. Do you have any reason to doubt that those are
9 all full supply years?

10 A. No.

11 Q. And if, in fact, during those years the
12 allocation available to EP1 was the 376,000 that we just
13 saw above-listed, would there be any shortage, then, if
14 they were allocated that amount of water?

15 A. I'm sorry, you kind of cut up. Could you
16 repeat that?

17 Q. Sorry. I said, if, in fact, during those
18 years, those full supply years, the allocation available
19 to EP1 was the 376,000 that we just saw listed above,
20 would there be any shortage, then, if they were
21 allocated that amount of water during these full supply
22 years?

23 MR. HOFFMAN: Asked and answered several
24 times.

25 A. Well, I haven't done any evaluations to

1 IN THE SUPREME COURT OF THE UNITED STATES
2 BEFORE THE OFFICE OF THE SPECIAL MASTER
3 HON. MICHAEL J. MELLOY

3 STATE OF TEXAS, :
 :
4 Plaintiff, :
 :
5 VS. : Original Action Case
 : No. 220141
6 STATE OF NEW MEXICO AND : (Original 141)
 STATE OF COLORADO, :
7 :
 : Defendants. :

8
9 I, PHYLLIS WALTZ, a Texas Certified Shorthand
10 Reporter, Texas Certified Realtime Reporter, Louisiana
11 Certified Court Reporter, Registered Merit Reporter,
12 Certified Realtime Reporter, and Certified Realtime
13 Captioner, in and for the State of Texas, do hereby
14 certify the following:

15 That the witness, HERMAN ROBERT SETTEMEYER, was
16 duly sworn by the officer and that the transcript of the
17 oral deposition is a true record of the testimony given
18 by the witness;

19 I further certify that the signature of the
20 deponent:

21 __X__ was requested by the deponent or a party
22 before the completion of the deposition and is to be
23 returned within 30 days from the date of receipt of the
24 transcript. If returned, the attached Changes and
25 Signature Page contains any changes and the reasons

_____ was not requested by the deponent or a party before the completion of the deposition.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
this, the 21ST day of AUGUST, 2020.

Phyllis Wall

Expiration Date: 12/31/20

(713) 572-2000



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September 14, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Herman R. Settemeyer, Volume 2**
07/31/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 64898

cc:
Samantha R. Barncastle
Preston V. Hartman
Renea Hicks
Stuart L. Somach
Lisa M. Thompson
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

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1 IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 2 HON. MICHAEL J. MELLOY

3 STATE OF TEXAS, :
 :
 4 Plaintiff, :
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8
 9 I, PHYLLIS WALTZ, a Texas Certified Shorthand
 10 Reporter, Texas Certified Realtime Reporter, Louisiana
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 12 Certified Realtime Reporter, and Certified Realtime
 13 Captioner, in and for the State of Texas, do hereby
 14 certify the following:

15 That the witness, HERMAN ROBERT SETTEMEYER, was
 16 duly sworn by the officer and that the transcript of the
 17 oral deposition is a true record of the testimony given
 18 by the witness;

19 I further certify that the signature of the
 20 deponent:

21 ___X___ was requested by the deponent or a party
 22 before the completion of the deposition and is to be
 23 returned within 30 days from the date of receipt of the
 24 transcript. If returned, the attached Changes and
 25 Signature Page contains any changes and the reasons

1 therefor;

2 _____ was not requested by the deponent or a
3 party before the completion of the deposition.

4 I further certify that I am neither counsel
5 for, related to, nor employed by any of the parties or
6 attorneys to the action in which this proceeding was
7 taken. Further, I am not a relative or employee of any
8 attorney of record in this cause, nor am I financially
9 or otherwise interested in the outcome of the action.

10 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
11 this, the 19TH day of AUGUST, 2020.



12
13
14 Phyllis Waltz

PHYLLIS WALTZ, RMR, CRR, CRC

15 Expiration Date: 12/31/20

TEXAS CSR, TCRR NO. 6813

16 Expiration Date: 12/31/21

LOUISIANA CCR NO. 2011010

17 Expiration Date: 12/31/20

18 Worldwide Court Reporters, Inc.

19 Firm Certification No. 223

3000 Wesleyan, Suite 235

20 Houston, Texas 77027

(713) 572-2000

WITNESS CORRECTIONS AND SIGNATURE

HERMAN ROBERT SETTEMEYER

JULY 30, 2020

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE

CORRECTION

REASON FOR CHANGE

59/4 silver shoe/shoesilvery - correction of name

72/15 file should be filing - correction

86/10 someone like Simmons & Dunn should be Smokey Simmons & Dunn

87/22 2006 should be 2015 - correction

92/20 Mexisen - Mexican should be domes h/c and lierack

93/25 workster should be work of work

115/14 irritable should be irrigable

178/20 no should be not

HERMAN ROBERT SETTEMEYER, VOLUME 1

1 I, HERMAN ROBERT SETTEMEYER, have read the
2 foregoing deposition and hereby affix my signature that
3 same is true and correct, except as noted above.
4

5
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HERMAN ROBERT SETTEMEYER, VOLUME 1

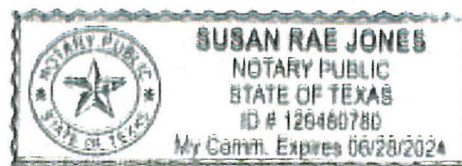
STATE OF T E X A S)
COUNTY OF Llano)

Before me, Susan Rae Jones, on
this day personally appeared HERMAN ROBERT SETTEMEYER,
known to me, or proved to me under oath or through
Tx Driver License) (description of identity card or
other document)), to be the person whose name is
subscribed to the foregoing instrument and acknowledged
to me that they executed the same for the purposes and
consideration therein expressed.

Given under my hand and seal of office on
this, the 2nd day of September, 2020.

Susan Rae Jones
NOTARY PUBLIC IN AND FOR THE
STATE OF TEXAS

My Commission Expires: 06-28-2024



IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLO

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

REMOTE ORAL AND VIDEOTAPED DEPOSITION OF
FILIBERTO CORTEZ
JULY 30, 2020
VOLUME 1

REMOTE ORAL AND VIDEOTAPED DEPOSITION of
FILIBERTO CORTEZ, produced as a witness at the
instance of the Defendant State of New Mexico, and
duly sworn, was taken in the above-styled and numbered
cause on July 30, 2020, from 9:20 a.m. to 4:08 p.m.,
before Heather L. Garza, CSR, RPR, in and for the
State of Texas, recorded by machine shorthand, at the
offices of HEATHER L. GARZA, CSR, RPR, The Woodlands,
Texas, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or
attached hereto; that the deposition shall be read and
signed.

1 **MR. WECHSLER:** Good morning. Anybody on
2 for pecan growers?

3 (No response.)

4 **MR. WECHSLER:** City of Las Cruces?

5 (No response.)

6 **MR. WECHSLER:** ABCWUA?

7 (No response.)

8 **MR. WECHSLER:** Hudspeth?

9 (No response.)

10 **MR. WECHSLER:** How about the City of El
11 Paso?

12 **MS. MAXWELL:** Good morning. Susan
13 Maxwell for the City of El Paso.

14 **MR. WECHSLER:** Good morning. Have I
15 missed anybody?

16 **MS. LLEWELLYN:** Dagmar Llewellyn is here
17 from the Bureau of Reclamation, as well.

18 **MR. WECHSLER:** Thank you.

19 **Q. (BY MR. WECHSLER)** All right. Mr. Cortez, why
20 don't we get started. You've been sworn remotely by
21 agreement. I understand you're also set up now on the
22 AgileLaw, which is the software we'll use to look at
23 exhibits; is that correct?

24 **A.** Yes.

25 **Q.** What is your current professional position?

1 A. I am the special assistant to the Albuquerque
2 office area manager.

3 **Q. What are your responsibilities in that role?**

4 A. Mainly to advise area manager on any
5 technical or other issues having to do with the Rio
6 Grande project.

7 **Q. Are you involved in any particular area of**
8 **the Rio Grande project or is it broadly cover all of**
9 **the issues related to that?**

10 A. Yeah. It broadly covers all the issues, but
11 mainly specific with water operations and also with
12 the issues dealing with the International Boundary and
13 Water Commission.

14 **Q. Who do you report to?**

15 A. Jennifer Faler, the area manager.

16 **Q. Are there people who report to you?**

17 A. No.

18 **Q. I want to talk a little bit about ground**
19 **rules for depositions. Have you had your deposition**
20 **taken before?**

21 A. No, I have not.

22 **Q. You understand you're under oath, so you have**
23 **an obligation to tell the truth just as if you were in**
24 **court?**

25 A. Yes.

1 21, I want to understand just some of the roles that
2 you've had at Reclamation as we're -- in order to help
3 me understand the subjects that you're familiar with.

4 A. Okay.

5 Q. So starting with Paragraph 2, in 2007, you
6 were the manager for the El Paso Field Division; is
7 that right?

8 A. That is correct.

9 Q. And what is the El Paso Field Division?

10 A. The El Paso Field Division is the office
11 which operated the Rio Grande Project at that time.
12 So that --

13 Q. And -- please. I'm sorry to interrupt.

14 A. Yeah. That involved the management of the
15 reservoirs, negotiations, the dealings with the
16 irrigation districts, water deliveries, making the
17 allocation, anything having to do with the Rio Grande
18 Project.

19 Q. You said that that was true at that time.
20 Has it changed?

21 A. Yes.

22 Q. When did that change?

23 A. I would say somewhere around 2012, 2013.

24 Q. What office is responsible now for the
25 management of the Rio Grande Project?

1 A. It has -- well, mainly coming out of the
2 Albuquerque Area Office. There has been a
3 reorganization, so there are various divisions within
4 the Albuquerque Area Office which manage what are now
5 separate parts of the Rio Grande Project.

6 **Q. You are now special assistant to the**
7 **Albuquerque area manager; do I have that right?**

8 A. Correct.

9 **Q. When did your position change?**

10 A. Right about that time, 2013, 2012.

11 **Q. And when it changed, is that when you became**
12 **the special assistant?**

13 A. That's correct.

14 **Q. Did your duties and responsibilities change?**

15 A. Yes, they did. I became mainly responsible
16 for as an advisory position to the area managers, as I
17 stated before, having to do with historical operations
18 of the Rio Grande Project and then also with the
19 dealings with the International Boundary and Water
20 Commission.

21 **Q. What do you mean by the "historical**
22 **operations"?**

23 A. Well, the responsibilities of the project
24 have remained pretty much the same. It's just that
25 other -- other people are responsible for making sure

1 those -- those responsibilities are carried out.

2 Q. I see. Do you know why the Bureau decided to
3 move the responsibilities for the Rio Grande Project
4 from the El Paso Field Division to, largely, the
5 Albuquerque office?

6 A. Mainly reorganization, consolidation.

7 Q. If you continue further down in your
8 declaration, Mr. Cortez, there you say that you were
9 the chief of the Engineering and Contracts Branch of
10 the Rio Grande Project. Do you see that?

11 A. Yes.

12 Q. When were you in that position?

13 A. I would have to take a guess on that, but it
14 would probably have been in the mid '80s.

15 Q. And after that position, is that when you
16 became manager for the El Paso Field Division?

17 A. No. Because that didn't occur until '97.

18 Q. What were your responsibilities as chief of
19 the Engineering and Contracts Branch of the Rio Grande
20 Project?

21 A. It's to do engineering designs on structures
22 and having to do with the distribution system for the
23 Rio Grande Project, canals, laterals, diversion dams
24 and so forth. And, also, to review pertinent requests
25 for crossings of utilities that were going to be

1 effecting the Rio Grande Project facilities.

2 Q. Sounds like you had a position between being
3 chief of Engineering and Contracts and the manager for
4 the El Paso Field Division; is that right?

5 A. That is correct.

6 Q. What position or positions were --

7 A. That -- in that position, I was responsible
8 for water operations, which had to do with management
9 of the reservoir storage and then, also, for releases
10 to deliver to the -- to the districts and to Mexico.

11 Q. If you look at deposition Exhibit 2, again,
12 Mr. Cortez, Paragraph 4 indicates that you were the
13 chief of the Water Operations Branch. Is that the
14 position that you just described?

15 A. Correct.

16 Q. So in order, you were chief of Engineering
17 Contracts, and then you became chief of the Water
18 Operations Branch?

19 A. I -- yes. Correct.

20 Q. I'm going to show you another document
21 related to, I think, the Water Operations Branch. I'm
22 marking it as deposition Exhibit FC3.

23 (Exhibit No. 3 was marked.)

24 A. Okay. Got it.

25 Q. (BY MR. WECHSLER) Do you recognize that

1 other is, "Appendix C of the Implementation of Rio
2 Grande Project Operating Procedures." Do you see
3 that?

4 A. Yes.

5 Q. Are you familiar with those two sources?

6 A. Yes.

7 Q. We may have a chance to talk about them
8 tomorrow. If you'd turn to Page 34.

9 A. Page 34?

10 Q. Correct. Lines 77 to 84. Line 77, it
11 says, "Operation of the RGP involves four primary
12 functions." Do you agree that those are the four
13 primary functions of the Rio Grande Project?

14 A. Yes.

15 Q. Are you familiar with the term "project
16 supply"?

17 A. Yes.

18 Q. How would you define project supply?

19 A. It's made out of two components, one being
20 the usable water in storage and then return flow back
21 to the river, which is captured and delivered to the
22 project water users.

23 Q. How is the return flow captured?

24 A. At each of the diversion dams, and then that
25 is transferred or diverted over to the main canal

1 understanding applied in this case. The McCarran
2 Amendment, I believe, has to do with adjudications
3 involving the United States.

4 Q. It indicates in the next sentence that there
5 was an evidentiary hearing held on this Rio Grande
6 Project right. Were you involved in that Texas
7 evidentiary hearing having to do with the Rio Grande
8 Project water right?

9 A. I don't believe so, no.

10 Q. Are you aware that there's a Texas
11 adjudication certificate that came out of the Texas
12 Adjudication Court?

13 A. Yes.

14 Q. And does that Texas adjudication certificate
15 define the project water right with respect to Texas?

16 A. Yes.

17 Q. And then if you scroll up to that same page,
18 then it's talking about the New Mexico adjudication,
19 right? I'm looking at the same page, Mr. Cortez.

20 A. Page 74?

21 Q. Correct. Yeah. Where the -- it's talking
22 about the Lower Rio Grande Basin Adjudication --

23 A. Lower Rio Grande Basin Adjudication?

24 Q. Right. And I think you told me earlier that
25 you generally have followed that adjudication; is that



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September 23, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Filiberto Cortez, Volume 1**
07/30/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63585

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Francis M. Goldsberry II
R. Lee Leininger

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :

COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, FILIBERTO CORTEZ, to the interrogatories as indicated were made before me by the said witness after being first duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. WECHSLER - 04:48:08

MR. GOLDSBERRY - 00:00:00

9 MR. LEININGER - 00:00:00

MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 25th day of August, 2020.

14 

HEATHER L. GARZA, CSR, RPR, CRR

15 Certification No.: 8262

Expiration Date: 04-30-22

16
17 Worldwide Court Reporters, Inc.

Firm Registration No. 223

18 3000 Weslayan, Suite 235

Houston, TX 77027

19 800-745-1101



WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
41/3	strike the word salt	

52/20	repace fill with spill	
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55/11	replace 10 million with 2 million	
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57/16	Replace Franklin with American	
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57/17	Replace Franklin with American	
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57/3	Replace array with Arrey	
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58/9	Insert lands in --	
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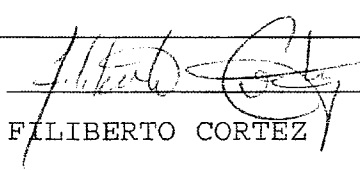
58/10	Replace acreage with charges	
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58/12	Strike the--by	
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59/25	Strike New	
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67/17	Replace near with here	
-------	------------------------	--

126/24	Replace .0241 with 3.0241	
--------	---------------------------	--


FILIBERTO CORTEZ

SIGNATURE OF WITNESS

I, FILIBERTO CORTEZ, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).


FILIBERTO CORTEZ

Job No. 63585

State of Texas, County of El Paso

Acknowledged before me on September 18, 2020

by Filiberto Cortez

Notary Public Savannah Young



IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

REMOTE ORAL AND VIDEOTAPED DEPOSITION OF
PATRICK R. GORDON
JULY 14, 2020
VOLUME 1

REMOTE ORAL AND VIDEOTAPED DEPOSITION of PATRICK R. GORDON, produced as a witness at the instance of the Defendant State of New Mexico, and duly sworn, was taken in the above-styled and numbered cause on July 14, 2020, from 9:03 a.m. to 3:33 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of HEATHER L. GARZA, CSR, RPR, The Woodlands, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

TX v. NM # 141

New Mexico Exhibit

NM_EX-258

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1 **Q. Great. If you have any trouble today, please**
2 **let me know. I know -- well, can you please state**
3 **your name for the record and -- and spell it?**

4 A. It's Patrick, P-A-T-R-I-C-K, initial R,
5 Gordon, G-O-R-D-O-N.

6 **Q. What is your current professional position?**

7 A. With the Compact?

8 **Q. Why don't we start with your day job?**

9 A. I have several day jobs. So, first, I'm -- I
10 have a law firm in El Paso called Gordon, Davis,
11 Johnson, and Shane. I'm president of the law firm.

12 **Q. You said you had several day jobs. What are**
13 **the others?**

14 A. I own a real estate company with my family in
15 El Paso. Its trademark name is Vista Star.

16 **Q. Any other professions?**

17 A. I'm a licensed real estate broker, so I'm
18 involved with that business, that real estate
19 business.

20 **Q. Then how about for the Commission?**

21 A. I'm the Texas Rio Grande Compact
22 Commissioner.

23 **Q. I appreciate your time today, Commissioner**
24 **Gordon. You're obviously a very busy person, and I'll**
25 **try and be as efficient as possible. I know you're a**

1 from your law firm Website, I believe. Do you see
2 that?

3 A. Yes.

4 Q. Do you recognize that document?

5 A. Yes.

6 Q. Is it accurate?

7 A. It should be. I think I -- my law firm
8 prepared it. Should be. I don't...

9 Q. Do you have an estimate of what percentage of
10 your time you spend in the practice of law and what
11 percentage you spend in your real estate practice?

12 A. That's a fluid dynamic. It depends on, you
13 know, the time and what's going on. I would have
14 said, you know, a few years ago, it was probably
15 50/50, but my son now is working in the real estate
16 business. He's president. I'm chairman. And so my
17 time in the day-to-day activities is a lot less.
18 So -- but it just depends.

19 Q. Could you please describe your education?

20 A. I have a BBA in finance from Texas A&M and an
21 MBA and a JD from Texas Tech.

22 Q. Prior to your becoming the Texas
23 commissioner, did you have any educational background
24 in water administration?

25 A. No.

1 **Q. How about hydrology?**

2 A. No.

3 **Q. Interstate water compacts?**

4 A. None.

5 **Q. Did you have any previous experience as a**
 6 **farmer?**

7 A. I grew up close to Dallas, and we grew
 8 coastal Bermuda hay, but we didn't have to irrigate.

9 **Q. How did you grow the hay?**

10 A. We got 22 inches of rain a year.

11 **Q. In what areas do you practice law?**

12 A. I'm a tax and transactional lawyer.

13 **Q. And have you ever practiced in the area of**
 14 **water law?**

15 A. I have not.

16 **Q. How about natural resources of any kind?**

17 A. No.

18 **Q. Environmental law?**

19 A. No.

20 **Q. Prior to becoming Compact commissioner, did**
 21 **you have any prior professional experience in the area**
 22 **of water?**

23 A. I did not.

24 **Q. As part of your professional practice, did**
 25 **you ever act as a mediator?**

1 A. I did not.

2 **Q. Did you ever participate in mediations on**
3 **behalf of clients?**

4 A. I may have on occasion.

5 **Q. When you were participating in a mediation on**
6 **behalf of clients, did you advise the clients that the**
7 **mediator should be neutral?**

8 A. I don't recall.

9 **Q. Do you think it's important that a mediator**
10 **be neutral?**

11 A. I'm not a mediator, so I -- I'm assuming that
12 the mediator tries to just facilitate the
13 communication.

14 **Q. Do you know if the normal rules for conflict**
15 **of interest apply to mediators?**

16 A. I don't know.

17 **Q. Prior to becoming the Compact commissioner**
18 **for the State of Texas, did you ever work for or**
19 **represent the City of El Paso?**

20 A. Yes. Our firm did. Sorry.

21 **Q. Did you personally work on that**
22 **representation?**

23 A. I worked on some pension matters, yes.

24 **Q. Did you say pension?**

25 A. Pension.

1 Q. Yeah, if you take a minute, Commissioner
2 Gordon, to take a look at this document, it's a --
3 looks like it's a five-page document.

4 A. Yeah. Okay.

5 Q. Do you recognize this document?

6 A. I don't re -- well, I don't recall this
7 document, but it is a document from our law firm from
8 one of my partners.

9 Q. Looks like it's dated August 15th, 2007. You
10 would have been Compact commissioner at that time; is
11 that right?

12 A. Correct.

13 Q. And then if -- if you go down to Paragraph 3
14 of that document, it indicates, "Responsible
15 professionals." Do you see that?

16 A. Yes.

17 Q. And it lists you and Mr. Davis as having
18 primary responsibility for representing the district,
19 right?

20 A. Correct.

21 Q. And -- and this is a retention letter from
22 your law firm for legal services to be provided to EP
23 No. 1; is that right?

24 A. Correct. That's correct.

25 Q. And then if you look at the final page, which

1 Mr. Hanson.

2 Q. But you never had an opportunity to discuss
3 the Compact or the Commission with Mr. Hanson?

4 A. No.

5 Q. Is Mr. Hanson still alive?

6 A. I -- I don't know.

7 Q. Do you know if Mr. Hanson lived in El Paso?

8 A. I believe he did, but he was out of town a
9 lot. Never had the opportunity to meet him.

10 Q. Did you attempt to talk with him?

11 A. I don't recall. I probably tried to reach
12 out to him, but he had resigned and left so I was -- I
13 filled an empty spot.

14 Q. Before you were appointed as the commissioner
15 to Texas by the governor, did you have to express
16 interest in the position?

17 A. I did not.

18 Q. How did it happen that -- well, did the
19 governor or someone in the governor's office reach out
20 to you about the position?

21 A. That's correct.

22 Q. Who reached out to you?

23 A. The governor's appointments office.

24 Q. Did you have to tell them that you were
25 interested in the position?

1 A. I was already serving on a governing board
2 for the -- for the governor, and they asked if I'd be
3 interested in this board because I'm from El Paso and
4 this involves El Paso.

5 **Q. What was the governing board that you were**
6 **already serving on?**

7 A. Texas Department of Housing and Community
8 Affairs.

9 **Q. You obviously told them that you would be**
10 **interested in serving on the commission; is that**
11 **right?**

12 A. I did.

13 **Q. Why were you interested in it?**

14 A. I just thought it would be interesting to do
15 it.

16 **Q. Do you know why the governor selected you for**
17 **the role of the Texas Rio Grande Compact Commissioner?**

18 A. I do not.

19 **Q. When you were appointed as the commissioner,**
20 **did you do anything to learn about the duties of**
21 **the -- either the Commission or of the commissioners?**

22 A. I did.

23 **Q. What did you do?**

24 A. Well, I met with the attorney general's
25 staff, who was in charge of the water areas for the

1 State of Texas. I met with the EP1 district, their
2 board members. I met with EBID and their board
3 members, tried to do whatever I could to get all the
4 background, read materials on the Compact.

5 **Q. You say you read materials on the Compact.**
6 **Did you read previous Compact meeting minutes and**
7 **transcripts?**

8 A. No. I read, like, a book by Little. Just --
9 there's just materials out there on the Compact.
10 Mainly it was talking to, you know, the districts to
11 get the information, you know, what -- how things
12 operated, how -- just trying to get up to speed as
13 best I could.

14 **Q. Did you read any -- or review any historical**
15 **documents?**

16 A. Well, I think there was some -- some
17 publications on the Compact and how it came around.

18 **Q. How about the negotiating minutes of the**
19 **Compact, did you read those?**

20 A. I did.

21 **Q. Why did you read those?**

22 A. Because I thought it was important to learn
23 about the Compact, including the joint investigation
24 report. I read that.

25 **Q. Any other historic documents that you recall?**

1 A. Not that I recall.

2 **Q. Did you read the Compact?**

3 A. I did.

4 **Q. The statutes -- the Texas statutes indicate**
5 **that a commissioner serves for six years; is that**
6 **correct?**

7 A. That's correct.

8 **Q. You have served for one term already; is that**
9 **right?**

10 A. That's -- I think I've served for two.

11 **Q. Two. Are you in your second term now?**

12 A. I'm in my third. I -- I took over a partial
13 one so Mr. Hanson resigned. I don't know where he
14 went. I think he was traveling or left town. So I
15 took over his remaining term and then I've been
16 appointed twice.

17 **Q. When is your current term up?**

18 A. Four years, I believe.

19 **Q. The statutes indicate that the Texas**
20 **commissioner receives a salary. Do you receive a**
21 **salary?**

22 A. I do.

23 **Q. What is that salary?**

24 A. It's about 40,000 a year.

25 **Q. That salary is received from the State of**

1 A. I'm not sure what your question is.

2 **Q. I'm just trying to understand if -- if you've**
3 **told me all of the things that you think that you're**
4 **responsible for doing as the Rio Grande Compact**
5 **commissioner for Texas.**

6 A. Well, so I need to keep the governor's office
7 informed of everything going on with the Compact. I
8 keep the AG informed with matters involving the
9 Compact. I meet with my engineer advisor, who meets
10 with the engineer advisors for Colorado and New
11 Mexico. Issues come up from time to time regarding
12 allocations of water or -- or releases of water.
13 There can be credits in the reservoir that are
14 relinquished. That would be my responsibility, along
15 with the other commissioners. There's -- I could
16 think of some other things. If I do, I'll -- I'll
17 tell you.

18 **Q. Great. One of the first things you mentioned**
19 **is keeping the governor and the governor's office**
20 **informed. Do you have a particular point of contact**
21 **in the Texas governor's office?**

22 A. I don't. I usually talk to their chief of
23 staff, which generally changes from time to time.

24 **Q. How often, on an annual basis, would you say**
25 **that you communicate with the governor's office?**

1 Blair if they call me. Sometimes it's -- something
2 comes up.

3 **Q. How about representatives of Hudspeth**
4 **Irrigation District?**

5 A. I have not talked to them.

6 **Q. As Texas Compact Commissioner, who do you**
7 **report to?**

8 A. The governor.

9 **Q. The Texas governor?**

10 A. Yes.

11 **Q. Do you have obligations to provide any**
12 **written reports?**

13 A. The written report provided to the governor
14 officially is the annual report from the Compact
15 Commission that's sent to the three governors.

16 **Q. As Texas Compact Commissioner, do you have**
17 **any constituents?**

18 A. I'm sorry. What -- I'm not following that.
19 Sorry.

20 **Q. Are there people that you, as Texas Compact**
21 **Commissioner, represent?**

22 A. It's the State of Texas.

23 **Q. What -- what's the role of the Texas engineer**
24 **advisor?**

25 A. Well, the -- the Texas engineer advisor works

1 with the engineer advisors for Colorado and New Mexico
2 and provides technical assistance. I'm not an
3 engineer. I'm not a hydrologist, so I rely on my
4 engineer advisor for information reports, I guess.

5 **Q. The Texas statute also indicates that what I**
6 **think was called the Texas Natural Resource**
7 **Conservation Commission, is that the predecessor**
8 **agency to the TCEQ?**

9 A. That's correct.

10 **Q. And what --**

11 A. I think -- I think several agencies rolled
12 into TCEQ, one of which was the TNRCC.

13 **Q. What does TCEQ stand for?**

14 A. Texas Commission on Environmental Quality.

15 **Q. And -- and so did the TCEQ assume those**
16 **statutory responsibilities of the TNRCC?**

17 A. I don't know.

18 **Q. Does -- does the TCEQ have any responsibility**
19 **to provide information and data to the Texas Compact**
20 **Commissioner?**

21 A. So I have an agreement with TCEQ where I'm
22 housed in TCEQ under a memorandum of understanding or
23 an agreement where, I'm in effect, housed under TCEQ,
24 so I get availability of the resources from TCEQ if I
25 need. I office in TCEQ.

1 agencies that you coordinate with in your role as
2 Compact commissioner?

3 A. Well, the Texas AG.

4 Q. Any other agencies?

5 A. No, not that I can recall.

6 Q. I'm going to show you a memo, which I'll mark
7 as deposition Exhibit PG005.

8 (Exhibit No. 5 was marked.)

9 Q. (BY MR. WECHSLER) Let me know when you have a
10 chance to -- or when that comes up for you.

11 A. Okay.

12 Q. Let me ask you first: Does the Rio Grande
13 Compact commissioner or commissioner's office have a
14 record of previous actions of the Rio Grande Compact
15 Commission?

16 A. Yes. They -- they have records of the
17 meetings. There's some documents.

18 Q. About communication amongst the Compacting
19 parties?

20 A. I assume so. I haven't looked at them.

21 Q. Have you ever seen this document before that
22 I've marked as deposition Exhibit PG005?

23 A. No.

24 Q. If you look at the first page, it's labeled
25 as a memorandum from Paul Elliot and Herman

1 Marcial to the lake to Elephant Butte. The delivery
2 is still at San Marcial, but the measurement of the
3 delivery is at Elephant Butte.

4 Q. I have that -- go ahead, please.

5 A. I don't know what -- who it was made to or --
6 I think it was in 1941.

7 Q. All right. We'll take a look at that in just
8 a minute, but before we do that, let's -- let me just
9 finish asking about this language. At the end of that
10 paragraph, it says that, "The Commission may, by
11 unanimous action, adopt rules and regulations
12 consistent with the provision of this Compact to
13 govern their proceedings." Do you see that?

14 A. Yes.

15 Q. So if I understand that correctly, the
16 Commission is authorized to adopt rules, but it must
17 be by unanimous agreement; is that correct?

18 A. Yes. If it involves the Compact, yes.

19 Q. And it also has to be consistent with the
20 provisions of the Compact; is that correct?

21 A. Correct.

22 Q. Has the Commission adopted rules?

23 A. I'm not aware of rules.

24 Q. The -- this particular sentence talks about
25 unanimous action. When the Commission acts as a body,

1 is it always by unanimous action?

2 A. I believe so, yes.

3 Q. All right. Let's look at that resolution
4 that you were just mentioning, which I will mark as
5 Exhibit -- looks like PG006.

6 (Exhibit No. 6 was marked.)

7 Q. (BY MR. WECHSLER) Again, you can see when it
8 comes up, it has an Appendix 3, and I'll represent I
9 took this from Mr. Lopez's expert report. And if you
10 look at the second page of the document, is that the
11 resolution that you were referring to just a moment
12 ago?

13 A. I believe it was. I -- I don't know if I've
14 ever officially seen the resolution.

15 Q. Were you aware that the change in the
16 delivery point was done by Rio Grande Compact
17 Commission resolution?

18 A. I don't think this is a change of the
19 delivery point. This is a change of a gaging station.

20 Q. All right. Were you aware that the changing
21 in the gaging station then measure -- measurements of
22 deliveries by New Mexico was done by a resolution?

23 A. I am now after looking at this.

24 Q. You weren't previously aware?

25 A. No.

1 **Q. Since you've been Texas commissioner, has the**
2 **Commission passed resolutions?**

3 A. Yes.

4 **Q. What is the purpose of resolutions from the**
5 **Rio Grande Compact Commission?**

6 A. Resolutions on the accounting, resolutions on
7 delivery of the -- accepting the engineer advisor's
8 reports, what -- the annual minutes will show what
9 those resolutions were.

10 **Q. I'm thinking more generally, what is the**
11 **purpose of a resolution from the --**

12 A. Well, resolution here would be to make a
13 recommendation to the states.

14 **Q. Is that the way that the Commission makes**
15 **recommendations or takes positions?**

16 A. I believe so, yes.

17 **Q. Is it necessary for resolutions to be**
18 **unanimous?**

19 A. I think based on the Compact, they need to be
20 unanimous.

21 **Q. And what is the effect -- the effect of a**
22 **commission resolution?**

23 A. I don't know. I'd have to know what the
24 resolution is.

25 **Q. I noticed in the Rio Grande Compact**

1 **Commission minutes that the Commission also entertains**
2 **motions; is that right?**

3 A. Yes.

4 **Q. What's the function of a motion?**

5 A. Well, the meeting -- the meetings are
6 conducted by someone making a motion, then there's a
7 second, and then there's a vote.

8 **Q. Is there a difference between motions of the**
9 **Commission and resolutions of the Commission?**

10 A. I don't know.

11 **Q. Do motions also have to be unanimous to pass?**

12 A. I think if it's a recommendation of the
13 Commission, it would need to be unanimous.

14 **Q. Do you have an estimate of how many**
15 **resolutions were passed by the Commission since you**
16 **were Texas commissioner?**

17 A. I don't.

18 **Q. In your experience, does the Commission**
19 **carefully consider resolutions before acting on them?**

20 A. I think so, yes.

21 **Q. Why is that?**

22 A. I just have. They always -- we discuss it
23 and have discussed it and considered it. Usually it's
24 done at the annual meeting.

25 **Q. Commissioner Gordon, it's been a little over**

1 an hour, and I'm at a good stopping point. Why don't
2 we take 15 minutes and come back at 10:25. Would that
3 be okay with you?

4 A. That's fine. Thank you.

5 Q. Thank you?

6 THE VIDEOGRAPHER: The time is 10:10
7 a.m. We're off the record.

8 (Break.)

9 THE VIDEOGRAPHER: The time is 10:25
10 a.m. We're on the record.

11 Q. (BY MR. WECHSLER) All right. Commissioner
12 Gordon, back from the break. Let's turn to
13 administration and management of water in Texas
14 starting with surface water. Are you familiar with
15 the administration and management of water in Texas?

16 A. No.

17 Q. Are you familiar with administration and
18 management of water within the Rio Grande Valley in
19 Texas?

20 A. No.

21 Q. Who is familiar with administration and
22 management of surface water in the Rio Grande Valley
23 in Texas?

24 A. I don't know.

25 Q. As Compact Commissioner, do your duties or

1 Q. Any area where surface water in Texas drains
2 into the Rio Grande River?

3 A. I -- no, I don't.

4 Q. What if I said El Paso and Hudspeth Valley --
5 I'm sorry -- counties?

6 MR. SOMACH: Objection; form of the
7 question.

8 A. Can you ask the question again, because I --
9 I'm lost.

10 Q. (BY MR. WECHSLER) Let me just ask broadly,
11 does your role as Compact commissioner for the State
12 of Texas relate in any way to water administration or
13 management anywhere in the State of Texas?

14 A. My understanding --

15 MR. SOMACH: Objection --

16 A. Go ahead.

17 MR. SOMACH: Objection; asked and
18 answered.

19 Go ahead, Pat.

20 A. My understanding is no.

21 Q. (BY MR. WECHSLER) You mentioned earlier that
22 you received some support from TCEQ; is that correct?

23 A. Correct.

24 Q. Do you ever consult with or coordinate with
25 TCEQ on any issue related to water administration

1 can think of off the top of my hand -- head.

2 Q. Is it fair to say that the issues that are
3 being discussed at the Commission meetings are issues
4 that are of relevance in one way or another to the Rio
5 Grande Compact?

6 A. Yes.

7 Q. I want to look at a few Compact documents
8 with you and talk about the anatomy of those documents
9 and then some of the specific things that get
10 discussed in -- in Commission meetings. I'm going to
11 mark deposition Exhibit PG009.

12 (Exhibit No. 9 was marked.)

13 Q. (BY MR. WECHSLER) Do you recognize this
14 document?

15 A. It's the Rio Grande Compact Commission, 60th
16 Annual Meeting in Alamosa, March 22nd, 2007.

17 Q. Are these the minutes of that meeting?

18 A. I believe they are. I haven't -- this is the
19 first I've probably looked at this.

20 Q. Do you -- when -- after a commission meeting,
21 are minutes from that meeting produced?

22 A. Yes.

23 Q. Who produces those minutes?

24 A. It's usually the host state.

25 Q. And so in this instance, it looks like it was

1 in Alamosa, Colorado, so this would have been produced
2 by Colorado; is that right?

3 A. Right.

4 Q. Do you review those minutes after they're
5 completed?

6 A. No. Usually engineer advisor does.

7 Q. The -- if you look towards the end, let me
8 give you a page number. On Page 12 of this document,
9 could you take a look at that a moment?

10 A. What page?

11 Q. 12. Do you see that?

12 A. Correct.

13 Q. And this has the signatures from each of the
14 commissioners; is that correct?

15 A. Correct.

16 Q. And then if you look at the next page, Page
17 13, I think you'll see an agenda.

18 A. Okay.

19 Q. When -- in terms of the way that commission
20 meetings -- or the agenda of commission meetings, at
21 each of the commission meetings, is there a report of
22 the secretary?

23 A. I don't know.

24 Q. At each of the commission meetings, is there
25 a report of the engineer advisor?

1 Q. The next term -- do you have an understanding
2 of the term actual release?

3 A. I'm assuming that it means what really left
4 the dam.

5 Q. The next line says, "Normal release for year
6 790,000 acre-feet." Do you see that?

7 A. Yes.

8 Q. Do you have an understanding of what the
9 term "normal release" means?

10 A. My understanding of a normal release is
11 that's a full release of 790.

12 Q. Do you know the origin of the 790,000?

13 A. I believe that's in the joint investigation
14 report when the Compact was entered into.

15 Q. Is it also in the Compact?

16 A. I -- I don't know.

17 Q. Do you know what the joint investigation said
18 about 790?

19 A. It said it -- it said it would go in -- 790
20 would create 120 percent of 790 for irrigation.

21 Q. Do you know what the purpose of the joint
22 investigation was?

23 A. It was the basis for coming up with the
24 Compact.

25 Q. When you say it was the basis for coming up

1 **with the Compact, what do you mean?**

2 A. Well, the Compact has a lot of measures, and
3 there was a certain quantity of water needed for the
4 project and -- and the two contracts, the two 1938
5 contracts, the joint investigation report, my
6 understanding, was engineer advisors for the various
7 states getting together and figuring out how much
8 water would be needed to irrigate the lands of EBID
9 and EP1.

10 **Q. Turn, please, to Page 23 using the PDF pages.**
11 **It's Page 5 of the engineer advisor's report. Middle**
12 **of the page, there's a paragraph that starts, "The**
13 **Commission subsequently invited water experts from the**
14 **area to become members of the Rio Grande project**
15 **salinity management coalition." We talked a little**
16 **bit about various meetings related to salinity. Were**
17 **you talking about this coalition when you --**

18 A. Yes, I believe so. This is the one that Dale
19 Doremus was in charge of.

20 **Q. And -- and I'll represent to you that I**
21 **believe Ms. Doremus worked for the State of New**
22 **Mexico, and I believe for the New Mexico Environment**
23 **Department; does that sound correct?**

24 A. I -- you know, I don't know. I just met her
25 a few times, and she was very nice.

1 A. 2013.

2 Q. So this e-mail went to you after the filing
3 of the lawsuit; is that correct?

4 A. What's the date of this e-mail?

5 Q. July 8, 2014.

6 A. Yeah, it would have been.

7 Q. Have you informed Ms. Ramirez or anybody at
8 TCEQ that they are publishing an incorrect description
9 of the Rio Grande Compact?

10 A. I have not. This is the first time I've seen
11 this that I recall it.

12 Q. Right. Well, we -- we can see that you were
13 at least sent the e-mail in July of 2014.

14 A. Right. Right.

15 Q. The next --

16 A. Also, the second paragraph talks about the
17 two districts are the ones that received the water.

18 Q. So it says -- reading the second
19 sentence, "Historically, project water has been
20 allocated by the 57/43 division based on the relative
21 amounts of project acreage originally identified in
22 each state." Do you see that?

23 A. Yeah.

24 Q. Do you agree with that?

25 A. Originally, it was that way. I believe EBID

1 has increased their acreage.

2 Q. Then it says, "Two districts received project
3 water, Elephant Butte Irrigation District in New
4 Mexico and El Paso County Water Improvement District
5 No. 1 in Texas." Do you agree with that?

6 A. The two districts do receive the water. I do
7 agree.

8 Q. Let's look at another -- a transcript from
9 the 2011 Compact Commission meeting, which I'll mark
10 as Exhibit PG16.

11 (Exhibit No. 16 was marked.)

12 Q. (BY MR. WECHSLER) Do you recognize this
13 document?

14 A. No.

15 Q. Do you know if there was a transcript at the
16 March 30th, 2011, annual meeting of the Rio Grande
17 Compact Commission?

18 A. I -- I assume there was. Generally, there --
19 there always is.

20 Q. If you turn to Page 37 of the PDF, and I'm
21 going to show you first what Commissioner D'Antonio
22 says, because I think there's something that you
23 respond to that I'm going to ask you about. So you
24 see here at Page 37, this is Commissioner D'Antonio,
25 and then if you turn to Page 50, and you can see Lines

1 in this case?

2 A. I believe so.

3 Q. We can go and review that report, right?

4 A. Yeah. Sure.

5 Q. Let's see what you said in response. So if
6 you turn to Page 53, you can see here's the beginning
7 of your discussion, and then if you turn to Page 57,
8 Lines 20 and 21, I'm just pointing this out as
9 reference. You can see that the -- here, you're --
10 you're going -- moving on to talk about the operating
11 agreement and responding to Commissioner D'Antonio.
12 And then on Page 58, Lines 22 to 25, you say, "While
13 it" -- and I understand you're talking about the
14 operating agreement here. "While it's not perfect, I
15 think it's something that can be modified and
16 corrected to the extent that those are necessary." I
17 want to pause there. Do you have a view of ways that
18 the operating agreement is not perfect?

19 A. Well, not particularly. That's more of a --
20 what a -- I would say a hydrologist would probably
21 need to -- or an engineer. To be honest, I wouldn't
22 know exactly what -- what it -- you know, what to do.
23 And these are general comments that I made in talking
24 to John D'Antonio at the time, because we were talking
25 about his concerns about the operating agreement and

1 what possibly could be done. I don't recall what
2 those were.

3 **Q. Page 59, you say, "I agree that the purpose**
4 **of the Compact was to allocate the water between the**
5 **districts and the 53/47 as provided in the Compact."**
6 **Do you see that?**

7 A. Yes.

8 **Q. Do you recall saying that?**

9 A. No. But it's what I said. But, you know,
10 technically, it's probably not right. I mean, the
11 problem is when you're in these meetings, people mix
12 the project of the Compact with Texas and New Mexico
13 versus EBID and EP1. So when you try to split hairs
14 and look at transcripts like this, you know, it may
15 not look totally accurate.

16 **Q. You think that you misspoke?**

17 A. To the extent it's inconsistent with, you
18 know, the Compact and -- and the project and the
19 contracts, the 38 contracts, yeah, I misspoke.

20 **Q. And how is it inconsistent with the Compact?**

21 A. I don't know.

22 **Q. How is what you said inconsistent with the**
23 **project?**

24 A. I don't know.

25 **Q. And how is what you said inconsistent with**

1 the contracts?

2 A. I don't know.

3 Q. Next sentence -- well, skip a sentence. You
4 say, "I do agree with that," and then next, you
5 say, "However, that 53/47 needs to take into account
6 diversions that are happening in each of the
7 particular states, whether it's Texas, New Mexico."
8 You see that?

9 A. Yes.

10 Q. What did you mean that the 53/47 needs to
11 take into account diversions that are happening in
12 each of the particular states?

13 A. Well, in New Mexico, there's significant
14 pumping that was impacting that, and in Texas, to the
15 extent the Canutillo well field was impacting, that
16 needs to be taken into account.

17 Q. What about other diversions in Texas, do they
18 also have to be taken into account?

19 A. Yes.

20 Q. I want to ask you about a couple of -- of
21 documents, and I'm -- I'll put them both together.
22 I'll ask you first about -- the first one, which I'll
23 mark as Exhibit PG17, and these were notes that we
24 received in discovery that we've collated all
25 together.

1 (Exhibit No. 17 was marked.)

2 Q. (BY MR. WECHSLER) Will you take a moment --
3 first of all, it says "Pat Gordon" at the top. Does
4 this -- do these appear to be -- at least the first
5 page appear to be your notes?

6 A. Yes.

7 Q. Can you take a look at these documents
8 that -- I realize there's 92, but see if these all
9 look like your notes? They're all notes. They all
10 look to be from the same handwriting, and I'd just
11 like you to confirm that these are yours.

12 A. Yeah. They appear to be my notes.

13 Q. All right. I'm going to come back to those,
14 but first, I -- I want to introduce this other
15 exhibit, and this -- these look to be more of your
16 notes, which I've just marked as Exhibit PG18, and
17 these are also two pages that we received in discovery
18 from Texas.

19 (Exhibit No. 18 was marked)

20 Q. (BY MR. WECHSLER) Do you recognize that
21 document -- or those two pages?

22 A. Those don't look like my notes. I don't know
23 whose they are.

24 Q. Does it look like your handwriting?

25 A. I can't tell. It may have been. It's too

1 neat.

2 Q. So if you -- you can look on the second page.
3 The first page, it's dark, but in the upper right-hand
4 corner there, you can see the date 5/11/11. Do you
5 see that?

6 A. Yeah.

7 Q. And if you scroll on this thing, you can see
8 that this looks to be one of those large sort of note
9 pads. Do you see that?

10 A. Yes.

11 Q. Do you -- I understand that these notes were
12 notes that were presented by you at a meeting between
13 Texas and New Mexico at your office right around the
14 time of May 11th, 2011. Does that sound familiar?

15 A. I don't think that was a meeting with New
16 Mexico. I don't recall.

17 Q. Well, I'll represent to you that
18 Mr. Schmidt-Petersen actually has a photograph, as
19 well, of these exact same notes.

20 A. Okay.

21 Q. Does that refresh your recollection?

22 A. That may be. He may have taken a picture of
23 them. May have written them on the -- on an easel.

24 Q. It's my understanding, do you -- and then you
25 see there, there's some writing that's in blue and

1 some that's in red. Do you see that?

2 A. Yes.

3 Q. Do you recall during the meeting, around that
4 time, that the red writing came from during the
5 meeting?

6 A. I don't recall.

7 Q. Do you recall around May of 2011, having any
8 meetings with people from New Mexico that may have
9 included Rolf and Nabil and possibly Peggy?

10 A. And John probably. D'Antonio.

11 Q. Yeah. I -- that may be right. Well, let me
12 ask you about a couple of these things and see if
13 it -- if it jogs your memory. You can see under No.
14 1, it says, "History of Compact and Project." Do you
15 see that?

16 A. Yes.

17 Q. And couple lines down there, it says, "1929
18 Temp Compact." Do you see that?

19 A. Yes.

20 Q. Do you understand that to be referring to the
21 1929 Temporary Compact?

22 MR. SOMACH: Objection; foundation.

23 A. Yes.

24 Q. (BY MR. WECHSLER) Does the 1929 temporary
25 Compact have any significance in understanding the

1 **current final Rio Grande Compact?**

2 **MR. SOMACH:** Objection; calls for a
3 legal conclusion.

4 A. I don't know.

5 **Q. (BY MR. WECHSLER)** And you can see there, the
6 next line says, "1938," and it says, "Rio Grande
7 Compact," and it's got a little asterisk. Do you see
8 that?

9 A. Yes.

10 **Q. And then in parens, it reads, "Incorporated**
11 **the Congressional allocation of Rio Grande project**
12 **water, 1904 to 1905," end parens. Do you see that?**

13 A. Yeah.

14 **Q. Do you have an understanding of what that is**
15 **referring to?**

16 A. No.

17 **MR. SOMACH:** Objection; foundation.

18 **THE WITNESS:** Sorry.

19 **MR. SOMACH:** Objection; foundation.

20 **Q. (BY MR. WECHSLER)** Do you know who else would
21 have been at this meeting from the State of Texas?

22 A. I believe Herman Settemeyer.

23 **Q. Anyone else?**

24 A. Possibly Carlos Rubinstein.

25 **Q. Do you know what the purpose of the meeting**

1 was?

2 A. New Mexico was concerned about the operating
3 agreement, so we were trying to have meetings to talk
4 to them about their concerns and issues.

5 Q. And do you recall what the intent of this --
6 of these notes were?

7 A. Discussion points.

8 Q. Do you recall what the discussion was about
9 the Rio Grande Compact?

10 A. I don't believe there's any discussion of the
11 Rio Grande Compact itself. Not that I know of.

12 Q. You don't recall?

13 A. I don't.

14 Q. The asterisk then says -- the asterisk on
15 that word is "Rio Grande Compact," and you can see it
16 says, "Asterisk, managed by the United States." Do
17 you know what that is a reference to?

18 MR. SOMACH: Objection; foundation.

19 A. No.

20 Q. (BY MR. WECHSLER) And then the next line
21 reads, "Allocation based on acreage, which is
22 equivalent to a volume of water delivered to EBID and
23 EP No. 1, parens, state line in Texas." Do you have
24 any understanding about what that meant?

25 A. No.

1 MR. SOMACH: Objection; foundation.

2 Q. (BY MR. WECHSLER) Again, you just don't
3 recall?

4 A. I don't recall.

5 Q. Next heading says, "No. 2, project water
6 under the Compact, parens, federal project." Do you
7 have any recollection of that discussion point?

8 A. No.

9 MR. SOMACH: Foundation.

10 Q. (BY MR. WECHSLER) And then the next bullet
11 point says, "Normal release of 790,000 acre-feet." Do
12 you see that?

13 A. Yes.

14 Q. Do you know what that refers to?

15 MR. SOMACH: Objection; foundation.

16 A. No.

17 Q. (BY MR. WECHSLER) Next, it says, "Use access
18 and reuse of releases." Do you have any understanding
19 of what that line refers to?

20 MR. SOMACH: Objection; foundation.

21 Q. (BY MR. WECHSLER) I'm sorry. Did you answer,
22 Commissioner Gordon?

23 A. What -- what are you asking -- where?

24 Q. The second bullet point under No. 2
25 says, "Use, access, and reuse of releases." Do you

1 **see that?**

2 A. Yes. I don't recall.

3 Q. Next one says, "Includes seepage and return
4 flows." Do you have any understanding about what that
5 is referring to?

6 A. No.

7 MR. SOMACH: Objection; foundation.

8 Q. (BY MR. WECHSLER) And then the next line
9 says, "Delivery without impact from man's activities."
10 Any recollection about where that comes from?

11 MR. SOMACH: Objection; foundation.

12 A. No.

13 Q. (BY MR. WECHSLER) Okay. So then you can see
14 it says, No. 3, "Apportionment of project water to
15 project users." Do you have any recollection of the
16 discussion that occurred at the meeting of that
17 subject?

18 A. No.

19 Q. And the bullet point reads, "Normal release
20 of 790,000 acre-feet plus return flows." Any
21 recollection of that discussion point?

22 A. No.

23 Q. All right. And then it says, "Texas, EP No.
24 1, 43 percent, parens, 1905 Reclamation Act, New
25 Mexico EBID 57 percent, parens 1905 Reclamation Act,

1 New Mexico 60,000 acre-feet, 1906 treaty." Any
2 understanding of what that is referring to?

3 MR. SOMACH: Objection; foundation.

4 A. No.

5 Q. (BY MR. WECHSLER) Next to it in red, it
6 says, "Delivery to land." Do you know what that is
7 referring to?

8 A. No.

9 MR. SOMACH: Objection; foundation.

10 Q. (BY MR. WECHSLER) All right. Well, we will
11 ask somebody who remembers. Let's turn to another
12 document here and then we'll come back to your notes.
13 I'm showing you what I'll mark as Exhibit PG19.

14 (Exhibit No. 19 was marked.)

15 Q. (BY MR. WECHSLER) I'll represent to you these
16 were received by us in what looks like out of order,
17 and I've presented them as we received them. If you
18 go to Page 7 of this document, I -- I think that
19 appears to be the title page. Do you recognize
20 that -- the title page of this presentation?

21 A. It's a Rio Grande project operating
22 agreement. Looks like a Power -- a presentation.

23 Q. Do you know what year this was given?

24 A. No.

25 Q. Do you have any recollection of this document

1 **Q. Yet you were involved in negotiating the**
2 **operating agreement; is that right?**

3 A. Correct.

4 **Q. Do you see any conflict between those two**
5 **positions?**

6 A. No.

7 **Q. Why not?**

8 A. Because the operating agreement was a
9 compromise to stop this lawsuit, and it was a way
10 to -- if EP1 and EBID were happy, the State of Texas
11 would probably be happy, too.

12 **Q. Is the State of Texas comfortable with the**
13 **operating agreement?**

14 A. I would say generally, yes.

15 **Q. Why do you qualify it with the**
16 **word "generally"?**

17 A. Because I'd have to look at -- at this point,
18 I think the State of Texas would be -- would be
19 satisfied with the operating agreement, but I've got
20 to get approvals of that.

21 **Q. Approvals from whom?**

22 A. The governor.

23 **Q. And you haven't had that discussion with the**
24 **governor?**

25 A. I've had discussions with the governor's

1 commissioner when the EP No. 1 right was adjudicated;
2 is that correct?

3 A. I'd just become commissioner, yes.

4 Q. Did you have any problem with the -- with
5 Texas adjudicating that water right?

6 A. I wasn't consulted.

7 Q. Are you aware that New Mexico follows the
8 prior appropriation doctrine?

9 A. I don't know what that is.

10 Q. Are you familiar with the term priority call?

11 A. I'm vaguely familiar with it.

12 Q. What's your understanding?

13 A. The senior the rights for pumping, the more
14 senior the less likely you're going to be told to stop
15 pumping.

16 Q. Are you aware that the project is one of the
17 most senior rights in the lower Rio Grande in New
18 Mexico?

19 A. I believe I know it is. I think so.

20 Q. To your knowledge, has Texas ever made a
21 priority call in the LRG in New Mexico?

22 A. In my knowledge, no.

23 Q. To your knowledge, has EP No. 1?

24 A. I'm not aware of that.

25 Q. To your knowledge, has Reclamation ever made

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WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
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PATRICK R. GORDON, VOLUME I

S I G N A T U R E O F W I T N E S S

I, PATRICK R. GORDON, solemnly swear or affirm
under the pains and penalties of perjury that the
foregoing pages contain a true and correct transcript
of the testimony given by me at the time and place
stated with the corrections, if any, and the reasons
therefor noted on the foregoing correction page(s).

PATRICK R. GORDON, VOLUME I

Job No. 63575

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS)
)
 Plaintiff,)
) Original Action Case
 VS.) No. 220141
) (Original 141)
 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
)
 Defendants.)

THE STATE OF TEXAS :
 COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, PATRICK R. GORDON, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

behalf this deposition is taken, nor in the regular
employ of this attorney; and I certify that I am not
interested in the cause, nor of kin or counsel to
either of the parties.

That the amount of time used by each party at
the deposition is as follows:

MR. WECHSLER - 04:40:08

MR. SOMACH - 00:00:00

MR. DUBOIS - 00:00:00

MR. WALLACE - 00:00:00

MS. O'BRIEN - 00:00:00

GIVEN UNDER MY HAND AND SEAL OF OFFICE,
this, the 26th day of July, 2020.

Heather L. Garza

HEATHER L. GARZA, CSR, RPR, CRR

Certification No.: 8262

Expiration Date: 04-30-22



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September 16, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of: **Patrick R. Gordon, Volume 1**
07/14/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **original deposition transcript** of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein that the deposition transcript **has been signed** by the witness and **no amendments** were made.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63575

cc:

Samantha R. Barncastle
Chad M. Wallace
Tessa T. Davidson
Maria O'Brien
Stuart L. Somach
James J. Dubois

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Original Action Case
No. 220141
(Original 141)

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1 IN THE SUPREME COURT OF THE UNITED STATES
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 HON. MICHAEL J. MELLO

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 7 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
 8)
 Defendants.)

9
 10 THE STATE OF TEXAS :

11 COUNTY OF HARRIS :

12 I, HEATHER L. GARZA, a Certified Shorthand
 13 Reporter in and for the State of Texas, do hereby
 14 certify that the facts as stated by me in the caption
 15 hereto are true; that the above and foregoing answers
 16 of the witness, PATRICK R. GORDON, to the
 17 interrogatories as indicated were made before me by
 18 the said witness after being first remotely duly sworn
 19 to testify the truth, and same were reduced to
 20 typewriting under my direction; that the above and
 21 foregoing deposition as set forth in typewriting is a
 22 full, true, and correct transcript of the proceedings
 23 had at the time of taking of said deposition.

24 I further certify that I am not, in any
 25 capacity, a regular employee of the party in whose

behalf this deposition is taken, nor in the regular
employ of this attorney; and I certify that I am not
interested in the cause, nor of kin or counsel to
either of the parties.

That the amount of time used by each party at
the deposition is as follows:

MR. WECHSLER - 04:40:08

MR. SOMACH - 00:00:00

MR. DUBOIS - 00:00:00

MR. WALLACE - 00:00:00

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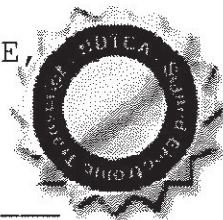
GIVEN UNDER MY HAND AND SEAL OF OFFICE,
this, the 26th day of July, 2020.

Heather L. Garza

HEATHER L. GARZA, CSR, RPR, CRR

Certification No.: 8262

Expiration Date: 04-30-22



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5 PAGE/LINE CORRECTION REASON FOR CHANGE
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PATRICK R. GORDON, VOLUME I

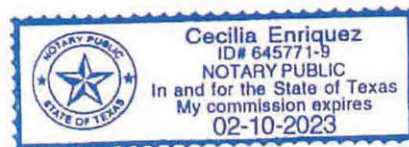
S I G N A T U R E O F W I T N E S S

I, PATRICK R. GORDON, solemnly swear or affirm
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stated with the corrections, if any, and the reasons
therefor noted on the foregoing correction page(s).

Pat Gndm

PATRICK R. GORDON, VOLUME I

Job No. 63575



Cecilia Enriquez
9-14-2020

IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLO

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

REMOTE ORAL AND VIDEOTAPED DEPOSITION OF
PATRICK R. GORDON
JULY 15, 2020
VOLUME 2

REMOTE ORAL AND VIDEOTAPED DEPOSITION of PATRICK R. GORDON, produced as a witness at the instance of the Defendant State of New Mexico, and duly sworn, was taken in the above-styled and numbered cause on July 15, 2020, from 9:02 a.m. to 2:21 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of HEATHER L. GARZA, CSR, RPR, The Woodlands, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

TX v. NM # 141

New Mexico Exhibit

NM_EX-259

Worldwide Court Reporters, Inc.
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1 responsibility to deliver the water to the contract
2 users.

3 **Q. And does New Mexico actually deliver the**
4 **water to the contract users?**

5 A. That -- I actually misstated that. Sorry.
6 New Mexico has an obligation not to interfere with the
7 water being delivered to the downstream contracts, as
8 well as Mexico.

9 **Q. Does New Mexico have any recourse if another**
10 **entity prevents it from fulfilling its**
11 **responsibilities under the Compact?**

12 A. I don't know.

13 **Q. And if I understood you correctly yesterday,**
14 **you think that water below Elephant Butte is divided**
15 **according to the downstream contracts?**

16 A. Yeah. I believe the water below Elephant
17 Butte is allocated to -- first, to Mexico under the
18 1906 treaty, and then to EBID and EP1 under 1938
19 contracts.

20 **Q. Under those contracts, EP No. 1 is entitled**
21 **to receive 43 percent of project supply?**

22 A. They're entitled to receive 43 percent of
23 what's released times, you know, the 790 times 120
24 percent on a full release.

25 **Q. EP No. 1 is located in Texas. Does that mean**

1 **that you think Texas is entitled to 43 percent of the**
2 **release?**

3 A. I think EP1 is entitled to it, and I believe
4 that these contracts are incorporated into the Compact
5 so indirectly, Texas is entitled to the 43 percent
6 we're discussing right now.

7 Q. **If the downstream contracts are incorporated**
8 **into the Compact and EBID is entitled to 57 percent of**
9 **the released water project supply; is that right?**

10 A. Correct.

11 Q. **So if the Compacts are incorporated into the**
12 **contract, does that mean that New Mexico, by**
13 **extension, is also entitled to 57 percent of the**
14 **supply?**

15 A. No.

16 Q. **Why not?**

17 A. Because New Mexico is not EBID.

18 Q. **Is Texas EP No. 1?**

19 A. No.

20 Q. **So what rights does Texas have to water below**
21 **Elephant Butte?**

22 **MR. SOMACH:** Objection to the extent
23 that it calls for a legal conclusion.

24 You can go ahead and answer.

25 A. Can you repeat that question?

1 **Q. (BY MR. WECHSLER) I can. What rights does**
2 **Texas have to water below Elephant Butte?**

3 A. I think the rights that Texas has to the
4 water is to ensure that it's not interfered with and
5 is delivered to the contract users.

6 **Q. If EP No. 1 does not receive 43 percent of**
7 **project supply, is that a violation of Texas' Compact**
8 **rights?**

9 A. I believe it is.

10 **Q. If New Mexico does not receive 57 percent of**
11 **project supply, is that a violation of New Mexico's**
12 **Compact rights?**

13 A. No.

14 **Q. What's the distinction?**

15 A. EBID is not New Mexico.

16 **Q. But you also told me EP No. 1 is not Texas?**

17 A. Texas is the -- the water that's in the
18 reservoir is delivered by New Mexico under Article 4
19 of the treaty -- under Article 4 of the Compact to
20 Texas. As commissioner for Texas, Texas -- this water
21 should -- is entitled to go to the contract users.

22 **Q. Does Texas have any jurisdiction over any**
23 **land within the territorial boundaries of the State of**
24 **New Mexico?**

25 A. Not that I'm aware of.

1 **Q. Does Texas -- the State of Texas have a**
2 **contract with EBID?**

3 A. I'm not aware of one.

4 **Q. If I understand correctly, it's your position**
5 **that all of the water delivered to Elephant Butte**
6 **reservoir by New Mexico is Texas' water; do I have**
7 **that correct?**

8 A. That's correct.

9 **Q. By what authority is EBID using water?**

10 A. A 1938 contract.

11 **Q. But that contract is not with Texas; is that**
12 **right?**

13 A. Correct.

14 **Q. Does that mean that EBID is not allowed to**
15 **use the water released from Elephant Butte reservoir?**

16 A. So the water released from Elephant Butte
17 reservoir is to go to the two contract users, EBID and
18 EP1. So that's how EBID gets to use the water.

19 **Q. By what authority does it go to those two**
20 **contract users?**

21 A. The 1938 contracts.

22 **Q. Those contracts are between Reclamation and**
23 **the two districts; is that right?**

24 A. Correct. So the Rio Grande project is the
25 mechanism for how the water gets to the two contracts

1 once it's released.

2 **Q. It's the mechanism under the Compact?**

3 A. The Compact delivers the water to the Rio
4 Grande project, which in turn is the mechanism that
5 these downstream contracts receives the water.

6 **Q. And I'm trying to understand what you think**
7 **the relationship between the project and the Compact**
8 **is. So when you say that the project is the mechanism**
9 **by which the districts receive water, is it the**
10 **mechanism under the Compact?**

11 A. I think it's incorporated into the Compact.
12 I don't think it's technically under the Compact.
13 It's incorporated. The Compact was the mechanism for
14 New Mexico to deliver its apportioned water to Texas.
15 When the water is released from Elephant Butte
16 reservoir, it's delivered to the downstream
17 contracts -- contractors as well as Mexico.

18 **Q. I want to make sure I get that right. You**
19 **think that the project was incorporated into the**
20 **Compact?**

21 **MR. SOMACH:** Objection; asked and
22 answered at least five times now this morning in the
23 short time we've had here.

24 Go ahead and try to -- you know, it's
25 been asked and answered, but if -- if you have a

1 different way of answering, Pat, go ahead and do it;
2 but, otherwise, I don't know what else you can do. Go
3 ahead.

4 A. I don't have a different answer. It's -- I
5 believe it's incorporated into the Compact.

6 **Q. (BY MR. WECHSLER) What does it mean that the**
7 **project is incorporated into the Compact?**

8 A. It's the mechanism for how the water that is
9 delivered to Texas and Elephant Butte, is delivered to
10 the two downstream contract users.

11 **Q. That delivery mechanism to the two downstream**
12 **users is incorporated into the Compact?**

13 A. Yes.

14 **Q. Are the districts a party to the Compact?**

15 A. No.

16 **Q. It's only the three states that are parties**
17 **to the Compact; is that right?**

18 A. That's correct.

19 **Q. The downstream contracts contemplate that**
20 **water will be used in EBID; is that correct?**

21 A. My understanding is yes.

22 **Q. EBID is located entirely within the State of**
23 **New Mexico?**

24 A. I believe so.

25 **Q. We talked yesterday that EBID is itself a New**

1 the operating agreement says about groundwater, so you
2 can ask that question eight different ways, but it's
3 the same question.

4 Go ahead.

5 **MR. WECHSLER:** I am not asking it at
6 least eight different ways.

7 **MR. SOMACH:** Well, I can count, I think,
8 because I've got the realtime up here, but go ahead.

9 **MR. WECHSLER:** Please.

10 **Q. (BY MR. WECHSLER)** If New Mexico changed the
11 **EBID statutes so that EBID no longer existed, would**
12 **New Mexico still be entitled to 57 percent of project**
13 **supply?**

14 **MR. SOMACH:** Objection; foundation;
15 incomplete hypothetical.

16 A. I don't know.

17 **Q. (BY MR. WECHSLER)** If -- we looked yesterday
18 **at the definition of usable water in the Compact, and**
19 **we looked at the language that says that the release**
20 **of water is to meet irrigation demands. Do you recall**
21 **that discussion?**

22 A. I do.

23 **Q. How do you measure EP No. 1's irrigation**
24 **demands?**

25 A. I don't know.

1 **Q. Have you ever measured EP No. 1's irrigation**
2 **demands?**

3 A. No.

4 **Q. Were you ever aware of a way to measure EP**
5 **No. 1's irrigation demands?**

6 A. No.

7 **Q. Do you recall any discussion at any Compact**
8 **commission meetings about how EP No. 1 -- how to**
9 **measure EP No. 1's irrigation demands?**

10 A. I don't recall.

11 **Q. In a given year, EP No. 1 receives enough**
12 **water to meet its irrigation demands. Has Texas**
13 **received all the water that it's entitled to receive**
14 **under the Compact?**

15 A. Texas is entitled to receive 120 percent of
16 what's released from the reservoir, so I don't know if
17 that's -- meets irrigation demands or not.

18 **Q. Where in the Compact do you read that Texas**
19 **is entitled to receive 120 percent of the releases?**

20 A. So when the Compact was adopted, there was a
21 joint investigation report, as well as engineer
22 advisors, and the 1938 contracts were in place with
23 the lands and the Rio Grande project was in place as a
24 mechanism for delivering the water, and it
25 contemplated with return flows an efficiency in the

1 project of 120 percent. So that's how I get that
2 Texas would get 120 percent.

3 Q. Are you saying that if the project releases
4 100,000 acre-feet, that Texas is entitled to receive
5 120,000 acre-feet?

6 A. Times 43 percent.

7 Q. 43 percent of that. I see. We talked
8 yesterday about the impact of the 60,000 from Mexico.
9 We don't have to --

10 A. Yeah, of course. The Mexico comes off the
11 top.

12 Q. You -- you also acknowledged yesterday that
13 New Mexico does not operate the project, right?

14 A. No. New Mexico does not operate the -- my
15 knowledge, they do not operate it.

16 Q. Reclamation is responsible for operating the
17 project; is that right?

18 A. That's my understanding.

19 Q. Does Reclamation have any responsibilities
20 that arise under the Compact?

21 A. Other than running the Rio Grande project,
22 which is the mechanism for delivering water to the
23 downstream contracts, I believe that's their only role
24 so technically, I don't know if it's a Compact role.
25 Again, the Rio Grande project and the contracts, I

1 believe, are incorporated or contemplated under the
2 Rio Grande -- Rio Grande Compact.

3 Q. So if the -- the project is incorporated into
4 the Compact, does that mean that Reclamation have
5 duties that they have to perform that arise under the
6 Compact by virtue of the incorporation?

7 A. I think their duties are limit -- are limited
8 to the Rio Grande project. I don't know if they would
9 rise to a, quote, Compact level. I -- I just don't
10 know.

11 Q. If -- if you have a full supply year, and
12 Reclamation intentionally delivers 100 percent of the
13 water released from the project to EBID and none to EP
14 No. 1, is that a violation of the Compact?

15 MR. SOMACH: Objection; foundation;
16 calls for a legal question -- or conclusion. It's
17 also an incomplete hypothetical.

18 Go ahead. You can answer.

19 A. I'm assume -- well, I don't know whose
20 violation it would be, but I'm just assuming that
21 if -- if Texas, EP1, didn't get 43 percent of 120
22 percent of that full release, it could be a Compact
23 violation. I don't know whose fault it'd be.

24 Q. (BY MR. WECHSLER) Got it. How about if -- if
25 Reclamation released a full release, but delivered 100

1 percent of the water to EP No. 1 and no water to EBID,
2 is that a Compact violation?

3 A. I --

4 MR. SOMACH: Objection. Same objection.

5 A. I don't know how that would happen.

6 Q. (BY MR. WECHSLER) Well, if it did?

7 A. I -- I don't agree with that hypothetical.

8 Q. I'm just asking you to assume it happens.

9 All of the water goes to EBID -- to EP No. 1?

10 MR. SOMACH: Objection -- same
11 objection. Incomplete hypothetical, lack of
12 foundation, and it calls for a legal conclusion.

13 Q. (BY MR. WECHSLER) You can go ahead.

14 A. I don't know.

15 Q. What's the distinction you see -- you said
16 that if -- if EP No. 1 doesn't get 43 percent of the
17 supply, it would be a Compact violation. You just
18 didn't know by whom. What's the distinction if -- if
19 EBID doesn't get its share of water?

20 A. I don't know.

21 Q. Do EP No. 1 and EBID have responsibilities
22 for some operations within the project?

23 A. My understanding is EP1 and EBID entered into
24 contracts, I believe in the '80s, 1979 or '80, for
25 maintenance of the project. I don't know what

1 A. Yes.

2 **Q. Is that a position that Texas had in 2007?**

3 A. I don't know what that ratio is. And I think
4 when this said what Texas wants, I believe this is
5 EBID.

6 **Q. You think this is from EBID, this document?**

7 A. I don't know.

8 **Q. If others testify about this meeting and**
9 **testify that this was a document that Texas talked**
10 **about at a meeting between the districts and**
11 **Reclamation, would you have any reason to disagree**
12 **with that testimony?**

13 **MR. SOMACH:** Objection. When you refer
14 to "Texas," what are you referring to? You're
15 imprecise in terms of what you're referring to. If
16 you're talking about Texas, presumably the State of
17 Texas represented by the commissioner, so is that what
18 the question is?

19 **MR. WECHSLER:** I am talking about the
20 State of Texas.

21 **Q. (BY MR. WECHSLER) Do you understand the**
22 **question, Commissioner?**

23 A. I think the reference to Texas in this
24 document is EBI -- is EP1.

25 **Q. Do you think this is a document produced by**

1 **EP1?**

2 A. I don't know who produced this document.

3 **Q. Your testimony is in 2007, Texas did not have**
4 **any particular -- the State of Texas did not have any**
5 **particular position on the provisions of an operating**
6 **agreement?**

7 A. The State of Texas didn't, no.

8 **Q. At what point were you asked to be involved**
9 **in the discussions between the districts as a**
10 **mediator?**

11 A. So I've been called a mediator in a lot of
12 meetings and documents, but I don't -- I don't really
13 call myself to be a mediator. I would -- I would say
14 it was more of a role of an informal facilitator, and
15 when I mean that, what that is is I -- I help keep the
16 districts talking.

17 **Q. What's the distinction between an informal**
18 **facilitator and a mediator?**

19 A. Well, I think of a mediator as someone who
20 puts two parties in a room and goes back and forth and
21 tries to come up with a deal. I didn't have enough
22 knowledge of the hydrology and issues like that to --
23 to have known to be a -- a -- I'd say a formal
24 mediator. I mainly develop relationships with the two
25 districts to keep them talking because they were not

1 that far apart, I didn't think, and as far as what
2 they wanted in an operating agreement. But you had
3 personalities on the two boards that sometimes were
4 very strong and so all I did was keep the dialogue
5 going when I could.

6 **Q. At what point did you -- what point were you**
7 **asked to become involved as a facilitator?**

8 A. I would say probably in April or May of 2007.

9 **Q. Do you have any knowledge about how the**
10 **decision was made to ask you to be a facilitator?**

11 A. I don't know.

12 **Q. Who approached you to be a facilitator?**

13 A. I would say from EBID, it was Robert Fabian
14 and James Salopek and Gary Esslinger, and EP1, it
15 would have been Chuy Reyes, Johnny Stubbs, maybe Art
16 Ivey.

17 **Q. Why did you agree to be a facilitator?**

18 A. Because these guys needed to work out
19 their -- work out a relationship and work out an
20 operating agreement, because the Bureau told them if
21 they didn't, the Bureau was going to put one in place,
22 and both of them probably had concerns with what the
23 Bureau was going to -- to do in an operating
24 agreement.

25 **Q. As Texas commissioner, you have an obligation**

1 to act on behalf of the State of Texas; is that right?

2 A. As Texas commissioner, yes.

3 Q. You mentioned yesterday that one of your
4 responsibilities is to make sure that Texas gets its
5 share of water?

6 A. That is one responsibility, but my
7 responsibility is to make sure that water is delivered
8 to the 1938 contracts. Actually, my responsibility is
9 to make sure it doesn't get picked off.

10 Q. In other words, New Mexico water users don't
11 deplete Texas' share?

12 A. Yes.

13 Q. Do you consider yourself neutral as to the
14 actions of EBID?

15 A. So first of all, when I helped be the
16 facilitator, I didn't do it as my role as the Rio
17 Grande Compact Commissioner. I did it because these
18 two districts were in what I consider the 38 contracts
19 involving Texas water, but I did not negotiate the
20 specific terms. Both districts had their own
21 attorneys. EBID had Dr. Maddock, Dr. King, Steve
22 Hernandez, Steve Hubert. EBID had Al Blair, Jim
23 Spear, and I believe Maria O'Brien. So as to the
24 negotiating of the specific terms of this operating
25 agreement, I did not do that.

1 Q. You said at the beginning of that answer that
2 you did not act as a facilitator in your role as the
3 Rio Grande Compact commissioner, but you were the
4 sitting and acting Compact commissioner for the State
5 of Texas at the time that you acted as a facilitator;
6 is that right?

7 A. That's right.

8 Q. In what role did you act as facilitator
9 between the districts and Reclamation?

10 A. As Pat Gordon.

11 Q. I think you told me as Pat Gordon, you didn't
12 have any expertise or information or knowledge about
13 water hydrology, water administration; do I have that
14 right?

15 A. That's right.

16 Q. What did you have to add as a facilitator
17 then?

18 A. I was able to develop a relationship with the
19 two boards and I could help keep them talking, but I
20 had no expertise in hydrology. I had no expertise in
21 the detail of the -- the detail of the agreement. So
22 what I added was just I kept them talking.

23 Q. Going back to my question, we -- we were
24 talking about your -- that you did have
25 responsibilities as commissioner, and my question to

1 **you was: With regard to the water -- water**
2 **distribution actions of the two districts, you are not**
3 **neutral; is that correct?**

4 A. I think I'm neutral between the two districts
5 as to the 38 contract water.

6 **Q. In what way do you think you're neutral?**

7 A. Well, you can go look at the Compact. If you
8 look at Article 7, I'm the -- if there's a
9 relinquishment of a credit water, I do it as Compact
10 commissioner, and it goes to both EBID and EP1. If
11 you look at Article 8, I can call on water if there's
12 a debit as Texas commissioner. In Article 8 in
13 January, I can call that water, and that water again
14 goes into the reservoir and then to EBID and EP1.

15 **Q. Why does that make you neutral?**

16 A. Well, it means I have to -- if I make a
17 decision as commissioner, it doesn't -- my decision
18 doesn't impact the 57/43. It gets the water to the
19 contracts through the project. I -- I don't decide
20 who gets more of the 57/43. That's not my decisions.

21 **Q. Under Article 7 we talked about yesterday,**
22 **there has to actually be an agreement between the**
23 **Texas commissioner and the New Mexico commissioner in**
24 **order to release New Mexico credit water, right?**

25 A. That's correct.

1 Q. Similarly, if Colorado was releasing credit
2 water, it has to actually be an agreement between the
3 Colorado commissioner and the Texas commissioner,
4 right?

5 A. Correct. That's right.

6 Q. And under Article 8, any water that reaches
7 Elephant Butte, if I understand your testimony, that
8 gets divided 57/43 between the two districts; is that
9 right?

10 A. In general, yes. If there's credits, it
11 becomes usable water. Whatever becomes usable water
12 and is released goes to -- to the contracts, 57/43.

13 Q. Do you have responsibilities under the
14 Compact to make sure that New Mexico gets its share of
15 Compact water?

16 A. My responsibilities are to make sure the
17 water gets to the reservoir and is delivered to the
18 reservoir, and "delivered" means that it's delivered
19 and not -- I used the word picked off. It's
20 probably -- it's not diverted.

21 Q. It's not diverted in New Mexico?

22 A. Correct.

23 Q. Except for the 57 percent that New Mexico
24 lands are entitled to?

25 A. Sure. The -- the water released should go to

1 the two downstream contract users.

2 Q. My question was: Do you have
3 responsibilities under the Compact to make sure that
4 New Mexico gets its share of Compact water?

5 A. I don't know. I -- I don't think so, because
6 New Mexico's share is under 1938 contracts, and I
7 don't control those.

8 Q. When you agreed to become the facilitator
9 between the two districts, did you have a discussion
10 with them where you informed them of your
11 responsibilities or what you viewed as your
12 responsibilities as the Texas commissioner?

13 A. They all knew what the Texas commissioner did
14 so, no, I did not have a discussion.

15 Q. How do you know what they knew?

16 A. In talking to them, having meetings with
17 them, discussing with them, they had -- had -- they'd
18 been in this project for quite a long time, so they
19 had a lot more knowledge about everything than you and
20 I do.

21 Q. When you agreed to become the facilitator
22 between the districts, did you inform them of the work
23 that your firm had done for the City of El Paso?

24 A. No.

25 Q. Did you inform them of the engagement letter

1 that you had with EP No. 1?

2 A. No. That I know of.

3 Q. Going back to, say, 2004, are you aware of
4 any work that your firm did for EP No. 1?

5 A. In 2004?

6 Q. Starting in 2004.

7 A. No, I'm not -- I'm not aware of it.

8 Q. How about any work that anyone from your firm
9 did for any of the board members of EP No. 1?

10 A. At one point, I did some help Johnny Stubbs
11 on a joint venture with another client of mine.

12 Q. What was the joint venture?

13 A. It was a real estate. They were selling
14 lots. Actually, I -- I think I represented the other
15 party. Johnny Stubbs was on the other side of it, so
16 I don't -- I don't know if I technically represented
17 Johnny or not.

18 Q. Let's look at another exhibit, which I'll
19 mark as deposition Exhibit 24.

20 (Exhibit No. 24 was marked.)

21 Q. (BY MR. WECHSLER) This is an October 18,
22 2007, letter from EBID signed by James Salopek. If
23 you look on Page 3, you can see you were copied on
24 this letter. Do you recall this letter?

25 A. No.

1 Q. Is it accurate to say that there were
2 significant issues in the fall of 2007 that separated
3 the parties?

4 A. No.

5 Q. What did you understand to be the issues that
6 separated the parties?

7 A. There were two issues. It was the -- the D3
8 curve and some hydraulic components that I'm not aware
9 of and the carryover.

10 Q. When you say the D3 curve and some hydraulic
11 components, do you put those as a single issue?

12 A. I -- I don't know. I don't know the
13 mechanics of the D3, but I just knew that -- that EBID
14 wanted some components into the D3. I don't know
15 specifically what they are or were.

16 Q. I'm going to show you a document that's been
17 marked now as Exhibit PG25.

18 (Exhibit No. 25 was marked.)

19 Q. (BY MR. WECHSLER) This is a document
20 addressed to you from Mr. Hubert. It's not signed so
21 my first question is: Have you ever seen this
22 document before?

23 A. I don't recall.

24 Q. Did you ask the districts to provide you with
25 position statements on the issues involving the

1 operating agreement?

2 A. Not that I recall.

3 Q. If you look at this document on Page 4 of the
4 document, it's the -- the last page right before this
5 signature, there's a reference to a meeting to be held
6 at your office on Monday, January 21, 2008. Were
7 there any meetings between the districts that were
8 held at your office around -- on or about January 21,
9 2008?

10 A. Correct. There was.

11 Q. Was Reclamation also at that meeting?

12 A. They were.

13 Q. You do not recall any statements or letters
14 about that mediation being sent to you from either the
15 districts or Reclamation?

16 A. I don't recall.

17 Q. Was this the first meeting at which you acted
18 as a facilitator?

19 A. There was several meetings with the districts
20 during 2007. I don't know how many. They were
21 informal where there was discussions and it was mainly
22 hydraulic carryover, so it was -- the -- the technical
23 people were talking.

24 Q. And you were involved in those discussions?

25 A. I -- I sat in and listened, yes.

1 Q. And then this meeting on January 21st, 2008,
2 was that meeting different than those, what I'll call
3 informal technical discussions?

4 A. Not really.

5 Q. Was Reclamation involved in those informal
6 discussions that occurred in 2007?

7 A. I believe they were.

8 Q. And when you held this meeting on
9 January 21st, 2008, was it just everybody sitting
10 around in one room or were people broken out?

11 A. Everybody was in the main conference room
12 talking, and occasionally, people would break out to
13 go talk, come back.

14 Q. Were there other negotiating meetings or -- I
15 don't know what you want to call them. Were there
16 other meetings between the districts and Reclamation
17 facilitated by you in 2008?

18 A. Not that I recall. There may have been other
19 meetings. They -- I believe in this January 21st,
20 they -- they came to terms on what they wanted in the
21 operating agreement. I don't recall having other
22 meetings with them, though.

23 Q. Were you involved at all in the -- well, was
24 the operating agreement drafted at that
25 January 21, 2008, meeting?

1 A. I don't -- I think there was drafts of the
2 operating agreement going around during 2007. I
3 didn't draft it, so I -- so I don't know.

4 **Q. Did you have any involvement in the wording**
5 **of the operating agreement?**

6 A. I believe I saw the -- saw the agreement, but
7 I don't know if I made any substantive comments to it.

8 **Q. When there was a draft of -- when would you**
9 **say there was a draft circulating of the operating**
10 **agreement between the districts and Reclamation?**

11 A. March of 2007, I believe, there was a draft
12 started.

13 **Q. Did you at any time present that draft to the**
14 **Rio Grande Compact Commission?**

15 A. No. I presented it to Commissioner D'Antonio
16 in a meeting after the -- after the -- the meeting in
17 Alamosa in 2007. I gave them a copy of it.

18 **Q. That would have been in March of 2007?**

19 A. March of 2007, yes.

20 **Q. Mr. D'Antonio testified he doesn't have any**
21 **recollection of being given a copy. Do you have any**
22 **documents that show that you gave that draft to**
23 **Mr. D'Antonio?**

24 A. Like a receipt?

25 **Q. Well, I don't know. He doesn't remember**

1 **that. I'm just trying to find a way to verify it.**

2 A. Yeah. I -- I could remember because it was
3 at the end of the -- end of the Rio Grande. We were
4 in a smaller room, and it was -- this is an older
5 hotel. I just remember it was a -- a small room. I
6 gave them the copy and said let me know if you have
7 comments and that's all I remember.

8 **Q. Did you have any other discussions with**
9 **Commissioner D'Antonio about the draft operating**
10 **agreement?**

11 A. I don't recall.

12 **Q. Do you know if there were any conversations**
13 **between the engineer advisors about draft operating**
14 **agreement?**

15 A. I don't know. There could have been.

16 **Q. In -- in 2008, after this meeting at your**
17 **office, were there any changes -- well, we know there**
18 **were changes to the operating agreement. Did you**
19 **provide a copy any time after -- to -- to Commissioner**
20 **D'Antonio, any time after that March, 2007?**

21 A. I didn't. My understanding is EBID gave them
22 copies.

23 **Q. Where do you get that understanding from?**

24 A. They told me.

25 **Q. Who told you?**

1 A. Yeah. That's the -- the -- I believe it's
2 called the full release.

3 Q. Then if you look at Lines 11 and 12, 11 is
4 EBID allocation balance, and it has a number there of
5 10,000. Is that intended to represent the -- what
6 I'll call the district carryover account?

7 A. Honestly, I wouldn't know how they're
8 calculating this Table 2.

9 Q. There are some references in this page to D2.
10 Do you have an understanding of how the operating
11 agreement relates to D2?

12 A. My understanding is the operating agreement
13 took the D2 and tried to allocate to EP1 as close as
14 possible to D2 allocation.

15 Q. Line 26, Commissioner Gordon, is for the
16 diversion ratio. Do you have an understanding of the
17 diversion ratio?

18 A. No.

19 Q. If you look at this particular table, Table
20 2, do you know enough about this document to say the
21 total amount that's allocated to either of the
22 districts?

23 A. I -- I don't.

24 Q. Page 22 of the PDF, Section 6.12, this is
25 under the heading, "Rio Grande Compact," and the

1 entire section reads, "Nothing herein is intended to
2 alter, amend, repeal, modify, or be in conflict with
3 the provisions of the Rio Grande Compact." Do you see
4 that?

5 A. I do.

6 Q. As Texas Compact commissioner, is that an
7 important provision of the operating agreement?

8 A. Yes. I think it's important.

9 Q. Why?

10 A. Well, it doesn't conflict with the Compact.

11 Q. Did you check with either of the Compact
12 commissioners to determine if they agreed with this
13 provision?

14 A. I did not.

15 Q. Did you do anything to satisfy yourself that
16 the operating agreement met this provision?

17 A. I did not.

18 Q. Has the operating agreement itself ever been
19 brought before the Commission for approval?

20 A. I'm not aware of that, no.

21 Q. Let me show you briefly the operating manual.
22 I think it's the most recent version, which I'll mark
23 as deposition Exhibit PG27.

24 (Exhibit No. 27 was marked.)

25 Q. (BY MR. WECHSLER) You can see the cover page

1 **Q. Even if they're filed by EBID members?**

2 A. Yeah. I don't know who particularly files
3 them.

4 **Q. One of the expert reports from the State of**
5 **Texas has a suggestion in it that New Mexico should be**
6 **forced to reduce its groundwater pumping by 60**
7 **percent. Have you discussed with EBID what the**
8 **impacts on EBID members would be if they were forced**
9 **to shut down 60 percent of their groundwater pumping?**

10 A. I have not discussed the expert report with
11 EBID.

12 **Q. Have you discussed that possibility of**
13 **shutting down groundwater pumping in EBID with EBID?**

14 A. The only shut -- shutting down with EBID is
15 the discussions with them on their DROP program.

16 **Q. Are you concerned about the possibility that**
17 **EBID members would have to shut down or cease**
18 **groundwater pumping?**

19 A. Am I concerned?

20 **Q. Yes.**

21 A. I'd be concerned, yes.

22 **Q. Why?**

23 A. Just because it -- it's -- it's groundwater
24 they're going to have to figure somewhere else to get.

25 **Q. Is the State of Texas asking to shut down**

1 **groundwater pumping within EBID?**

2 A. The State of Texas is asking that the
3 groundwater be shut down in New Mexico. That could
4 include EBID.

5 **Q. And could include EBID members?**

6 A. It -- yeah. EBID and EBID members, yes.

7 **Q. In this case, is Texas claiming that New**
8 **Mexico had under deliveries to Elephant Butte**
9 **reservoir?**

10 A. That's not in this suit.

11 **Q. Does -- are you aware of any joint defense**
12 **agreements in this case that Texas has with any other**
13 **party?**

14 A. I believe there's a joint defense with the
15 United States, with EP1, and EBID, I believe.

16 **Q. Any other entities?**

17 A. Not that I know of. Probably the City of El
18 Paso, too, PSP.

19 **MR. WECHSLER:** Commissioner Gordon,
20 that's all the questions I have for you. I appreciate
21 your time. Thank you very much.

22 I should ask, Chad or does anybody else
23 have any questions?

24 **MR. WALLACE:** No questions from
25 Colorado. Thanks.

1 **MR. WECHSLER:** All right. Thank you.

2 **MR. DUBOIS:** No questions from the
3 United States.

4 **MR. SOMACH:** No questions either, so I
5 guess we're done.

6 **MR. WECHSLER:** We're done. Have a good
7 day.

8 THE WITNESS: Thank you.

9 THE VIDEOGRAPHER: The time is 2:21 p.m.
10 We're off the record.

11 (The deposition concluded at 2:21 p.m.)

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S I G N A T U R E O F W I T N E S S

I, PATRICK R. GORDON, solemnly swear or affirm
under the pains and penalties of perjury that the
foregoing pages contain a true and correct transcript
of the testimony given by me at the time and place
stated with the corrections, if any, and the reasons
therefor noted on the foregoing correction page(s).

PATRICK R. GORDON, VOLUME II

Job No. 63576

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS)
)
 Plaintiff,)
) Original Action Case
 VS.) No. 220141
) (Original 141)
 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
)
 Defendants.)

THE STATE OF TEXAS :
 COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand
 Reporter in and for the State of Texas, do hereby
 certify that the facts as stated by me in the caption
 hereto are true; that the above and foregoing answers
 of the witness, PATRICK R. GORDON, to the
 interrogatories as indicated were made before me by
 the said witness after being first remotely duly sworn
 to testify the truth, and same were reduced to
 typewriting under my direction; that the above and
 foregoing deposition as set forth in typewriting is a
 full, true, and correct transcript of the proceedings
 had at the time of taking of said deposition.

I further certify that I am not, in any
 capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. WECHSLER - 03:37:49

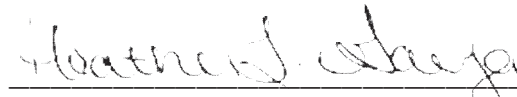
 MR. SOMACH - 00:00:00

9 MR. DUBOIS - 00:00:00

 MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 26th day of July, 2020.

14 

HEATHER L. GARZA, CSR, RPR, CRR

Certification No.: 8262

Expiration Date: 04-30-22



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September 16, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of: **Patrick R. Gordon, Volume 2**
07/15/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **original deposition transcript** of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein that the deposition transcript **has been signed** by the witness and **no amendments** were made.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63576

cc:

Samantha R. Barncastle
Chad M. Wallace
Tessa T. Davidson
Maria O'Brien
Stuart L. Somach
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLO

STATE OF TEXAS

PLAINTIFFS,

VS.

STATE OF NEW MEXICO,
and STATE OF COLORADO,

DEFENDANT.

§
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§
§
§
§
§
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§
§

Original Action Case
No. 220141
(Original 141)

REMOTE ORAL AND VIDEOTAPED DEPOSITION OF

PATRICK R. GORDON

JULY 15, 2020
VOLUME 2

ORIGINAL



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STATE OF TEXAS)
)
)
 Plaintiff,)
) Original Action Case
 VS.) No. 220141
) (Original 141)
 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
)
 Defendants.)

COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, PATRICK R. GORDON, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

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6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. WECHSLER - 03:37:49

 MR. SOMACH - 00:00:00

9 MR. DUBOIS - 00:00:00

 MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 26th day of July, 2020.

14 *Heather L. Garza*

HEATHER L. GARZA, CSR, RPR, CRR

15 Certification No.: 8262

16 Expiration Date: 04-30-22

17 Worldwide Court Reporters, Inc.

18 Firm Registration No. 223

19 3000 Wesleyan, Suite 235

20 Houston, TX 77027

21 800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS, :
 :
 :
 Plaintiff, :
 :
 VS. : Original Action Case
 : No. 220141
 STATE OF NEW MEXICO AND : (Original 141)
 STATE OF COLORADO, :
 :
 Defendants. :

ORAL AND VIDEOTAPED 30(b)(6) DEPOSITION OF
UNITED STATES BUREAU OF RECLAMATION
BY AND THROUGH
FILIBERTO CORTEZ
AUGUST 20, 2020

ORAL AND VIDEOTAPED 30(b)(6) DEPOSITION OF
UNITED STATES BUREAU OF RECLAMATION BY AND THROUGH
FILIBERTO CORTEZ, produced as a witness at the instance
of the Defendant State of New Mexico, and duly sworn,
was taken in the above-styled and numbered cause on
August 20, 2020, from 10:02 a.m. MDT to 1:32 p.m. MDT,
via Zoom videoconference, before PHYLLIS WALTZ, RMR,
CRR, CRC, Texas CSR, TCRR, Louisiana CCR, in and for the
State of Texas, recorded by machine shorthand, pursuant
to the Federal Rules of Civil Procedure and the
provisions stated on the record or attached hereto; that
the deposition shall be read and signed before any
Notary Public.

1 Q. Ultimately, it results in if there is a
2 diversion ratio of less than 1, it will result in EBID
3 receiving an allocation of less than 57 percent?

4 A. The -- the amount of water needed, as
5 calculated by the diversion ratio, is subtracted from
6 the EBID allocation, correct.

7 Q. D-2 is based on data from 1951 to 1978?

8 A. Correct.

9 Q. During that time period, there was groundwater
10 pumping in both states?

11 A. From my understanding, yes.

12 Q. The effects to the river and to deliveries to
13 the districts would have been reflected within the D-2
14 curve; is that right?

15 A. Say again. The -- the effects. Yes.

16 Q. And that include impacts that occurred to the
17 river from groundwater pumping, those would be reflected
18 in the D-2 curve?

19 A. Correct.

20 Q. Let's look at the operating agreement, which
21 I'll mark as Deposition Exhibit 13.

22 Does the ground -- the operating agreement
23 grandfather in the groundwater pumping from the D-2
24 period?

25 A. The operating agreement grandfathers in the --

1 all of the conditions on the project. Part of that is
2 being the groundwater extraction taken -- being done at
3 the time, but along with all the climatic conditions,
4 the return flows from Arroyo runs, any flooding
5 conditions which may be -- have gone on at the time. So
6 it's not just the pumping, but quite a few other
7 factors.

8 Q. All conditions that existed during that D-2
9 period?

10 A. Correct.

11 Q. The -- if you look at Page 18, Section 6.12 is
12 the one that says "Rio Grande Compact," and it says,
13 "Nothing herein is intended to alter, amend, repeal,
14 modify, or be in conflict with provisions of the
15 Rio Grande Compact." And so, if I understand, in
16 putting that along with the use of D-2, is it correct
17 that D-2 is not in conflict with the provisions of the
18 Rio Grande Compact?

19 A. That is correct.

20 Q. In -- does Reclamation claim that a contract
21 is needed for groundwater pumping within the Rio Grande
22 Project area?

23 A. The contract with whom?

24 Q. Reclamation.

25 A. No.

1 the record for a moment and decide whether or not we're
2 going to break for lunch or if you prefer just pushing
3 through.

4 THE VIDEOGRAPHER: Time is 12:02 p.m.
5 We're off the record.

6 (Recess from 12:02 p.m. to 1:06 p.m.)

7 THE VIDEOGRAPHER: The time is 1:06 p.m.
8 We're on the record.

9 Q. (BY MR. WECHSLER) Back from lunch,
10 Mr. Cortez. Before we talk about the -- the EIS, I had
11 a follow-up question or questions about the operating
12 manual, which is Exhibit 5. So if you could go to that
13 exhibit, please. And I'm looking at page -- pdf Page 5,
14 Paragraph 3.2.

15 A. Oh, before we go on to that, I'd like to
16 address the question that I had on the El Paso County
17 Water Improvement District monthly water allocation
18 charges report.

19 Q. Okay.

20 A. I think that's Document 5, page -- pdf
21 Page 12.

22 Q. Okay.

23 A. And the question had to do with the crude
24 conservation credit and the estimated annual
25 conservation credit.

1 **Q. Right.**

2 A. Yeah. What I expected to see and what I
3 actually saw didn't quite jibe. But the annual
4 conservation credit is the anticipated credit based on
5 the allocation and the amount of water that -- that is
6 anticipated to be run through the American Canal
7 extension for that year. The accrued conservation
8 credit is the actual water run through the American
9 Canal extension year to date.

10 **Q. Okay. I understand that. Thank you for**
11 **clarifying. Any -- anything else on that figure?**

12 A. No, that's all.

13 **Q. Okay. Let's look at Page 5. And I'm curious**
14 **about Section 3.2, the "Bonita Private Irrigation**
15 **Canal."**

16 A. Yes.

17 **Q. What is the Bonita Canal -- Canal -- excuse**
18 **me?**

19 A. The Bonita Private Irrigation Canal or also
20 known as the Bonita Lateral is a separate release made
21 through Caballo which goes to the Bonita Lateral and
22 irrigates some lands outside of the district.

23 **Q. Is -- it says it's a private irrigation canal.**
24 **What does that mean?**

25 A. It is not part of the project.

1 Q. Do you know the acreage that it irrigates?

2 A. I sure don't, no.

3 Q. Do you know how many water users are located
4 on the Bonita Lateral?

5 A. No, it changes, so...

6 Q. Is all of that acreage located in New Mexico?

7 A. Yes, it is. It's right below Caballo Dam.

8 Q. Do you know if those water users have water
9 rights?

10 A. They say that they have a prior water right to
11 the project.

12 Q. Has it been adjudicated in the New Mexico
13 adjudication?

14 A. I don't know specifically.

15 Q. Does Reclamation have a contract with the
16 Bonita Lateral?

17 A. No.

18 Q. Does Reclamation communicate with any of the
19 water users or maybe leadership for the Bonita Lateral?

20 A. I don't know that there is any leadership.
21 It's, basically, a private ditch which supplies water to
22 various farmers.

23 Q. How much water do they divert?

24 A. They divert whatever they need.

25 Q. There is no limit to it?



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September 23, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Filiberto Cortez 30(b)(6)**
08/20/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65123

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Sarah A. Klahn
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

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IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS, :
 :
 Plaintiff, :
 :
 VS. : Original Action Case
 : No. 220141
 STATE OF NEW MEXICO AND : (Original 141)
 STATE OF COLORADO, :
 :
 Defendants. :

I, PHYLLIS WALTZ, a Texas Certified Shorthand Reporter, Texas Certified Realtime Reporter, Louisiana Certified Court Reporter, Registered Merit Reporter, Certified Realtime Reporter, and Certified Realtime Captioner, in and for the State of Texas, do hereby certify the following:

That the witness, FILIBERTO CORTEZ, was duly sworn by the officer and that the transcript of the oral deposition is a true record of the testimony given by the witness;

I further certify that pursuant to FRCP Rule 30(e)(1) that the signature of the deponent:

X was requested by the deponent or a party before the completion of the deposition and is to be returned within 30 days from the date of receipt of the transcript. If returned, the attached Changes and Signature Page contains any changes and the reasons

therefor;

_____ was not requested by the deponent or a party before the completion of the deposition.

I further certify that I am neither counsel for, related to, nor employed by any of the parties or attorneys to the action in which this proceeding was taken. Further, I am not a relative or employee of any attorney of record in this cause, nor am I financially or otherwise interested in the outcome of the action.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, on this, the 4TH day of SEPTEMBER, 2020.



Phyllis Waltz

PHYLLIS WALTZ, RMR, CRR, CRC

Expiration Date: 12/31/20

TEXAS CSR, TCRR NO. 6813

Expiration Date: 12/31/21

LOUISIANA CCR NO. 2011010

Expiration Date: 12/31/20

Worldwide Court Reporters, Inc.

Firm Certification No. 223

3000 Weslayan, Suite 235

Houston, Texas 77027

(713) 572-2000

WITNESS CORRECTIONS AND SIGNATURE

FILIBERTO CORTEZ

AUGUST 20, 2020

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

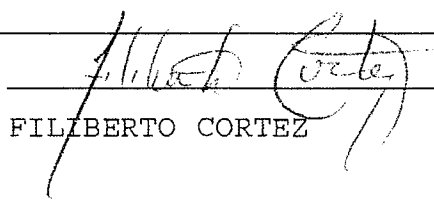
PAGE/LINE	CORRECTION	REASON FOR CHANGE
14/4	Capitalize Upper	official name of Region

23/8	Change back storage to bank storage	
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35/17	Change Artello to Garcia	
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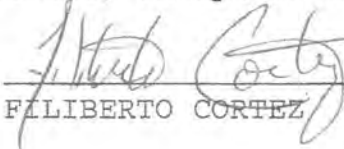
54/14	Change our to their	
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77/23	Change crude to accrued	
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FILIBERTO CORTEZ

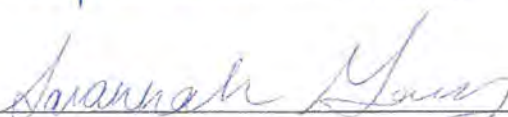
1 I, FILIBERTO CORTEZ, have read the
 2 foregoing deposition and hereby affix my signature that
 3 same is true and correct, except as noted above.

4 
 5 FILIBERTO CORTEZ

6 STATE OF T E X A S)
 7 COUNTY OF El Paso)

8 Before me, September 18, 2020, on
 9 this day personally appeared FILIBERTO CORTEZ, known to
 10 me, or proved to me under oath or through
 11 TX Driver's License) (description of identity card or
 12 other document)), to be the person whose name is
 13 subscribed to the foregoing instrument and acknowledged
 14 to me that they executed the same for the purposes and
 15 consideration therein expressed.

16 Given under my hand and seal of office on
 17 this, the 18 day of September, 2020.

18 
 19 NOTARY PUBLIC IN AND FOR THE
 20 STATE OF TEXAS

21 My Commission Expires: 08-04-2024



IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLO

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

REMOTE ORAL AND VIDEOTAPED DEPOSITION OF
FILIBERTO CORTEZ
JULY 31, 2020
VOLUME 2

REMOTE ORAL AND VIDEOTAPED DEPOSITION of
FILIBERTO CORTEZ, produced as a witness at the
instance of the Defendant State of New Mexico, and
duly sworn, was taken in the above-styled and numbered
cause on July 31, 2020, from 9:01 a.m. to 3:25 p.m.,
before Heather L. Garza, CSR, RPR, in and for the
State of Texas, recorded by machine shorthand, at the
offices of HEATHER L. GARZA, CSR, RPR, The Woodlands,
Texas, pursuant to the Federal Rules of Civil
Procedure and the provisions stated on the record or
attached hereto; that the deposition shall be read and
signed.

1 Q. Let's look at another one of these briefing
2 memos that you prepared. This one is dated -- I've
3 marked it now as deposition Exhibit FC33.

4 (Exhibit No. 33 was marked.)

5 Q. (BY MR. WECHSLER) You can see at the top
6 here, it -- it says, "Information/Briefing Memorandum"
7 the date is -- I think it's June -- well, is it June
8 1st, 2017?

9 A. Correct.

10 Q. And that's from you, correct?

11 A. Correct.

12 Q. Do you know who was at this briefing?

13 A. Can you ask that question again, please?

14 Q. I can. I'm wondering who this briefing was
15 for.

16 A. Oh, nobody in particular. We keep a set of
17 briefings going on a monthly basis. They're updated
18 as any changes may come about.

19 Q. And who has access to those briefings?

20 A. The area manager, maybe the commissioner if
21 the issue comes up. So like I was -- and the regional
22 director and any staff up at the regional level. But
23 anybody involved having to do with what this
24 particular issue had to do with, they are available
25 for their review.

1 Q. Again, important that these information
2 briefing memorandums are accurate?

3 A. Correct.

4 Q. What was the purpose of this particular
5 briefing memorandum?

6 A. This had to do with the proposal from
7 Elephant Butte Irrigation District on their DROP
8 program, or the Depletion Reduction and Office
9 Program. Apparently they were -- had a WaterSMART
10 grant in order to prepare a program for change of use
11 of water within their district.

12 Q. The first bullet point under the key
13 takeaways, Mr. Cortez, says, "Determine if EBID's DROP
14 proposal will conflict with the claims by the United
15 States in the complaint by Texas against New Mexico in
16 the Supreme Court." Do you see that?

17 A. Yes, I do.

18 Q. Why did the DROP proposal have the potential
19 to conflict with the claims by the United States in
20 this case?

21 A. The only thing that I could say --

22 MR. LEININGER: Hold on. Hold on.
23 Excuse me. Jeff, I'm going to object at this point.
24 To the extent that you're asking for any communication
25 that Mr. Cortez has had with counsel regarding this



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September 23, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Filiberto Cortez, Volume 2**
07/31/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63586

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Francis M. Goldsberry II
R. Lee Leininger

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :

COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, FILIBERTO CORTEZ, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. WECHSLER - 04:28:42

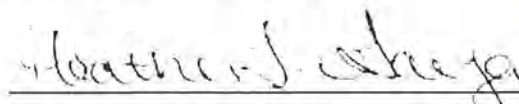
MR. GOLDSBERRY - 00:00:00

9 MR. LEININGER - 00:00:00

MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 25th day of August, 2020.

14 

HEATHER L. GARZA, CSR, RPR, CRR

15 Certification No.: 8262

16 Expiration Date: 04-30-22

17 Worldwide Court Reporters, Inc.

18 Firm Registration No. 223

19 3000 Weslayan, Suite 235

20 Houston, TX 77027


21 800-745-1101



WITNESS CORRECTIONS AND SIGNATURE

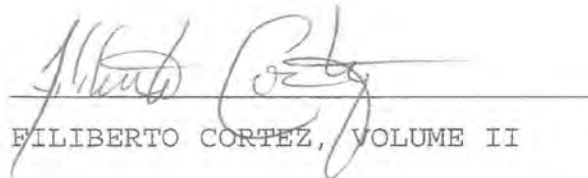
Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
218/18	Replace Says with releases	
277/24	Replace Oh with No	
367/11	Repalce array with Arrey	


FILIBERTO CORTEZ, VOLUME II

SIGNATURE OF WITNESS

I, FILIBERTO CORTEZ, solemnly swear or affirm
under the pains and penalties of perjury that the
foregoing pages contain a true and correct transcript
of the testimony given by me at the time and place
stated with the corrections, if any, and the reasons
therefor noted on the foregoing correction page(s).


FILIBERTO CORTEZ, VOLUME II

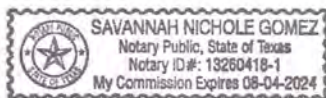
Job No. 63586

State of Texas, County of El Paso

Acknowledged before me on September 18, 2020

by Filiberto Cortez

Notary Public Savannah Gomez



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IN THE SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff(s),

vs.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendant(s).

DEPOSITION OF SCOTT A. MILTENBERGER, PH.D.
Sacramento, California
Wednesday, October 2, 2019
Volume I

Reported by:
Carrie Pederson
CSR No. 4373, RMR, CRR
Job No. 3524789
Pages 1 - 138

1 if I may get some more water.

2 Q. Of course.

3 A. Thank you.

4 (Pause)

5 BY MR. ROMAN:

6 Q. In reviewing the United States's Expert
7 Historian Report, were there any of its conclusions
8 that you questioned or disagreed with?

9 A. None that I can recall as I sit here.

10 Q. Would you characterize your review of that
11 report as in-depth or cursory or somewhere in
12 between?

13 A. Well, I guess I would want to know what you
14 mean by "in-depth."

15 Q. Very reasonable question. First question is
16 did you review it more than once?

17 A. Yes.

18 Q. Did you review any of the source materials
19 cited therein that were different from your own
20 source materials?

21 A. I believe so.

22 Q. Did your review of the United States's
23 Expert Historian Report cause you to consider adding
24 or revising any of the opinions in your disclosed
25 report?

1 A. Well, I believe my review of the U.S. expert
2 report didn't occur until after my expert report had
3 been submitted.

4 Q. And I understand that. My question goes
5 to -- I understand you've submitted your final report
6 or your primary report. When you reviewed the U.S.'s
7 Expert Historian Report after you'd turned yours in,
8 was there anything in your review of that report or
9 the sources cited therein that caused you to consider
10 modifying or revising any of the opinions in your
11 disclosed report?

12 A. Nothing that would cause me to modify my
13 opinions. There were a couple other examples that
14 were provided that -- if I had known those or if
15 those had come up in our research, that I would have
16 liked to have incorporated, but nothing that would
17 have modified my conclusions.

18 Q. In other words, what you're referring to are
19 materials that you believe supported your
20 conclusions; correct?

21 A. Correct.

22 Q. And you didn't see any materials that you
23 felt caused any of your conclusions to be drawn into
24 question?

25 A. Not that I can recall.

1 I, the undersigned, a Certified Shorthand
2 Reporter of the State of California, do hereby
3 certify:

4 That the foregoing proceedings were taken
5 before me at the time and place herein set forth;
6 that any witnesses in the foregoing proceedings,
7 prior to testifying, were duly sworn; that a record
8 of the proceedings was made by me using machine
9 shorthand which was thereafter transcribed under my
10 direction; that the foregoing transcript is a true
11 record of the testimony given.

12 Further, that if the foregoing pertains to
13 the original transcript of a deposition in a Federal
14 Case, before completion of the proceedings, review of
15 the transcript [] was [] was not requested.

16 I further certify I am neither financially
17 interested in the action nor a relative or employee
18 of any attorney or party to this action.

19 IN WITNESS WHEREOF, I have this date
20 subscribed my name.

21
22 Dated: October 15, 2019



CARRIE PEDERSON

CSR No. 4373

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I, SCOTT A. MILTENBERGER, PH.D., do hereby declare under penalty of perjury that I have read the foregoing transcript; that I have made any corrections as appear noted, in ink, initialed by me, or attached hereto; that my testimony as contained herein, as corrected, is true and correct.

EXECUTED this 5th day of November,
20 19, at Davis, California.
(City) (State)



SCOTT A. MILTENBERGER,

PH.D.

**WITNESS CORRECTIONS
AND SIGNATURE**

Page	Line	Change	Reason for Change
21	12	"interpreted" to "interpretative"	Correcting transcription
25	7	"dialect" to "dialectic"	Correcting transcription
41	14	"H-i-n-d-e-r-l-i-d-r" to "H-i-n-d-e-r-l-i-d-e-r"	Correcting spelling
112	11	"JAR" to "JIR"	Correcting spelling/transcription
112	12	"JAR" to "JIR"	Correcting spelling/transcription
112	22	"JAR" to "JIR"	Correcting spelling/transcription
112	23	"JAR" to "JIR"	Correcting spelling/transcription
117	2	"reclamation" to "Reclamation"	Reflecting intended meaning
128	6:7	"I'm not at" to "I do not know"	Reflecting intended meaning; correcting transcription



Scott A. Miltenberger, Ph.D.

Deposition of Scott Miltenberger, Vol 1 taken October 2, 2019

IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)
)
 Plaintiff,)
) Original Action Case
 VS.) No. 220141
) (Original 141)
 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
)
 Defendants.)

ORAL AND VIDEOTAPED DEPOSITION OF
ESTEVAN LOPEZ
FEBRUARY 26, 2020

ORAL AND VIDEOTAPED DEPOSITION of ESTEVAN LOPEZ,
produced as a witness at the instance of the
Plaintiff, and duly sworn, was taken in the
above-styled and numbered cause on February 26, 2020,
from 9:08 a.m. to 4:02 p.m., before Heather L. Garza,
CSR, RPR, in and for the State of Texas, recorded by
machine shorthand, at the DRURY PLAZA HOTEL - SANTA
FE, 820 Paseo De Peralta, Santa Fe, New Mexico,
pursuant to the Federal Rules of Civil Procedure and
the provisions stated on the record or attached
hereto; that the deposition shall be read and signed.

1 report, and this is your resume. In May of 2019, we
2 talked about your experiences on your resume, as I
3 recall, and today, I'd like to focus on your resume
4 entries as they might relate to your opinions
5 disclosed in this case. So one of the first questions
6 I have is taking a look at Exhibit 2, can you locate
7 for me the professional experience -- well, first of
8 all, your education is in engineering, correct?

9 A. That's correct.

10 Q. And chemistry, I guess?

11 A. Engineering and chemistry, that's correct.

12 Q. Do you have a degree in history?

13 A. I do not.

14 Q. Could you locate for me on your -- on your
15 resume, the professional experiences that would relate
16 to any expertise you claim to have in history?

17 MR. ROMAN: Object to form.

18 A. I don't claim to have any expertise as a
19 historian. I will say, though, that as -- as a
20 director for the Interstate Stream Commission,
21 certainly that period, and as a commissioner of
22 Reclamation, I routinely reviewed historic precedent
23 of things and background to understand the context in
24 which I was working. That's common for a water
25 administrator.

1 Q. (BY MS. KLAHN) Okay. Similarly, have you
2 attended law school?

3 A. I have not.

4 Q. Do you have any experience -- professional
5 experiences which you would point to as a basis to
6 allege an expertise to give legal opinions?

7 A. No, I -- I'm not claiming to have any
8 expertise or basis on which to give legal opinions,
9 but similar to my last -- my last answer, as a -- as
10 the director of the Interstate Stream Commission and
11 as commissioner of Reclamation and -- and probably,
12 frankly, on some of the others, county manager and
13 some of the county jobs, it was not unusual for me
14 to -- to review legal documents and become familiar
15 with those and the requirements of those. That was --
16 in particular, that was important as the director of
17 Interstate Stream Commission in dealing with water
18 administration of the Compacts that I was -- that were
19 under my purview.

20 Q. When you were director of Interstate Stream
21 Commission, did you develop legal positions on behalf
22 of the State of New Mexico?

23 A. I did not.

24 Q. So to the extent that you have expressed
25 legal opinions in your expert report today, are those

1 purported to be the positions of the State of New
2 Mexico in this lawsuit?

3 A. I don't purport to -- to -- to express any
4 legal opinions. I'm giving opinions from the
5 perspective as a water manager and administrator.

6 Q. Okay. In this matter, when were you asked to
7 act as an expert witness?

8 A. You know, I reviewed -- I reviewed my
9 transcript from the last deposition in this case with
10 you, I think it was last May, and you asked me whether
11 I had been asked to be an expert witness, and I
12 replied no. I think the first conversation we had
13 about that was after that deposition, immediately
14 after that deposition.

15 Q. So basically, I got you some work, is that
16 what you're saying?

17 A. Thank you.

18 Q. So when did you start work on your expert
19 report?

20 A. I think probably started kind of putting
21 together an outline and that sort of thing in maybe
22 late July and -- but then really got busy in terms of
23 drafting in -- in September -- well, August and
24 September, I think.

25 Q. Okay. I want to go back to one question I

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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :
COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, ESTEVAN LOPEZ, to the interrogatories as indicated were made before me by the said witness after being first duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MS. KLAHN - 04:42:44

 MR. ROMAN - 00:00:00

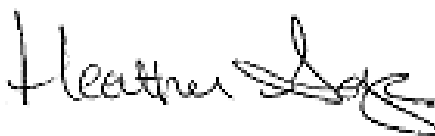
9 MR. GEHLERT - 00:00:00

 MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

 MS. BARNCASTLE - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
13 this, the 27th day of March, 2020.

14 

15 HEATHER L. GARZA, CSR, RPR, CRR

 Certification No.: 8262

16 Expiration Date: 04-30-22

 VERITEXT LEGAL SOLUTIONS

17 Firm Registration No. 571

 300 Throckmorton Street, Suite 1600

18 Fort Worth, TX 76102

 1-800-336-4000

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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLO

STATE OF TEXAS)	
)	
Plaintiff,)	
)	Original Action Case
VS.)	No. 220141
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)	
Defendants.)	

ORAL AND VIDEOTAPED DEPOSITION OF
ESTEVAN LOPEZ
FEBRUARY 26, 2020

ORAL AND VIDEOTAPED DEPOSITION of ESTEVAN LOPEZ,
produced as a witness at the instance of the
Plaintiff, and duly sworn, was taken in the
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from 9:08 a.m. to 4:02 p.m., before Heather L. Garza,
CSR, RPR, in and for the State of Texas, recorded by
machine shorthand, at the DRURY PLAZA HOTEL - SANTA
FE, 820 Paseo De Peralta, Santa Fe, New Mexico,
pursuant to the Federal Rules of Civil Procedure and
the provisions stated on the record or attached
hereto; that the deposition shall be read and signed.

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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :
COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, ESTEVAN LOPEZ, to the interrogatories as indicated were made before me by the said witness after being first duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MS. KLAHN - 04:42:44

 MR. ROMAN - 00:00:00

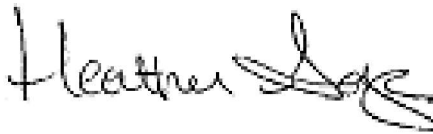
9 MR. GEHLERT - 00:00:00

 MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

 MS. BARNCASTLE - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
13 this, the 27th day of March, 2020.

14 

15 HEATHER L. GARZA, CSR, RPR, CRR

 Certification No.: 8262

16 Expiration Date: 04-30-22

 VERITEXT LEGAL SOLUTIONS

17 Firm Registration No. 571

 300 Throckmorton Street, Suite 1600

18 Fort Worth, TX 76102

 1-800-336-4000

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
-----------	------------	-------------------

15/13	strike "us"	- extraneous word
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15/24	replace "in" with "and"	- incorrect word
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16/3	insert "Compact" before "accounting" and add "g" after "accounting"	- Clarity
------	---	-----------

18/21	strike "government"	- extraneous / incorrect
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18/25	insert "New Mexico" before second "Compact"	- Clarity
-------	---	-----------

19/1	capitalize <u>U</u> pper	- Proper name
------	--------------------------	---------------

20/11	strike "state"	- clarity
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32/9	replace "and" with "in"	- incorrect word
------	-------------------------	------------------

33/14	replace "make" with "sell"	- clarity
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33/16	replace "it" with "effluent"	- clarity
-------	------------------------------	-----------

41/21	replace second "a" with "an" and insert "g" after disagreement	- clarity
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44/7	replace "they" with "the Commission"	- clarity
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44/9	replace "we" with "New Mexico"	- clarity
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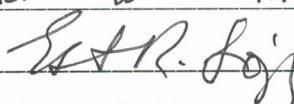
45/9 and 10	replace "couldn't" with "could" (2 occurrences)	- wrong word
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47/23	replace "being" with "been"	- incorrect word
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60/18	replace "it" with "waste" and "It's" with "Water is"	- clarity
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74/1	replace "were" with "are"	- clarity
------	---------------------------	-----------

75/4	replace "there" with "then"	- clarity
------	-----------------------------	-----------


ESTEVAN LOPEZ

Job No. TX3852996

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE CORRECTION REASON FOR CHANGE

75/16	replace "model" with "modeling"	- clarity
78/15	insert "--" after "super"	- clarity
78/23	replace second occurrence of "it" with "ISC"	- incorrect word
81/19	insert "," after "forth"	- clarity
90/16	replace "effect" with "affect"	- incorrect word
94/7	replace "El Vado" with "Lobatos"	- incorrect name
112/17	replace "effect" with "affect"	- incorrect word
112/23	replace "effect" with "affect"	- incorrect word
114/9 and 10	replace "gained" with "gamed" (2 occurrences)	- incorrect word
114/14	replace first occurrence of "of" with "in"	- clarity
114/15	replace "what" with "one"	- incorrect word
114/17	replace "500" with "500,000"	- clarity
115/3 and 4	replace "effect" with "affect" (2 occurrences)	- incorrect word
115/7 and 8	replace "effect" with "affect" (3 occurrences)	- incorrect word
115/22	strike second occurrence of "by"	- clarity
116/1	replace "effect" with "affect"	- incorrect word
116/18	replace "gain" with "game"	- incorrect word
118/8	replace "effect" with "affect"	incorrect word

ESTEVAN LOPEZ

Job No. TX3852996

165 ERL
Page 164

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE CORRECTION REASON FOR CHANGE

118/9 insert "going into effect" after "articles" and
replace "790" with "790,000" - clarity

122/6 strike "and" - clarity

125/5 replace "Mesillas" with "Mesilla" - incorrect name

125/15 replace second occurrence of "in" with "by" - clarity

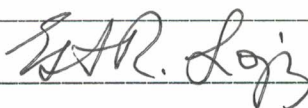
125/16 strike "New" - incorrect entity

133/16 replace "allure" with "lore" - incorrect word

158/13 replace "actual" with "actually" - incorrect word

158/14 replace first two occurrences of "I" with "they" - clarity

16/23 replace "did n't" with "did" - incorrect statement



ESTEVAN LOPEZ

Job No. TX3852996

166 ePL
Page 164

S I G N A T U R E O F W I T N E S S

I, ESTEVAN LOPEZ, solemnly swear or affirm under
the pains and penalties of perjury that the foregoing
pages contain a true and correct transcript of the
testimony given by me at the time and place stated
with the corrections, if any, and the reasons therefor
noted on the foregoing correction page(s).

A handwritten signature in dark ink, appearing to read 'Estevan Lopez', is written over a horizontal line.

ESTEVAN LOPEZ

Job No. 3852996



Systems Technology for the Litigation World

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December 11, 2020

Luis Robles
ROBLES, RAEL & ANAYA, P.C.
500 Marquette Ave. NW, Suite 700
Albuquerque, NM 87102

Re: Deposition of: **Kathy Ann Alexander, Ph.D.**
8/28/2020
State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Robles:

Enclosed please find the original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein that the deposition **has not been** signed by the witness.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65189

cc:
Samantha R. Barncastle
Katherine Duncan
Maria O'Brien
Theresa Barfield
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009



For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLO

STATE OF TEXAS, :
:
Plaintiff, :
:
VS. : Original Action Case
: No. 220141
STATE OF NEW MEXICO AND : (Original 141)
STATE OF COLORADO, :
:
Defendants. :

I, PHYLLIS WALTZ, a Texas Certified Shorthand
Reporter, Texas Certified Realtime Reporter, Louisiana
Certified Court Reporter, Registered Merit Reporter,
Certified Realtime Reporter, and Certified Realtime
Captioner, in and for the State of Texas, do hereby
certify the following:

That the witness, KATHY ANN ALEXANDER, PH.D.,
was duly sworn by the officer and that the transcript of
the oral deposition is a true record of the testimony
given by the witness;

I further certify that pursuant to FRCP Rule
30(e)(1) that the signature of the deponent:

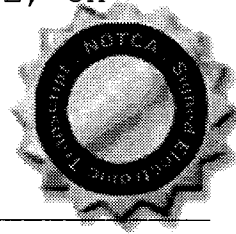
 X was requested by the deponent or a party
before the completion of the deposition and is to be
returned within 30 days from the date of receipt of the
transcript. If returned, the attached Changes and
Signature Page contains any changes and the reasons

1 therefor;

2 _____ was not requested by the deponent or a
3 party before the completion of the deposition.

4 I further certify that I am neither counsel
5 for, related to, nor employed by any of the parties or
6 attorneys to the action in which this proceeding was
7 taken. Further, I am not a relative or employee of any
8 attorney of record in this cause, nor am I financially
9 or otherwise interested in the outcome of the action.

10 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
11 this, the 11TH day of SEPTEMBER, 2020.



12
13
14 Phyllis Waltz

PHYLLIS WALTZ, RMR, CRR, CRC

15 Expiration Date: 12/31/20

TEXAS CSR, TCRR NO. 6813

16 Expiration Date: 12/31/21

LOUISIANA CCR NO. 2011010

17 Expiration Date: 12/31/20
18

Worldwide Court Reporters, Inc.

19 Firm Certification No. 223

3000 Weslayan, Suite 235

20 Houston, Texas 77027

(713) 572-2000
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WITNESS CORRECTIONS AND SIGNATURE

KATHY ANN ALEXANDER, PH.D.

AUGUST 28, 2020

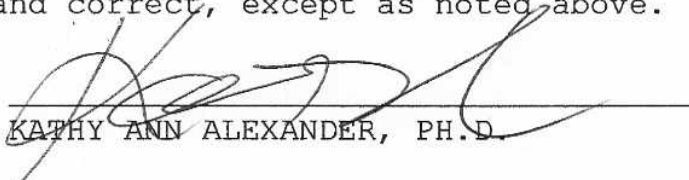
Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
7/6	Change "Sir" to "Sure"	Misunderstood by court reporter
8/24	Insert "a" before "water"	Missing word
18/14	Change "river" to "rivers"	Typographic error
21/22	Change "reservoir" to "reservoirs"	Typographic error
22/5	Change "space" to "based"	Misunderstood by court reporter
24/19	Change "based in" to "based on"	Typographic error
27/5	Remove "there is"	Typographic error
31/1	Change "is" to "are"	Typographic error
31/25	Change "is" to "are"	Typographic error
32/24	Change "is" to "are"	Typographic error
38/25	Remove "in"	Typographic error
56/18	Change "state" to "data"	Misunderstood by court reporter
62/20	Change "or" to "for"	Typographic error



KATHY ANN ALEXANDER, PH.D.

1 I, KATHY ANN ALEXANDER, PH.D., have read
 2 the foregoing deposition and hereby affix my signature
 3 that same is true and correct, except as noted above.
 4

5 
 6 KATHY ANN ALEXANDER, PH.D.

7 STATE OF T E X A S)
 8 COUNTY OF TRAVIS)

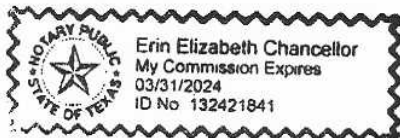
9 Before me, ERIN E. CHANCELLOR, on
 10 this day personally appeared KATHY ANN ALEXANDER, PH.D.,
 11 known to me, or proved to me under oath or through
 12 _____) (description of identity card or
 13 other document)), to be the person whose name is
 14 subscribed to the foregoing instrument and acknowledged
 15 to me that they executed the same for the purposes and
 16 consideration therein expressed.

17 Given under my hand and seal of office on
 18 this, the 5th day of OCTOBER, 2020.

19 
 20

21 NOTARY PUBLIC IN AND FOR THE
 22 STATE OF TEXAS

23 My Commission Expires: 3/31/2024
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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

ORAL AND VIDEOTAPED DEPOSITION OF
PEGGY BARROLL
FEBRUARY 5, 2020
VOLUME 1

ORAL AND VIDEOTAPED DEPOSITION of PEGGY BARROLL,
produced as a witness at the instance of the
Plaintiff, and duly sworn, was taken in the
above-styled and numbered cause on February 5, 2020,
from 9:39 a.m. to 5:29 p.m., before Heather L. Garza,
CSR, RPR, in and for the State of Texas, recorded by
machine shorthand, at the DRURY PLAZA HOTEL - SANTA
FE, 828 Paseo De Peralta, Santa Fe, New Mexico,
pursuant to the Federal Rules of Civil Procedure and
the provisions stated on the record or attached
hereto; that the deposition shall be read and signed.

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STATE OF TEXAS)	
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and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :
COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, PEGGY BARROLL, to the interrogatories as indicated were made before me by the said witness after being first duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. LEININGER - 05:07:04

 MR. ROMAN - 00:00:00

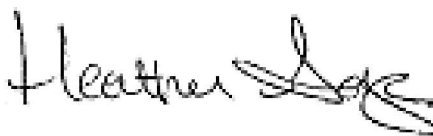
9 MR. SOMACH - 00:00:00

 MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

 MS. BARNCASTLE - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
13 this, the 24th day of February, 2020.

14 

15 HEATHER L. GARZA, CSR, RPR, CRR

 Certification No.: 8262

16 Expiration Date: 04-30-22

 VERITEXT LEGAL SOLUTIONS

17 Firm Registration No. 571

 300 Throckmorton Street, Suite 1600

18 Fort Worth, TX 76102

 1-800-336-4000

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
-----------	------------	-------------------

46/5	"I used Blang Criddle estimates in."	I misspoke
------	--------------------------------------	------------

62/11+12	"Water use and reports people had made a calculation, and sent it to Water Rights who stated using that value"	transcription makes my meaning unclear
----------	--	--

46/2	"kriged" not "creed"	error in transcription
------	----------------------	------------------------

16/16	"curtail water rights in priority"	transcription error
-------	------------------------------------	---------------------

190/9	"probably" not "proudly"	transcription error
-------	--------------------------	---------------------

104/8	"one water" should be "One Rain"	misspoke
-------	----------------------------------	----------

106/21	"I water" should be "One Rain"	misspoke
--------	--------------------------------	----------

PEGGY BARROLL, VOLUME I

Job No. TX3852882

Page 199

S I G N A T U R E O F W I T N E S S

I, PEGGY BARROLL, solemnly swear or affirm under
the pains and penalties of perjury that the foregoing
pages contain a true and correct transcript of the
testimony given by me at the time and place stated
with the corrections, if any, and the reasons therefor
noted on the foregoing correction page(s).

Peggy Barroll 5/4/20

PEGGY BARROLL, VOLUME I

Job No. 3995820

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
-----------	------------	-------------------

214/13	change "for" to "or"	transcription error
--------	----------------------	---------------------

223/13+14	omit "from surface water to groundwater"	I misspoke
-----------	--	------------

225/9	change "that the" to "what sort of"	I misspoke
-------	-------------------------------------	------------

263/13	change "in" to "and"	transcription error
--------	----------------------	---------------------

277/3	change "and" to "in"	transcription error
-------	----------------------	---------------------

281/19	change "I've sorted" to "assorted"	transcription error
--------	------------------------------------	---------------------

297/4	should read "effect of changes in accounting between the two"	transcription error
-------	---	---------------------

306/25-2	should read "the whole delta is 137,000 AF, and the delta	
----------	---	--

307/1	part I'm getting out of accounting is about 75,000"	
-------	---	--

	I found the numbers and made the calculation	
--	--	--

337/8	should read "We demonstrated that the quality etc"	
-------	--	--

		I misspoke
--	--	------------

PEGGY BARROLL, VOLUME II

Job No. TX3852890

S I G N A T U R E O F W I T N E S S

I, PEGGY BARROLL, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).

Peggy Barroll 5/4/2020

PEGGY BARROLL, VOLUME II

Job No. 3995842



Systems Technology for the Litigation World

Court Reporting ♦ Video Production ♦ Videoconferencing ♦ Litigation Group

September 28, 2020

Stuart Somach
Somach Simmons & Dunn
500 Capitol Mall, Suite 1000
Sacramento, CA 95814

Re: Deposition of **Peggy Barroll, Volume 3**
08/10/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Somach:

Enclosed please find the **signed** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65039

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Jeffrey J. Wechsler
R. Lee Leininger

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

STATE OF TEXAS)
)
)
 Plaintiff,)
)
) Original Action Case
 VS.)
) No. 220141
) (Original 141)
 STATE OF NEW MEXICO,)
)
 and STATE OF COLORADO,)
)
)
 Defendants.)

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, PEGGY BARROLL, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

behalf this deposition is taken, nor in the regular employ of this attorney; and I certify that I am not interested in the cause, nor of kin or counsel to either of the parties.

That the amount of time used by each party at the deposition is as follows:

MR. SOMACH - 00:00:59

MR. WECHSLER - 00:00:00

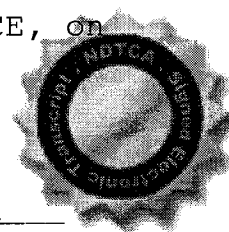
MR. LEININGER - 02:53:39

MR. WALLACE - 00:00:00

MS. O'BRIEN - 00:41:15

MS. BARNCASTLE - 00:27:08

GIVEN UNDER MY HAND AND SEAL OF OFFICE, on this, the 3rd day of September, 2020.



Heather L. Garza

HEATHER L. GARZA, CSR, RPR, CRR

Certification No.: 8262

Expiration Date: 04-30-22

Worldwide Court Reporters, Inc.

Firm Registration No. 223

3000 Weslayan, Suite 235

Houston, TX 77027

800-745-1101

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE CORRECTION REASON FOR CHANGE

339/16 after "river" add "~~except~~ effluent from the City of
El Paso's Northwest wastewater treatment plant"
I had omitted this term in error

340/4 change "along" to "below"

346/24 omit the word "may"

349/12 change "Silber" to "Silver"

350/23 " " " "

364/22 add the word "no" in front of "modeling" transcription error

371/2 change "but" to "that"

372/2 change "this" to "that"

372/3 change "run, so I" to "run. I"

384/3 change "glued" to "projected"

392/25-393/1 change "diversions are not allocations"

to "diversions are calculated"

394/23 change "groundwater in" to "groundwater. In"

398/24 omit the word "New"

426/23 omit the word "when"

430/17 change "district's" to "districts'"

PEGGY BARROLL, VOLUME III

S I G N A T U R E O F W I T N E S S

I, PEGGY BARROLL, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).

Peggy Barroll 9/26/2020

PEGGY BARROLL, VOLUME III

Job No. 65039



Systems Technology for the Litigation World

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December 04, 2020

James Dubois
U.S. DEPARTMENT OF JUSTICE
Environment & Natural Resources Division
999 18th St, # 370 South Terrace
Denver, CO 80202

Re: Deposition of **Peggy Barroll**
10/21/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Dubois:

Enclosed please find the **signed** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65834

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Jeffrey J. Wechsler
Sarah A. Klahn

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. DUBOIS - 01:16:41

MR. WECHSLER - 00:00:00

9 MS. KLAHN - 00:45:07

MR. HARTMAN - 00:00:00

10 MR. HICKS - 00:11:48

MS. BARNCastle - 00:00:00

11
12
13 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
14 this, the 31st day of October, 2020.

15 

HEATHER L. GARZA, CSR, RPR, CRR

16 Certification No.: 8262

Expiration Date: 04-30-22

17
18 Worldwide Court Reporters, Inc.

Firm Registration No. 223

19 3000 Weslayan, Suite 235

Houston, TX 77027

20 800-745-1101



Page.line	Change From	Change to	Reason
13.10	Hotstef	Hohstadt	Transcript error
14.3-4	"which have been adopted and were succeeded in the constitution and in the New Mexico Supreme Court."	"which have been adopted and were upheld by the New Mexico Supreme Court."	Transcript error/ I misspoke
15.19-20	"New Mexico has the responsibility no to interfere with at or not to – or to ensure that that can occur to work in _"	"New Mexico has the responsibility to ensure its legal and regulatory framework allows Reclamation to deliver Project and Compact waters"	Clarification
15.24-16.1	"To work in concert with Reclamation when it comes to whatever is necessary surface water distribution of the project."	"To work in concert with Reclamation as necessary to assist in the delivery of surface water by the project."	Clarification
18.1-2	"it is, in fact, usable water or project supply."	"it is, in fact, project water, or project supply."	Clarification
24.9		Add to end: "Furthermore, the normal operations of the project, as understood by New Mexico, ensure that project users are delivered what they order. Reclamation adjusts Project releases to ensure the water that has been ordered is in fact delivered, regardless of contemporaneous gains or losses to the stream system."	My answer was incomplete
32.17-24	"A. Water users are -- water users in New Mexico cannot divert water that they're not entitled to and so that water users who do not have legal authority cannot divert surface water away from the Rio Grande project if groundwater use is impacting the Rio Grande project, then it would be necessary to, I believe, New Mexico would have to --sorry. Groundwater use depleting the project were alleged, it would have to be investigated and demonstrated. Groundwater depletions negatively impacting the project demonstrated the New Mexico remedied the priority administration, but this has not occurred."	"A. Water users in New Mexico cannot divert water that they are not entitled to. Water users who do not have legal authority cannot divert surface water away from the Rio Grande project. If it is alleged that groundwater use in New Mexico is impairing the project, then New Mexico would investigate it, and if necessary, remedy it."	Incomplete answer, transcript error
37.7	"information"	"investigation"	Transcript error

37.17-18	"And I say all water rights would be curtailed..."	"When I say water rights would be curtailed..."	Transcript error
39.7	"No."	"Some model runs that have be made in current studies can address this issue."	Incomplete answer
39.23		Add to end: " However, stream depletions calculated by a groundwater model alone cannot determine the actual change in the flows in the Rio Grande because the flow of the Rio Grande to Texas is controlled by Reclamation's operations of the Rio Grande project, which changes response to changes in gains and losses to the stream system."	Incomplete answer
46.15		Add "In part it would depend on the nature of the call. If it were a call based on instantaneous under-delivery of water to Texas, such that Texas was not receiving its Compact apportionment, New Mexico would evaluate the evidence, and rapidly work to resolve the under-delivery by whatever means necessary, ideally in cooperation with Reclamation. If it were a call based on deficits to Project performance or Project efficiency caused by New Mexico, then a more comprehensive evaluation would probably be necessary, but much of the work needed for such an evaluation has taken place as part of past and present hydrologic studies by New Mexico.	Incomplete answer
46.20	"That's right. The state engineer-- Q. And how long would -- go ahead. I'm sorry. A. The state engineer would make a determination as to what amount of curtailment was necessary, what volume of water, say, was necessary to address the call and probably involving use of groundwater models to take into account any delays as to when the water -- the water associated with curtailing groundwater rights would show up back in the river and would come up with -- he would be tasked with determining the administration date and water rights junior to that date would be curtailed."	"That's right. In the case of a call to address an immediate shortfall in delivery to Texas, New Mexico would take whatever steps were necessary to address that shortfall, which might involve other measures than curtailment of groundwater use, because of the delays inherent in groundwater impacts on surface water flows. In the case of a call based on impacts to Project performance or efficiency caused by New Mexico, the state engineer would made a determination as to what amount of curtailment of water use is necessary based on water rights data, and probably model results as well. Based on this analysis the state engineer would determine an administration date, and water rights junior to that date would be curtailed."	Unclear and incomplete answer.

47.9	"I don't know." But the tools we've developed as part of settlement talks and as part of our litigation have definitely made it within striking distance that we should be able to perform such an analysis expeditiously."	"Again, it depends on the type of priority call. In that case of a call made to alleviate an immediate shortfall of water to Texas, so that Texas is not receiving its Compact apportionment, New Mexico would act in a matter of days, to address this shortfall. The actions taken by New Mexico to address such a shortfall may or may not include curtailment of groundwater use, due to the inherent delayed impacts of groundwater pumping on surface water. For a call made by Reclamation to address deficits in project performance or efficiency caused by New Mexico, the more comprehensive analysis required would probably take a longer amount of time, but given the amount of work New Mexico has already done in this area, it should be achieved relatively expeditiously."	Unclear and incomplete answer.
61.5-6	"and it's also because of the current litigation and a lot of different causes that are all related to each other."	"The current litigation is related to the same issues: dropping groundwater conditions in the Mesilla basin."	I misspoke: my language was unclear.
80.13-14	"To provide you information about New Mexico's policies and the information required under Section C."	"The purpose of my testimony is to provide you information about New Mexico's policies and the information required under Section C."	Transcript error

Signature: Peggy Barroll 11/21/2020

SIGNATURE OF WITNESS

I, PEGGY BARROLL, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).

Peggy Barroll 11/21/2020
PEGGY BARROLL

Job No. 65834

10/21/2020 Deposition



Systems Technology for the Litigation World

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August 25, 2020

Michael Kopp
TROUT RALEY
1120 Lincoln St., Suite 1600
Denver, CO 80203

Re: Deposition of **Daniel Chavez**
07/22/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Kopp:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 64834

cc:

Samantha R. Barncastle
Maria O'Brien
Theresa Barfield
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :
 COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, DANIEL CHAVEZ, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. KOPP - 04:11:50

 MR. MILLER - 00:00:00

9 MR. DUBOIS - 00:00:00

 MS. O'BRIEN - 00:00:00

10
11 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
12 this, the 6th day of August, 2020.

13 

14 HEATHER L. GARZA, CSR, RPR, CRR

 Certification No.: 8262

15 Expiration Date: 04-30-22

16 Worldwide Court Reporters, Inc.

17 Firm Registration No. 223

 3000 Weslayan, Suite 235

18 Houston, TX 77027

 800-745-1101



SIGNATURE OF WITNESS

I, DANIEL CHAVEZ, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).

Daniel Chavez

DANIEL CHAVEZ



Guillermina Rodriguez

August 20, 2020

Job No. 64834

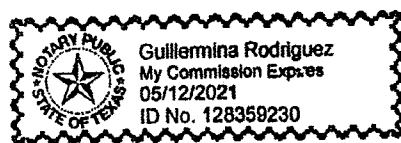
WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
27/2	4 years	Elections are held every 2 years but the term is 4 years.
31/17	Roads	Reporter heard Rows, should be roads.
32/6	Green	Reporter heard Grey, should be Green Manure.
64/1	Sulfur	Talking about practices used to combat salinity, should be sulfur burner.

Daniel Chavez

DANIEL CHAVEZ



Guillermina Rodriguez
August 20, 2020



Systems Technology for the Litigation World

Court Reporting ♦ Video Production ♦ Videoconferencing ♦ Litigation Group

September 23, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Filiberto Cortez 30(b)(6)**
08/20/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65123

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Sarah A. Klahn
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS, :
 :
 Plaintiff, :
 :
 VS. : Original Action Case
 : No. 220141
 STATE OF NEW MEXICO AND : (Original 141)
 STATE OF COLORADO, :
 :
 Defendants. :

I, PHYLLIS WALTZ, a Texas Certified Shorthand Reporter, Texas Certified Realtime Reporter, Louisiana Certified Court Reporter, Registered Merit Reporter, Certified Realtime Reporter, and Certified Realtime Captioner, in and for the State of Texas, do hereby certify the following:

That the witness, FILIBERTO CORTEZ, was duly sworn by the officer and that the transcript of the oral deposition is a true record of the testimony given by the witness;

I further certify that pursuant to FRCP Rule 30(e)(1) that the signature of the deponent:

 X was requested by the deponent or a party before the completion of the deposition and is to be returned within 30 days from the date of receipt of the transcript. If returned, the attached Changes and Signature Page contains any changes and the reasons

1 therefor;

2 _____ was not requested by the deponent or a
3 party before the completion of the deposition.

4 I further certify that I am neither counsel
5 for, related to, nor employed by any of the parties or
6 attorneys to the action in which this proceeding was
7 taken. Further, I am not a relative or employee of any
8 attorney of record in this cause, nor am I financially
9 or otherwise interested in the outcome of the action.

10 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
11 this, the 4TH day of SEPTEMBER, 2020.



12
13
14 Phyllis Waltz

PHYLLIS WALTZ, RMR, CRR, CRC

15 Expiration Date: 12/31/20

TEXAS CSR, TCRR NO. 6813

16 Expiration Date: 12/31/21

LOUISIANA CCR NO. 2011010

17 Expiration Date: 12/31/20
18

Worldwide Court Reporters, Inc.

19 Firm Certification No. 223

3000 Weslayan, Suite 235

20 Houston, Texas 77027

(713) 572-2000
21
22
23
24
25

WITNESS CORRECTIONS AND SIGNATURE

FILIBERTO CORTEZ

AUGUST 20, 2020

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

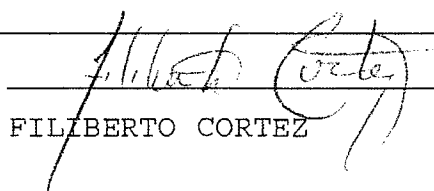
PAGE/LINE	CORRECTION	REASON FOR CHANGE
14/4	Capitalize Upper	official name of Region

23/8	Change back storage to bank storage	
------	-------------------------------------	--

35/17	Change Artello to Garcia	
-------	--------------------------	--

54/14	Change our to their	
-------	---------------------	--

77/23	Change crude to accrued	
-------	-------------------------	--



FILIBERTO CORTEZ

I, FILIBERTO CORTEZ, have read the foregoing deposition and hereby affix my signature that same is true and correct, except as noted above.

Filiberto Cortez
FILIBERTO CORTEZ

STATE OF TEXAS)
COUNTY OF El Paso)

Before me, September 18, 2020, on this day personally appeared FILIBERTO CORTEZ, known to me, or proved to me under oath or through TX Driver's License (description of identity card or other document)), to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that they executed the same for the purposes and consideration therein expressed.

Given under my hand and seal of office on this, the 18 day of September, 2020.

Savannah Nichole Gomez
NOTARY PUBLIC IN AND FOR THE
STATE OF TEXAS

My Commission Expires: 08-04-2024





Systems Technology for the Litigation World

Court Reporting ♦ Video Production ♦ Videoconferencing ♦ Litigation Group

September 23, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Filiberto Cortez, Volume 1**
07/30/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63585

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Francis M. Goldsberry II
R. Lee Leininger

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :

COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, FILIBERTO CORTEZ, to the interrogatories as indicated were made before me by the said witness after being first duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. WECHSLER - 04:48:08

MR. GOLDSBERRY - 00:00:00

9 MR. LEININGER - 00:00:00

MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 25th day of August, 2020.

14 

HEATHER L. GARZA, CSR, RPR, CRR

15 Certification No.: 8262

Expiration Date: 04-30-22

16
17 Worldwide Court Reporters, Inc.

Firm Registration No. 223

18 3000 Weslayan, Suite 235

Houston, TX 77027

19 800-745-1101



WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
41/3	strike the word salt	

52/20	repace fill with spill	
-------	------------------------	--

55/11	replace 10 million with 2 million	
-------	-----------------------------------	--

57/16	Replace Franklin with American	
-------	--------------------------------	--

57/17	Replace Franklin with American	
-------	--------------------------------	--

57/3	Replace array with Arrey	
------	--------------------------	--

58/9	Insert lands in --	
------	--------------------	--

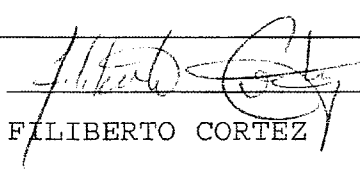
58/10	Replace acreage with charges	
-------	------------------------------	--

58/12	Strike the--by	
-------	----------------	--

59/25	Strike New	
-------	------------	--

67/17	Replace near with here	
-------	------------------------	--

126/24	Replace .0241 with 3.0241	
--------	---------------------------	--


FILIBERTO CORTEZ

SIGNATURE OF WITNESS

I, FILIBERTO CORTEZ, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).


FILIBERTO CORTEZ

Job No. 63585

State of Texas, County of El Paso

Acknowledged before me on September 18, 2020

by Filiberto Cortez

Notary Public

Savannah Young





Systems Technology for the Litigation World

Court Reporting • Video Production • Videoconferencing • Litigation Group

September 23, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Filiberto Cortez, Volume 2**
07/31/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,


Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63586

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Francis M. Goldsberry II
R. Lee Leininger

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :
COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, FILIBERTO CORTEZ, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. WECHSLER - 04:28:42

MR. GOLDSBERRY - 00:00:00

9 MR. LEININGER - 00:00:00

MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 25th day of August, 2020.

14 

HEATHER L. GARZA, CSR, RPR, CRR

15 Certification No.: 8262

Expiration Date: 04-30-22

16
17 Worldwide Court Reporters, Inc.

Firm Registration No. 223

18 3000 Weslayan, Suite 235


Houston, TX 77027

19 800-745-1101

WITNESS CORRECTIONS AND SIGNATURE

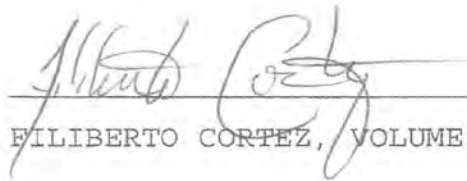
Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
218/18	Replace Says with releases	
277/24	Replace Oh with No	
367/11	Repalce array with Arrey	


FILIBERTO CORTEZ, VOLUME II

SIGNATURE OF WITNESS

I, FILIBERTO CORTEZ, solemnly swear or affirm
under the pains and penalties of perjury that the
foregoing pages contain a true and correct transcript
of the testimony given by me at the time and place
stated with the corrections, if any, and the reasons
therefor noted on the foregoing correction page(s).


FILIBERTO CORTEZ, VOLUME II

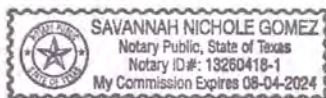
Job No. 63586

State of Texas, County of El Paso

Acknowledged before me on September 18, 2020

by Filiberto Cortez

Notary Public Savannah Gomez





Systems Technology for the Litigation World

Court Reporting ♦ Video Production ♦ Videoconferencing ♦ Litigation Group

September 4, 2020

Stuart Somach
Somach Simmons & Dunn
500 Capitol Mall, Suite 1000
Sacramento, CA 95814

Re: Deposition of **John D'Antonio, Volume 2**
06/25/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Somach:

Enclosed please find the **signed** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63559

cc:
Samantha R. Barncastle
Chad M. Wallace
Renea Hicks
Jeffrey J. Wechsler
R. Lee Leininger

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :
 COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, JOHN D'ANTONIO, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. SOMACH - 03:07:40

MR. WECHSLER - 00:00:00

9 MR. LEININGER - 00:00:00

MR. WALLACE - 00:00:00

10 MR. HICKS - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 21st day of July, 2020.

14 

HEATHER L. GARZA, CSR, RPR, CRR

15 Certification No.: 8262

Expiration Date: 04-30-22

16
17 Worldwide Court Reporters, Inc.

Firm Registration No. 223

18 3000 Weslayan, Suite 235


Houston, TX 77027

19 800-745-1101

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
51/ 24	change "account" to "accounted"	Correction
57/ 20	change "ensues" to "sued"	Correction
58/ 4	capitalize "n" in "new"	Correction
60/ 25	change "was" to "were"	Correction
70/ 8	change "a" to "an"	Correction
73/ 7&8	delete "you know don't adjudicate interstate compact variable supply where it's --"	Correction
76/ 11	change "there" to "they"	Correction
76/ 12	delete "case in the"	Correction
78/ 7	change "metering to" to "metering on"	Correction
78/ 19	delete "that cost so"	Correction
78/ 19	change "was" to "so that cost was"	Correction
78/ 20	change "imperative" to "a factor"	Correction
79/ 25	change "in" to "and in the"	Correction
80/ 1	change "that New Mexico Supreme Court" to "they"	Correction
83/ 8,9 & 19	change "waterline" to "water law"	Correction
83/ 10	change "attendance" to "obligation"	Correction
83/ 13	change "in" to "and"	Correction


JOHN D'ANTONIO, VOLUME II

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
83/ 14	change "add" to "an"	Correction
91/ 14	change "a few" to "to"	Correction
91/ 15	change "than" to "that"	Correction
96/ 13	change "that" to "that need to"	Correction
96/ 17	change "full" to "whole"	Correction
100/ 16	change "nonuse" to "nonuse an issue"	Correction
100/17	change "issued" to "issues"	Correction


JOHN D'ANTONIO, VOLUME II

S I G N A T U R E O F W I T N E S S

I, JOHN D'ANTONIO, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).



JOHN D'ANTONIO, VOLUME II

Job No. 63559



Systems Technology for the Litigation World

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September 4, 2020

Stuart Somach
Somach Simmons & Dunn
500 Capitol Mall, Suite 1000
Sacramento, CA 95814

Re: Deposition of **John D'Antonio, Volume 3**
06/26/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Somach:

Enclosed please find the **signed** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63560

cc:
Samantha R. Barncastle
Chad M. Wallace
Renea Hicks
Jeffrey J. Wechsler
R. Lee Leininger

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :

COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, JOHN D'ANTONIO, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.
5

6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. SOMACH - 01:07:48

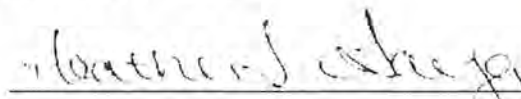
MR. WECHSLER - 00:00:00

9 MR. LEININGER - 02:11:41

MR. WALLACE - 00:00:00

10 MR. HICKS - 00:00:00
11

12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 21st day of July, 2020.

14 

HEATHER L. GARZA, CSR, RPR, CRR

15 Certification No.: 8262

Expiration Date: 04-30-22

16
17 Worldwide Court Reporters, Inc.

Firm Registration No. 223

18 3000 Weslayan, Suite 235


Houston, TX 77027

19 800-745-1101
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WITNESS CORRECTIONS AND SIGNATURE


Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
14/ 24	change "hot" to "how"	Correction
19/ 14	change "or" to "and"	Correction
27/ 13	change "a" to "an"	Correction
27/ 14	change "operations" to "apportionment"	Correction
30/ 12	change "ask" to "answer"	Correction
30/ 13 & 14	change "western states, a lot of council" to "Western States Water Council"	Correction
30/ 21	change "could discuss" to "could have discussed"	Correction
37/ 11	change "log" to "water"	Correction
44/ 4	change "appropriate" to "unappropriated"	Correction
51/ 15	change "was" to "wasn't"	Correction
74/ 8	change "continuum" to "continual"	Correction
77/ 3	change "2" to "\$200"	Correction
80/ 22	change "the Antonio" to "D'Antonio"	Correction
87/ 19	delete "away"	Correction
89/ 24	change "back" to "bad"	Correction
103/ 9	change "limitation" to "interpretation"	Correction


JOHN D'ANTONIO, VOLUME III

SIGNATURE OF WITNESS

I, JOHN D'ANTONIO, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).



JOHN D'ANTONIO, VOLUME III

Job No. 63560



Systems Technology for the Litigation World

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October 6, 2020

Stuart Somach
Somach Simmons & Dunn
500 Capitol Mall, Suite 1000
Sacramento, CA 95814

Re: Deposition of John D'Antonio, P.E.,
08/14/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Somach:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65060

cc:

Samantha R. Barncastle
Chad M. Wallace
Renea Hicks
Jeffrey J. Wechsler
R. Lee Leininger

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

1 IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 2 HON. MICHAEL J. MELLOY

3 STATE OF TEXAS, §
 §
 4 Plaintiff, §
 §
 5 vs. § ORIGINAL ACTION
 § CASE NO.: 220141
 6 STATE OF NEW MEXICO, § (ORIGINAL 141)
 and STATE OF COLORADO, §
 7 §
 Defendants. §

8
 9 *****

10 REPORTER'S CERTIFICATE
 11 REMOTE VIDEOCONFERENCED DEPOSITION OF
 12 JOHN D'ANTONIO, P.E.
 13 AUGUST 14, 2020

14 *****

15 I, Karen L. D. Schoeve, Registered Diplomate
 16 Reporter, Certified Realtime Reporter, and Realtime
 17 Systems Administrator, residing in the State of
 18 Texas, do hereby certify that the foregoing
 19 proceedings were reported by me and that the
 20 foregoing transcript constitutes a full, true,
 21 and correct transcription of my stenographic
 22 notes, to the best of my ability and hereby
 23 certify to the following:

24 That the witness, JOHN D'ANTONIO, P.E., was
 25 duly remotely sworn by the officer and that the

1 transcript of the oral deposition is a true record
2 of the testimony given by the witness;

3 I further certify that I am neither counsel
4 for, related to, nor employed by any of the parties
5 in the action in which this proceeding was taken,
6 and further that I am not financially or otherwise
7 interested in the outcome of the action.

8 That the amount of time used by each party at
9 the deposition is as follows:

10	R. Lee Leininger	- 02:41
	Stuart L. Somach	- 00:28
11	Chad Wallace	- 00:01
	Jeffrey Wechsler	- 00:00
12	Renae Hicks	- 00:58
	James Brockmann	- 00:00
13	John W. Utton	- 00:00

14

15 Subscribed and sworn to on this the 29th day of
16 August, 2020.

17

18

19

Karen L.D. Schoeve



20 Karen L.D. Schoeve, CSR, RDR, CRR
21 Realtime Systems Administrator
22 Texas CSR No. 3354, Exp.: 10-31-2021
23 NCRA Exp. Date: 09-30-21
24 Worldwide Court Reporters, Inc.
25 Firm Certification No. 223
3000 Wesleyan, Suite 235
Houston, Texas 77027
(713) 572-2000
Job No. 65060

1 CHANGES AND SIGNATURE

2 WITNESS NAME: JOHN D'ANTONIO, P.E.

3 DATE: AUGUST 14, 2020

4	PAGE/LINE	CHANGE	REASON
5	18/15	change "basis" to "beneficial use"	Correction
6	18,15	change "basis to" to "basis, the"	Correction
7	18/18	change "FOPS" to "crops"	Correction
8	30/7	change "breaker" to "FDR"	Correction
9	35/15	change "there tells" to "there's"	Correction
10	41/1	change "travel" to "Tribal"	Correction
11	41/20	change "short-sharing" to "shortage sharing"	Correction
12	41/21	change "Galenas" to "Gallinas"	Correction
13	41/22	change "Nimbus" to "Mimbres"	Correction
14	43/13	change " at the" to "active"	Correction
15	44/5	change "it" to "I"	Correction
16	49/8	change "combat" to "compact"	Correction
17	56/6	change "AWR" to "AWRM"	Correction
18	56/7	delete "and the"	Correction
19	59/24	change "based on" to "place"	Correction
20	70/6	delete "monthly"	Correction
21	74/23	change "general" to "engineer"	Correction
22	90/6	change "legal" to "an illegal"	Correction
23	98/15	change "Raul" to "Rolf"	Correction
24	98/19	change "Rio" to "River"	Correction"
25	103/3	change "apply" to "comply"	Correction

[illegible]

1 I, JOHN D'ANTONIO, P.E., solemnly swear
 2 or affirm under the pains and penalties of perjury
 3 that the foregoing pages contain a true and correct
 4 transcript of the testimony given by me at the
 5 time and place stated with the corrections, if any,
 6 and the reasons therefor noted on the foregoing
 7 correction pages(s).

8

9

10

John R. D'Antonio

11

12

JOHN D'ANTONIO, P.E.

13

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23

24

25 Job No. 65060



Systems Technology for the Litigation World

Court Reporting ♦ Video Production ♦ Videoconferencing ♦ Litigation Group

July 14, 2020

Samantha Barncastle
BARNCASTLE LAW FIRM, LLC
1100 South Main, Suite 20
Las Cruces, NM 88005

Re: Deposition of **Sheldon Dorman**
06/09/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Ms. Barncastle:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

We appreciate your choosing Worldwide Court Reporters, Inc. and look forward to working with you in the future. If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63392

cc:

Chad M. Wallace
Maria O'Brien
Francis M. Goldsberry II
Michael A. Kopp
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

behalf this deposition is taken, nor in the regular
employ of this attorney; and I certify that I am not
interested in the cause, nor of kin or counsel to
either of the parties.

That the amount of time used by each party at
the deposition is as follows:

MR. GOLDSBERRY - 03:19:32

MR. KOPP - 00:00:00

MS. COLEMAN - 00:00:00

MR. WALLACE - 00:00:00

MS. BARNCastle - 00:00:00

GIVEN UNDER MY HAND AND SEAL OF OFFICE,
this, the 22nd day of June, 2020.

Heather L. Garza

HEATHER L. GARZA, CSR, RPR, CRR

Certification No.: 8262

Expiration Date: 04-30-22



Worldwide Court Reporters, Inc.

Firm Registration No. 223

3000 Wesleyan, Suite 235

Houston, TX 77027

800-745-1101

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
22/20	abstract	incorrect word
23/8	conjunction	Two separate basins
43/9	Mirabal	name spelling
92/16	Micabal	name spelling



SHELDON DORMAN

State of New Mexico)

County of Colfax)

This instrument was acknowledged before me on the 9 day of

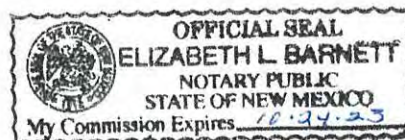
July, 2020, by Sheldon Dorman

Elizabeth L. Barnett

Notary Public

10-24-23

My Commission Expires:



SIGNATURE OF WITNESS

I, SHELDON DORMAN, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).



SHELDON DORMAN

Job No. 63392

State of New Mexico)
) ss
 County of Colfax)
 This instrument was acknowledged before me on the 9 day of
July, 20 20, by Sheldon Dorman
Elizabeth L. Barnett
10-24-23
 My Commission Expires: Notary Public



1 work as to the number of wells that you had found in
2 the survey?

3 A. I don't remember.

4 Q. Can you give me even a range?

5 A. Thousands.

6 Q. And did you -- when did you -- when you left
7 the work at Parsons, what was the reason for leaving
8 that job?

9 A. We had finished the project.

10 Q. What was the nature of the work that you were
11 doing in District 4 involving applications?

12 A. I would -- whenever an application came to
13 the office and it was assigned to me, I would evaluate
14 the application and either recommend approval or
15 denial or partial approval for it.

16 Q. How did you go about evaluating the
17 application?

18 A. I would sometimes do field work if -- if that
19 was appropriate. If there was an existing file, I
20 would ^{abstract} extract the file to see what was the history. I
21 would do hydrologic analysis if that was appropriate
22 and compile all the data together, write a memorandum
23 of recommendation, and submit it to my supervisor.

24 Q. Okay. At that -- when you first started
25 there in 2001, that would have gone to Mr. Chavez?

1 A. Yes.

2 Q. In 2001, how was the District 4 office
3 organized?

4 A. At that time there was a district supervisor,
5 Mr. Chavez, and then there was -- there was a basin
6 supervisor for the Lower Rio Grande. I don't know
7 what else -- basin they supervised, and then there was
8 a basin supervisor for the Tularosa ^{and} Salt Basin, and
9 then there was three -- I don't remember the exact
10 numbers, but there are three of us who did field work
11 below them. It was a very small office.

12 Q. Did District 4 have access to a WATERS
13 database?

14 A. I don't remember.

15 Q. Okay. During the period of time that you
16 worked in Roswell, the seven-and-a-half years, did you
17 receive any -- any training from the Office of the
18 State Engineer?

19 A. Yes.

20 Q. And what was the nature of the training that
21 you received?

22 A. I was taught how to measure wells and take
23 samples, how to do hydrologic analysis, how to write a
24 memo, how to write the letters.

25 Q. And what form did this training take?

1 A. I think the other water master was hired
2 probably within a couple of years after I was hired.
3 It wasn't very long.

4 Q. And who was that person?

5 A. Craig Cathey.

6 Q. In your position as -- so when you left the
7 job, you just had one assistant. Who was that
8 individual?

9 A. That was Margie Mirabel.

10 Q. And at the time you left, did you have
11 responsibilities related to maintenance of the
12 water -- WATERS database in any manner?

13 A. No.

14 Q. You had no entry -- data entry
15 responsibilities?

16 A. Well, Margie entered the meter readings that
17 came in. I didn't do that, but she did.

18 Q. Is that her only task?

19 A. No. She assisted me in all the duties for
20 the -- as a water master, but she had also entered the
21 meter readings.

22 Q. Do you have any idea of what percentage of
23 her time was taken up entering data from the meter
24 readings?

25 A. Oh, I have no idea.

1 A. Yeah. Just the driving around doing the
2 field work.

3 Q. Were there any problems that you encountered
4 as the Lower Rio Grande water master in implementing
5 the state engineer's metering order that we haven't
6 touched on today?

7 A. I can't think of any, no.

8 Q. At the time you left District 4, had a
9 successor water master been selected?

10 A. At the time I left, there was two water
11 masters, myself and Craig Cathey. I don't know what
12 happened after I left, if they had him take over
13 temporarily or if they promoted my assistant. I don't
14 know.

15 Q. Who was your assistant at the time you left?

16 A. Margie Mirabel.

17 Q. So she remained your assistant throughout the
18 period of time that you were the Lower Rio Grande
19 water master?

20 A. Yes.

21 Q. My last question to you is how do you rate
22 the fishing in the Cimarron district?

23 A. Excellent. That's river fishing or lake
24 fishing.

25 Q. What's that?



Systems Technology for the Litigation World

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October 8, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Gary Esslinger, Volume 1**
08/17/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63594

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Sarah A. Klahn
R. Lee Leininger

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

1 IN THE SUPREME COURT OF THE UNITED STATES
2 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

3
4 STATE OF TEXAS)
)
5 Plaintiff,)
) Original Action Case
6 VS.) No. 220141
) (Original 141)
7 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
8)
 Defendants.)

9
10
11 THE STATE OF TEXAS :
12 COUNTY OF HARRIS :

13 I, HEATHER L. GARZA, a Certified Shorthand
14 Reporter in and for the State of Texas, do hereby
15 certify that the facts as stated by me in the caption
16 hereto are true; that the above and foregoing answers
17 of the witness, GARY ESSLINGER, to the interrogatories
18 as indicated were made before me by the said witness
19 after being first remotely duly sworn to testify the
20 truth, and same were reduced to typewriting under my
21 direction; that the above and foregoing deposition as
22 set forth in typewriting is a full, true, and correct
23 transcript of the proceedings had at the time of
24 taking of said deposition.


25 I further certify that I am not, in any
 capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. WECHSLER - 04:59:22
MS. KLAHN - 00:00:00
9 MR. LEININGER - 00:00:00
MR. WALLACE - 00:00:00
10 MS. O'BRIEN - 00:00:00
MS. BARNCASTLE - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
this, the 9th day of September, 2020.

13
14 
15 HEATHER L. GARZA, CSR, RPR, CRR
Certification No.: 8262
16 Expiration Date: 04-30-22
17



18 Worldwide Court Reporters, Inc.
Firm Registration No. 223
3000 Wesleyan, Suite 235
19 Houston, TX 77027
800-745-1101
20
21
22
23
24
25

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
12 8	BANK	NOT A BUY
26 23	90,640	NOT 9,640
101 6	PARCEL	NOT PARTIAL
108 13	PLAN	NOT PLANT
136 15	AND	NOT IN
149 17	RTU	NOT RPU

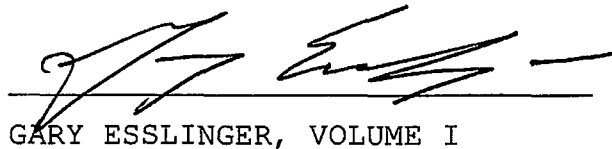
[Signature]
GARY ESSLINGER, VOLUME I

Subscribed and sworn before me this 5th day of October, 2020, by
Gary L. Esslinger.
State of New Mexico
County of Dona Ana

[Signature]
Notary Public
My commission expires 12/30/2022

SIGNATURE OF WITNESS

I, GARY ESSLINGER, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).



GARY ESSLINGER, VOLUME I

Job No. 63594

Subscribed and sworn to before me this 5th day of October, 2020
by Gary L. Esslinger

State of New Mexico

County of Dona Ana

Paul E. Norwood

Notary Public

My Commission expires 12/20/2022



Systems Technology for the Litigation World

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October 8, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Gary Esslinger, Volume 2**
08/18/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63595

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Sarah A. Klahn
R. Lee Leininger

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027

713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

1 IN THE SUPREME COURT OF THE UNITED STATES

2 BEFORE THE OFFICE OF THE SPECIAL MASTER

3 HON. MICHAEL J. MELLOY

4 STATE OF TEXAS, §

§

5 Plaintiff, §

§

6 vs. § ORIGINAL ACTION

§ CASE NO.: 220141

7 STATE OF NEW MEXICO, § (ORIGINAL 141)

and STATE OF COLORADO, §

§

8 Defendants. §

9 *****

10 REPORTER'S CERTIFICATE

11 REMOTE VIDEOCONFERENCED DEPOSITION OF

12 GARY ESSLINGER

13 AUGUST 18, 2020

14 *****

15 I, Karen L. D. Schoeve, Registered Diplomate
16 Reporter, Certified Realtime Reporter, and Realtime
17 Systems Administrator, residing in the State of
18 Texas, do hereby certify that the foregoing
19 proceedings were reported by me and that the
20 foregoing transcript constitutes a full, true, and
21 correct transcription of my stenographic notes, to
22 the best of my ability and hereby certify to the
23 following:
24
25

1 That the witness, GARY ESSLINGER, was duly
2 remotely sworn by the officer and that the
3 transcript of the oral deposition is a true record
4 of the testimony given by the witness;

5
6 I further certify that I am neither counsel
7 for, related to, nor employed by any of the parties
8 in the action in which this proceeding was taken,
9 and further that I am not financially or otherwise
10 interested in the outcome of the action.

11
12 That the amount of time used by each party at
13 the deposition is as follows:

14
15 JEFFREY WECHSLER - 04:21

16 SAMANTHA BARNCastle - 00:00

17 SARAH A. KLAHN - 00:02

18 CHAD WALLACE - 00:00

19 R. LEE LEININGER - 00:00

20 MARIA O'BRIEN - 00:00

21 SAMANTHA BARNCastle - 00:00

22 JAMES C. BROCKMANN - 00:00

23 TESSA T. DAVIDSON 00:00

24 JOHN W. UTTON 00:00
25

Subscribed and sworn to on this the 18th day
of August, 2020.

Karen L.D. Schoeve



Karen L.D. Schoeve, CSR, RDR, CRR
Realtime Systems Administrator
Texas CSR No. 3354, Exp.: 10-31-2021
NCRA Exp. Date: 09-30-21
Worldwide Court Reporters, Inc.
Firm Certification No. 223
3000 Weslayan, Suite 235
Houston, Texas 77027
(713) 572-2000

Job No. 63595

CHANGES AND SIGNATURE

WITNESS NAME: GARY ESSLINGER

DATE: AUGUST 18, 2020

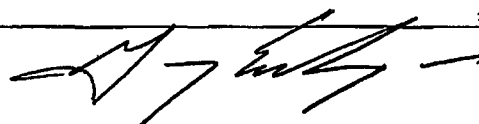
PAGE/LINE	CHANGE	REASON
19 11	New Mexico	Not Nevada
30 24	Management	Not Manager
42 7	The river	Not the aquifer
42 13	earthen lined	Not lime
42 19	earthen lined	Not lime
46 21	Hubert	Not Coubert
63 15	prefer	Not refer
66 24	early	Not area
73 19	dams	Not depths
74 7	button	Not area
97 13	Fuel	Not Field
98 21	discharge	Not charge
102 18-25	part of my answer	not part of my question
103 1-4	part of my answer	not part of my question
116 18-19	"offset withdraws with purchase"	his question not mine
139 13	plan	Not Plant
140 18	Service	Not surface
140 19	PSB	Not PSV
142 15	Board	Not Award
149 2	Union	Not Inyon
155 2	Plan	Not Plant

1 CHANGES AND SIGNATURE

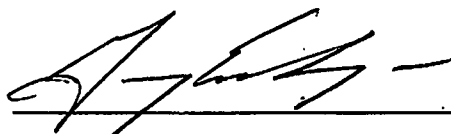
2 WITNESS NAME: GARY ESSLINGER

3 DATE: AUGUST 18, 2020

4 PAGE/LINE	CHANGE	REASON
5 160 10-23	This is a question not an answer	
6 164 18	add study	replace zoom cut-out
7 169 14	everything answer yes then starts question	Dr. King... is not my answer
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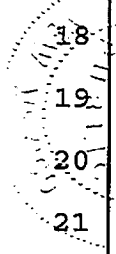
1 I, GARY ESSLINGER, solemnly swear or
2 affirm under the pains and penalties of perjury that
3 the foregoing pages contain a true and correct
4 transcript of the testimony given by me at the
5 time and place stated with the corrections, if any,
6 and the reasons therefor noted on the foregoing
7 correction pages(s).

8
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GARY ESSLINGER

Subscribed and sworn to before me this 5th day of October, 2020
by Gary L. Esslinger

State of New Mexico

Dona Ana County

 Julie E. Norwood

Notary Public

My Commission expires 12/30/2022

Job No. 63595



Systems Technology for the Litigation World

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October 6, 2020

Luis Robles
ROBLES, RAEL & ANAYA, P.C.
500 Marquette Ave. NW, Suite 700
Albuquerque, NM 87102

Re: Deposition of **Larry French**
08/31/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Robles:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65191

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Stuart L. Somach
John P. Tustin

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

1 That the witness, LARRY FRENCH, was duly
2 remotely sworn by the officer and that the
3 transcript of the oral deposition is a true record
4 of the testimony given by the witness;

5
6 I further certify that I am neither counsel
7 for, related to, nor employed by any of the parties
8 in the action in which this proceeding was taken,
9 and further that I am not financially or otherwise
10 interested in the outcome of the action.

11
12 That the amount of time used by each party at
13 the deposition is as follows:

14
15 LUIS ROBLES - 01:25
16 STUART L. SOMACH - 00:00
17 THERESA C. BARFIELD - 00:00
18 PRISCILLA M. HUBENAK - 00:00
19 JOHN P. TUSTIN - 00:00
20 EMILY HALVORSEN - 00:00
21 BOBBY SALEHI - 00:00
22 BROOKE PAUP - 00:00
23 KATHERINE DUNCAN - 00:00

24
25

1 Subscribed and sworn to on this the 8th day of
2 September, 2020.
3
4
5
6
7

Karen L.D. Schoeve



8 Karen L.D. Schoeve, CSR, RDR, CRR
9 Realtime Systems Administrator
10 Texas CSR No. 3354, Exp.: 10-31-2021
11 NCRA Exp. Date: 09-30-21
12 Worldwide Court Reporters, Inc.
13 Firm Certification No. 223
14 3000 Weslayan, Suite 235
15 Houston, Texas 77027
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25 Job No. 65191

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CHANGES AND SIGNATURE

WITNESS NAME: LARRY FRENCH


 9/29/20

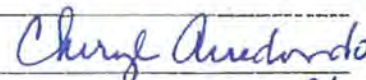
DATE: AUGUST 31, 2020

PAGE/LINE

CHANGE

REASON

16/21 "in those aquifers" to "of the division" Clarifies the response,
 28/23 add "Not for the Hueco-Mesilla Bolson" Clarifies the
 44/13 Substitute "and" for "of" Clarifies the response.


 9/29/20

1 I, LARRY FRENCH, solemnly swear or affirm
2 under the pains and penalties of perjury that the
3 foregoing pages contain a true and correct
4 transcript of the testimony given by me at the
5 time and place stated with the corrections, if any,
6 and the reasons therefor noted on the foregoing
7 correction pages(s).

8
9
10 

11
12 LARRY FRENCH

9/29/20

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20 Cheryl Arredondo
21 9/29/20

22
23
24
25 Job No. 65191



Systems Technology for the Litigation World

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September 16, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of: **Patrick R. Gordon, Volume 1**
07/14/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **original deposition transcript** of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein that the deposition transcript **has been signed** by the witness and **no amendments** were made.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63575

cc:

Samantha R. Barncastle
Chad M. Wallace
Tessa T. Davidson
Maria O'Brien
Stuart L. Somach
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

1 IN THE SUPREME COURT OF THE UNITED STATES
2 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLO

3
4 STATE OF TEXAS)
)
5 Plaintiff,)
) Original Action Case
6 VS.) No. 220141
) (Original 141)
7 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
8)
 Defendants.)

9
10 THE STATE OF TEXAS :

11 COUNTY OF HARRIS :

12 I, HEATHER L. GARZA, a Certified Shorthand
13 Reporter in and for the State of Texas, do hereby
14 certify that the facts as stated by me in the caption
15 hereto are true; that the above and foregoing answers
16 of the witness, PATRICK R. GORDON, to the
17 interrogatories as indicated were made before me by
18 the said witness after being first remotely duly sworn
19 to testify the truth, and same were reduced to
20 typewriting under my direction; that the above and
21 foregoing deposition as set forth in typewriting is a
22 full, true, and correct transcript of the proceedings
23 had at the time of taking of said deposition.

24 I further certify that I am not, in any
25 capacity, a regular employee of the party in whose

1 WITNESS CORRECTIONS AND SIGNATURE

2 Please indicate changes on this sheet of paper,
3 giving the change, page number, line number and reason
4 for the change. Please sign each page of changes.

5 PAGE/LINE CORRECTION REASON FOR CHANGE
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PATRICK R. GORDON, VOLUME I

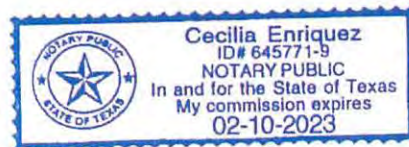
S I G N A T U R E O F W I T N E S S

I, PATRICK R. GORDON, solemnly swear or affirm
under the pains and penalties of perjury that the
foregoing pages contain a true and correct transcript
of the testimony given by me at the time and place
stated with the corrections, if any, and the reasons
therefor noted on the foregoing correction page(s).

Pat Gndm

PATRICK R. GORDON, VOLUME I

Job No. 63575



Cecilia Enriquez
9-14-2020



Systems Technology for the Litigation World

Court Reporting ♦ Video Production ♦ Videoconferencing ♦ Litigation Group

September 16, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of: **Patrick R. Gordon, Volume 2**
07/15/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **original deposition transcript** of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein that the deposition transcript **has been signed** by the witness and **no amendments** were made.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63576

cc:

Samantha R. Barncastle
Chad M. Wallace
Tessa T. Davidson
Maria O'Brien
Stuart L. Somach
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

STATE OF TEXAS)
)
)
 Plaintiff,)
) Original Action Case
 VS.) No. 220141
) (Original 141)
 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
)
 Defendants.)

COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, PATRICK R. GORDON, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. WECHSLER - 03:37:49


 MR. SOMACH - 00:00:00

9 MR. DUBOIS - 00:00:00

 MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 26th day of July, 2020.

14 

HEATHER L. GARZA, CSR, RPR, CRR

15 Certification No.: 8262

16 Expiration Date: 04-30-22

17 Worldwide Court Reporters, Inc.

18 Firm Registration No. 223

19 3000 Wesleyan, Suite 235

20 Houston, TX 77027

21 800-745-1101

1 WITNESS CORRECTIONS AND SIGNATURE

2 Please indicate changes on this sheet of paper,
3 giving the change, page number, line number and reason
4 for the change. Please sign each page of changes.

5 PAGE/LINE CORRECTION REASON FOR CHANGE

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23 _____
24 PATRICK R. GORDON, VOLUME II
25

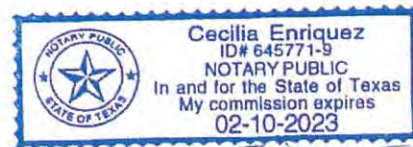
SIGNATURE OF WITNESS

I, PATRICK R. GORDON, solemnly swear or affirm
under the pains and penalties of perjury that the
foregoing pages contain a true and correct transcript
of the testimony given by me at the time and place
stated with the corrections, if any, and the reasons
therefor noted on the foregoing correction page(s).

Pat Gndm

PATRICK R. GORDON, VOLUME II

Job No. 63576



Cecilia Enriquez
9-14-2020



Systems Technology for the Litigation World

Court Reporting ♦ Video Production ♦ Videoconferencing ♦ Litigation Group

November 10, 2020

Lisa Thompson
TROUT RALEY
1120 Lincoln St., Suite 1600
Denver, CO 80203

Re: Deposition of **Art Ivey**
08/28/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Ms. Thompson:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65237

cc:
Samantha R. Barncastle
Emily Halvorsen
Maria O'Brien
Sarah A. Klahn
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLO

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :
 COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, ART IVEY, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MS. THOMPSON - 03:44:29

MS. KLAHN - 00:02:19

9 MR. DUBOIS - 00:00:00

MS. HALVORSEN - 00:00:00

10 MS. O'BRIEN - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 24th day of September, 2020.

14 

HEATHER L. GARZA, CSR, RPR, CRR

15 Certification No.: 8262

Expiration Date: 04-30-22

16
17 Worldwide Court Reporters, Inc.

Firm Registration No. 223

18 3000 Weslayan, Suite 235

Houston, TX 77027

19 800-745-1101
20
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WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
20/12	"waters" to "receiving waters"	clarification / misspoke
27/12	"light" to "late"	misspoke or misunderstood
34/10	"drain" (2) to "drink" (2)	misspoke or misunderstood
41/2	"tract" to "track"	misspoke or misunderstood
44/6	"says" to "said"	misspoke or misunderstood
54/4	"stack" to "snap"	misspoke or misunderstood
54/12	insert "it" at the end of this line	I misspoke or was missed
55/11	"near" to "newly"	misspoke or misunderstood
56/9	"that's" to "that,"	cadence or accent problem
56/10	"alfalfa." to "alfalfa,"	cadence or accent problem
57/11	"lost" to "lose"	misspoke or misunderstood
58/13	"meat" to "in-shell"	clarification / I misspoke
59/22	"plant" to "plantings"	misspoke or misunderstood
62/23	"civil" to "golden"	misspoke
63/9-10	"time. I'm a memorial almost." to	
	"time immemorial, almost."	I suspect accent problems / misunderstood
63/23	"UTE P" to "UTEP"	typo
67/19	"valleys" to "valley's"	misspoke or misunderstood

ART IVEY





WORLDWIDE

Systems Technology for the Litigation World

Court Reporting ♦ Video Production ♦ Videoconferencing ♦ Litigation Group

July 9, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Dr. J. Phillip King**
05/18/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

We appreciate your choosing Worldwide Court Reporters, Inc. and look forward to working with you in the future. If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,



Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63353

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Sarah A. Klahn
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

1 IN THE SUPREME COURT OF THE UNITED STATES
 2 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

3
 4 STATE OF TEXAS)
)
 5 Plaintiff,)
) Original Action Case
 6 VS.) No. 220141
) (Original 141)
 7 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
 8)
 Defendants.)

9
 10
 11 THE STATE OF TEXAS :
 COUNTY OF HARRIS :

12 I, HEATHER L. GARZA, a Certified Shorthand
 13 Reporter in and for the State of Texas, do hereby
 14 certify that the facts as stated by me in the caption
 15 hereto are true; that the above and foregoing answers
 16 of the witness, DR. J. PHILLIP KING, to the
 17 interrogatories as indicated were made before me by
 18 the said witness after being first remotely duly sworn
 19 to testify the truth, and same were reduced to
 20 typewriting under my direction; that the above and
 21 foregoing deposition as set forth in typewriting is a
 22 full, true, and correct transcript of the proceedings
 23 had at the time of taking of said deposition.

24 I further certify that I am not, in any
 25 capacity, a regular employee of the party in whose

behalf this deposition is taken, nor in the regular employ of this attorney; and I certify that I am not interested in the cause, nor of kin or counsel to either of the parties.

That the amount of time used by each party at the deposition is as follows:

MR. WECHSLER - 03:43:36
MS. KLAHN - 00:00:00
MR. DUBOIS - 00:00:00
MR. WALLACE - 00:00:00
MS. O'BRIEN - 00:00:00
MS. BARNCASTLE - 00:00:00

GIVEN UNDER MY HAND AND SEAL OF OFFICE, on this, the 8th day of June, 2020.



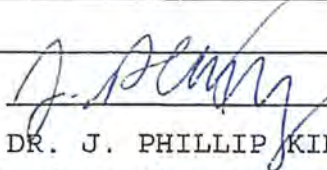
Heather L. Garza
HEATHER L. GARZA, CSR, RPR, CRR
Certification No.: 8262
Expiration Date: 04-30-22

Worldwide Court Reporters, Inc.
Firm Registration No. 223
3000 Wesleyan, Suite 235
Houston, TX 77027
800-745-1101

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
48/8-9	"but part of the intention of the compact.."	Extra words
62/19	"funding management"	typo
66/5	"we, the two districts, instruct ..."	Word order
76/21	"make the treaty delviery ..."	typo
77/11	"1900s"	typo
95/3	"special water users association"	typo
100/20	"districts" (plural)	typo
104/19	"It is not a singular impact."	Word order
126/2	"restoration site"	typo
126/4	"You have on balance increased"	typo


DR. J. PHILLIP KING, VOLUME I

SUBSCRIBED AND SWORN TO BEFORE ME THIS 9TH DAY OF JULY
BY JAMES PHILLIP KING.

STATE OF NEW MEXICO, COUNTY OF DONA ANA

James Phillip King MY COMMISSION EXPIRES 12/20/2022
Notary Public

SIGNATURE OF WITNESS

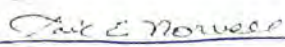
I, DR. J. PHILLIP KING, solemnly swear or affirm
under the pains and penalties of perjury that the
foregoing pages contain a true and correct transcript
of the testimony given by me at the time and place
stated with the corrections, if any, and the reasons
therefor noted on the foregoing correction page(s).


DR. J. PHILLIP KING, VOLUME I

Job No. 63353

SUBSCRIBED ~~to~~ AND SWORN TO BEFORE ME THIS 9TH DAY OF JULY
BY JAMES PHILLIP KING

STATE OF NEW MEXICO, COUNTY OF DONA ANA


DALE E. NORWELL

NOTARY PUBLIC

MY COMMISSION EXPIRES 12/30/2022



Systems Technology for the Litigation World

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December 11, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of: **Nicolai Kryloff**
8/6/2020
State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein that the deposition **has not been** signed by the witness.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65021

cc:
Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Robert B. Hoffman
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

behalf this deposition is taken, nor in the regular
employ of this attorney; and I certify that I am not
interested in the cause, nor of kin or counsel to
either of the parties.

That the amount of time used by each party at
the deposition is as follows:

MR. WECHSLER - 03:45:49

MR. HOFFMAN - 00:00:00

MR. DUBOIS - 00:04:48

MR. WALLACE - 00:01:27

MS. BARNCASTLE - 00:00:00

GIVEN UNDER MY HAND AND SEAL OF OFFICE,
this, the 2nd day of September, 2020.

Heather L. Garza

HEATHER L. GARZA, CSR, RPR, CRR

Certification No.: 8262

Expiration Date: 04-30-22



Worldwide Court Reporters, Inc.

Firm Registration No. 223

3000 Weslayan, Suite 235

Houston, TX 77027

800-745-1101

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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLO

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

ORAL AND VIDEOTAPED DEPOSITION OF
ESTEVAN LOPEZ
FEBRUARY 26, 2020

ORAL AND VIDEOTAPED DEPOSITION of ESTEVAN LOPEZ,
produced as a witness at the instance of the
Plaintiff, and duly sworn, was taken in the
above-styled and numbered cause on February 26, 2020,
from 9:08 a.m. to 4:02 p.m., before Heather L. Garza,
CSR, RPR, in and for the State of Texas, recorded by
machine shorthand, at the DRURY PLAZA HOTEL - SANTA
FE, 820 Paseo De Peralta, Santa Fe, New Mexico,
pursuant to the Federal Rules of Civil Procedure and
the provisions stated on the record or attached
hereto; that the deposition shall be read and signed.

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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLO

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :
COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, ESTEVAN LOPEZ, to the interrogatories as indicated were made before me by the said witness after being first duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MS. KLAHN - 04:42:44

 MR. ROMAN - 00:00:00

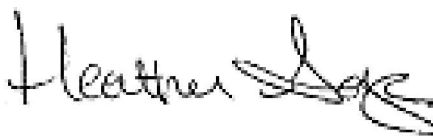
9 MR. GEHLERT - 00:00:00

 MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

 MS. BARNCASTLE - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
13 this, the 27th day of March, 2020.

14 

15 HEATHER L. GARZA, CSR, RPR, CRR

 Certification No.: 8262

16 Expiration Date: 04-30-22

 VERITEXT LEGAL SOLUTIONS

17 Firm Registration No. 571

 300 Throckmorton Street, Suite 1600

18 Fort Worth, TX 76102

 1-800-336-4000

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
-----------	------------	-------------------

15/13	strike "us"	- extraneous word
-------	-------------	-------------------

15/24	replace "in" with "and"	- incorrect word
-------	-------------------------	------------------

16/3	insert "Compact" before "accounting" and add ";" after "accounting"	- Clarity
------	---	-----------

18/21	strike "government"	- extraneous / incorrect
-------	---------------------	--------------------------

18/25	insert "New Mexico" before second "Compact"	- Clarity
-------	---	-----------

19/1	capitalize <u>U</u> pper	- Proper name
------	--------------------------	---------------

20/11	strike "state"	- clarity
-------	----------------	-----------

32/9	replace "and" with "in"	- incorrect word
------	-------------------------	------------------

33/14	replace "make" with "sell"	- clarity
-------	----------------------------	-----------

33/16	replace "it" with "effluent"	- clarity
-------	------------------------------	-----------

41/21	replace second "a" with "an" and insert ";" after disagreement	- clarity
-------	--	-----------

44/7	replace "they" with "the Commission"	- clarity
------	--------------------------------------	-----------

44/9	replace "we" with "New Mexico"	- clarity
------	--------------------------------	-----------

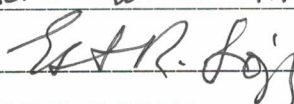
45/9 and 10	replace "couldn't" with "could" (2 occurrences)	- wrong word
-------------	---	--------------

47/23	replace "being" with "been"	- incorrect word
-------	-----------------------------	------------------

60/18	replace "it" with "waste" and "It's" with "Water is"	- clarity
-------	--	-----------

74/1	replace "were" with "are"	- clarity
------	---------------------------	-----------

75/4	replace "there" with "then"	- clarity
------	-----------------------------	-----------


ESTEVAN LOPEZ

Job No. TX3852996

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE CORRECTION REASON FOR CHANGE

75/16 replace "model" with "modeling" - clarity
 78/15 insert "--" after "super" - clarity
 78/23 replace second occurrence of "it" with "ISC" - incorrect word
 81/19 insert "," after "forth" - clarity
 90/16 replace "effect" with "affect" - incorrect word
 94/7 replace "El Vado" with "Lobatos" - incorrect name
 112/17 replace "effect" with "affect" - incorrect word
 112/23 replace "effect" with "affect" - incorrect word
 114/9 and 10 replace "gained" with "gamed" (2 occurrences) - incorrect word
 114/14 replace first occurrence of "of" with "in" - clarity
 114/15 replace "what" with "one" - incorrect word
 114/17 replace "500" with "500,000" - clarity
 115/3 and 4 replace "effect" with "affect" (2 occurrences) - incorrect word
 115/7 and 8 replace "effect" with "affect" (3 occurrences) - incorrect word
 115/22 strike second occurrence of "by" - clarity
 116/1 replace "effect" with "affect" - incorrect word
 116/18 replace "gain" with "game" - incorrect word
 118/8 replace "effect" with "affect" - incorrect word

Estevan Lopez

ESTEVAN LOPEZ

Job No. TX3852996

165 ERL
 Page 164

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE CORRECTION REASON FOR CHANGE

118/9 insert "going into effect" after "articles" and
replace "790" with "790,000" - clarity

122/6 strike "and" - clarity

125/5 replace "Mesillas" with "Mesilla" - incorrect name

125/15 replace second occurrence of "in" with "by" - clarity

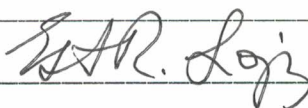
125/16 strike "New" - incorrect entity

133/16 replace "allure" with "lore" - incorrect word

158/13 replace "actual" with "actually" - incorrect word

158/14 replace first two occurrences of "I" with "they" - clarity

16/23 replace "did n't" with "did" - incorrect statement



ESTEVAN LOPEZ

Job No. TX3852996

166 ePL
Page 164

S I G N A T U R E O F W I T N E S S

I, ESTEVAN LOPEZ, solemnly swear or affirm under
the pains and penalties of perjury that the foregoing
pages contain a true and correct transcript of the
testimony given by me at the time and place stated
with the corrections, if any, and the reasons therefor
noted on the foregoing correction page(s).

A handwritten signature in dark ink, appearing to read 'Estevan Lopez', is written over a horizontal line.

ESTEVAN LOPEZ

Job No. 3852996



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September 2, 2020

Stuart Somach
Somach Simmons & Dunn
500 Capitol Mall, Suite 1000
Sacramento, CA 95814

Re: Deposition of **Estevan Lopez, Volume 1**
07/06/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Somach:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63570

cc:
Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Jeffrey J. Wechsler
David W. Gehlert

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :

COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, ESTEVAN LOPEZ, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. SOMACH - 05:01:50

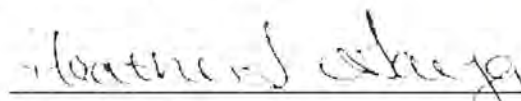
MR. WECHSLER - 00:00:00

9 MR. GEHLERT - 00:59:19

MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 22nd day of July, 2020.

14 

HEATHER L. GARZA, CSR, RPR, CRR

15 Certification No.: 8262

16 Expiration Date: 04-30-22

17 Worldwide Court Reporters, Inc.

Firm Registration No. 223

18 3000 Weslayan, Suite 235

Houston, TX 77027

19 800-745-1101

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE CORRECTION REASON FOR CHANGE

18/13 Strike "a" and replace with "or"; wrong word

19/6 Strike "then" and replace with "and"; wrong word

21/3 Strike "projects" and replace with "project segments"; clarity

23/22 Insert "in a" before "facilitation"; clarity

26/4 Strike "with"; clarity

31/9 Strike "she" and replace with "he"; wrong pronoun.

31/12 Insert "It" before "Moved"; clarity.

35/20 Strike "effects" and replace with "affects"; wrong word

38/16 Strike "groundwater" and replace with "ground"; clarity

38/25 Strike "ground"; clarity

44/7 Strike "safe" and replace with "saved"; clarity

50/15 Strike "was" and replace with "were"; wrong word

65/6 Strike "not" and replace with "and"; clarity

65/7 Insert "to" before "Hudspeth"; clarity

66/11 Insert "separately" before "from"; clarity

74/6 Strike "Compact square. The Compact" and replace with "compacts where the compact"; clarity

74/15 Strike "lands" and replace with "man's"; wrong word


ESTEVAN LOPEZ, VOLUME I

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE CORRECTION REASON FOR CHANGE

82/14 Strike both uses of "project" and replace each with "compact"; clarity

82/16 Strike "article" and replace with "project"; clarity

99/16 Change "schedule" to "schedules"; correcting quote

110/9 Strike "have" and replace with "had"; wrong word.

125/5 Strike "but it's" and replace with "when there's"; clarity

126/21 Strike the first instance of "the"; clarity

129/19 Strike "for"; clarity

147/3 Strike "eyes" and replace with "us"; clarity

149/6 Strike "repetition" and replace with "refutation"; wrong word

155/17 Strike "draws" and replace with "drawn"; wrong word

162/25 Strike "does" and replace with "has been done"; clarity

170/3 Strike "in"; clarity

176/14 Strike "may" and replace with "might"; clarity

176/16 Strike "I'm seeing" and replace with "I've seen"; clarity

177/3 Strike "in"; clarity

177/19 strike "post supply"; clarity

180/23 strike ". I mentioned" and replace with "or mention"; clarity

182/22 strike "Compact" and replace with "contract"; wrong word


ESTEVAN LOPEZ, VOLUME I

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.


PAGE/LINE	CORRECTION	REASON FOR CHANGE
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188/2 strike "the" and replace with "below"; clarity
188/3 strike "real estate" and replace with "the state"; clarity
190/23 strike "30"; clarity
191/12 strike "the"; clarity
192/25 strike "tightening" and replace with "tightly"; clarity
194/9 strike "system" and replace with "doctrine"; clarity
197/1 strike "delay" and replace with "define"; clarity

ESTEVAN LOPEZ, VOLUME I

S I G N A T U R E O F W I T N E S S

I, ESTEVAN LOPEZ, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).



ESTEVAN LOPEZ, VOLUME I

Job No. 63570



Systems Technology for the Litigation World

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September 2, 2020

Stuart Somach
Somach Simmons & Dunn
500 Capitol Mall, Suite 1000
Sacramento, CA 95814

Re: Deposition of **Estevan Lopez, Volume 2**
07/07/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Somach:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63571

cc:
Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Jeffrey J. Wechsler
David W. Gehlert

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

STATE OF TEXAS)
)
)
 Plaintiff,)
)
) Original Action Case
 VS.)
) No. 220141
)
) (Original 141)
)
 STATE OF NEW MEXICO,)
)
 and STATE OF COLORADO,)
)
)
)
 Defendants.)

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, ESTEVAN LOPEZ, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

behalf this deposition is taken, nor in the regular employ of this attorney; and I certify that I am not interested in the cause, nor of kin or counsel to either of the parties.

That the amount of time used by each party at the deposition is as follows:

MR. SOMACH - 00:17:58

MR. WECHSLER - 00:00:00

MR. GEHLERT - 03:14:41

MR. WALLACE - 00:00:00

MS. O'BRIEN - 00:55:00

MS. BARNCASTLE - 00:55:00

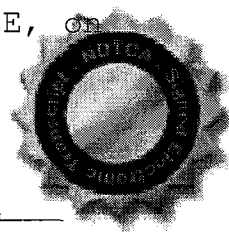
GIVEN UNDER MY HAND AND SEAL OF OFFICE, on this, the 25th day of July, 2020.

Heather L. Garza

HEATHER L. GARZA, CSR, RPR, CRR

Certification No.: 8262

Expiration Date: 04-30-22



Worldwide Court Reporters, Inc.

Firm Registration No. 223

3000 Wesleyan, Suite 235

Houston, TX 77027

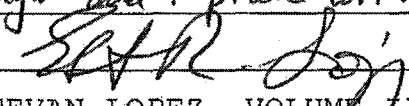
800-745-1101

WITNESS CORRECTIONS AND SIGNATURE.

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE CORRECTION REASON FOR CHANGE

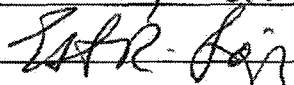
14/8 Strike "before" and replace with "for"; clarity
20/16 Strike "the correspondence" and replace with "it corresponds"; clarity
22/6 Strike "has" and replace with "if as"; wrong words
23/23 Strike "that"; extraneous word.
24/15 Strike "analysis" and replace with "canals"; wrong word
26/16 Strike "alfalfa" and replace with "wastewater"; wrong word
28/3 Insert "inflow" after "tributary"; missing word
28/21 Strike "of the year" and replace with "years"; clarity
46/22 Strike "pre" and replace with "pretty"; clarity
50/20 Strike "it" and replace with "I"; clarity
58/23 Strike "there's" and replace with "they're"; wrong words
62/17 Strike "I'd call" and replace with "I've called"; wrong words
66/13 Strike "and" and replace with "in"; wrong word
76/12 Strike "carryover" and replace with "accrued"; wrong word
77/7 Strike "a" and replace with "or"; wrong word
77/7 Strike "or apportionment" and replace with "of a portion"; clarity
77/18 Strike "that" and replace with "and there"; clarity
84/5 Strike "through" and replace with "to"; wrong word.


ESTEVAN LOPEZ, VOLUME II

WITNESS CORRECTIONS AND SIGNATURE.

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
94/4	Strike "options" and replace with "experts";	clarity
106/16	Strike "independence" and replace with "independent";	wrong word
106/24	Strike "gain" and replace with "game";	wrong word
110/20	Strike "it" and replace with "them";	clarity
114/3	Strike "that does";	clarity
115/3	Strike "is" and replace with "was";	wrong word
117/25	Strike "that" and replace with "to the";	clarity
118/11	Strike "on" and replace with "an";	clarity
125/16	Strike "they're" and replace with "you're";	clarity
141/4	Strike "with the" and replace with "that";	clarity
142/17	Strike "didn't";	clarity
142/18	Strike "didn't" and replace with "did";	clarity
148/4, 6, 9, 15, 16-17,	Strike "warrant act" and replace with "Warren Act" (5 times)	wrong name
151/11	Strike "an images" and replace with "a damages";	wrong words
155/14	Strike "transacts" and replace with "transects";	wrong word.
158/23	Strike "the" and replace with "as";	clarity
166/4	Strike "for" and replace with "from";	wrong word
176/20	Strike "it was";	clarity


ESTEVAN LOPEZ, VOLUME II

WITNESS CORRECTIONS AND SIGNATURE.

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
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180/11 strike "report seem" and replace with "court seemed"; wrong way

183/16 strike "for" and replace with "that"; clarity

ESTEVAN LOPEZ, VOLUME II

SIGNATURE OF WITNESS

I, ESTEVAN LOPEZ, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).



ESTEVAN LOPEZ, VOLUME II

Job No. 63571



Systems Technology for the Litigation World

Court Reporting ♦ Video Production ♦ Videoconferencing ♦ Litigation Group

October 12, 2020

Sarah Klahn
Somach Simmons & Dunn
500 Capitol Mall, Suite 1000
Sacramento, CA 95814

Re: Deposition of **Estevan Lopez, Volume 3**
08/21/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Ms. Klahn:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65083

cc:

Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Jeffrey J. Wechsler
David W. Gehlert

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

1 IN THE SUPREME COURT OF THE UNITED STATES
2 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

3
4 STATE OF TEXAS)
)
5 Plaintiff,)
) Original Action Case
6 VS.) No. 220141
) (Original 141)
7 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
8)
 Defendants.)

9
10
11 THE STATE OF TEXAS :
12 COUNTY OF HARRIS :

13 I, HEATHER L. GARZA, a Certified Shorthand
14 Reporter in and for the State of Texas, do hereby
15 certify that the facts as stated by me in the caption
16 hereto are true; that the above and foregoing answers
17 of the witness, ESTEVAN LOPEZ, to the interrogatories
18 as indicated were made before me by the said witness
19 after being first remotely duly sworn to testify the
20 truth, and same were reduced to typewriting under my
21 direction; that the above and foregoing deposition as
22 set forth in typewriting is a full, true, and correct
23 transcript of the proceedings had at the time of
24 taking of said deposition.

25 I further certify that I am not, in any
 capacity, a regular employee of the party in whose

behalf this deposition is taken, nor in the regular
employ of this attorney; and I certify that I am not
interested in the cause, nor of kin or counsel to
either of the parties.

That the amount of time used by each party at
the deposition is as follows:

MS. KLAHN - 02:02:41
MR. WECHSLER - 00:00:00
MR. GEHLERT - 01:34:21
MR. WALLACE - 00:00:00
MS. O'BRIEN - 00:00:00
MS. BARNCastle - 00:00:00

GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
this, the 10th day of September, 2020.



Heather L. Garza
HEATHER L. GARZA, CSR, RPR, CRR
Certification No.: 8262
Expiration Date: 04-30-22

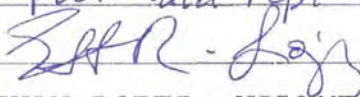
Worldwide Court Reporters, Inc.
Firm Registration No. 223
3000 Wesleyan, Suite 235
Houston, TX 77027
800-745-1101

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE CORRECTION REASON FOR CHANGE

- 9/17 Delete "is" and replace with "are"; wrong word
- 10/3 Delete "location" and replace with "rotation"; wrong word
- 13/2 Delete "the account" and replace with "County"; wrong words
- 15/21-22 Delete "water that it was under by some"; unclear
- 15/24 After "initially" insert "the San Juan-Chama water rights
were"; clarify meaning of sentence.
- 18/14 Delete "those" and replace with "Spronk's"; clarity
- 24/6 Delete the first instance of "did" and replace it with "laid"; wrong word
- 29/24 Delete "gained" and replace with "made"; wrong word.
- 34/6 Delete "--ma'am."; doesn't make sense.
- 42/16 Delete "EBID" and replace with "EPCWID"; wrong District
- 43/8 Delete "exclusions" and replace with "exclusively"; wrong word
- 47/3 Delete "uses" and replace with "produces"; wrong word
- 47/20 Delete "with" and replace with "when"; wrong word.
- 63/22 Delete "recall" and replace with "call"; wrong word
- 65/1 Delete "their" and replace with "there"; wrong word.
- 68/2 Delete "that"; clarity
- 79/22 Delete "Compact" and replace with "Project"; wrong reference


ESTEVAN LOPEZ, VOLUME III

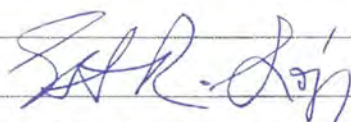
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WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
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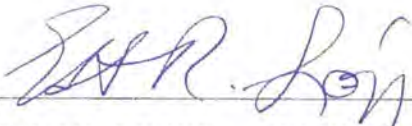
86/14	Delete "periods" and replace with "relationships";	wrong word, clarity
89/18	Delete "Supply" and replace with "Offset";	wrong word.



ESTEVAN LOPEZ, VOLUME III

SIGNATURE OF WITNESS

I, ESTEVAN LOPEZ, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).


ESTEVAN LOPEZ, VOLUME III

Job No. 65083



Systems Technology for the Litigation World

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October 16, 2020

R. Lee Leininger
U.S. DEPARTMENT OF JUSTICE
Environment & Natural Resources Division
999 18th St, # 370 South Terrace
Denver, CO 80202

Re: Deposition of Estevan Lopez
09/18/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Leininger:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65405

cc:
Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Jeffrey J. Wechsler
Stuart L. Somach

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. SOMACH - 00:48:35

MR. WECHSLER - 00:00:00

9 MR. DUBOIS - 02:02:47

MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:13:01

MS. BARNCastle - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
13 this, the 7th day of October, 2020.

14 
15 HEATHER L. GARZA, CSR, RPR, CRR

Certification No.: 8262

16 Expiration Date: 04-30-22
17

Worldwide Court Reporters, Inc.

18 Firm Registration No. 223

3000 Wesleyan, Suite 235

19 Houston, TX 77027

20 800-745-1101
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WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE

CORRECTION

REASON FOR CHANGE

- 14/5 Delete "states" and replace with "representatives of the state"; clarity
- 15/15 Delete "done" and replace with "nuanced"; wrong word
- 15/17 Insert "nuanced" between "more" and "way"; clarity
- 17/8 Insert "less Mexico's share under the Treaty" after "Quitman"; incomplete answer.
- 19/25 After "Butte" insert "that remains after providing Mexico's portion"; incomplete
- 20/19 Before "it" insert "after supplying Mexico"; incomplete answer.
- 20/19 After "the" insert "remaining"; incomplete, clarity.
- 22/25 Delete "proportionate" and replace with "proportional"; wrong word.
- 24/21 Delete "is" and replace with "are"; wrong word
- 29/25 Before "43 percent" insert "After providing Mexico's supply, it is"; incomplete
- 30/1 After "the" insert "remaining"; incomplete, clarity.
- 33/1 After "that" insert "if"; clarity.
- 33/19 After "If" insert "after supplying Mexico"; incomplete.
- 33/20 Delete "its" and replace with "the remaining"; incomplete.
- 44/24 Delete "respected" and replace with "respective"; wrong word.
- 49/12 Delete "appropriation" and replace with "apportionment"; wrong word.
- 49/18 Delete "and doing" and replace with "in lieu of"; wrong words.
- 60/18 Delete "private positions" and replace with "prior depositions"; wrong words


ESTEVAN LOPEZ

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE CORRECTION REASON FOR CHANGE

62/24 Delete "that" and replace with "Reclamation used the"; clarity.

62/25 Delete "tried" and replace with "to try"; clarity.

63/10 Delete "thing for release" and replace with "claim for relief"; wrong words.

64/18 Delete "conflict" and replace with "Compact"; wrong word.

64/20 Delete "on"; clarity.

66/5 After apportionment insert "is"; clarity.

67/2 Delete "for" and replace with "with"; wrong word, clarity.

71/9 Delete "precedes" and replace with "preceded"; wrong tense.

75/3 Delete "you" and replace with "they"; wrong pronoun.

79/2 Delete "I" and replace with "me"; wrong pronoun.

84/19 After "Butte" insert "Irrigation District"; incomplete reference.

86/19 Delete "per-project" and replace with "per-acre"; wrong word.

86/20 Delete second occurrence of "the" and replace with "in"; clarity.

89/15 Delete "referring" and replace with "referred"; wrong word.

90/19 Delete "reduced in" and replace with "reduced. In"; sentence break.

96/5 After "40s" insert a comma (","); clarity.

100/11 Delete "Humberto" and replace with "Filiberto"; wrong name.

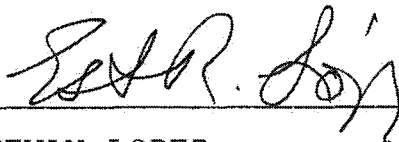
104/12 Delete "is" and replace with "are"; wrong word.


ESTEVAN LOPEZ

84/20 Delete "portion" and replace with "apportionment"; wrong word.

S I G N A T U R E O F W I T N E S S

I, ESTEVAN LOPEZ, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).

A handwritten signature in cursive script, appearing to read "Estevan Lopez", is written over a horizontal line.

ESTEVAN LOPEZ

Job No. 65405



Systems Technology for the Litigation World

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December 11, 2020

Luis Robles
ROBLES, RAEL & ANAYA, P.C.
500 Marquette Ave. NW, Suite 700
Albuquerque, NM 87102

Re: Deposition of: **Temple McKinnon**
8/31/2020
State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Robles:

Enclosed please find the original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein that the deposition **has not been** signed by the witness.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65192

cc:
Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Stuart L. Somach
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

1 That the witness, TEMPLE MCKINNON, was duly
2 remotely sworn by the officer and that the
3 transcript of the oral deposition is a true record
4 of the testimony given by the witness;

5
6 I further certify that I am neither counsel
7 for, related to, nor employed by any of the parties
8 in the action in which this proceeding was taken,
9 and further that I am not financially or otherwise
10 interested in the outcome of the action.

11
12 That the amount of time used by each party at
13 the deposition is as follows:

14
15 LUIS ROBLES - 01:11
16 JAMES DuBOIS - 00:00
17 STUART L. SOMACH - 00:00
18 THERESA C. BARFIELD - 00:00
19 PRISCILLA M. HUBENAK - 00:00
20 JOHN P. TUSTIN - 00:00
21 EMILY HALVORSEN - 00:00
22 BOBBY SALEHI - 00:00

23
24
25

1 Subscribed and sworn to on this the 8th day of
2 September, 2020.

3
4
5 *Karen L.D. Schoeve*



6 Karen L.D. Schoeve, CSR, RDR, CRR
7 Realtime Systems Administrator
8 Texas CSR No. 3354, Exp.: 10-31-2021
9 NCRA Exp. Date: 09-30-21
10 Worldwide Court Reporters, Inc.
11 Firm Certification No. 223
12 3000 Weslayan, Suite 235
13 Houston, Texas 77027
14 (713) 572-2000

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25 Job No. 65192

CHANGES AND SIGNATURE

WITNESS NAME: TEMPLE MCKINNON

DATE: AUGUST 31, 2020


PAGE/LINE

CHANGE

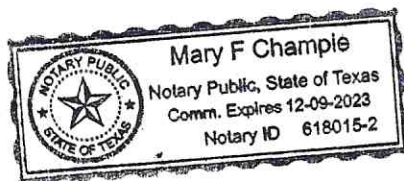
REASON

14/18	Projections and Planning Division	correcting name
17/2	legislative inquiries.	correcting statement
22/1	The quantified elements in the regional	correct statement
26/15	The desired future conditions process	correct name
29/21	We build an IMPLAN model	correct name
30/24	groundwater availability models	correct plural
32/25	strategies	correct plural
35/9-11	Our governing statute requires that	
	conservation must be considered for all identified	
	water needs.	correcting statement
37/22	plan, so it's our implementation survey	
	that's	correcting statement
38/19	conservation strategies in the Regional	correct statement
42/25	Tmc	
44/18	there is an increase in the potential	correct statement
49/2	available data to supplement or revise	
	information	correct statement

1 I, TEMPLE MCKINNON, solemnly swear or
2 affirm under the pains and penalties of perjury that
3 the foregoing pages contain a true and correct
4 transcript of the testimony given by me at the
5 time and place stated with the corrections, if any,
6 and the reasons therefor noted on the foregoing
7 correction pages(s).

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TEMPLE MCKINNON




my commission expires: 12-9-23

Job No. 65192



Systems Technology for the Litigation World

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December 11, 2020

Luis Robles
ROBLES, RAEL & ANAYA, P.C.
500 Marquette Ave. NW, Suite 700
Albuquerque, NM 87102

Re: Deposition of: **Kelly Wade Mills, P.G**
8/27/2020
State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Robles:

Enclosed please find the original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein that the deposition **has not been** signed by the witness.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65188

cc:
Samantha R. Barncastle
Katherine Duncan
Maria O'Brien
Theresa Barfield
David W. Gehlert

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER

HON. MICHAEL J. MELLO

STATE OF TEXAS, :
:
Plaintiff, :
:
VS. : Original Action Case
: No. 220141
STATE OF NEW MEXICO AND : (Original 141)
STATE OF COLORADO, :
:
Defendants. :

I, PHYLLIS WALTZ, a Texas Certified Shorthand Reporter, Texas Certified Realtime Reporter, Louisiana Certified Court Reporter, Registered Merit Reporter, Certified Realtime Reporter, and Certified Realtime Captioner, in and for the State of Texas, do hereby certify the following:

That the witness, KELLY WADE MILLS, P.G., was duly sworn by the officer and that the transcript of the oral deposition is a true record of the testimony given by the witness;

I further certify that pursuant to FRCP Rule 30(e)(1) that the signature of the deponent:

 X was requested by the deponent or a party before the completion of the deposition and is to be returned within 30 days from the date of receipt of the transcript. If returned, the attached Changes and Signature Page contains any changes and the reasons

1 therefor;

2 _____ was not requested by the deponent or a
3 party before the completion of the deposition.

4 I further certify that I am neither counsel
5 for, related to, nor employed by any of the parties or
6 attorneys to the action in which this proceeding was
7 taken. Further, I am not a relative or employee of any
8 attorney of record in this cause, nor am I financially
9 or otherwise interested in the outcome of the action.

10 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
11 this, the 11TH day of SEPTEMBER, 2020.



12
13 Phyllis Waltz
14

PHYLLIS WALTZ, RMR, CRR, CRC

15 Expiration Date: 12/31/20

TEXAS CSR, TCRR NO. 6813

16 Expiration Date: 12/31/21

LOUISIANA CCR NO. 2011010

17 Expiration Date: 12/31/20
18

Worldwide Court Reporters, Inc.

19 Firm Certification No. 223

3000 Wesleyan, Suite 235

20 Houston, Texas 77027

(713) 572-2000
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WITNESS CORRECTIONS AND SIGNATURE

KELLY WADE MILLS, P.G.

AUGUST 27, 2020

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
7/7	'Raba-Kistner-Brytest' Consultants, Inc.	Correct Name
27/12	Remove second 'the' before 'El Paso'	Misunderstood by reporter
27/14	First word should be 'excluded'	Same
29/18	Insert 'would' before 'have'	Same
36/25	Replace 'and' with 'in'	Same
38/22	Add 'the' before 'recommendation'	Same
51/10	Replace first 'information' with 'that'	Same
52/17&18	'Texas Department of Licensing and Regulation Water Well Drillers and Pump Installers Program'	Same

KELLY WADE MILLS, P.G.

1 I, KELLY WADE MILLS, P.G., have read the
 2 foregoing deposition and hereby affix my signature that
 3 same is true and correct, except as noted above.

4 *Kelly Wade Mills*
 KELLY WADE MILLS, P.G.

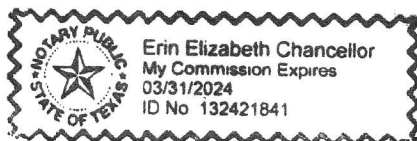
5
 6 STATE OF T E X A S)
 7 COUNTY OF TRAVIS)

8 Before me, ERIN E. CHANCELLOR, on
 9 this day personally appeared KELLY WADE MILLS, P.G.,
 10 known to me, or proved to me under oath or through
 11 _____) (description of identity card or
 12 other document)), to be the person whose name is
 13 subscribed to the foregoing instrument and acknowledged
 14 to me that they executed the same for the purposes and
 15 consideration therein expressed.

16 Given under my hand and seal of office on
 17 this, the 5th day of OCTOBER, 2020.

18 *Erin E. Chancellor*
 19 NOTARY PUBLIC IN AND FOR THE
 20 STATE OF TEXAS

21 My Commission Expires: 03/31/2024



IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLO

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

REMOTE ORAL AND VIDEOTAPED DEPOSITION OF
SCOTT MILTENBERGER

JUNE 8, 2020

REMOTE ORAL AND VIDEOTAPED DEPOSITION of SCOTT MILTENBERGER, produced as a witness at the instance of the Defendant State of New Mexico, and duly sworn, was taken in the above-styled and numbered cause on June 8, 2020, from 9:03 a.m. to 3:30 p.m., before Heather L. Garza, CSR, RPR, in and for the State of Texas, recorded by machine shorthand, at the offices of HEATHER L. GARZA, CSR, RPR, The Woodlands, Texas, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto; that the deposition shall be read and signed.

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS)
)
 Plaintiff,)
) Original Action Case
 VS.) No. 220141
) (Original 141)
 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
)
 Defendants.)

THE STATE OF TEXAS :
 COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, SCOTT MILTENBERGER, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

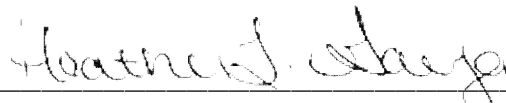
I further certify that I am not, in any capacity, a regular employee of the party in whose

behalf this deposition is taken, nor in the regular
employ of this attorney; and I certify that I am not
interested in the cause, nor of kin or counsel to
either of the parties.

That the amount of time used by each party at
the deposition is as follows:

MR. WECHSLER - 04:26:04
MR. HOFFMAN - 00:00:00
MR. DUBOIS - 00:00:00
MR. WALLACE - 00:01:59
MS. O'BRIEN - 00:00:00
MS. BARNCASTLE - 00:00:00

GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
this, the 22nd day of June, 2020.


HEATHER L. GARZA, CSR, RPR, CRR
Certification No.: 8262
Expiration Date: 04-30-22



Worldwide Court Reporters, Inc.
Firm Registration No. 223
3000 Weslayan, Suite 235
Houston, TX 77027
800-745-1101

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
81/17	Add "Not" before "limited"	Intended meaning
85/14	"Constitute" for "institute"	Intended meaning / clarity
103/6	"salient" for "saline"	Intended meaning / mis transcribed

 4/13/2020
SCOTT MILTENBERGER

S I G N A T U R E O F W I T N E S S

I, SCOTT MILTENBERGER, solemnly swear or affirm
under the pains and penalties of perjury that the
foregoing pages contain a true and correct transcript
of the testimony given by me at the time and place
stated with the corrections, if any, and the reasons
therefor noted on the foregoing correction page(s).

A handwritten signature in blue ink, reading "Scott Miltenberger 7/13/2020", is written over a horizontal line.

SCOTT MILTENBERGER

Job No. 63391



Fort Worth

300 Throckmorton St.
Suite 1600
Fort Worth, TX 76102
P 817.336.3042

Austin

1601 Rio Grande
Suite 443
Austin, TX 78701
P 512.499.0277

Houston

1001 Texas Avenue
Suite 1400
Houston, TX 77002
P 800.336.4000

February 14, 2019

VIA FEDEX – STANDARD OVERNIGHT

Mr. Robert B. Hoffman
SOMACH SIMMONS & DUNN
500 Capitol Mall, Suite 1000
Sacramento, California 95814

RE: No. 220141
State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Hoffman:

This is to inform you that the sealed original of the oral deposition of Jesus Reyes taken on November 16, 2018, in the above-referenced case is being forwarded to you for safekeeping. There were no changes made to the deposition.

Veritext Legal Solutions
Fort Worth, Texas

Job No. 3069668

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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)
)
Plaintiff,)
) Original Action Case
VS.) No. 220141
) (Original 141)

STATE OF NEW MEXICO,)
and STATE OF COLORADO,)
)
Defendants.)

THE STATE OF TEXAS :
COUNTY OF HARRIS :
I, HEATHER L. GARZA, a Certified Shorthand
Reporter in and for the State of Texas, do hereby
certify that the facts as stated by me in the caption
hereto are true; that the above and foregoing answers
of the witness, JESUS REYES, to the interrogatories as
indicated were made before me by the said witness
after being first duly sworn to testify the truth, and
same were reduced to typewriting under my direction;
that the above and foregoing deposition as set forth
in typewriting is a full, true, and correct transcript
of the proceedings had at the time of taking of said
deposition.
I further certify that I am not, in any
capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MS. KLAHN - 01:34:24

MS. O'BRIEN - 00:00:00

9 MR. WALLACE - 00:00:00

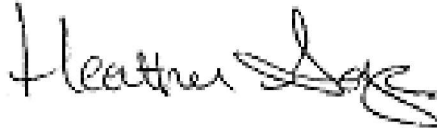
MR. ROMAN - 00:00:00

10 MR. DUBOIS - 00:00:00

MS. BARNCASTLE - 00:00:00

11 MR. CAROOM - 00:00:00

12
13 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
14 this, the 5TH DAY OF DECEMBER, 2018

15 

HEATHER L. GARZA, CSR, RPR, CRR

16 Certification No.: 8262

Expiration Date: 12-31-19

17 VERITEXT LEGAL SOLUTIONS

Firm Registration No. 571

18 300 Throckmorton Street, Suite 1600

Fort Worth, TX 76102

19 1-800-336-4000
20
21
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25

Job No. 3069668

1 WITNESS CORRECTIONS AND SIGNATURE

2 Please indicate changes on this sheet of paper,
3 giving the change, page number, line number and reason
4 for the change. Please sign each page of changes.

4 PAGE/LINE CORRECTION REASON FOR CHANGE

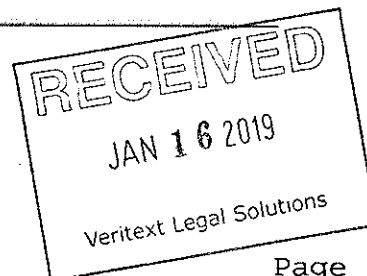
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JESUS REYES

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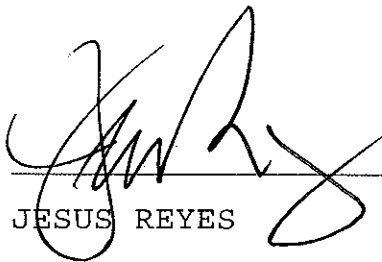


Page 73

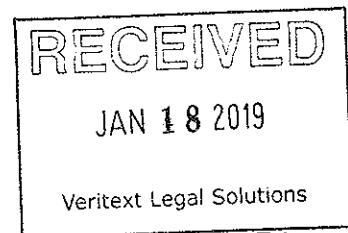
Job No. 3069668

S I G N A T U R E O F W I T N E S S

I, JESUS REYES, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).


JESUS REYES

Job No. 3069668



Page 74



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Court Reporting • Video Production • Videoconferencing • Litigation Group

October 16, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of: **Jesus Reyes**
08/31/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **original deposition transcript** of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein that the deposition transcript **has been signed** by the witness and **no amendments** were made.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65312

cc:
Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Sarah A. Klahn
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLO

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :

COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, JESUS REYES, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. WECHSLER - 02:52:04

MS. KLAHN - 00:00:00

9 MR. DUBOIS - 00:00:00

MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

MS. BARNCASTLE - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
13 this, the 24th day of September, 2020.

14 

15 HEATHER L. GARZA, CSR, RPR, CRR

Certification No.: 8262

16 Expiration Date: 04-30-22

17 Worldwide Court Reporters, Inc.

18 Firm Registration No. 223

3000 Weslayan, Suite 235

19 Houston, TX 77027

20 800-745-1101



WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
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JESUS REYES



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S I G N A T U R E O F W I T N E S S

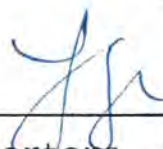
I, JESUS REYES, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).



JESUS REYES

Job No. 65312







Systems Technology for the Litigation World

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October 16, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of: **Robert Rios**
08/26/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **original deposition transcript** of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein that the deposition transcript **has been signed** by the witness and **no amendments** were made.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65235

cc:
Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Sarah A. Klahn
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

STATE OF TEXAS)
)
 Plaintiff,)
) Original Action Case
 VS.) No. 220141
) (Original 141)
 STATE OF NEW MEXICO,)
 and STATE OF COLORADO,)
)
 Defendants.)

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, ROBERT RIOS, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. WECHSLER - 02:15:14

MS. KLAHN - 00:02:14

9 MR. DUBOIS - 00:00:00

MR. WALLACE - 00:00:00

10 MS. O'BRIEN - 00:00:00

MS. BARNCASTLE - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
13 this, the 21st day of September, 2020.

14 

15 HEATHER L. GARZA, CSR, RPR, CRR

Certification No.: 8262

16 Expiration Date: 04-30-22

17
18 Worldwide Court Reporters, Inc.

Firm Registration No. 223

3000 Weslayan, Suite 235

19 Houston, TX 77027

20 800-745-1101

1 WITNESS CORRECTIONS AND SIGNATURE

2 Please indicate changes on this sheet of paper,
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5 PAGE/LINE CORRECTION REASON FOR CHANGE
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23 _____
24 ROBERT RIOS
25

SIGNATURE OF WITNESS

I, ROBERT RIOS, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).



ROBERT RIOS

Job No. 65235





Systems Technology for the Litigation World

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September 4, 2020

Stuart Somach
Somach Simmons & Dunn
500 Capitol Mall, Suite 1000
Sacramento, CA 95814

Re: Deposition of **Rolf Schmidt-Petersen**
06/29/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Somach:

Enclosed please find the **signed** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 63563

cc:

Samantha R. Barncastle
Chad M. Wallace
Renea Hicks
Jeffrey J. Wechsler
Sarah A. Klahn
R. Lee Leininger

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :
 COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, ROLF SCHMIDT-PETERSEN, to the interrogatories as indicated were made before me by the said witness after being first remotely duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MS. KLAHN - 02:47:24

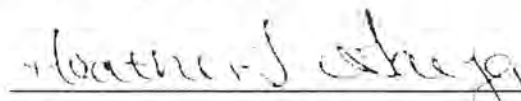
MR. WECHSLER - 00:00:00

9 MR. LEININGER - 03:03:24

MR. WALLACE - 00:00:00

10 MR. HICKS - 00:00:00

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE,
13 this, the 21st day of July, 2020.

14 

HEATHER L. GARZA, CSR, RPR, CRR

15 Certification No.: 8262

Expiration Date: 04-30-22

16
17 Worldwide Court Reporters, Inc.

Firm Registration No. 223

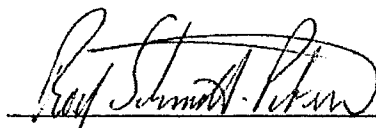
18 3000 Weslayan, Suite 235

Houston, TX 77027

19 800-745-1101
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S I G N A T U R E O F W I T N E S S

I, ROLF SCHMIDT-PETERSEN, solemnly swear or affirm
under the pains and penalties of perjury that the
foregoing pages contain a true and correct transcript
of the testimony given by me at the time and place
stated with the corrections, if any, and the reasons
therefor noted on the foregoing correction page(s).

A handwritten signature in cursive script, appearing to read 'Rolf Schmidt-Petersen', is written over a horizontal line.

ROLF SCHMIDT-PETERSEN, VOLUME I

Job No. 63563

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
14/5	"with instead" for	clarity/correctness
14/13	"November", not "September"	correctness
15/24	"meetings", not "attorneys"	correctness
17/22	"they", not "we"	clarity
19/16	"several" as opposed to "2"	we had several more than 2 miles S of San M.
22/11	"or", not "if" / "we", not "me"	correctness
22/12	add "it" between "and" & "will"	clarity
23/14	"Shafike", not "Shafik"	correctness
24/21	"Cenjes", not "Cenaj"	correctness
26/25	add "its" before "still" & "in" before "State"	clarity
27/14	should be "Their complaints point at the point is at Tobites"?	clarity
28/18	strike "with" in first instance	clarity
30/4	Something appears to be missing in this sentence, perhaps replace add "affecting" between "really" & "one"?	
34/11	should be "deal with the Plata Compact of 1972 issues"	clarity
3/13	replace "committee" with "Canadian"	correctness
35/19	delete "statutes" in second instance	clarity
35/28	delete "was", replace with "are"	clarity

Rolf Schmidt-Petersen
ROLF SCHMIDT-PETERSEN, VOLUME I

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
38/17	replace "elements" with "delta"	correctness
38/21	replace "Head" with "Head"	correctness
38/23	replace "non-matched" with "non-mix"	correctness
39/16	delete "the" before "New Mexico"	clarity
41/22	insert "for Texas", after "commissioners"	clarity
41/25	replace "there" before "no" with "here"	clarity
43/9	replace "Shutik" with "Shutik"	correctness
43/10	replace "Flanegin" with "Flanigan"	correctness
44/25	delete "we have"	clarity
47/13	replace "Vanderwever" with "Vandiver"	correctness
51/17	replace "Is it" with "It is"	clarity & correctness
52/19	replace "C.B." with "C.V."	correctness
52/22	insert "the" before "same"	clarity
54/12	insert "I" before "had"	clarity
54/14	insert "program" before "in"	correctness
54/20	replace "permitting" with "permits"	correctness
54/21	replace "or" with "are"	correctness
54/22-23	Should read, as before, "that EPA has gotten its share of water and more out of the 2008 operating Agreement. So, the groundwater pumping has had any effect on Project Apishito, which is..."	

ROLF SCHMIDT-PETERSEN, VOLUME I

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
60/7	add "we" before "talked"	clarity
62/10	replace "what" with "work"	correctness
62/10	add "the" before "kind"	clarity
61/2	replace "Shake" with "Shake" wherever it occurs in the deposition transcript, correctness.	
61/13	replace "went from" with "congratulated", clarity, context.	
62/21	replace "their" with "the"	correctness
62/22	insert "factors" before "with"	clarity
63/14	replace "legally" with "legal"	clarity
63/15	replace "C.B." with "C.V."	correctness
63/16	insert "been" before "going"	clarity
67/15	suggest deleting "the == video =="	for clarity
	Some words missing, think that it can't determine in the review.	
71/16	lines 15-16 not clear, for clarity, delete "State ratifying" and replace with "compact"	
73/25	replace "weights" with "water"	correctness
79/25	replace "Since the" with "it develops"	correctness
83/7	replace "compact" with "cap", add a "camera" after "locations".	

Rolf Schmidt-Petersen
ROLF SCHMIDT-PETERSEN, VOLUME I

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
85/1	Add "changed" after these, ^{"come" after} "limiting" clarity, correctness	
85/2	replace "kind of water" with "kind of water", clarity	
85/3	add "similar" after "now" & ^{similar to} "potentially" clarity	
85/5	note that "not" refers to miscellaneous purposes list, clarity	
85/8	replace "when" with "where", correctness	
86/5	by "from" in this answer, I'm referring to "mechanisms" clarity in the question	
87/22	add "circumstances" after "and", clarity & correctness	
90/16	"the" should be "their", correctness	
91/10	delete "this", insert "the", clarity	
91/23	replace "as" with "in", delete "inclusion", clarity	
91/24	insert "the" before "v.s.", clarity	
92/12	insert "/" after "flow" & before "relax"; clarity & correctness	
92/22	insert a comma after "water", replace "and" with "instead of", " - "	
92/23	insert a comma after "Bolsen", clarity	
93/1	replace "in" with "as", correctness	
93/3	add "Texas" after "The", clarity	
99/4	replace "but" with "and", correctness	

ROLF SCHMIDT-PETERSEN, VOLUME I

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE

CORRECTION

REASON FOR CHANGE

93/8 replace "arms" with "harm", correctness

93/13 replace "in" with "of", clarity

94/5 add "if" before the 2nd "the", clarity.

96/2 replace "to" with "of", correctness

101/25 replace "defer" with "after", correctness

103/25 delete "?", correctness

104/8 replace "side" with "said", correctness

106/10 add "because of" after "just", clarity.

107/3-4 add "as well as" before "part", replace "its" with "it";
add "that" after "it" & "pumped back" as opposed to "pumpback" - clarity

107/21 delete "it's", correctness

107/22 delete "that", correctness

108/13 add "thousand air feet" after "hundred" and "

each year" after "depression", clarity.

110/14 add "I" before "look", remove caption "Look" clarity

110/19 replace "the" with "to" before "Hulspeth", correctness

111/24 add "for New Mexico" after "concern", clarity

111/25 add "for", clarity.

Rolf Schmidt-Petersen
ROLF SCHMIDT-PETERSEN, VOLUME I.

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE

CORRECTION

REASON FOR CHANGE

112/1 replace "see" with "seen", clarity

112/25 replace "plant" with "plan", correctness

110/13 insert "appropriation" after "this", clarity

125/16 replace "having" with "having", correctness

124/7 replace "an" with "and", add comma after "date", clarity

131/6 replace "manager" with "manager", correctness

131/12 replace "into" with "for" and "after" with "until", correctness

131/14 by "him", a man Edwin Lopez in this instance, clarity

132/3 replace "any" with "his/her" and 2nd "as" with "than", clarity

133/17 replace "the" with "her/his", clarity

133/21 insert "s" after "provide", clarity

136/18 insert "(and water)" after "Hats" & replace "Belle"

with "Vale", clarity, correctness

136/20 insert "That's" before "at", add semi-colon after

water, clarity

137/22 Add comma after "And" & insert "in" before my, clarity

137/23 Add semi-colon after new, delete "but", clarity

138/5 delete "prescription" & replace with "restriction"

Rolf Schmidt-Petersen
ROLF SCHMIDT-PETERSEN, VOLUME I

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
139/15	replace "for" with "at"	correctness
145/11-12	delete "is the author" & replace with "offer",	clarity & correctness
150/7	replace "refer" with "defer"	, clarity
153/15	delete "all" after "in"	, clarity
153/16	insert "they" before "went"	, clarity
153/19	insert "(Reclamation)" after "our"	, clarity
156/2	delete "s" from "projects"	, correctness
159/20	delete "a", replace with "the formations"	, clarity
160/18	I believe "Orf" is spelled "OrFP" & its	correctness, &
	the OrFP vs VS case in front of VSSC in mid 2000's -	clarity
161/13	add "the ter" before "Colorado" & "River Basin	
	Bureau" after "Colorado"	, clarity
162/17	add "Dam" after "Cibola"	, clarity
163/5	Replace "was" with "were", and "ing" to "specific"	, clarity
163/6	Replace "can" with "must"	, clarity
163/8	Replace "in" with "and"	, clarity
163/13	Insert "the impact" after "importing"	, clarity
164/13	Replace "release" with "relief"	correctness

Rolf Schmidt-Petersen
ROLF SCHMIDT-PETERSEN, VOLUME I

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE

CORRECTION

REASON FOR CHANGE

166/4 Strike "the United States" & replace with "Dunkley". Correctness

167/15 Strike "two" & replace with "titles", clarity & correctness

169/19 Strike "certainties" & replace with "constraints", " — "

172/5 Add "it" after "that", clarity

173/13 remove "s" from "administrations", add "is" after "administration" and replace "and" with "then" = Clarity & correctness

174/17 add "d" to "negotiate" for "negotiated" = clarity

177/1 add "(Reclamation)" after "you're", clarity

177/3 add "the" after "then" and add "ment" to "agreement", clarity, rep

177/4 strike "New" before "Mexico", add "the", correctness

179/10 replace "got" with "go" correctness

177/11 strike "didn't", replace with "and actually spill"

178/3 add "plus the full Mexico delivery at Juarez" after "portion", correctness

178/6 replace "what" with "Mexico" "that", correctness

179/2 replace "was" with "was", " — "

180/18 replace "meat" with "need", " — "

183/5 replace "IPWC" with "IOWC", correctness

185/1 replace "but" with "that" & add "express" after "have", correctness & clarity.

Rolf Schmidt-Petersen
ROLF SCHMIDT-PETERSEN, VOLUME I

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
185/2	add "of the Project" after bottom,	clarity
186/13	add "ve" to "we" to get "we've",	clarity
186/15	replace "that" with "it"	clarity
186/17	add "the Operating Agreement" after "within",	clarity
186/18	delete "that"	clarity
186/25	delete "they are" & replace with "I'm",	clarity
189/6	add "Water definition" after "usable",	clarity
189/19	add "eng" after "reservoir"	clarity
190/3	add "1948" after "the"	clarity
190/12	replace "7" with "6"	correctness
190/21	replace "as" with "is"	clarity
191/4	replace "a" with "the"	clarity
191/13	replace "from" with "with"	clarity
191/23	replace "a" with "the" before "project",	clarity
198/15	*change "released" to "release"	correctness & clarity
198/18	add "and are" after "Permission"	clarity & correctness
198/20	replace "me" with "they"	" "
198/25	replace "you're" with "they're"	" "

Rolf Schmidt-Petersen
ROLF SCHMIDT-PETERSEN, VOLUME I

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

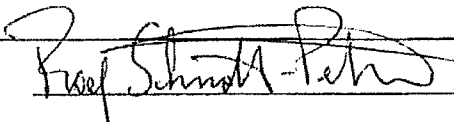
PAGE/LINE	CORRECTION	REASON FOR CHANGE
199/11	add "with Reclamation of the other States" after "discussions",	clarity.
204/11	replace "an" with "and"	clarity
204/12	add "in Elephant Butte Reservoir" after "in",	clarity.
205/18	add a comma after "advisers" and "they" before "would",	clarity
205/19	replace "but" with "and"	clarity
207/6	add "(last unnumbered paragraph of Article VI)" after "explicitly",	clarity.
208/4	replace "Hammond" with "Hammann",	correctness
208/5	Add period after "under", Capitalize "That", add "reference" after 2nd "that".	clarity
208/9	delete "is"	, clarity
208/10	add "(Redaction)" after "they" and add "saying" they were" before "releasing".	clarity & correctness.
208/23	add "for the Project Supply" after "accounting",	clarity
208/24	insert "(Bert" after "I've",	clarity
210/11	insert "with" before "Bert"	, clarity
211/34	replace "round house" with Capital	, clarity
211/6	replace "say" with "said"	, clarity

Rolf Schmidt-Petersen
ROLF SCHMIDT-PETERSEN, VOLUME I

KSP.
Please
recheck
in other
locations
also

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
212/10	add "the" before "compact",	clarity
220/19	add "I" before "refer", add "on" after "Estuaries",	
	add "in 2003-2006" after "it".	clarity
225/25	replace "for" with "of" & add "for irrigation demand" after "water".	clarity.
227/11	^{227/11} delete "d" from "realized", add "that" after "was",	clarity
227/12	add comma after "2001" and delete "that"	clarity
229/9	add "agreement" after "that"	clarity
233/7	add "Al Blair said something like " before "we"	clarity
233/12	delete "retention" and replace with "counted as Project Supply"	correctness & clarity
234/25	replace "you" with "you'd"	clarity
235/19	replace "projects" with "project"	clarity
235/25	replace "as" with "is"	clarity
236/3	replace "people" with "EP2 farmers",	clarity & correctness
236/7	add "it" before "creates"	clarity
— END —		
		
ROLF SCHMIDT-PETERSEN, VOLUME I		

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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

ORAL AND VIDEOTAPED DEPOSITION OF
RYAN SERRANO
FEBRUARY 26, 2019

ORAL AND VIDEOTAPED DEPOSITION of RYAN SERRANO,
produced as a witness at the instance of the Plaintiff
State of Texas, and duly sworn, was taken in the
above-styled and numbered cause on February 26, 2019,
from 9:23 a.m. to 3:29 p.m., before Heather L. Garza,
CSR, RPR, in and for the State of Texas, recorded by
machine shorthand, at the RAMADA HOTEL & CONFERENCE
CENTER BY WYNDHAM LAS CRUCES, 201 East University
Boulevard, Las Cruces, New Mexico, pursuant to the
Federal Rules of Civil Procedure and the provisions
stated on the record or attached hereto; that the
deposition shall be read and signed.

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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :
COUNTY OF HARRIS :
I, HEATHER L. GARZA, a Certified Shorthand
Reporter in and for the State of Texas, do hereby
certify that the facts as stated by me in the caption
hereto are true; that the above and foregoing answers
of the witness, RYAN SERRANO, to the interrogatories
as indicated were made before me by the said witness
after being first duly sworn to testify the truth, and
same were reduced to typewriting under my direction;
that the above and foregoing deposition as set forth
in typewriting is a full, true, and correct transcript
of the proceedings had at the time of taking of said
deposition.
I further certify that I am not, in any
capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

8 MR. GOLDSBERRY - 03:39:23

 MR. ROMAN - 00:00:00

9 MR. WALLACE - 00:00:00

 MR. DUBOIS - 00:00:00

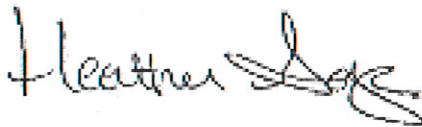
10 MS. BARNCASTLE - 00:00:00

 MS. O'BRIEN - 00:00:00

11 MS. DAVIDSON - 00:00:00

 MR. UTTON - 00:00:00

12
13 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
14 this, the 7th day of March, 2019.

15 

16 HEATHER L. GARZA, CSR, RPR, CRR

 Certification No.: 8262

17 Expiration Date: 12-31-19

 VERITEXT LEGAL SOLUTIONS

18 Firm Registration No. 571

 300 Throckmorton Street, Suite 1600

19 Fort Worth, TX 76102

 1-800-336-4000

Job No. 3197405

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

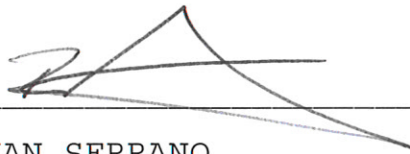
PAGE/LINE	CORRECTION	REASON FOR CHANGE
34/23	Cheryl	spelling
30/18	meter	spelling

RYAN SERRANO

Job No. 3197405

S I G N A T U R E O F W I T N E S S

I, RYAN SERRANO, solemnly swear or affirm under
the pains and penalties of perjury that the foregoing
pages contain a true and correct transcript of the
testimony given by me at the time and place stated
with the corrections, if any, and the reasons therefor
noted on the foregoing correction page(s).

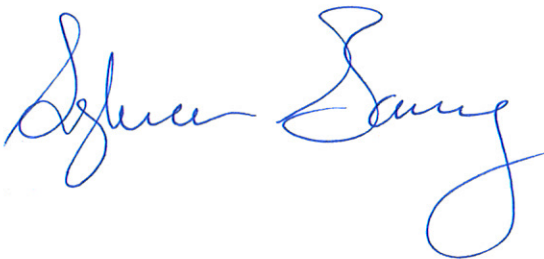


RYAN SERRANO

Job No. 3197405



OFFICIAL SEAL
SYLVIA GARAY
NOTARY PUBLIC - STATE OF NEW MEXICO
My commission expires: 3/8/23



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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

ORAL AND VIDEOTAPED DEPOSITION OF
RYAN SERRANO
APRIL 17, 2019
VOLUME II

ORAL AND VIDEOTAPED DEPOSITION of RYAN SERRANO,
produced as a witness at the instance of the Plaintiff
State of Texas, and duly sworn, was taken in the
above-styled and numbered cause on April 17, 2019,
from 9:17 a.m. to 4:34 p.m., before Heather L. Garza,
CSR, RPR, in and for the State of Texas, recorded by
machine shorthand, at the HOTEL ENCANTO DE LAS CRUCES,
705 S. Telshor, Las Cruces, New Mexico, pursuant to
the New Mexico Rules of Civil Procedure and the
provisions stated on the record or attached hereto;
that the deposition shall be read and signed.

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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :
COUNTY OF HARRIS :
I, HEATHER L. GARZA, a Certified Shorthand
Reporter in and for the State of Texas, do hereby
certify that the facts as stated by me in the caption
hereto are true; that the above and foregoing answers
of the witness, RYAN SERRANO, to the interrogatories
as indicated were made before me by the said witness
after being first duly sworn to testify the truth, and
same were reduced to typewriting under my direction;
that the above and foregoing deposition as set forth
in typewriting is a full, true, and correct transcript
of the proceedings had at the time of taking of said
deposition.
I further certify that I am not, in any
capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

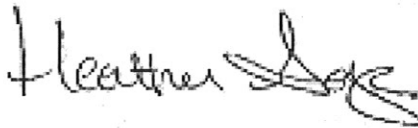
8 MR. GOLDSBERRY - 04:31:53

 MR. ROMAN - 00:00:00

9 MS. COLEMAN - 00:40:41

 MR. WALLACE - 00:00:00

10
11 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
12 this, the 2nd day of May, 2019.

13 

14 HEATHER L. GARZA, CSR, RPR, CRR

 Certification No.: 8262

15 Expiration Date: 12-31-19

 VERITEXT LEGAL SOLUTIONS

16 Firm Registration No. 571

 300 Throckmorton Street, Suite 1600

17 Fort Worth, TX 76102

 1-800-336-4000

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper,
giving the change, page number, line number and reason
for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
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220/20	Rincon	Spelling
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249/13	from	wrong word
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RYAN SERRANO, VOLUME II

Job No. 3269298

S I G N A T U R E O F W I T N E S S

I, RYAN SERRANO, solemnly swear or affirm under
the pains and penalties of perjury that the foregoing
pages contain a true and correct transcript of the
testimony given by me at the time and place stated
with the corrections, if any, and the reasons therefor
noted on the foregoing correction page(s).



RYAN SERRANO, VOLUME II

Job No. TX 3269298



OFFICIAL SEAL
SYLVIA GARAY
NOTARY PUBLIC - STATE OF NEW MEXICO
My commission expires: 3/8/23





Systems Technology for the Litigation World

Court Reporting ♦ Video Production ♦ Videoconferencing ♦ Litigation Group

September 14, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Herman Robert Settemeyer, Volume 1**
07/30/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 64896

cc:

Samantha R. Barncastle
Preston V. Hartman
Renea Hicks
Stuart L. Somach
Lisa M. Thompson
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

IN THE SUPREME COURT OF THE UNITED STATES
 BEFORE THE OFFICE OF THE SPECIAL MASTER
 HON. MICHAEL J. MELLOY

STATE OF TEXAS, :
 :
 Plaintiff, :
 :
 VS. : Original Action Case
 : No. 220141
 STATE OF NEW MEXICO AND : (Original 141)
 STATE OF COLORADO, :
 :
 Defendants. :

I, PHYLLIS WALTZ, a Texas Certified Shorthand Reporter, Texas Certified Realtime Reporter, Louisiana Certified Court Reporter, Registered Merit Reporter, Certified Realtime Reporter, and Certified Realtime Captioner, in and for the State of Texas, do hereby certify the following:

That the witness, HERMAN ROBERT SETTEMEYER, was duly sworn by the officer and that the transcript of the oral deposition is a true record of the testimony given by the witness;

I further certify that the signature of the deponent:

 X was requested by the deponent or a party before the completion of the deposition and is to be returned within 30 days from the date of receipt of the transcript. If returned, the attached Changes and Signature Page contains any changes and the reasons

therefor;

_____ was not requested by the deponent or a party before the completion of the deposition.

I further certify that I am neither counsel for, related to, nor employed by any of the parties or attorneys to the action in which this proceeding was taken. Further, I am not a relative or employee of any attorney of record in this cause, nor am I financially or otherwise interested in the outcome of the action.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, on this, the 21ST day of AUGUST, 2020.



Phyllis Waltz

PHYLLIS WALTZ, RMR, CRR, CRC

Expiration Date: 12/31/20

TEXAS CSR, TCRR NO. 6813

Expiration Date: 12/31/21

LOUISIANA CCR NO. 2011010

Expiration Date: 12/31/20

Worldwide Court Reporters, Inc.

Firm Certification No. 223

3000 Weslayan, Suite 235

Houston, Texas 77027

(713) 572-2000

WITNESS CORRECTIONS AND SIGNATURE

HERMAN ROBERT SETTEMEYER

JULY 31, 2020

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE	CORRECTION	REASON FOR CHANGE
24/17	EBID should be GPI	Correction
65/4	take out "a"	Correction
65/5	insert credit after accrual	correction
76/21	Glenn should be New Mexico	Correction
77/22	take out why	Correction
83/24	insert New Mexico before Engineer	Correction
89/12	change whatever to one every	Correction
91/17	Kathy Lane should be Kothlow	Correction
136/25	1978 should be 1938	Correction

HERMAN ROBERT SETTEMEYER, VOLUME 2


1 I, HERMAN ROBERT SETTEMEYER, have read the
2 foregoing deposition and hereby affix my signature that
3 same is true and correct, except as noted above.
4


HERMAN ROBERT SETTEMEYER, VOLUME 2

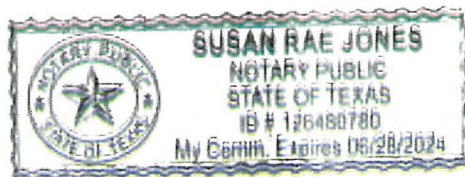
5
6 STATE OF T E X A S)
7 COUNTY OF Llano)

8 Before me, Susan Rae Jones, on
9 this day personally appeared HERMAN ROBERT SETTEMEYER,
10 known to me, or proved to me under oath or through
11 Ta Drivers License (description of identity card or
12 other document)), to be the person whose name is
13 subscribed to the foregoing instrument and acknowledged
14 to me that they executed the same for the purposes and
15 consideration therein expressed.

16 Given under my hand and seal of office on
17 this, the 2nd day of September, 2020.


18 NOTARY PUBLIC IN AND FOR THE
19 STATE OF TEXAS

20 My Commission Expires: 06-28-2024



June 7, 2019

VIA FEDEX – STANDARD OVERNIGHT

Sarah Klahn
SOMACH SIMMONS & DUNN, PC
500 Capitol Mall, Suite 1000
Sacramento, California 95814

In Re: Cause No. 220141
State of Texas vs. State of New Mexico, et al

Dear Ms. Klahn:

This is to inform you that the sealed original of the oral deposition of CHERYL THACKER, taken on April 18, 2019, in the above-referenced case is being forwarded to you for safekeeping. There were changes made to the deposition.

Sincerely,

Veritext Legal Solutions

Job No. 3269302

Fort Worth

300 Throckmorton Street
Suite 1600
Fort Worth, TX 76102
P 817.336.3042

Austin

515 Congress Avenue
Suite 1700
Austin, TX 78701
P 512.499.0277

Dallas

600 N. Pearl Street
Suite 2230
Dallas, Texas 75201
P 800.336.4000

Houston

4295 San Felipe Street
Suite 125
Houston, Texas 77027
P 713.481.2120

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IN THE SUPREME COURT OF THE UNITED STATES
BEFORE THE OFFICE OF THE SPECIAL MASTER
HON. MICHAEL J. MELLOY

STATE OF TEXAS)	
)	
Plaintiff,)	
	)	Original Action Case
VS.	)	No. 220141
	)	(Original 141)
STATE OF NEW MEXICO,)	
and STATE OF COLORADO,)	
)	
Defendants.)	

THE STATE OF TEXAS :
COUNTY OF HARRIS :

I, HEATHER L. GARZA, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that the facts as stated by me in the caption hereto are true; that the above and foregoing answers of the witness, CHERYL THACKER, to the interrogatories as indicated were made before me by the said witness after being first duly sworn to testify the truth, and same were reduced to typewriting under my direction; that the above and foregoing deposition as set forth in typewriting is a full, true, and correct transcript of the proceedings had at the time of taking of said deposition.

I further certify that I am not, in any capacity, a regular employee of the party in whose

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.

5
6 That the amount of time used by each party at
7 the deposition is as follows:

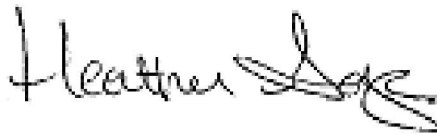
8 MS. KLAHN - 02:14:51

 MS. THOMPSON - 00:00:00

9 MS. COLEMAN - 00:17:08

 MR. WALLACE - 00:00:00

10
11 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
12 this, the 3rd day of May, 2019.

13 

14 HEATHER L. GARZA, CSR, RPR, CRR

 Certification No.: 8262

15 Expiration Date: 12-31-19

 VERITEXT LEGAL SOLUTIONS

16 Firm Registration No. 571

 300 Throckmorton Street, Suite 1600

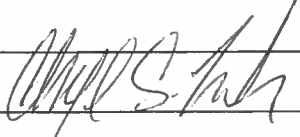
17 Fort Worth, TX 76102

 1-800-336-4000

WITNESS CORRECTIONS AND SIGNATURE

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.


PAGE/LINE	CORRECTION	REASON FOR CHANGE
12/7:8	"Bayard" not "Bay Area"	
19/9	"As well as" not "as aware as"	
26/1	"being" should be "bean"	
28/3	"BDEFFA" should be LR6-3150-B,	
	LR6-3150-F, LR6-3150-E, LR6-3150-F	
	and LR6-3150-FA."	Changed for clarification
68/18:19	"73513" should be "7351-3" & "7351 dash 3"	
	"73514" should be "7351 dash 4"	
82/4	"LRN03 dash 0013" and not "LRN-03 without the parentheses"	
82/10	"LRN03 dash 0013" and not "LRN-03-0013"	
83/12	"LRN03 dash 0013" and not "LRN-03-0013"	
88/13	"depletions" not "solutions."	



CHERYL THACKER

S I G N A T U R E O F W I T N E S S

I, CHERYL THACKER, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).



CHERYL THACKER

Job No. TX 3269302

State of New Mexico
County of Dona Ana

This instrument was acknowledged before me
this 4th day of ~~May~~ ^{June} A.D., 2019, ~~by name of current~~ ³⁶!



OFFICIAL SEAL
SYLWIA GARAY
NOTARY PUBLIC - STATE OF NEW MEXICO

My commission expires: 3/8/2023

Notary Public: 
My commission expires: 3/8/2023



Systems Technology for the Litigation World

Court Reporting ♦ Video Production ♦ Videoconferencing ♦ Litigation Group

October 26, 2020

R. Lee Leininger
U.S. DEPARTMENT OF JUSTICE
Environment & Natural Resources Division
999 18th St, # 370 South Terrace
Denver, CO 80202

Re: Deposition of **Cheryl Thacker**
09/18/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Leininger:

Enclosed please find the **signed** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 65671

cc:
Samantha R. Barncastle
Chad M. Wallace
Maria O'Brien
Jeffrey J. Wechsler
Sarah A. Klahn

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027

713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

1 behalf this deposition is taken, nor in the regular
2 employ of this attorney; and I certify that I am not
3 interested in the cause, nor of kin or counsel to
4 either of the parties.
5

6 That the amount of time used by each party at
7 the deposition is as follows:

8 MS. KLAHN - 00:39:49

MR. WECHSLER - 00:00:00

9 MR. LEININGER - 01:46:47

MR. WALLACE - 00:00:00

10 MR. HICKS - 00:17:46

MS. BARNCASTLE - 00:02:45

11
12 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
this, the 8th day of October, 2020.



13
14 Heather L. Garza
15 HEATHER L. GARZA, CSR, RPR, CRR
16 Certification No.: 8262
17 Expiration Date: 04-30-22

Worldwide Court Reporters, Inc.

18 Firm Registration No. 223

3000 Weslayan, Suite 235

19 Houston, TX 77027

800-745-1101
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S I G N A T U R E O F W I T N E S S

I, CHERYL THACKER, solemnly swear or affirm under the pains and penalties of perjury that the foregoing pages contain a true and correct transcript of the testimony given by me at the time and place stated with the corrections, if any, and the reasons therefor noted on the foregoing correction page(s).



CHERYL THACKER

Job No. 65671



Systems Technology for the Litigation World

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September 14, 2020

Jeffrey Wechsler
MONTGOMERY & ANDREWS, P.A.
325 Paseo de Peralta
Santa Fe, NM 87501

Re: Deposition of **Herman R. Settemeyer, Volume 2**
07/31/2020
141 ORIGINAL; State of Texas vs. State of New Mexico and State of Colorado

Dear Mr. Wechsler:

Enclosed please find the **signed and notarized** original deposition of the witness named in the above-referenced matter for filing among your records. By copy of this letter, we are informing all parties shown herein of the **amendments** made to the deposition.

If you have any questions regarding this matter, please feel free to contact our office.

Sincerely,

Minnie Adame
Worldwide Court Reporters, Inc.

Job No. 64898

cc:
Samantha R. Barncastle
Preston V. Hartman
Renea Hicks
Stuart L. Somach
Lisa M. Thompson
James J. Dubois

Corporate Headquarters

3000 Wesleyan St. Suite 235 Houston TX 77027
713-572-2000 Fax 713-572-2009

For U.S. & International Services: 1-800-745-1101

STATE OF TEXAS, :
 :
 Plaintiff, :
 :
 VS. : Original Action Case
 : No. 220141
 STATE OF NEW MEXICO AND : (Original 141)
 STATE OF COLORADO, :
 :
 Defendants. :

That the witness, HERMAN ROBERT SETTEMEYER, was duly sworn by the officer and that the transcript of the oral deposition is a true record of the testimony given by the witness;

____X____ was requested by the deponent or a party before the completion of the deposition and is to be returned within 30 days from the date of receipt of the transcript. If returned, the attached Changes and Signature Page contains any changes and the reasons

1 therefor;

2 _____ was not requested by the deponent or a
3 party before the completion of the deposition.

4 I further certify that I am neither counsel
5 for, related to, nor employed by any of the parties or
6 attorneys to the action in which this proceeding was
7 taken. Further, I am not a relative or employee of any
8 attorney of record in this cause, nor am I financially
9 or otherwise interested in the outcome of the action.

10 GIVEN UNDER MY HAND AND SEAL OF OFFICE, on
11 this, the 19TH day of AUGUST, 2020.



12
13
14 Phyllis Waltz

PHYLLIS WALTZ, RMR, CRR, CRC

15 Expiration Date: 12/31/20

TEXAS CSR, TCRR NO. 6813

16 Expiration Date: 12/31/21

LOUISIANA CCR NO. 2011010

17 Expiration Date: 12/31/20

18 Worldwide Court Reporters, Inc.

19 Firm Certification No. 223

3000 Wesleyan, Suite 235

20 Houston, Texas 77027

(713) 572-2000
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WITNESS CORRECTIONS AND SIGNATURE

HERMAN ROBERT SETTEMEYER

JULY 30, 2020

Please indicate changes on this sheet of paper, giving the change, page number, line number and reason for the change. Please sign each page of changes.

PAGE/LINE

CORRECTION

REASON FOR CHANGE

59/4 silver shoe/shoesilvery - correction of name

72/15 file should be filing - correction

86/10 someone like Simmons & Dunn should be Smokey Simmons & Dunn

87/22 2006 should be 2015 - correction

92/20 Mexisen - Mexican should be domes h/c and lierack

93/25 workster should be waste of work

115/14 irritable should be irrigable

178/20 no should be not

HERMAN ROBERT SETTEMEYER, VOLUME 1

1 I, HERMAN ROBERT SETTEMEYER, have read the
2 foregoing deposition and hereby affix my signature that
3 same is true and correct, except as noted above.
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HERMAN ROBERT SETTEMEYER, VOLUME 1

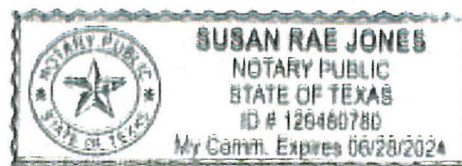
STATE OF T E X A S)
COUNTY OF Llano)

Before me, Susan Rae Jones, on
this day personally appeared HERMAN ROBERT SETTEMEYER,
known to me, or proved to me under oath or through
Tx Driver License) (description of identity card or
other document)), to be the person whose name is
subscribed to the foregoing instrument and acknowledged
to me that they executed the same for the purposes and
consideration therein expressed.

Given under my hand and seal of office on
this, the 2nd day of September, 2020.

Susan Rae Jones
NOTARY PUBLIC IN AND FOR THE
STATE OF TEXAS

My Commission Expires: 06-28-2024



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I, SCOTT A. MILTENBERGER, PH.D., do hereby declare under penalty of perjury that I have read the foregoing transcript; that I have made any corrections as appear noted, in ink, initialed by me, or attached hereto; that my testimony as contained herein, as corrected, is true and correct.

EXECUTED this 5th day of November,
20 19, at Davis, California.
(City) (State)



SCOTT A. MILTENBERGER,

PH.D.

**WITNESS CORRECTIONS
AND SIGNATURE**

Page	Line	Change	Reason for Change
21	12	"interpreted" to "interpretative"	Correcting transcription
25	7	"dialect" to "dialectic"	Correcting transcription
41	14	"H-i-n-d-e-r-l-i-d-r" to "H-i-n-d-e-r-l-i-d-e-r"	Correcting spelling
112	11	"JAR" to "JIR"	Correcting spelling/transcription
112	12	"JAR" to "JIR"	Correcting spelling/transcription
112	22	"JAR" to "JIR"	Correcting spelling/transcription
112	23	"JAR" to "JIR"	Correcting spelling/transcription
117	2	"reclamation" to "Reclamation"	Reflecting intended meaning
128	6:7	"I'm not at" to "I do not know"	Reflecting intended meaning; correcting transcription



Scott A. Miltenberger, Ph.D.

Deposition of Scott Miltenberger, Vol 1 taken October 2, 2019

SMITH & HALL

ATTORNEYS

EDINBURG, TEXAS

September 29, 1938

SAWNIE B. SMITH
HARRY L. HALL

Mr. Frank B. Clayton
Rio Grande Compact Commissioner
for Texas, Bassett Tower,
El Paso, Texas

Dear Mr. Clayton:

There has been considerable comment on the fact that the Rio Grande Compact between Colorado, New Mexico and Texas, dated March 18, 1938, makes no provision for the division of waters below Elephant Butte between the States of New Mexico and Texas and makes no provision concerning the amount of water to which Texas is entitled.

I understand that theoretically, if not in fact, the total amount of water in the project storage provided for in the compact is used or needed by the Rio Grande project except the portion thereof required to be delivered to Mexico. I also understand that the Rio Grande project is an established, defined area lying about 60% in New Mexico and about 40% in Texas. Therefore, if these understandings are correct, and the present usage and physical conditions remain the same, the division of the waters as between Texas and New Mexico would be in the proportions of the Rio Grande project area in said two States.

I do not find anything in the compact, however, which ties down and limits the use or division of the waters according to present usage and physical conditions, and nothing that would prevent controversy between the two States in the future regarding the division of the waters between the two States.

This omission is too obvious to have been inadvertent, and, therefore, unquestionably, the Commissioners had what they considered valid reason for it. In behalf of a number of interested parties in this area, I would appreciate it very much if you would advise me why the respective rights of Texas and New Mexico to these waters were not defined and provided for in the compact in express terms.

With best wishes, I am,

Yours very truly,



Sawnie B. Smith

SBS:BH

TX v. NM # 141
New Mexico Exhibit

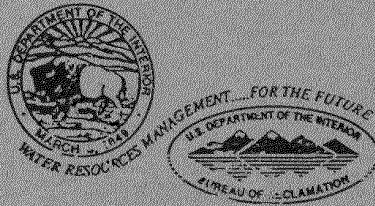
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LEGAL AND INSTITUTIONAL FRAMEWORK
FOR RIO GRANDE PROJECT WATER SUPPLY AND USE

... a legal hydrograph



U.S. Department of the Interior
Bureau of Reclamation
Upper Colorado Region

October 1995

FINAL DRAFT

TX v. NM # 141
New Mexico Exhibit

NM_EX-449



United States Department of the Interior

BUREAU OF RECLAMATION

Albuquerque Projects Office
505 Marquette NW, Suite 1313
Albuquerque, New Mexico 87102-2162

IN REPLY REFER TO:

ALB-100
WTR-1.00

OCT 10 1995

Subject: Transmittal of *Legal and Institutional Framework for Rio Grande Project Water Supply and Use Final Draft Report Dated October 1995*

Dear Interested Individuals and Organizations:

Enclosed is a copy of the subject Final Draft report, which was prepared by the Bureau of Reclamation to be used in making future water management decisions regarding its stewardship responsibilities for the Rio Grande Project. As stated in the introduction:

The purpose of this document is to provide background information to enable the Bureau of Reclamation to define its position and policy for converting Rio Grande Project water from agricultural to other uses. This report describes the legal, institutional, and hydrological parameters that define the current use of the region's water resources and provides a basis for determining future Reclamation policy and how those policies can be achieved.

Although the report is primarily intended as an internal document, we realize that others may find its content and/or concept of value.

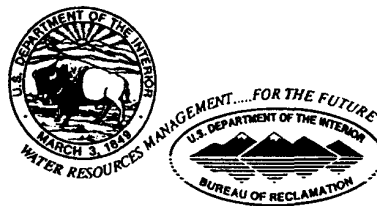
Sincerely,

Garry M. Rowe
Area Manager

Enclosure

LEGAL AND INSTITUTIONAL FRAMEWORK FOR RIO GRANDE PROJECT WATER SUPPLY AND USE

. . . a legal hydrograph



**U.S. Department of the Interior
Bureau of Reclamation
Upper Colorado Region**

October 1995

FINAL DRAFT

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ACRONYMS AND ABBREVIATIONS

Authority	El Paso County Lower Valley Water District Authority
BLM	Bureau of Land Management
cfs	Cubic feet per second
Cir.	Circuit
EBID	Elephant Butte Irrigation District
EIS	Environmental impact statement
EPCWID	El Paso County Water Improvement District No. 1
GAO	General Accounting Office
Hudspeth	Hudspeth County Conservation and Reclamation District No. 1
IBC	International Boundary Commission
IBWC	International Boundary and Water Commission
Interior	Department of the Interior
M&I	Municipal and industrial
maf	Million acre-feet
NEPA	National Environmental Policy Act
O&M	Operation and maintenance
OM&R	Operation, maintenance, and replacement
ppm	Parts per million
R&B	Rehabilitation and betterment
Reclamation	Bureau of Reclamation
RRA	Reclamation Reform Act
Secretary	Secretary of the Interior
Stat.	Statute
Supp.	Supplement
TDS	Total dissolved solids
TNRCC	Texas Natural Resource Conservation Commission
U.S.C.	United States Code
USGS	U.S. Geological Survey

CHAPTER I

INTRODUCTION

The purpose of this document is to provide background information to enable the Bureau of Reclamation (Reclamation) to define its position and policy for converting Rio Grande Project water from agricultural to other uses. This report describes the legal, institutional, and hydrological parameters that define the current use of the region's water resources and provides a basis for determining future Reclamation policy and how those policies can be achieved. The Department of Justice and the Department of the Interior's (Interior) Office of the Solicitor should find this document useful in providing a general understanding of management decisions in administering the Rio Grande Project, New Mexico-Texas.

This chapter briefly summarizes the background of ongoing litigation, conflicting laws, and lack of policy that affect management of the Rio Grande Project. Chapter II presents an overview of the Rio Grande Project—its facilities, operation, and contractual arrangements. Chapter III provides an overview of the legal framework under which Reclamation acquired and exercises the Rio Grande Project water rights. Chapter IV describes the most pressing issues of concern facing Federal managers in administering the Rio Grande Project, as well as the current institutional environment wherein these issues must be addressed.

BACKGROUND

The Rio Grande Project area, from the headwaters of Elephant Butte Reservoir in New Mexico to Fort Quitman in Texas, is shown in figure 1. The project provides storage water and captured return flows to three irrigation districts in two states. However, large metropolitan areas adjacent to the project are complicating project administration and operation.

A sharp increase in population growth is occurring throughout the region, particularly in the border cities of El Paso, Texas, and Juarez, Mexico. The tri-city regional area encompassed by Juarez, El Paso, and Las Cruces, New Mexico, is expected to grow to a population of over 3,500,000 by the year 2010. The cities and other small communities all rely on a limited ground-water supply for their municipal and industrial water. This ground-water supply has been and continues to be "mined" at a rate that greatly exceeds the natural recharge of the freshwater aquifers.

Juarez, with a current population of over 1.2 million, relies on ground water for 100 percent of its water supply. Las Cruces, with a current population of 66,000, also depends totally on ground water. El Paso, with a current population of 555,000, depended on ground water for 75 percent of its water supply until 1992. At that time, the city invested in a new surface water treatment plant as well as improvements to a 1950's surface water treatment plant. It now relies on 50 percent ground water and 50 percent surface water for its supply. The surface water was acquired by converting Rio Grande Project water from agricultural to municipal and industrial (M&I) use.

FINAL DRAFT

Faced with the tremendous need to use existing water resources efficiently and to convert water from agricultural to M&I use, Reclamation must clearly define its role and administer its responsibilities in light of:

1. Ongoing litigation between the United States and two irrigation districts of the Rio Grande Project
2. Conflicting laws and water permitting systems imposed by two Federal and two State Governments
3. Lack of clearly defined policies regarding water transfers, water conservation, and water spreading

Ongoing Litigation

Presently, there are two separate lawsuits involving the Rio Grande Project water districts—Elephant Butte Irrigation District (EBID) and El Paso County Water Improvement District No. 1 (EPCWID). In one of the cases, the two irrigation districts together are challenging Federal management of the Rio Grande Project. In the other case, EBID is requesting a water rights adjudication for the Rio Grande from Elephant Butte Dam on the north to the Texas border on the south.

Elephant Butte Irrigation District, et al. v. United States, No. CIV-90-0095 (revenue lawsuit). EBID is currently challenging past and present Federal management practices before the Federal District Court in New Mexico. EPCWID has joined in the lawsuit as a plaintiff. The irrigation districts allege that they are entitled to all annual miscellaneous revenues from project lands under Subsection I of the *Fact Finders Act* (43 U.S.C. § 501) because they have undertaken operation and maintenance (O&M) and fulfilled repayment obligations. The districts challenge the arrangement that Reclamation has with the Bureau of Land Management for grazing permits and also believe that revenues from New Mexico State Parks operations on reservoir lands should be credited to them to offset O&M charges rather than retained by the State of New Mexico. They also claim that the United States is charging excessive yearly O&M costs and not properly crediting miscellaneous revenues.

Additionally, the irrigation districts allege that they are contractually entitled to receive title to the project works—including easements, ditches, laterals, canals, drains, and grazing lands—upon full payment of their construction charges.

Finally, the districts assert that the United States operates the power facilities at Elephant Butte Dam in a manner that leads to evaporation losses on an average of 20,000 acre-feet per year. The irrigation districts claim that they should be compensated for the evaporation losses.

Interior's position is that the Secretary of the Interior is given broad discretion in the management of reclamation projects in the *Reclamation Act of 1902* and that the irrigation districts have no legitimate basis to challenge Federal management of the Rio Grande Project.

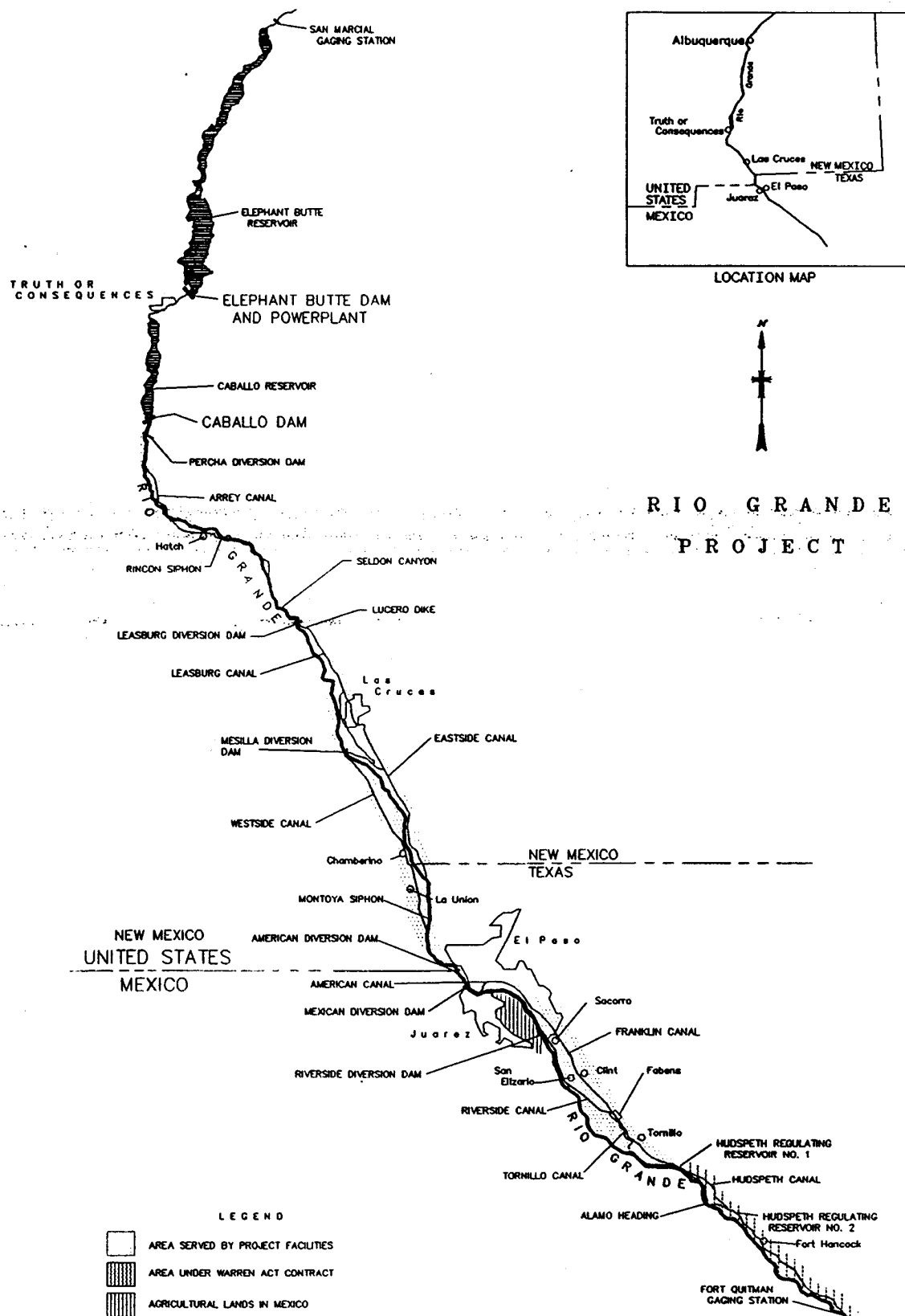


Figure 1

Elephant Butte Irrigation District v. Reynolds, et al., No. CIV-86-848 (adjudication lawsuit). EBID has filed a complaint in the Third Judicial District Court in New Mexico against the New Mexico State Engineer requesting a water rights adjudication for the Rio Grande from Elephant Butte Dam on the north to the Texas border on the south. EBID is asking the court to mandate that the state engineer conduct a hydrographic survey of the stream system. Upon completion of that survey and its submittal to the court, all persons claiming an interest in the waters would be joined as parties in the subsequent stream adjudication.

EBID claims in the lawsuit that, because it completed payment of its reimbursable construction debt to the United States in 1971, the United States no longer owns the water rights for that portion of the Rio Grande Project within New Mexico. EBID has asked the court to declare the district as the recordholder of those water rights.

This lawsuit also challenges ground-water uses that EBID claims have had detrimental impacts on surface water availability. EBID believes that all of the surface and ground water in the area is appropriated and wants the state engineer to discontinue issuing additional ground-water permits. In one example, EBID alleges that since the early 1960's, the city of El Paso has been pumping large amounts of shallow New Mexico ground water from the Canutillo Well Field located in Texas near the New Mexico border. EBID formally requested that the state engineer conduct a hydrographic survey and investigation of the water system, but the request was denied due to lack of available funding and staff.

EBID asserts that a stream adjudication is necessary because:

. . . there is great uncertainty regarding the amount of water appropriated, the amount of water unappropriated, and the rights and duties of all of the parties hereto and others regarding their respective rights, duties, and obligations under various contracts, federal statutes, state statutes, local custom and usage, and the doctrine of prior appropriation . . . (Item 31 of complaint).

In addition, EBID asked the court to compel the United States to come forward and declare any rights claimed in the Rio Grande stream system. If EBID is successful in demanding a stream adjudication, the United States will likely be named as a party in the adjudication.

Conflicting Laws

Wide disparity exists among Texas, New Mexico, and the Federal Government in the interpretation of the status and significance of water rights along the Rio Grande between Elephant Butte Dam and Fort Quitman. A major difference of opinion between the United States and Texas involves the significance of the Federal Government's 1908 filing with the State of New Mexico which appropriated all of the unappropriated Rio Grande water for Rio Grande Project purposes. Texas claims that when the water crosses the New Mexico-Texas border it belongs to the State of Texas and can be distributed according to state laws. Consequently, Texas has approved permit applications from the city of El Paso for project water.

Questions about who controls the distribution of project water remain unanswered. Although courts have consistently held that the water is "project water," some uncertainty remains regarding who controls the water—the Federal Government, the state, or the irrigation districts. Interior's position is that when the United States appropriated all of the water and stored it for project purposes, the controlling authority for distribution of the stored water became the Federal Government. At that point in time, the Rio Grande changed from a free-flowing river below Elephant Butte Dam to a channel for the distribution of stored project water.

Further conflicts may arise in Texas. Although there is not any pending litigation, ongoing activities may soon generate lawsuits. The Texas Natural Resource Conservation Commission is in the process of investigating water rights claims on the Rio Grande between the New Mexico border and Fort Quitman. Also, the city of El Paso is searching for additional water sources because of its growth. In the past, El Paso has attempted to transport ground water from New Mexico without much success. The city also filed a lawsuit attempting to reclaim its effluent for reuse by the city. However, the court ordered that the contract arrangement between El Paso and the Federal Government provided that the effluent became project water and was, therefore, not available to the city. Even though El Paso has been thwarted in its previous attempts, the city needs water for its future growth and will continue to try to acquire water resources to fulfill its needs.

Lack of Policy

Some water transfers have taken place on the Rio Grande Project, even though there are no contracts for such transfers; i.e., changing from one use of project water to another within project boundaries and surrounding metropolitan areas. With the increasing demand for water from the city of El Paso and the decreasing irrigable lands due to metropolitan growth, the need to supply project water for M&I rather than agricultural use is growing. If the United States cannot find ways to legally make that possible, the irrigation districts may decide to illegally distribute project waters. The existing permissible uses of project water within the scope of Federal and state laws must be defined and policy developed to facilitate the optimum use of these waters.

Reclamation has no process for implementing Interior's existing water transfer guidelines. An audit report completed by the General Accounting Office (GAO) in 1994 noted several areas where Reclamation laws and policies inhibit water transfers (U.S. Department of the Interior 1994b). For instance, the authorizing legislation for a project specifies the purposes to be served. If the potential purpose of the transferred water is not authorized, it cannot legally be used for that purpose. In some instances, however, authority under other laws can be used. A second restriction noted in the GAO report is that some repayment and water service contracts prohibit transfers or resales, and some restrict the use or area to be served.

Other areas of concern noted in the report pertain to the applicability of the *Reclamation Reform Act of 1982* and the definition of appurtenancy as used in Section 8 of the

Reclamation Act of 1902. The GAO report recommends that some parts of the existing transfer guidance be revised to reduce uncertainty and confusion associated with water transfers, including:

- List and explain the Reclamation laws that must be satisfied
- Clarify the approval process
- Develop clear National Environmental Policy Act compliance requirements specific to water transfers

CHAPTER II

RIO GRANDE PROJECT OVERVIEW

This chapter describes Rio Grande Project facilities, how the project is operated, and the contractual arrangements that control water supplies and repayment of the facilities. The contract information presented is provided to help policymakers understand:

- How construction of Rio Grande Project features was funded
- Allocation of water supplies
- Repayment obligations and how they accrued
- Assignment of operation and maintenance (O&M) responsibility
- Legal and contractual obligations of the involved parties

This Rio Grande Project contract history illustrates a long-established policy of ensuring that the districts benefit from every opportunity provided by Reclamation law. More discussion of contracts can be found in the Secretarial Determination of May 26, 1994, which summarizes Rio Grande Project construction costs. Of the total construction costs of over \$38 million, \$22 million was allocated to irrigation. "[T]he Districts paid, by means of direct payment or credit, only the approximately \$10,150,000 of project construction costs for the irrigation delivery and drainage system allocated to the Districts to repay" (U.S. Department of the Interior 1994a, p. 3).

PROJECT SETTING

The Rio Grande Project occupies the river bottom land of the Rio Grande Valley in south-central New Mexico and extreme west Texas. Approved by the Secretary of the Interior in 1905, the Rio Grande Project consists of two dams and reservoirs, a power generating plant, and five diversion dams. These facilities provide full irrigation service to 178,000 water-right acres of land in the Elephant Butte Irrigation District (EBID) in Dona Ana County, New Mexico, and the El Paso County Water Improvement District No. 1 (EPCWID) in El Paso County, Texas. Drainage water from project lands provides a supplemental water supply to 18,000 acres in Hudspeth County Conservation and Reclamation District No. 1 in Hudspeth County, Texas. With a total irrigable acreage of 196,557, about 52 percent of the project lands receiving water are in New Mexico and 48 percent are in Texas. The project also furnishes electric power for communities and industries in the area.

Diversions for project irrigation are made at five points on the Rio Grande below the storage reservoirs. All diversions are made and measured at the headings by Reclamation personnel. Water district personnel, under contract with the United States, are responsible for water deliveries to water users.

¹ This \$38 million figure does not include over \$3 million in capitalized rehabilitation and betterment costs. This additional cost was excluded because rehabilitation and betterment is defined as an O&M expense and, thus, should not be included with construction (U.S. Department of the Interior 1994a, p. 3).

Project features in operation include:

New Mexico

- Elephant Butte Dam, Reservoir, and Powerplant
- Caballo Dam and Reservoir
- Percha Diversion Dam
- Leasburg Diversion Dam
- Mesilla Diversion Dam

Texas

- American Diversion Dam
- Riverside Diversion Dam

The Rio Grande Project also includes 139 miles of canals, 458 miles of laterals, and 461 miles of drains. The flow distribution of Rio Grande Project water is shown in figure 2.

ELEPHANT BUTTE DAM AND RESERVOIR

Elephant Butte Dam and Reservoir, in New Mexico, approximately 125 miles north of El Paso, Texas, can store 2,065,000 acre-feet of water (Bureau of Reclamation 1988) to provide irrigation and year-round power generation. Using monies taken from the Reclamation Fund and funds appropriated by the Congress in 1907, construction of Elephant Butte Dam—originally called Engle Dam—began in 1912. Storage operation began in 1915.

Elephant Butte Dam is a concrete gravity structure 301 feet high and 1,674 feet long, including the spillway. The spillway channel below the dam was added in 1921 and modified in 1947. The powerplant was added in 1940. The power system consists of a 24,300-kilowatt hydroelectric powerplant, approximately 490 miles of 115-kilovolt transmission lines, and 11 substations totaling 81,750 kilovoltamperes. The transmission system was developed and operated by Reclamation until 1977 and then sold to Plains Electric, a private electric company. The dam, reservoir, and powerplant are operated and maintained by Reclamation.

Located midway between Albuquerque, New Mexico, and El Paso, Texas, in scenic semidesert mountain terrain, Elephant Butte Reservoir is popular throughout the entire Southwest for boating, fishing, and swimming. The State of New Mexico administers recreation facilities at Elephant Butte Reservoir.

CABALLO DAM AND RESERVOIR

Caballo Dam and Reservoir is approximately 25 miles downstream from Elephant Butte Dam in New Mexico. Caballo Reservoir is a reregulating reservoir with a maximum capacity of 331,500 acre-feet (Bureau of Reclamation 1984) including 100,000 acre-feet of

Flow Distribution of Rio Grande Project Water

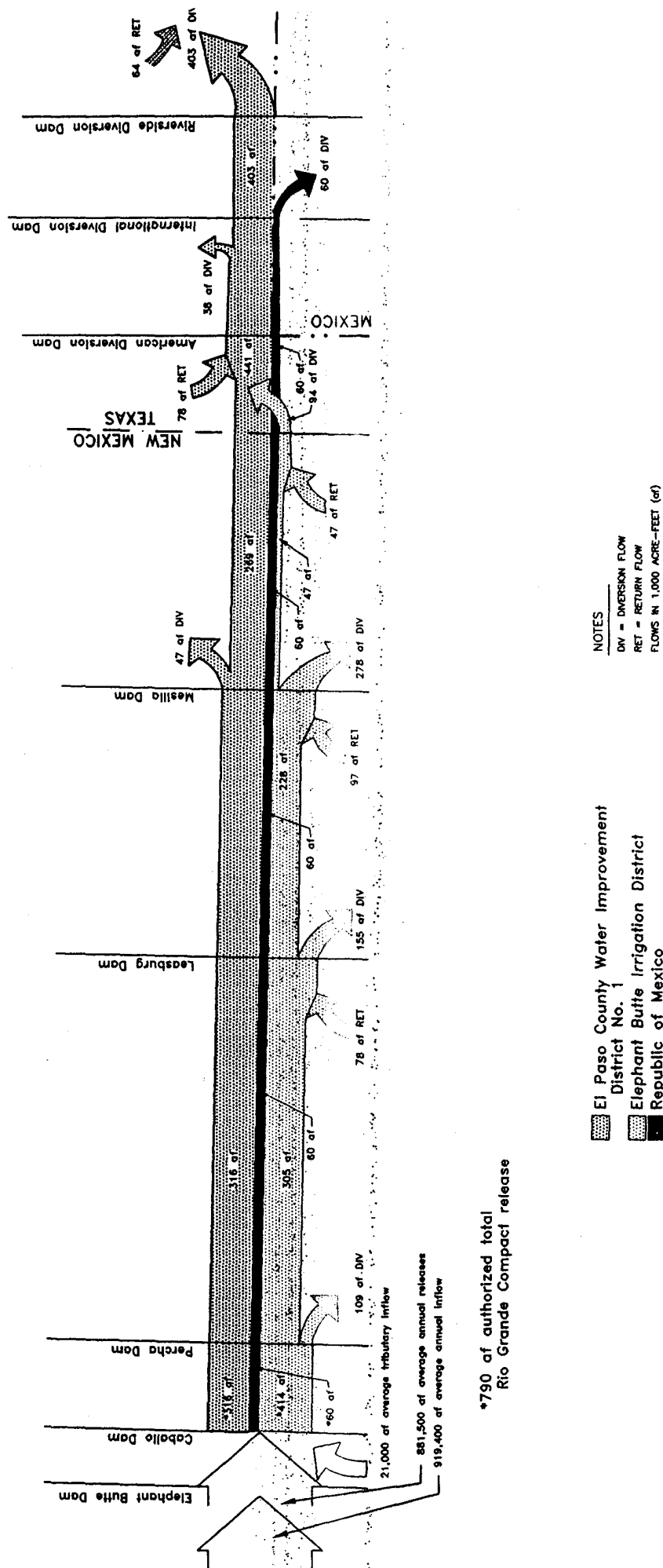


Figure 2

flood control space. Caballo Dam is an earthfill structure 96 feet high and 4,590 feet long. The facility was completed in 1938. Although it was not authorized as a storage facility, Caballo Reservoir does store water. Inflows to the river below Elephant Butte Dam, together with water discharged from Elephant Butte Powerplant during power generation, are stored in Caballo Reservoir for irrigation use during the summer.

Reclamation operates and maintains this facility. The river channel between Elephant Butte Dam and Caballo Reservoir and between Caballo Dam and U.S. Interstate Highway 25 also is maintained by Reclamation. Releases from Caballo Reservoir to satisfy project requirements are made by Reclamation personnel.

In rough desert terrain 17 miles south of Truth or Consequences, New Mexico, Caballo Reservoir provides year-round recreation including picnicking, boating, and fishing. Recreation facilities at Caballo Reservoir are administered by the State of New Mexico.

ELEPHANT BUTTE IRRIGATION DISTRICT

In 1918, Elephant Butte Water Users Association was dissolved and reorganized as the Elephant Butte Irrigation District. EBID comprises a total of 102,000 irrigable acres in Rincon and Mesilla Valleys. In 1992, Public Law 102-575 Title XXXIII authorized transfer to the district of title to "... such easements, ditches, laterals, canals, drains, and other rights-of-way which the United States acquired on behalf of the project ..." Storage and diversion structures were not authorized for transfer. The major diversion and distribution facilities of the Rio Grande Project within EBID between Elephant Butte Reservoir and Montoya Drain Siphon are depicted schematically on figure 3. These features are described in upstream to downstream order in the following section.

Percha Diversion Dam, on the Rio Grande 2 miles downstream from Caballo Dam, diverts water into the Rincon Valley Main Canal for irrigation purposes. Completed in 1917, this structure is a rubble concrete weir 14 feet high and 350 feet long with radial sluice gates and earthfill dikes.

Arrey Canal² services approximately 16,260 acres in the Rincon Valley. The canal is approximately 28.1 miles long and has an initial design capacity of 400 cubic feet per second (cfs). The canal system is operated and maintained by EBID.

Garfield Siphon,² under the Rio Grande 4 miles south of Percha Diversion Dam, is a 90-inch-diameter concrete pipe 680 feet long that carries the Rincon Valley Main Canal irrigation water under the Rio Grande to the east side of the river. The siphon replaced the original flume in 1963.

² Authorized for title transfer to EBID.

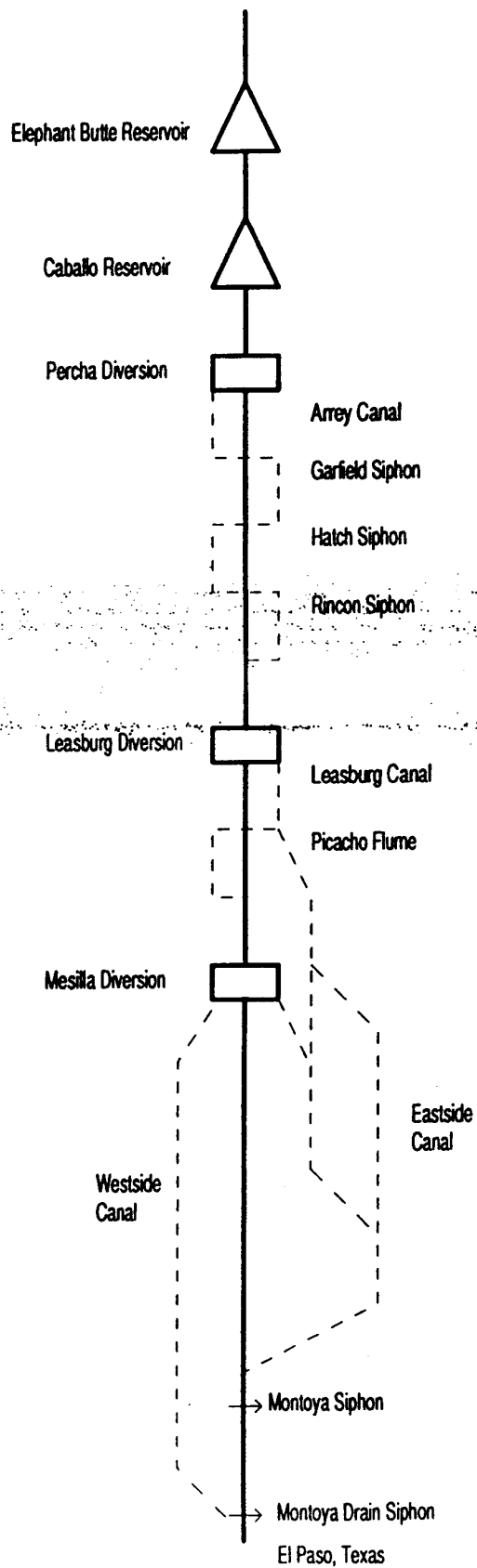


Figure 3
Rio Grande System Diagram
Elephant Butte to Montoya Drain Siphon
EBID Facilities

Hatch Siphon,² under the Rio Grande 9 miles south of Garfield Siphon, is a concrete structure 6 feet in diameter and 650 feet long that carries Rincon Valley Main Canal irrigation water back under the Rio Grande to the west side.

Rincon Siphon,² under the Rio Grande 8 miles southeast of Hatch Siphon, is a concrete structure 5 feet in diameter and 550 feet long that carries Arrey (Rincon Valley Main) Canal irrigation water under the Rio Grande back to the east side of the river.

Leasburg Diversion Dam, on the Rio Grande 62 miles north of El Paso at the head of the Mesilla Valley, is a rubble concrete weir 10 feet high and 600 feet long with earthfill dikes. This structure diverts water into the Leasburg Canal for the upper 31,200 acres of the Mesilla Valley irrigation system. Together with 6 miles of Leasburg Canal, it was the first Rio Grande Project construction work by Reclamation and was completed in 1908.

Leasburg Canal² services approximately 31,600 acres in the Upper Mesilla Valley. The canal is approximately 13.5 miles long and has an initial design capacity of 625 cfs. EBID operates and maintains this canal system.

Picacho Flume,² over the Rio Grande 9 miles south of Leasburg Diversion Dam, is a steel truss structure 502 feet long that carries the irrigation water of the Picacho branch of Leasburg Canal over the Rio Grande.

Mesilla Diversion Dam, on the Rio Grande 40 miles north of El Paso, is a low concrete weir, radial gate structure, 22 feet high and 303 feet long. This structure diverts water into the East Side and West Side Canals for the lower 54,000 acres of the Mesilla Valley irrigation system. It was completed in 1916.

East Side Canal² services the eastern portion of Lower Mesilla Valley. The East Side Canal has an initial design capacity of 350 cfs and is 13.5 miles long. EBID operates and maintains this canal under contract.

West Side Canal² services the western portion of the Lower Mesilla Valley. The West Side Canal has an initial design capacity of 650 cfs and is 23.5 miles long. EBID operates and maintains this canal under contract.

Montoya Siphon,² under the Rio Grande 22 miles downstream from Mesilla Diversion Dam, is a concrete structure 3 feet 9 inches in diameter and 468 feet long that carries irrigation water from West Side Canal under the Rio Grande to the lower end of Mesilla Valley.

Montoya Drain Siphon² is a concrete structure 6 feet in diameter and 600 feet long that carries Mesilla Valley west side drain water under the river to a discharge point at the extreme lower end of the valley.

Diversions and Irrigated Acres

The major canals pertinent to the Elephant Butte Irrigation District are included in table II-1, which shows diversion trends for the period of record. For comparison, table II-2 shows the irrigated acreage and consumptive use in the Elephant Butte Irrigation District. The diversions indicate the fluctuating availability of water, and the irrigated acreage and consumptive use show the gradual decline in agricultural water use during the period shown.

Table II-1.—Elephant Butte Irrigation District
5-year sum of annual diversions
(1,000 acre-feet)

Period	Arrey Canal	Westside Canal	Eastside Canal	Leasburg Canal
1910-1914				723
1915-1919				796
1920-1924	372		448	1,453
1925-1929	517		465	1,354
1930-1934	503		447	1,097
1935-1939	386		369	746
1940-1944	468	1,061	429	911
1945-1949	468	1,070	435	989
1950-1954	300	685	283	546
1955-1959	275	634	215	517
1960-1964	362	748	282	639
1965-1969	389	751	289	640
1970-1974	340	797	298	645
1975-1979	316	709	274	505
1980-1984	424	869	328	626
1985-1989	572	982	406	781
1990-1994	492	1,015	355	721

Table II-2.—Elephant Butte Irrigation District
irrigated acreage and consumptive use

Year	Net acres irrigated	Total irrigation consumptive use in acre-feet
1950	85,757	279,765
1955	86,153	283,865
1960	85,162	276,155
1965	83,259	258,650
1970	84,948	255,933
1975	85,346	259,528
1980	83,096	242,844
1985	78,697	254,131
1990	79,525	222,492

EBID Contracts

This section summarizes contracts between the United States and EBID in terms of two main issues: *repayment* and *water supply*. This contract history is included to provide a framework for understanding the current legal status of the Rio Grande Project.

³*Contract dated June 27, 1906

Repayment— The contract was executed among the United States, Elephant Butte Water Users Association, and El Paso Valley Water Users Association for the repayment of Leasburg Diversion Dam and Canal construction costs. The contract allowed for repayment in 10 equal annual installments without interest to " . . . be payable when the water is first delivered from said works, or within a reasonable time thereafter . . ." Documents indicate that the earliest record of repayment by either association was not until March of 1923. The costs were to be apportioned equally per acre among those acquiring rights to delivery.

Water Supply— In terms of water delivery from the project to the users, the contract states,

. . . [t]hat the aggregate amount of such rights to be issued shall, in no event, exceed the number of acres of land capable of irrigation by the total amount of water available for the purpose, being (1) the amount now appropriated by the shareholders of said associations, and (2) the amount to be delivered from all sources in excess of the water now appropriated; and that the Secretary of the Interior shall determine the number of acres so capable of such irrigation . . .

In addition, article 10 requires that Elephant Butte Water Users Association's right to use project water is subject to the *Reclamation Act of 1902* and other acts of the Congress on the subject of the acquisition and enjoyment of the rights to use water.

*Contract dated July 6, 1917

Repayment— Unable to receive funds under the *Sundry Civil Appropriations Act of June 12, 1917*, until it could be reorganized as a district, the Elephant Butte Water Users Association agreed in this contract to provide payment in advance to Reclamation for drainage construction. The money was to be reimbursed once the association was properly organized and could qualify for the funds appropriated in 1917.

Water Supply— Not addressed.

*Contract No. IIR-349 dated June 15, 1918

Repayment— The contract addressed the dissolution of the association and provided that its obligations be the responsibility of the district. EBID became obligated to repay for construction of irrigation and drainage facilities an aggregate sum of \$6,530,000 (article 10). In addition, EBID was required to reimburse the

³ Asterisk (*) denotes contract is no longer in effect.

United States for the operation and maintenance (O&M) of the project irrigation works and, pending the formal opening of the project, an annual storage water rental charge equal to 50 cents per acre of the total acreage.

Water Supply— Article 13 allows the Secretary of the Department of the Interior (Secretary) to reallocate water supplies based on the irrigability of land.

***Contract dated October 11, 1919**

Repayment— The contract provided for advancing \$60,000 from EBID to the United States for drainage work. Upon reimbursement of the advanced funds, EBID agreed to assign to the United States all right, title, and interest in the drainage works constructed during the period the funds were employed.

Water Supply— Not addressed.

***Contract dated July 1, 1922**

Repayment— The United States assigned its rights to EBID in collecting outstanding O&M obligations from individuals totaling \$11,139.25.

Water Supply— Not addressed.

***Supplemental Contract No. Ilr-349 dated February 21, 1924**

Repayment— The contract adds \$940,000 (for additional work not covered under previous contracts) to EBID's obligation of \$6,530,000, for a total of \$7,470,000 (article 6).

Water Supply— Not addressed.

***Contract dated May 10, 1928**

Repayment— The contract provided for both EBID and EPCWID to construct, operate, and maintain all facilities for a hydroelectric powerplant; title to the plant would remain with the United States.

Water Supply— Article 3 provided that the Secretary would determine water availability for the purpose of generating hydropower and that no obligation existed to release stored water in any manner other than for irrigation demand, flood control, and those obligations to Mexico.

***Amendatory Contract No. Ilr-349 dated July 16, 1928**

Repayment— The contract amended article 7 of the 1918 contract to allow repayment by EBID for the irrigation works as follows:

. . . the district will pay the construction charge for said works in annual installments, the first four of which shall each be two per centum of the total construction charge, or the portion of the construction charge unpaid at the beginning of such installments, and the remainder of said annual installments shall be at the rate of Three Dollars and Sixty Cents (\$3.60) per irrigable acre . . . and shall continue until the total construction charge against the District is paid . . . The installments may, however, be divided and become payable semiannually by agreement . . .

In addition, the contract **amended article 6 of the 1924 contract** to provide payment as outlined above but does not change the total construction obligation of \$7,470,000 established in the 1924 contract.

Water Supply— Not addressed.

***Supplemental Contract No. Ilr-349 dated December 20, 1929**

Repayment— This contract supplemented the contracts of 1918, 1924, and July of 1928 to add \$450,000 to the repayment obligation for a total of \$7,920,000 (article 11). The added amount was for additional improvement and extension of EBID's irrigation distribution system, drainage works, and miscellaneous project features. However, article 11 also provided that credits be allowed to EBID, not to exceed \$230,000. The credit was for "donated" drainage rights-of-way.

Water Supply— Not addressed.

Contract dated September 20, 1937

Repayment— Not addressed.

Water Supply— The contract was an agreement between EBID and EPCWID to allow for a 3-percent increase in the authorized acreage of each entity. At the time, EBID's acreage was 88,000 acres and EPCWID had 67,000 acres. Shortage language states,

... in the event of a shortage of water for irrigation in any year, the distribution of the available supply in such year, shall so far as practicable, be made in the proportion of 67/155 thereof to the lands within the El Paso County Water Improvement District No. 1, and 88/155 to the lands within the Elephant Butte Irrigation District.

Contract No. Ilr-982 dated November 9, 1937

Repayment— The contract significantly amended the contracts of 1918, 1924, May and July of 1928, and 1929. In exchange for EBID surrendering a lease of power privilege that it had received from the United States free of charge and had never developed, the United States relieved EBID of the construction cost obligation for Elephant Butte Dam. The reimbursable cost of constructing Elephant Butte Dam was agreed to be \$4,246,408.39, and the district was relieved of 56.7742 percent, or \$2,410,864.39. This amount was subtracted from EBID's repayment obligation of \$7,920,000, for a remaining obligation of \$5,509,135.61 (article 5). Consequently, EBID was charged only with repaying the construction costs of the irrigation water delivery and drainage facilities. When power generation facilities were finally installed at Elephant Butte Dam, the responsibility of repaying the dam's construction cost was effectively assigned to power users.

The 1937 O&M charge of \$170,000 (article 6) and \$21,850.16 interest on deferred construction charges (article 7) were added to the construction charge for a total obligation to the United States of \$5,700,985.77 (article 8). With credits for previous payments, the resulting balance at the execution of the contract was \$3,783,711.92, and article 8 provided that EBID would repay this amount in 50 equal, successive, semiannual installments with the first due on March 1, 1938, and the last on September 1, 1962.

Article 9 segregated O&M responsibility into two components: the storage facility and the irrigation and drainage system. Article 10 set forth special provisions for storage charges to EBID while it was repaying construction obligations. Rather than paying O&M on the storage facility, the district only had to pay a reservoir service charge based on actual water deliveries. Charges for O&M costs of the irrigation and drainage were to be determined by the Secretary and billed to EBID.

Finally, article 12 of the contract provided that pursuant to subsection J of section 4 of the *Fact Finder's Act of 1924*, collections of water rental charges from the Hudspeth County Conservation and Reclamation District (Hudspeth) were to be credited to EBID's repayment obligation.

Water Supply— Articles 3 and 4 restate language in the Interior Department Appropriation Act of 1938. The language is incorporated in the contract under article 18 and reads in part,

The district . . . does hereby convey, and grant to the United States all of its and their claims of right, title, interest and estate, present and prospective in the use of Elephant Butte Dam and other project works, including the project water supply, for the development of hydroelectric energy by the United States. Provided that the use of said dam, project works, and water supply for power purposes shall not deplete or interfere with the use thereof for irrigation purposes . . . (emphasis added).

The article also provided that the United States would receive all net earnings from the power operation.

Contract dated February 16, 1938

There appears to be no difference between this contract and the contract dated September 20, 1937.

Contract No. Il6r-1300 dated February 2, 1939

Repayment— The contract provided that EBID advance \$145,000 to the United States for repairs and additions to certain project features. In return, EBID received credits against the repayment obligation in the amount of \$200,744.21.

Water Supply— Not addressed.

Contract No. Ilr-349 dated August 30, 1939 (no present application)

Repayment— The contract amended the 1929 contract by adding \$30,000 of additional credit to EBID's original credit of \$230,000 for rights-of-way.

Water Supply— Not addressed.

Contract No. Ilr-982 dated October 1, 1939

Repayment— The contract amended the November 1937 contract by extending the final payment date from September 1, 1962, to September 1, 1967. The contract states that at the time of execution, the remaining obligation was \$3,481,010.96, and the 56 remaining semiannual payments were to be \$62,160.91.

Water Supply— Not addressed.

Contract No. 9-07-54-X0554 dated February 15, 1979 (O&M transfer)

Repayment— Article 3(b) of the contract provided that EBID is responsible for repaying 56.7742 percent of the reimbursable O&M costs of the water control and conveyance reserved works which were defined as Percha, Leasburg, Mesilla, and Riverside Diversion Dams and appurtenances. Article 2 transferred O&M responsibility of the remaining irrigation works to EBID.

Water Supply— Article 6(a) provided that the United States allocate available stored water among EBID, EPCWID, and the Republic of Mexico. Article 6(c) provided that the United States reserves the right to direct diversions and deliveries to assure the delivery of water to " . . . other involved entities outside District boundaries."

Amendatory Contract No. 9-07-54-X0554 dated May 31, 1989

Repayment— The contract amended the 1979 contract by adding Percha and Leasburg Diversion Dams to EBID's O&M responsibilities (of which they agree to pay all O&M costs). Article 2 provides that EBID pay the United States for 56.7742 percent of the reimbursable O&M costs of the water control and conveyance reserved works. Article 2 also provides that EBID be responsible for 79.45155 percent of maintenance costs of Mesilla Diversion Dam and appurtenant works.

Water Supply— Not addressed.

EL PASO COUNTY WATER IMPROVEMENT DISTRICT

In 1917, the El Paso Valley Water Users Association was dissolved and reorganized as El Paso County Water Improvement District No. 1. EPCWID comprises 76,000 irrigable acres in the El Paso Valley of Texas. In 1992, Public Law 102-575 Title XXXIII authorized the transfer to the district of title to " . . . such easements, ditches, laterals, canals, drains, and other rights-of-way which the United States acquired on behalf of the project . . ." Storage and diversion structures were not authorized for transfer. The major features of the Rio Grande Project within EPCWID between Montoya Drain Siphon and the Fort Quitman gauge are shown on figure 4 and are described in upstream to downstream order in the following section.

American Diversion Dam, on the Rio Grande 2 miles northwest of El Paso and immediately above the point where the river becomes the International Boundary Line, diverts irrigation water to the El Paso Valley for use on the American side. This radial gate structure is 18 feet high and 286 feet long with earthfill dikes. It was constructed in 1938 and is operated by the American Section of the International Boundary and Water Commission (IBWC) to regulate flows for delivery to Mexico in accordance with treaty provisions.

American Canal,⁴ also constructed and operated by the American Section of IBWC in connection with American Diversion Dam, carries water for use on the American side from the dam to the head of the Franklin Canal, a distance of 2.1 miles, with a capacity of 1,200 cfs.

⁴ Authorized for title transfer to EPCWID.

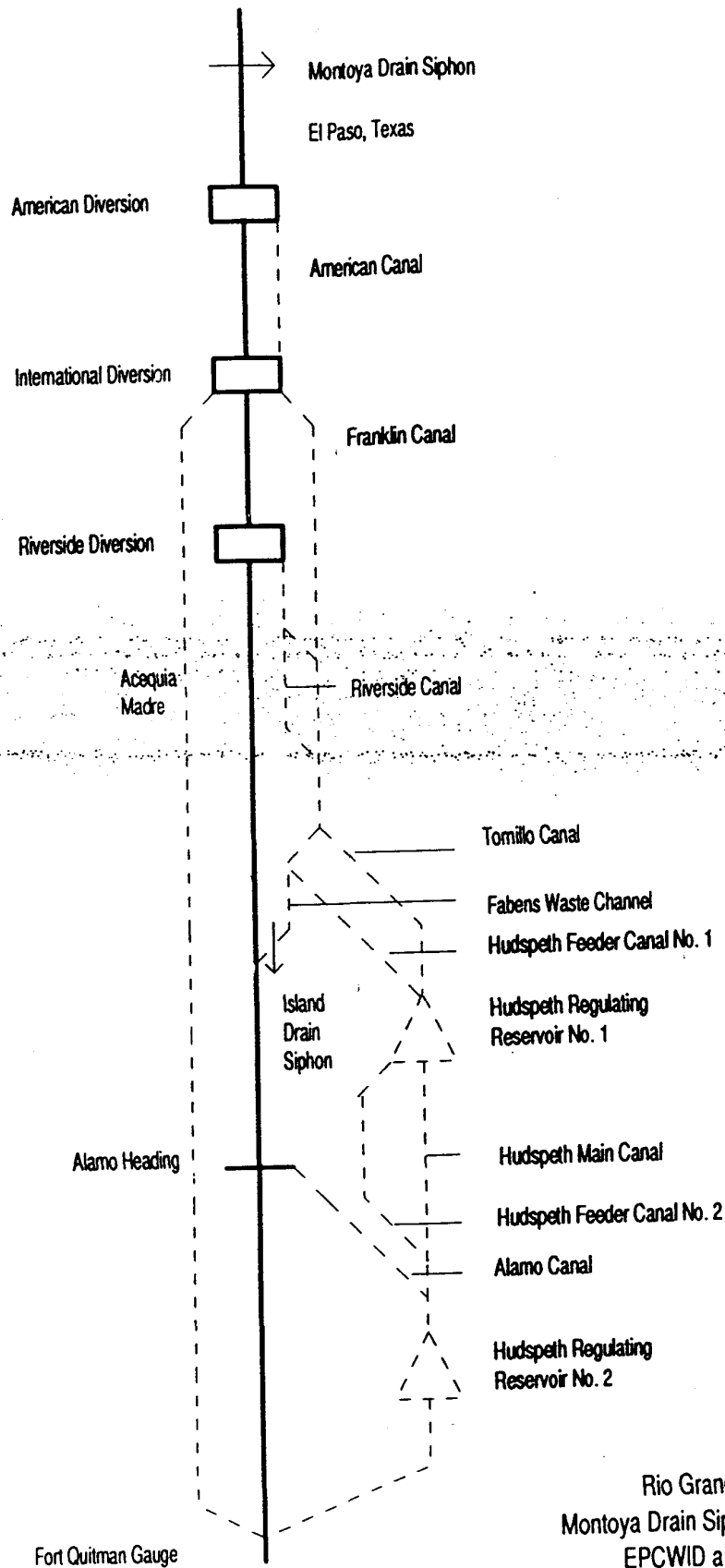


Figure 4
 Rio Grande System Diagram
 Montoya Drain Siphon to Fort Quitman Gauge
 EPCWID and Hudspeth Facilities

American Canal Extension Project is an ongoing effort of the American Section of IBWC to build 18 miles of canal, replace sections of Franklin Canal, and ultimately permit delivery of Mexico's portion of Rio Grande water at a Riverside Canal diversion rather than the Mexican Diversion Dam. The project will replace the 5 miles of Franklin Canal that currently run through downtown El Paso with a concrete-lined canal having 1,500-cfs capacity. Five miles of the canal have already been constructed, and the next 5 miles should be completed in the next year. IBWC estimates that the majority of the project will be finished within the next 2 years.

International Diversion Dam, on the Rio Grande at El Paso, diverts irrigation water to Mexico. This rubble masonry and concrete radial gate structure is 4.7 feet high and 320 feet long. It was also formerly used to divert water into the Franklin Canal. It is not a part of the project works but diverts water into Mexico.

Franklin Canal⁴ carries water in the El Paso Valley. With an initial capacity of 325 cfs, this 28.4-mile-long canal serves 18,500 acres in the upper portion of the valley. It was constructed in 1889-90 by an irrigation company and was acquired by Reclamation in 1912 to become one of the project's main canals.

Riverside Diversion Dam, the lowest project diversion on the Rio Grande 15 miles southeast of El Paso, diverts water into the Riverside Canal for irrigation purposes. This radial gate concrete structure is 17.5 feet high and 267 feet long with flood bypass weir. It was constructed in 1927.

Riverside Canal⁴ carries irrigation water in the El Paso Valley to serve 39,500 acres in the lower portion of the valley and carry any surplus through to the Hudspeth district. Diversions to this canal are made at the Riverside Diversion Dam. The canal system is operated and maintained under contract by EPCWID. This is the southernmost diversion made by the Rio Grande Project.

Tornillo Canal,⁴ a continuation of Riverside Canal for carrying irrigation water to the lower end of the El Paso Valley, is 12 miles long and has an initial capacity of 325 cfs.

Island Drain Siphon⁴ is a concrete structure 6 feet in diameter and 571.5 feet long. It returns drain water under the Fabens Waste Channel (formerly the river) to a discharge point at the lower end of the project.

Diversions and Irrigated Acres

The major canals pertinent to the EPCWID are included in table II-3, which shows diversion trends for the period of record. For comparison, table II-4 shows the irrigated acreage and consumptive use for EPCWID. The diversions indicate the fluctuating availability of water, and the irrigated acreage and consumptive use show a gradual decrease during the period shown.

Table II-3.—El Paso County Water Improvement District No. 1
5-year sum of annual diversions
(1,000 acre-feet)

Period	Franklin Canal	Riverside Canal at heading	Tomillo Canal
1915-1919	447		
1920-1924	662		
1925-1929	670		156
1930-1934	564	844	88
1935-1939	652	1,116	71
1940-1944	759	1,646	54
1945-1949	662	1,192	98
1950-1954	430	596	55
1955-1959	392	477	31
1960-1964	569	702	52
1965-1969	462	728	63
1970-1974	405	868	85
1975-1979	361	897	75
1980-1984	444	960	105
1985-1989	472	1,371	184
1990-1994	496	1,129	113

Table II-4.—El Paso County Water Improvement District No. 1
irrigated acreage and consumptive use

Year	Net acres irrigated	Total irrigation consumptive use in acre-feet
1950	67,326	210,580
1955	58,710	184,537
1960	58,228	180,292
1965	54,868	164,183
1970	56,291	169,624
1975	52,154	156,125
1980	47,452	148,722
1985	45,605	144,636
1990	46,764	123,627

EPCWID Contracts

This section summarizes contracts between the United States and EPCWID in terms of two main issues: *repayment* and *water supply*. This contract history is included to provide a framework for understanding the current legal status of the Rio Grande Project.

⁵*Contract dated June 27, 1906

Repayment— The contract was executed among the United States, Elephant Butte Water Users Association, and El Paso Valley Water Users Association for the repayment of construction costs of the Leasburg Diversion Dam and Canal. The contract allowed for repayment in 10 equal annual installments without interest to " . . . be payable when the water is first delivered from said works, or within a reasonable time thereafter" Documents indicate that the earliest record of repayment by either association was not until March 1923. The costs were to be apportioned equally per acre among those acquiring rights to delivery.

Water Supply— In terms of water delivery from the project to the users, the contract states,

. . . [t]hat the aggregate amount of such rights to be issued shall, in no event, exceed the number of acres of land capable of irrigation by the total amount of water available for the purpose, being (1) the amount now appropriated by the shareholders of said associations, and (2) the amount to be delivered from all sources in excess of the water now appropriated; and that the Secretary of the Interior shall determine the number of acres so capable of such irrigation . . .

In addition, article 10 requires that the association's right to use project water is subject to the *Reclamation Act of 1902* and other acts of the Congress on the subject of the acquisition and enjoyment of the rights to use water.

***Contract dated October 13, 1917**

Repayment— Unable to receive funds under the Sundry Civil Appropriations Act of June 12, 1917, until the association could be reorganized as a district, the association agreed in this contract to upfront funds to Reclamation for drainage construction. The money was to be reimbursed once the association was properly organized and could qualify for the funds appropriated in 1917.

Water Supply— Not addressed.

***Contract dated December 29, 1917**

Repayment— The contract addressed the dissolution of the association and provided that its obligation be assumed by EPCWID. The United States agreed to expend \$1 million (articles 1 and 2) for drainage, improvement, and extension of the irrigation distribution system, and EPCWID agreed to repay this amount without interest (article 6). Under article 5 of the contract, the United States would operate the distribution system at cost to EPCWID and charge an additional 50 cents per acre for the operation expense of the storage unit.

Water Supply— The enlargement and extension of the irrigation system was to provide water to the following acreage (article 2):

⁵ Asterisk (*) denotes contract is no longer in effect.

Irrigated area	
Name of system	Estimated acres
Juan de Herrera	5,000
Isleta	5,000
Salatral	4,000
Clint	3,000
Jomada	3,000
Socorro	1,500
San Elizario	8,000
Island	13,000

The remainder of the valley, comprising about 13,500 acres, was to be irrigated by direct diversion from the Franklin Canal. Article 9 allowed the Secretary to reallocate water supplies based on the irrigability of land.

***Contract No. Ir-348 dated January 17, 1920**

Although not expressly stated, this contract appears to supersede all previous contracts.

Repayment— EPCWID became obligated to repay an aggregate sum of \$4,941,000 which included costs for the irrigation distribution system, as well as a proportionate share of the construction cost of Elephant Butte Dam and Reservoir (article 8). Under article 7 of the contract, the United States would operate the distribution system at cost to EPCWID and charge an additional 50 cents per acre for the operation expense of the storage unit.

Water Supply— The enlargement and extension of the irrigation system was to provide water to the following acreage (article 5):

Irrigated area	
Name of system	Estimated acres
Upper Franklin	5,300
Juan de Herrera	3,760
Ysla	4,450
Salatral	3,700
Clint	2,420
Jomada	2,720
Socorro	1,510
San Elizario	6,270
Island	9,400
Lower Franklin	6,070
Montoya, Texas	2,600
La Union District, Texas	5,600
Three Saints District, Texas	1,000

Article 13 allowed the Secretary to reallocate water supplies based on the irrigability of land.

***Contract dated December 28, 1920**

Repayment— The contract provided for the advancement of \$125,000 from EPCWID to the United States for constructing drainage works. Upon reimbursement of the advanced funds, EPCWID agreed to assign to the United States all right, title, and interest in the drainage works constructed using the advanced funds.

Water Supply— Not addressed.

***Contract dated July 1, 1922**

Repayment— The United States assigned its rights to EPCWID in collecting outstanding O&M obligations from individuals totaling \$13,210.16.

Water Supply— Not addressed.

***Supplemental Contract No. Ilr-348 dated October 12, 1922**

Repayment— The contract added \$1,165,000 to EPCWID's obligation of \$4,941,000 for a total obligation of \$6,106,000.

Water Supply— The boundaries of EPCWID were extended by 8,000 acres, known as the Tornillo Tract.

***Contract No. Ilr-48 dated August 2, 1926**

Repayment— The United States was to credit EPCWID \$350,000 for additional works.

Water Supply— Contract's main purpose was to build certain works to prevent Rio Grande diversions to Mexico from impacting the Rio Grande Project water supply.

***Contract dated May 10, 1928**

Repayment— Contract provided for both EBID and EPCWID to construct, operate, and maintain all facilities for a hydroelectric powerplant; title to the plant would remain with the United States.

Water Supply— Article 3 provided that the Secretary would determine water availability for the purpose of generating hydropower and that no obligation existed to release stored water in any manner other than for irrigation demand, flood control, and those obligations to Mexico.

***Amendatory Contract No. Ilr-348 dated July 16, 1928**

Repayment— The contract amended article 11 of the January 1920 contract to allow repayment by EPCWID for the irrigation works as follows:

. . . the district will pay the construction charge for said works in annual installments, the first four of which shall each be two per centum of the total construction charge, or the portion of the construction charge unpaid at the beginning of such installments, and the remainder of said annual installments shall be at the rate of Three Dollars and Sixty Cents (\$3.60) per irrigable acre . . . , and shall continue until the total construction charge against the District is paid The installments may, however, be divided and become payable semiannually by agreement

In addition, the contract amended article 10 of the October 1922 contract to provide payment as outlined above but does not change the total construction obligation established in the 1922 contract.

Water Supply— Not addressed.

***Contract No. II6r-239 dated August 4, 1928**

Repayment— Article 8 provided that EPCWID advance \$20,000 to the United States as a result of insufficient funds for work to continue in calendar year 1928.

Water Supply— Not addressed.

***Contract No. II6r-365 dated September 3, 1929**

Repayment— The contract allowed EPCWID to advance \$50,000 to the United States for continued drainage construction work. If funds were advanced, the United States would credit O&M charges to EPCWID.

Water Supply— Not addressed.

***Contract No. II6r-572 dated November 2, 1932**

Repayment— The contract amended the September 1929 contract to increase the \$50,000 to \$70,000. In addition, the credit for the advancement of funds by EPCWID would be in the following manner:

... with an amount equal to the proportionate part of the construction component of all revenues received by the United States for the year 1928 and thereafter, not otherwise credited, from the sale of water for irrigation and miscellaneous purposes under the acts of February 21, 1911 (36 Stat. 925), and February 25, 1920 (41 Stat. 451), and other revenues and water rentals, properly to be allocated to the Texas division of the Rio Grande Project, as and when received; provided, that the aggregate of such credits shall not at any time be in excess of the aggregate funds contributed by the District (EPCWID). . . .

Water Supply— Not addressed.

Contract dated September 20, 1937

Repayment— Not addressed.

Water Supply— The contract was an agreement between EBID and EPCWID to allow for a 3-percent increase in the authorized acreage of each entity. At the time, EBID's acreage was 88,000 acres and EPCWID had 67,000 acres. Shortage language states,

... in the event of a shortage of water for irrigation in any year, the distribution of the available supply in such year shall, so far as practicable, be made in the proportion of 67/155 thereof to the lands within the El Paso County Water Improvement District No. 1, and 88/155 to the lands within the Elephant Butte Irrigation District.

Contract No. Ilr-981 dated November 10, 1937

Repayment— The contract significantly amended contracts of 1917; January 1920; July and October 1922; July and August 1928, 1929, and 1932. In exchange for EPCWID surrendering a lease of power privilege that it had received from the United States free of charge but had never developed, the United States relieved EPCWID of the construction cost obligation for Elephant Butte Dam. The reimbursable cost of constructing the dam was agreed to be \$4,246,408.39, and EPCWID was relieved of 43.2258 percent, or \$1,835,544.00. This amount was subtracted from the EPCWID's repayment obligation of \$6,106,000, for a remaining obligation of \$4,270,456 (article 5). As a consequence of this amendment, EPCWID was charged only with repaying the construction costs of the irrigation delivery and drainage facilities. When power generation facilities were finally installed at Elephant Butte Dam, the responsibility of repaying the dam's construction cost was effectively assigned to power users.

The 1937 O&M charge of \$156,000 (article 6) and \$16,933.44 interest on deferred construction charges (article 7) was added to the construction charge for a total obligation to the United States of \$4,443,389.44 (article 8). With credits for previous payments, the resulting balance at the execution of the contract was \$3,008,873.84, and article 8 provided that EPCWID would repay this amount in 50 equal successive semiannual installments with the first due on March 1, 1938, and the last due on September 1, 1962.

Article 9 segregated Reclamation's O&M responsibility into the two components: the storage facility and the irrigation and drainage system. Article 10 set forth special provisions for storage charges to EPCWID while it was repaying construction obligations. Rather than paying O&M on the storage facility, the district only had to pay a reservoir service charge based on actual water deliveries. Charges for O&M costs of the irrigation and drainage systems were to be determined by the Secretary and billed to EPCWID.

Finally, article 12 of the contract provided that, pursuant to subsection J of section 4 of the *Fact Finder's Act of 1924*, collections of water rental charges from Hudspeth were to be credited to EPCWID's repayment obligation.

Water Supply— Articles 3 and 4 restate language in the *Interior Department Appropriation Act of 1938*. The language is incorporated in the contract under article 18 and reads in part,

The District [EPCWID] . . . does hereby convey, and grant to the United States all of its and their claims of right, title, interest, and estate, present and prospective, in the use of Elephant Butte Dam and other project works, including the project water supply, for the development of hydroelectric energy by the United States: Provided that the use of said dam, project works and water supply for power purposes shall not deplete or interfere with the use thereof for irrigation purposes . . . (emphasis added).

The article also provided that the United States would receive all net earnings from the power operation.

Contract dated February 16, 1938

There appears to be no difference between this contract and the one dated September 20, 1937.

Contract No. II6r-1299 dated February 2, 1939

Repayment— EPCWID agreed to advance the United States \$143,000 for additional drainage work. At the same time, EPCWID was credited \$144,933.41 on its repayment obligation (article 13).

Water Supply— Not addressed.

Contract dated October 1, 1939

Repayment— This contract amended the November 1937 contract. Articles 8 and 9 stated that at the time of contract execution, EPCWID's remaining obligation was \$2,768,163.92. Article 9 provided that EPCWID would repay this amount in 55 semiannual installments of \$49,431.50 on March 1 and September 1 of each year, with the first payment due on March 1, 1940, and ending on March 1, 1967. In addition, a 56th and final payment of \$49,431.42 would be due on September 1, 1967.

Water Supply— Not addressed.

Contract No. II6r-1541 dated February 18, 1941

Repayment— Article 11(c) provided that the city of El Paso pay the United States for water associated with acquired land. Such payment would be based on the amount of water delivered to the city. However, the per acre-foot rate to be paid by the city is not apparent from the contract. Article 12 provided that payments made to the United States by the city would be credited to EPCWID in the following ways:

1. An amount equal to the designated construction charge to the city of El Paso to be credited to EPCWID's construction obligation
2. An amount equal to the designated reservoir service charge to be credited to EPCWID's reservoir service charge
3. An amount equal to the O&M charge to be credited to EPCWID's O&M charge

Water Supply— The contract provided for supplemental municipal water for the city of El Paso by acquiring up to 2,000 acres of EPCWID's "water right lands," which was established in article 6 to equate to 3.5 acre-feet per acre. The agreement required that there be no interference with any other district's water right lands. Article 17 provided that the city could not hold the United States or EPCWID liable for shortages or acts of God.

Contract No. II6r-1712 dated December 1, 1944

Although not expressly stated, the contract amended, if not superseded, Contract No. II6r-1541 dated February 18, 1941.

Repayment— The contract provided in article 10 that the city of El Paso would directly pay both EPCWID and EBID for water delivery rather than making payment to the United States as expressed in article 11(c) of the 1941 contract. Although article 10(c) required payments to be made in compliance with Reclamation law, payments made by EBID and EPCWID to the United States for water use by the city under article 10(d) were to be payable in pursuance to existing contracts and as required of a qualified landowner for irrigation water.

Water Supply— The contract amended, if not superseded, the February 1941 contract by allowing the city of El Paso to use "water right lands" from EBID as well as EPCWID. Article 8(c) of the contract provided that the amount of supplemental water delivered for municipal purposes to the city shall:

be allocated proportionately to the acres of water right lands acquired and owned by the City between the Elephant Butte District and the El Paso District [EPCWID], and it shall be conclusively presumed that the City received at its diversion facilities an equal amount of water for each acre of water right land acquired and owned by the City with the Elephant Butte District and the El Paso District [EPCWID].

This article expressly amended article 6 of the 1941 contract, which provided that there should be no interference with any other district's water right lands. Article 15 provided that the city could not hold the United States, EBID, or EPCWID liable for shortages or acts of God.

Amendatory Contract No. II6r-1712 dated May 20, 1949

Repayment— Payment for the city of El Paso's use of return flows was to be conducted in the same manner as provided in the contract of 1944.

Water Supply— The contract amended the contract of 1944 by allowing the city the right to Rio Grande Project return flows in excess of project requirements.

Contract dated August 10, 1949

Repayment— Article 7 of the contract allowed the city of El Paso to make payment to EPCWID for use of project works in the following manner:

For each and every acre-foot of water diverted and used by the City for the diversion and use of which Project works are used, the City will pay at the same rate of charge per acre-foot then prevalent for excess water as made by the District [EPCWID] against its lands. "Excess water," as used in this paragraph, means those waters which may be delivered to said lands by the District [EPCWID] upon the payment of the District's minimum charge.

No provisions in this contract addressed payment to the United States.

Water Supply— The contract allowed the city of El Paso to divert and store, in its own storage facilities, return flows created during periods of nonirrigation use, storm runoff, and unavoidable project operating wastes due to sudden weather changes. These flows were deemed in excess of the requirements of EPCWID and Hudspeth. In addition, article 10 of the contract provided that the city would not be held to have in any way relinquished or impaired its title, ownership, and right to control and determine the use of any sewage effluent resulting from the use of water obtained from sources other than the project supply.

Contract No. 14-06-500-375 dated May 15, 1959

Repayment— This contract was a rehabilitation and betterment (R&B) contract for project works serving EPCWID lands with a contract obligation of \$2.3 million. Payments were based on a variable repayment plan, but the remaining obligation was bought out in 1988.

Water Supply— Not addressed.

Contract No. 14-06-500-762 dated December 20, 1965

Repayment— The contract provided that the city of El Paso pay for water delivery based on annual statements of taxes, charges, and assessments against the lands associated with the transferred water. No provisions were made for payments to the United States for transfer of irrigation to municipal use.

Water Supply— The contract provided for the city to acquire additional project water by obtaining assignments and transfers of water from owners of tracts of water right lands 2 acres or less in area within EPCWID's service boundary. The minimum term for these assignments was 25 years, and the amount of water transferred was equivalent to 3.5 acre-feet per acre annually.

Contract No. 14-06-500-1351 dated November 16, 1966

Repayment— The contract amended the contracts of November 1937, October 1939, and May 1959 to provide for a variable repayment plan of all EPCWID's annual and semiannual installments. The annual payment of \$133,860 was to be adjusted based upon a ratio of the acre-feet per acre July 10th water allotment over 3.00 acre-feet. EPCWID would still make one-half payment on March 1 and one-half payment on September 1 starting in 1967, but the repayment period would be open-ended.

Water Supply— Not addressed.

Contract No. 14-06-500-1805 dated February 12, 1971

Repayment— The contract was another R&B contract with a contractual obligation of \$5,471,200. Article 6 of the contract provided a variable repayment plan similar the 1966 contract with an annual base charge of \$40,716. The remaining obligation under this contract was bought out in 1988.

Water Supply— Not addressed.

Contract No. 0-07-54-X0904 dated March 14, 1980

Repayment— The contract transferred O&M responsibility from the United States to EPCWID for the remainder of the distribution and drainage system. Article 3(a) of the contract required that EPCWID pay 20.54845 percent of O&M costs on Mesilla

Diversion Dam and 43.2258 percent of all costs of operating the water control and conveyance reserved works.

Water Supply— Article 6 provided that the United States allocate stored project water among EPCWID, EBID, and the Republic of Mexico.

Contract No. 9-07-40-R0680 dated November 29, 1988

Repayment— The contract provided that the El Paso County Lower Valley Water District Authority (Authority) pay for water delivery based on annual statements of taxes, charges, and assessments against the lands associated with the transferred water. No provisions were made for payments to the United States for transfer of irrigation to municipal use.

Water Supply— The contract provided a means for the Authority to obtain a supplemental water supply by acquiring assignment and transfer of project supply rights from owners of tracts 2 acres or less. Deliveries of water to the Authority could be made only during the irrigation season, and no deliveries could be made by the release of stored water from project storage reservoirs except at times when stored water was released for irrigation. Each assignment had an initial term of 75 years.

Amendatory Contract No. 0-07-54-X0904 dated May 31, 1989

Repayment— The contract amended the 1980 O&M transfer contract by providing that EPCWID pay the United States all costs of maintaining the Riverside Diversion Dam and 43.2258 percent of all costs of operating the water control and conveyance reserved works. In addition, EPCWID was not obligated to pay any O&M costs of such works allocable to storage and delivery of water to Mexico. EPCWID agreed to pay 20.54845 percent of the O&M costs to EBID for Mesilla Diversion Dam.

Water Supply— Not addressed.

HUDSPETH COUNTY CONSERVANCY AND RECLAMATION DISTRICT

In 1924, the Hudspeth County Conservation and Reclamation District No. 1 was organized to consolidate into one canal system several ditches that had been built in about 1915 and were diverting water from the Rio Grande at various points between the Rio Grande Project boundary and Guayuco Arroyo. Under a Warren Act contract between Hudspeth and the United States, the district has been making a direct diversion of drainage and wastewaters from the Rio Grande Project since 1925. This contract extends only to the return water as it occurs in the normal operation of the Rio Grande Project and puts no obligation upon the latter for delivery of any specific amounts of water.

The Hudspeth Main Canal heads at the lower end of the Tornillo Canal, about 12 miles southeast of Fabens, and diverts the residual flow of the latter canal. At Alamo Heading on the Rio Grande, about 8 miles below the end of the Tornillo Canal, riverflow—consisting chiefly of drainage and return water—is diverted by gravity to the Hudspeth feeder canal which joins the Hudspeth Main Canal a short distance northwest of Fort Hancock.

Comprising over 18,000 acres of the El Paso Valley below the Rio Grande Project, the total acreage in Hudspeth irrigated from the Rio Grande in 1992 was 15,000 acres.

On the Texas side of the river between Guayuco Arroyo—which is the terminus of the Hudspeth district canal system—and the canyon below Fort Quitman, there is some irrigation by individual landowners who divert from the river by short gravity ditches or pumping plants.

Hudspeth Contracts

This section summarizes contracts between the United States and Hudspeth County Conservation and Reclamation District in terms of two main issues: *repayment* and *water supply*.

***Contract dated December 1, 1924**

Repayment— Hudspeth was to pay the United States \$1.25 per acre-foot of delivery. In addition, Hudspeth agreed to pay \$3,702.50 in unpaid rental charges.

Water Supply— The contract allowed for water delivery to Hudspeth from the terminus of the Tornillo Main Canal during the irrigation season. The water could not be made available from Elephant Butte Reservoir storage.

***Contract dated April 10, 1935**

Repayment— Not addressed.

Water Supply— The contract allowed Hudspeth to establish facilities for pumping water from the lower end of the Tornillo Drain only during the year 1935.

Contract No. II6r-3471 dated April 27, 1951

Repayment— This contract amended the 1924 contract by providing that Hudspeth pay the United States \$1.25 per irrigated acre (rather than the \$1.25 per acre-foot). However, a limit of 18,000 acres was set on the total area irrigated under this contract.

Water Supply— The contract provided that the United States would deliver to Hudspeth water available from the Tornillo Canal, the Fabens Waste Channel, and the outlet of the Tornillo Drain without the use of project storage. Hudspeth relinquished to the United States all right, title, interest, and claim to any and all waters of the Rio Grande vesting in Hudspeth as of December 1, 1924.

⁶ Asterisk (*) denotes contract is no longer in effect.

CHAPTER III

AUTHORITIES AND INSTITUTIONAL CONSTRAINTS

This chapter provides an overview of the legal framework under which the Bureau of Reclamation acquired the water rights for the Rio Grande Project and the present legal framework under which those rights are exercised.

Congress provided general authority for the construction of irrigation works to reclaim arid and semiarid lands in the *Reclamation Act of June 17, 1902* (43 U.S.C. § 391). The purpose of the legislation was to encourage the settlement and cultivation of western lands. Section 2 of the act gave the Secretary of the Interior (Secretary) general authority to locate and construct irrigation works for the storage, diversion, and development of water. The 1902 legislation specifies conditions under which proceeds from the sale of public lands could be forwarded to the U.S. Treasury and applied to a reclamation fund for the irrigation projects. The act gave the Secretary the authority to expend monies from the Reclamation Fund for preliminary investigations, construction of reservoirs and irrigation works, operation and maintenance of constructed works, and acquisition of necessary property by purchase or condemnation without further specific appropriations by Congress. Texas was not included in the 1902 legislation. However, Congress later passed the *Extend Reclamation Act to Texas Act*, June 12, 1906 (43 U.S.C. § 391), which included and applied the Reclamation Act to Texas.

RIO GRANDE PROJECT AUTHORITIES

The Rio Grande Project was among the first projects to receive Federal attention soon after the passage of the Reclamation Act. Investigation surveys were begun in 1903, and a feasibility report was completed in 1904. The project was approved by the Secretary on December 2, 1905. Congress passed the *Rio Grande Reclamation Project Act* on February 25, 1905 (33 Stat. 814). Because Texas was not yet included in the provisions of the Reclamation Act, Congress specifically authorized its inclusion for this particular project. The legislation provided for a dam to be constructed near Engle in the Territory of New Mexico to store floodwaters and provide water storage for a general system of irrigation.

In 1906, a convention between the United States and Mexico resulted in a treaty providing for the equitable distribution of Rio Grande water for irrigation purposes. This treaty was ratified by the Congress on January 16, 1907. The United States agreed to deliver to Mexico 60,000 acre-feet of water annually "in the bed of the Rio Grande at the point where the headworks of the Acequia Madre, known as the Old Mexican Canal, now exist above the city of Juarez, Mexico" (34 Stat. 2953). The countries agreed that delivery would begin when the proposed storage dam near Engle, New Mexico, and the auxiliary distribution system was completed. The treaty specified that in cases of extraordinary drought or serious accident to the irrigation system in the United States, the amount delivered to Mexico could be diminished in the same proportion as water deliveries in the United States.

FINAL DRAFT

On March 4, 1907, Congress appropriated an additional \$1 million from the Treasury for the construction of Elephant Butte Dam (34 Stat. 1357). The \$1 million was the State Department's nonreimbursable share of the construction costs to accommodate the annual allocation of 60,000 acre-feet of water to Mexico. The legislation specified that remaining construction costs were to be funded by the Reclamation Fund and monies collected from settlers and owners of the land benefiting from the *Reclamation Act*.

The *50-Year Power Lease, Rio Grande Project Act*, dated February 24, 1911 (43 U.S.C. § 522), provided for a 50-year power lease on the Rio Grande Project. Because costs of the power facilities were to be charged to the water users, the money derived from any lease was to be returned to the project as a tail-end credit on the construction costs. Pursuant to this legislation, the lease was granted to the water users at no cost in 1928.

On July 8, 1916, the Congress authorized the Atchison, Topeka, and Santa Fe Railway Company the right to take water from Elephant Butte Reservoir, not to exceed 30 million gallons per month, in exchange for a portion of that company's pipeline right-of-way, which would be flooded by the reservoir (39 Stat. 351). The deed was accepted by the Department of the Interior (Interior) on October 7, 1918.

Under the *Sundry Civil Expenses Appropriations Act for 1918*, dated June 12, 1917 (40 Stat. 148), \$648,000 was appropriated for maintenance, operation, continuation of construction, and incidental operations. A provision in the legislation stated that the funds were not to be used for drainage in irrigation districts unless they were formed under state laws and executed agreements for repayment to the United States of all project investments.

The *Omnibus Adjustment Act*, enacted on May 25, 1926 (44 Stat. 643), authorized the deduction of an additional \$31,661.35 from the total costs of the project due to error. It also authorized a credit on the contract between the United States and El Paso County Water Improvement District No. 1 (EPCWID) for up to \$350,000 as compensation for diversions made from the Rio Grande to Mexico.

On August 29, 1935, the Congress authorized and appropriated \$1 million for the construction, operation, and maintenance of the American Diversion Dam (49 Stat. 961). Constructed and operated by the United States section of the International Boundary Commission (IBC),¹ the diversion dam is located on the Rio Grande 2 miles northwest of El Paso immediately above the point where the river becomes the international boundary line. The purpose of the American Diversion Dam is to provide better measurement and control of the 60,000 acre-feet of water annually delivered to Mexico.

Caballo Dam became justified when it was included as a flood control unit in the Rio Grande Rectification Project and part of its cost allocated to that purpose. On

¹ The International Boundary Commission was created, with an effective date of December 24, 1890, pursuant to the Convention with Mexico of March 1, 1889 (26 Stat. 1512). It was reconstituted as the International Boundary and Water Commission, United States and Mexico, by the Treaty with Mexico of February 3, 1944 (59 Stat. 1219), effective November 8, 1945. The Secretary of State is given authority to perform several actions in support of the International Boundary Commission in the Act of August 27, 1935 (49 Stat. 906).

November 10, 1933, the Congress ratified a treaty with Mexico that provided for the rectification of the Rio Grande (48 Stat. 1621). The treaty specified that it would use IBC studies and engineering plans to protect towns and agricultural lands located in the El Paso-Juarez Valley from flood dangers and secure the stabilization of the international boundary line. The nations agreed to carry out the rectification works provided in Minute 129 of the IBC. Minute 129, paragraph 2, states: "the plan includes construction of a flood retention dam at the only available site, twenty-two (22) miles below Elephant Butte on the Rio Grande, creating reservoir storage of one hundred thousand (100,000) acre-feet" (48 Stat. 1629). Caballo Reservoir made year-round power generation at Elephant Butte Dam possible, and part of the cost was allocated to that purpose. It also provided additional project storage.

The *Rio Grande Canalization Project Act* was enacted on June 4, 1936 (49 Stat. 1463). It authorized the construction, operation, and maintenance of the said project and appropriated \$3 million. The funds were used to control and operate the water supply in the Rio Grande from Caballo Reservoir in New Mexico to the International Dam near El Paso, Texas. The project was undertaken to facilitate compliance with the convention between the United States and Mexico that concluded on May 21, 1906.

In the 1938 *Interior Department Appropriation Act* (50 Stat. 564), EPCWID and Elephant Butte Irrigation District (EBID) were relieved of any future obligation to pay for the costs of constructing Elephant Butte Dam. In exchange, the two districts conveyed to the United States all of "the districts' right, title, interest, and estate in the use of said dam and other project works, including the project water supply, for the development of hydroelectric energy." Use of the powerplant was not to interfere with or deplete irrigation use (50 Stat. 593).

The Secretary authorized construction of Elephant Butte Powerplant on July 9, 1938. Plans specified that power allocation would be split between New Mexico and Texas. Power development funds were made available from the Reclamation Fund (\$500,000) and the Public Works Administration (\$500,000). The *Interior Department Appropriation Act of 1940* (53 Stat. 717) allocated \$483,000 for the project, and the *First Deficiency Appropriation Act of 1940* (54 Stat. 87) provided that funding be carried over until completion. The estimated cost of the plant and transmission lines was \$2.5 million, of which the plant and generating equipment cost \$1.5 million. Additional funds were appropriated from the Reclamation Fund for fiscal year 1941. The plant itself was completed in 1940.

The Rio Grande Compact, distributing Upper Rio Grande water between the States of Colorado, New Mexico, and Texas and providing for the treaty allowance to Mexico, was entered into in 1938 and ratified by the Congress on May 31, 1939 (53 Stat. 785). Increasing diversions from the Rio Grande in Colorado had decreased riverflow above Elephant Butte in the 1920's. As a result, a commission composed of members representing the affected states and the United States met to decide the apportionment of the river.

The Rio Grande Compact provided for equitable apportionment of Rio Grande water above Fort Quitman, Texas. Colorado is obligated to make its delivery of water at the Colorado-

New Mexico state line. New Mexico, on the other hand, is obligated to make delivery at Elephant Butte Reservoir. The actual quantity of water is measured according to a quantified inflow/outflow schedule. The compact was designed to permit an average normal release from Elephant Butte Reservoir of 790,000 acre-feet per year—sufficient to irrigate project lands in New Mexico and Texas and deliver the obligated water to Mexico. The Rio Grande Compact Commission, with voting representatives from the three states and a nonvoting representative appointed by the President acting as chairman, was created to administer the provisions of the compact.

The *Act of July 25, 1962* (76 Stat. 171) provided for the establishment and administration of basic public recreation facilities at Elephant Butte and Caballo Reservoirs. However, it did not allocate any water for recreation use or reserve any of the reservoir capacity for recreation. The Congress appropriated \$607,000 to implement this act.

On October 27, 1974, Title XIV of the *Reclamation Development Act of 1974* (88 Stat. 1498) authorized the storage of San Juan-Chama Project, New Mexico, water in Elephant Butte Reservoir in order to establish a recreation pool. The Secretary was authorized to transfer water from Heron Reservoir to provide 50,000 acre-feet for the recreation pool and up to 6,000 acre-feet per year to maintain the pool. In order for this water storage to have no impact on the Rio Grande Compact provisions for water allocation, the Congress specified that in case of emergency spill of water from Elephant Butte, no "actual spill" (as defined in the compact) would occur until all San Juan-Chama Project water is spilled.² The legislation also specified that 50 percent of the Secretary's incremental cost for maintaining the recreation pool would be borne by a non-Federal entity. There were no provisions in the legislation for replacement of the recreation pool in case of spill.

Title IV of the *Reclamation Authorizations Act of 1976* (90 Stat. 1327) provided for the 13-mile extension of American Canal from the vicinity of International Dam extending south to the Riverside Canal heading. Congress authorized \$21.7 million for the construction costs including laterals, pumping plants, wasteways, and appurtenant facilities.

The *San Juan-Chama Project Water Act of 1981* (43 U.S.C. § 620a) authorized the Secretary to enter into agreements with Reclamation's San Juan-Chama Project water contractors for storing such water in Elephant Butte Reservoir. The Secretary was authorized to release San Juan-Chama Project water to the contracting entities for such storage. The legislation stipulated that any increase in operation and maintenance costs resulting from that storage not offset by increased power revenues would be proportionately

² Actual spill would occur when the water level of the reservoir equals the total physical capacity of the reservoir to the level of the uncontrolled spillway. San Juan-Chama Project water would be spilled prior to any calculation of actual spill.

Calculations of spills are important because they affect the credit and debit calculations for Colorado and New Mexico. In a year when an actual spill occurs, no annual credits or debits are computed for that year. In addition, in any actual spill year, the accrued credits of Colorado or New Mexico, or both, are reduced in proportion to their respective credits by the amount of the actual spill. Also, in a year when there is actual spill of usable water, all accrued debits of Colorado or New Mexico, or both, at the beginning of the year are canceled.

paid for by the contracting entities. Accountability for evaporation loss and spill chargeable to San Juan-Chama Project water was to follow requirements specified in the Rio Grande Compact.

WATER RIGHTS

To understand the development of western water policy, one must appreciate the vast differences in terrain that occur when crossing the hundredth meridian from east to west in the United States. East of that meridian, the land generally receives enough rainfall to farm without irrigation. West of the hundredth meridian, the land is for the most part desert, receiving as much as 20 inches of precipitation a year on the eastern edge, compared to only 7 inches or less in areas further west.

Prior Appropriation Doctrine

Western water rights laws developed quite differently from those of the East and evolved into the prior appropriation doctrine. Lack of rainfall in the West creates a dependency on surface water sources and a need to divert water to where it is needed. Thus, the English riparian rights doctrine was inadequate. The riparian laws adopted in the Eastern States stipulated that an owner with land adjacent to a stream had rights to reasonable use of the water. The owner could not transport the water to other locations because the downstream owner was entitled to the undiminished flow of the stream. Because streams in the West in many cases had to be diverted, some Western States attempted to modify the riparian doctrine to meet their needs. However, once the appropriation doctrine was developed, most Western States rejected riparian law entirely. A few states attempted to combine both doctrines.

The beginnings of the prior appropriation doctrine can be traced to territorial mining law. The mining doctrine of "first in time, first in right" applied to those who diverted water for beneficial use. Water rights were recognized by posting a notice at the water source that declared the amount of water one intended to divert. Later, when state constitutions were written, the West adopted the principles of prior appropriation in varying degrees. Most state constitutions require an application to be filed with a state agency, a subsequent ruling by that agency approving or denying the application based on water availability, and finally, maintenance of a public record of all applications.

Key features of the prior appropriation doctrine are:

- Requirement for beneficial use
- First in time is first in right
- Need for a diversion
- Vested water rights that become a property interest
- Use it or lose it

Thus, under this doctrine, the first person to divert water for a beneficial use obtains a property right in the use of the water. An appropriation water right is considered property

and can be separately transferred from the land. The appropriator, however, owns only the right to use the water and not the water itself. The water right permits the owner to change the point of diversion, place, or use of the right. The owner of the right must request permission from the state prior to any change. The right retains its priority date and its specific quantity of water as long as the right continues to be exercised.

Under state systems, the day that a person first diverts water for a beneficial use is the "priority date." As more people divert water, priority dates continue to be assigned until all of the water is fully appropriated or even until it becomes overappropriated. Subsequent water appropriators have a lesser right to the water. In years of water shortage, the users with the earlier priority dates receive their shares of the water first, and people with later priority dates may receive no water. This method ensured the early water users that they would always have the water they needed. If a senior water rightholder did not use the appropriated water after a specified length of time, under state law, another party could allege that the water right was abandoned. The holder could then lose the right to the water. The philosophy was "use it or lose it."

Federal Reserved Rights

Federal water rights can be attained through two distinct processes. The first process is known as the Federal reserved rights doctrine. This doctrine was articulated by the Supreme Court in 1908 in *Winters v. United States*, 207 U.S. 564. That case involved claims by the United States on behalf of the Fort Belknap Indian Reservation in Montana for water from the Milk River. In deciding for the United States, the court stated:

The power of the government to reserve the waters and exempt them from appropriation under the state laws is not denied, and could not be. That the government did reserve them we have decided, and for a use which would be necessarily continued through years. This was done May 1, 1888 . . .
Winters at 577.

The court determined that the effective date of the reserved water right was May 1, 1888, for the purposes for which Fort Belknap Indian Reservation was created.

Furthermore, in 1963, the Supreme Court in *Arizona v. California*, 373 U.S. 546, applied the reserved rights doctrine to other Federal establishments, stating:

The Master ruled that the principle underlying the reservation of water rights for Indian Reservations was equally applicable to other federal establishments such as National Recreation Areas and National Forests. We agree with the conclusions of the Master that the United States intended to reserve water sufficient for the future requirements . . . Arizona at 578.

Also, in 1976, in *Cappaert v. United States*, 426 U.S. 128, the Supreme Court stated:

This Court has long held that when the Federal Government withdraws its land from the public domain and reserves it for a federal purpose, the Government, by

implication, reserves appurtenant water then unappropriated to the extent needed to accomplish the purpose of the reservation. In so doing the United States acquires a reserved right in unappropriated water which vests on the date of the reservation and is superior to the rights of future appropriators. Cappaert at 138.

Therefore, one of the ways for the Federal Government to acquire water rights is through Federal reserved rights at the time land appurtenant to water is reserved. These rights oftentimes have not been documented in state offices, and much discussion has occurred on the amount of water that is reserved. The exact quantity often is not established unless the stream has been through a general adjudication process whereby all rights are specified by the court.

Federal Rights Through State Appropriation—the Reclamation Way

Another way for the Federal Government to acquire water rights is through use of the state appropriation system. Under this method, the Federal Government applies for a right under whatever process is established by the state. As stated above, water rights are considered a property interest and, as such, fall under a state's property law provisions. Reclamation laws support state authority and generally direct the agency to apply for rights under the state appropriation system. For example, section 8 of the *Reclamation Act* states:

Nothing in this Act shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this Act, shall proceed in conformity with such laws, and nothing herein shall in any way affect any right of any State or of the Federal Government or of any landowner, appropriator, or user of water in, to, or from any interstate stream or the waters thereof: Provided, that the right to the use of water acquired under the provisions of this Act shall be appurtenant to the land irrigated and beneficial use shall be the basis, the measure, and the limit of the right.

Thus, the *Reclamation Act* recognizes the prior appropriation systems of the Western States. Some debate has occurred regarding what physical acts are necessary to constitute an appropriation and what is a beneficial use. Most state water laws have a statement similar to the act's assertion that beneficial use is the basis of the water right. The states commonly define beneficial use as application of water to a lawful purpose that is useful to the appropriator and at the same time is consistent with public interest in maximum water use.

Court Cases on Reclamation Water Rights

Three major Supreme Court cases have dealt with the scope and impacts of Reclamation water rights. Review of the court's decisions provides insight into how courts may rule on current and future controversies.

In *Ickes v. Fox*, 300 U.S. 82 (1936), the court examined whether the Secretary of the Interior could reduce the amount of water to which the landowner is entitled by contract. The court stated that Reclamation projects have appropriated water for use by landowners, and the water rights attach to the land. The landowners had a vested property right in receiving a quantity of water to beneficially and successfully irrigate their lands. On this particular project, landowners had received 4.84 acre-feet-per-acre per year for 20 years. The court ruled that the Secretary could not subsequently reduce their rights to 3.0 acre-feet and then require an additional rental charge for water delivery over that amount.

The court subsequently looked at how to apportion waters of a stream crossing state boundaries in *Nebraska v. Wyoming*, 325 U.S. 589 (1945). The dispute centered around apportionment of North Platte River water among Nebraska, Wyoming, and Colorado. Nebraska brought the action asking the court to determine the respective rights of the states to the water in the North Platte. Nebraska claimed that some Wyoming diverters continued to take water in times of shortage, even though they had appropriation rights junior to some owners in Nebraska. Therefore, Nebraska did not receive its fair entitlement of water.

The court limited its decision to apportionment of the natural flow of the river and did not dictate apportionment of the storage water at Reclamation projects on the North Platte River. The court said that storage water distribution should be in accordance with the associated contracts and declared:

... [s]torage water therefore is defined for purposes of this decree as any water which is released from reservoirs for use on lands under canals having storage contracts in addition to the water which is discharged through those reservoirs to meet the requirements of any canal as recognized in the decree. Nebraska, 325 U.S. at 631.

Thus, the court dealt only with the distribution of a quantity of water that it determined constituted the natural flow of the river. In a further discussion of storage water, the court stated:

Certainly an apportionment [by the Court] of storage water would disrupt the system of water administration which has become established pursuant to mandate of Congress in § 8 of the Reclamation Act that the Secretary of the Interior in the construction of these federal projects should proceed in conformity with state law. In pursuance thereto all of the storage water is disposed of under contracts with project users and Warren Act canals. It appears that under that system of administration of storage water no State and no water users within a State are entitled to the use of storage facilities or storage water unless they contract for the use. Nebraska, 325 U.S. at 639-40.

Finally, in *Nevada v. United States*, 463 U.S. 110 (1983), the court declared that the United States could not raise a water rights claim on behalf of the Pyramid Lake Paiute Tribe because the water rights had already been decided in an earlier decree. The United States wanted to provide an additional water supply to the tribe from the Federal water rights confirmed by the court in the Orr Ditch decree in 1944. However, that water was awarded

for use in irrigating lands within Reclamation's Newlands Project, and the United States could not transfer that right because the beneficial interest in the water was vested in the project landowners. The court declared:

... we conclude that the Government is completely mistaken if it believes that the water rights confirmed to it by the Orr Ditch decree in 1944 for use in irrigating lands within the Newlands Reclamation Project were like so many bushels of wheat, to be bartered, sold, or shifted about as the Government might see fit. Once these lands were acquired by settlers in the Project, the Government's "ownership" of the water rights was at most nominal; the beneficial interest in the rights confirmed to the Government resided in the owners of the land within the Project to which these water rights became appurtenant upon the application of Project water to the land. Nevada at 126.

Even if Reclamation holds legal title to the water rights for the project, the courts view landowners as having vested property interests in receiving project water. These landowner vested rights exist for two reasons. First, the landowner has a contractual arrangement with the United States for project water and, unless that person breaches the contract, there is an obligation to satisfy the agreement. Second, the purpose behind Reclamation projects was to provide a consistent water supply for the appurtenant lands and not for the government's benefit. Therefore, the project's beneficial use of the water ultimately resides with the landowner.

However, recent decisions by the Ninth Circuit in California indicate that landowner contract rights may not be interpreted as expansively today as they were in 1936 when *Ickes* was decided. In *Peterson v. U.S. Department of the Interior*, 899 F.2d 799 (9th Cir. 1990, certiorari denied 111 S. Ct. 567 (1990)), the Ninth Circuit Court of Appeals held that the Congress could make policy changes by statute and apply those changes to existing contracts. This case was brought by water districts challenging certain provisions of the *Reclamation Reform Act*, 43 U.S.C. §§ 203(b), 390bb-kk. In this legislation, the Congress closed a leasing loophole and redefined who could receive subsidized reclamation water. The act specified that water districts could either: (1) amend pre-existing contracts to conform to these new provisions or (2) continue to pay the original contract price for water deliveries to land within the new 160-acre limit held in common ownership, and pay full cost for water delivered to landholdings in excess of 160 acres.

The districts declined to amend their contracts and filed a lawsuit claiming that the 203(b) requirement violated due process and taking clauses of the Fifth Amendment of the Constitution. The taking clause provides that the Federal Government cannot appropriate private property for public use without just compensation. The court said that it will apply three principles when interpreting the Federal Government's contracts:

1. *Sovereign power, even when unexercised, is an enduring presence that governs all contracts subject to the sovereign's jurisdiction, and will remain intact unless surrendered in unmistakable terms;*

2. *Governmental contracts should be construed, if possible to avoid foreclosing exercise of sovereign authority;*
3. *Governmental contracts should be interpreted against the backdrop of the legislative scheme that authorized them, and our interpretation of ambiguous terms or implied covenants can only be made in light of the policies underlying the controlling legislation. Peterson at 807.*

In view of those principles, the court held that the water districts had no vested property right to buy reclamation water for delivery to leased lands. Therefore, there were no taking or due process violations of the Fifth Amendment.

In *O'Neill v. United States*, 50 F.3d 677 (9th Cir. 1995), the Ninth Circuit Court of Appeals held that a water service contract provision stating that the government was not liable for damages arising from water shortages due to errors in operation, drought, or any other cause unambiguously relieves the government of liability for water shortages resulting from valid legislation. The court also held that even if the contract obligated the government to supply a specified amount of water without exception, the contract was not immune from subsequently enacted statutes. In this instance, subsequent to the contract, legislation was passed protecting the chinook salmon and the delta smelt. This legislation required modification of Central Valley Project water deliveries to protect and restore habitat of the endangered species. The court pointed out that the contract provided a remedy for water shortages—a reduction in the price paid for water deliveries.

These recent cases appear to lessen the impact of the Supreme Court's opinion in *Ickes*, which declared that landowners had a vested property right to receive a specified quantity of water. It appears that if the Congress decides to change policy, the courts will support the change even if the landowners suffer water shortages and the legislation impacts existing contracts. On the other hand, it also is clear that the Secretary cannot arbitrarily and unilaterally make changes in contract provisions.

Rio Grande Water Rights

Evaluating the water rights of the Rio Grande becomes quite complicated because there are a number of factors that must be considered. The Rio Grande is an interstate river beginning in Colorado and running through New Mexico and Texas. Any analysis must include the impact of the Rio Grande Compact regulating the distribution of Rio Grande water. Because the river forms the major part of the international boundary with Mexico, the treaty guaranteeing that a specified quantity of Rio Grande water be delivered to Mexico also must be included. Also, the Federal Government has extensive involvement through sponsorship of the Rio Grande Project. To some extent, the water rights are influenced by New Mexico and Texas water law. Texas claims their water is the property of the state, and New Mexico claims that water is the property of the public. In addition, case law has interpreted the status of the Rio Grande water rights, and so a discussion of those court decisions is also appropriate. Each of the above factors will be separately examined in this section.

International

Disputes between Mexico and the United States over the distribution of the surface water of the Rio Grande resulted in the 1906 Treaty with Mexico. Mexico had filed a court claim for \$35 million in damages against the United States, alleging that water shortages near Juarez were the result of increased diversions from the Rio Grande by Colorado and New Mexico (McDonald and Tysseling 1982, p. 857). The 1906 Treaty settled this claim with the United States, promising an annual delivery of 60,000 acre-feet of water to Mexico.

Federal

The Federal Government sponsored the Rio Grande Project for several reasons, including guaranteeing a specific quantity of water to Mexico. In the authorizing legislation, the *Rio Grande Reclamation Project Act of 1905*, the stated goal was to store the Rio Grande floodwaters and then supply New Mexico and Texas with the stored water for irrigation. House Report No. 3990 declares:

The bill is one of large importance and of great merit. For years there have been conflicting claims between the citizens of New Mexico and Texas in reference to the use of the waters of the Rio Grande, and there are also pending claims, nominally of a very large amount, in behalf of the citizens of Mexico. There is no doubt that a considerable amount of land in Mexico was formerly irrigated to some extent by the waters of the Rio Grande, and that the use of the water farther up the stream has been injurious to this land.

Various schemes have been suggested for constructing dams on the river, but none have seemed to be entirely feasible or to meet all the conditions. The engineers connected with the Geological Survey in charge of the work under the Reclamation Act, and especially Mr. Newell, after careful examination have devised a scheme which we regard as highly beneficial. A dam will be constructed at the mouth of a canyon in New Mexico which will store a very large amount of water, with the additional advantage that it will flood practically no land of any value. As an additional advantage it will be possible to irrigate 185,000 acres of land that is now of small or little value. As an additional advantage it will be possible to irrigate the land in Mexico formerly receiving water from the Rio Grande, and it will settle claims that have long been pending upon an equitable basis . . .

The act extends the provisions of the reclamation act to the lands in Texas which can be irrigated from the Rio Grande. The scheme is approved by the engineers of the Geological Survey, by the people in New Mexico and Texas, and there is no doubt that it will enable the Secretary of State to dispose of troublesome claims upon an equitable basis.

If the Government of Mexico should decline to enter into such an agreement they will keep their claims and we shall furnish no water for their land, but there is no probability that such will be the result. Your committee regard this bill as of very

large importance, and trust that it may speedily become a law. It will dispose of questions that have been embarrassing the Government for 20 years and satisfy the demands of the people both of Texas and New Mexico.

The House Report indicates that the citizens of Texas and New Mexico supported the project, which was also seen as a solution to the problems with water delivery to Mexico. Citizens desired a firm, dependable water supply from the Rio Grande rather than the status quo of extreme fluctuating flows. Except for deliveries to Mexico, project water was authorized for irrigation use only. In House of Representatives Document No. 39 of the 62nd Congress, the Secretary submitted information regarding appropriation or disposition of the water of the Rio Grande and its tributaries in Colorado and New Mexico. On June 27, 1906, the United States, Elephant Butte Water Users Association of New Mexico, and El Paso Valley Water Users Association, entered into an agreement in which all parties recognized that, without irrigation, the lands in that area would remain unclaimed and unfit for habitation unless the Rio Grande was impounded and the flow regulated and controlled. The agreement states that the users of project water should file in the appropriate state for the right to use the water. Article 10 of the agreement declares:

That in all the relations between the United States and these associations and the members of the associations, the rights of the members of the associations to the use of water where the same have vested, are to be defined, determined and enjoyed in accordance with the provisions of the said act of Congress and of other acts of Congress on the subject of the acquisition and enjoyment of the rights to use water; and also by the laws of New Mexico and Texas, where not inconsistent therewith, modified, if modified at all, by the provisions of the articles of incorporation and by-laws of said associations.

The Federal Government asserts a superior interest in use of project water by stating that the use must be in compliance with acts of Congress. The agreement also states that the water laws of New Mexico and Texas must be complied with as long as those laws are not inconsistent with Federal law. The Congress places conditions on water use through legislation. Reclamation has contractual arrangements with the irrigation districts for delivery of water, and these contracts implement the congressional conditions.

Another Federal concern is the storage of San Juan-Chama Project water in Elephant Butte Reservoir. Special legislation was passed authorizing the formation of a recreation pool for the reservoir using San Juan-Chama water. The city of Albuquerque has, in the past, established such a storage contract with the Federal Government. Records are maintained on the quantity of non-Rio Grande water in the reservoir, so that if a spill occurs, proper accreditation can be made. The city of Albuquerque has an agreement with the New Mexico State Parks and Recreation Department to provide water releases from Heron and El Vado Reservoirs for white-water rafting. Heron Dam and Reservoir is on Willow Creek immediately at its confluence with Rio Chama about 9 miles west of Tierra Amarilla, New Mexico. El Vado Dam and Reservoir is downstream on the Rio Chama. This water was designated to be moved downstream to Elephant Butte Reservoir to offset evaporation

losses from the recreation pool. However, after the recreation pool was spilled in 1987, a decision was made to use that replacement water to re-establish the recreation pool, which is the current policy.

Rio Grande Compact

The Rio Grande Compact is a tri-state agreement between Colorado, New Mexico, and Texas. The compact was ratified by the states and approved by the Congress in 1939. The stated purpose of the compact was to:

... remove all causes of present and future controversy among these States and between citizens of one of these States and citizens of another State with respect to the use of the waters of the Rio Grande above Fort Quitman, Texas, and being moved by considerations of interstate comity, and for the purpose of effecting an equitable apportionment of such waters, have resolved to conclude a Compact for the attainment of these purposes . . .

Throughout the compact, reference is made to "project storage." That term is defined in Article I(k) as:

"Project storage" is the combined capacity of Elephant Butte Reservoir and all other reservoirs actually available for the storage of usable water below Elephant Butte and above the first diversion to lands of the Rio Grande Project, but not more than a total of 2,638,860 acre-feet.

"Usable water" is all water, exclusive of credit water, which is in project storage and which is available for release in accordance with irrigation demands, including deliveries to Mexico.

The compact requires gauging stations at specific locations along the river, and Colorado and New Mexico must deliver a quantity of water adjusted yearly for fluctuating flow levels. Article III of the compact requires Colorado to deliver in the Rio Grande at the Colorado-New Mexico state line a quantity of water based on upstream flow measurements taken at four locations on the Conejos River and the Rio Grande. A gauging station at Lobatos measures the Colorado delivery.

Article IV requires New Mexico to deliver water in the Rio Grande at San Marcial according to a formula that considers the flow at Otowi Bridge and at San Marcial, except in the months of July, August, and September.

The compact defines an elaborate system of credits and debits applied to Colorado and New Mexico affecting water delivery requirements. It also specifies limitations on the extent of accrued debits and credits and includes a discussion of what happens to credited and debited water in the event of actual spills.

Article VIII projects a normal annual release of 790,000 acre-feet from Rio Grande Project storage. In Article XI, New Mexico and Texas agreed that when the compact becomes effective, all controversies between the two states regarding the quantity or quality of Rio Grande water are settled. Further, in Article XIV, the states agreed that the schedules for water delivery will never be increased or diminished based on any change in the delivery or loss of water to Mexico.

New Mexico Water Law

New Mexico became a United States territory in 1848 and inherited an expansive agricultural system based on conflicting rules of land ownership and water rights. By 1851, the territorial legislature had established water laws that supported the Indian-Spanish concept of public control of water and community ownership of irrigation ditches. The territory's first comprehensive water law was passed in 1907, adopting the system of prior appropriation and establishing the position of territorial engineer as the administering officer. The 1907 law established the right to use surface water as regulated either by permit from the territorial engineer or by court decree. The territorial engineer (now called the state engineer) is responsible for general supervision of the state's water resources including measurement, appropriation, and distribution.

An appropriation water right is considered property and can be separately transferred from the land. The appropriator, however, owns only the right to use the water and not the water itself. The water right permits the owner to change the point of diversion, place, or use of the right. The owner of the right must request permission from the state engineer prior to any change. In determining whether or not to allow the change, the state engineer is governed by the overriding question of whether or not the change will impair existing water rightholders. The right retains its priority date and its specific quantity of water as long as the right continues to be exercised.

New Mexico law specifies that the natural waters belong to the public and are subject to appropriation. To establish a water right in New Mexico, a person must create a diversion, such as a dam or irrigation ditch. A natural diversion from a stream does not meet the requirement. Once the water has been diverted, the second requirement is that the water be put to a beneficial use. Although beneficial use has not been defined in the law, nearly all uses are considered beneficial, including agriculture, recreation, municipal, industry, and mining. In New Mexico, all beneficial uses of water are considered equal regardless of economic value produced by the use.

New Mexico's 1907 water law also set the criteria for vested water rights. Those rights are based on historical use and date from the initiation of the claim. In order to obtain a water right after 1907, a person had to apply for a permit to the territorial engineer. Those with vested rights are not required to file a claim unless there is a change in ownership or there is an adjudication.

According to New Mexico case law, impounded water becomes the personal property of the appropriator. In a 1911 case, *Hagerman Irrigation Co. v. McMurry*, 113 P. 823

(N.M. 1911), the New Mexico Supreme Court declared that when water flowing in a natural stream is appropriated and stored by artificial means, it becomes personal property. The plaintiff appropriated all of the Hondo River water in 1888 at the point of its dam, built a connecting canal to its reservoir in 1907, and was supplying water for crops to some 200 neighboring farmers. The defendant owned riparian land below the dam that needed irrigation water for crops. In order to get water, the defendant had removed flashboards from the dam. The plaintiff brought the action requesting an injunction against the defendant. The defendant's appropriation originated in 1883, prior to the plaintiff's diversion. Nonetheless, the court determined that the defendant only diligently irrigated 100 acres of land, and there was sufficient water supply from other sources for the defendant to irrigate those acres. Therefore, the court found that the plaintiff was entitled to a perpetual injunction against the defendant. In its opinion, the court stated:

While water flowing in a natural stream is not the subject of private ownership any more than the fish in it, yet, when it is impounded and reduced to possession by artificial means, it becomes personal property, as the fish do when caught, or, as the common, ownerless air does, when it is liquefied and held in a vessel.
113 P. at 825.

The court ruled that the plaintiff had acquired a personal property interest in the water when he stored the water by artificial means. At that point, the water might be "the subject of purchase and sale, or of larceny; and it makes no difference in that respect whether the captured fluid is held in a skin or cask, by an itinerant water vendor, or in the pipes of a modern aqueduct company." *Hagerman* at 825.

In order to claim any personal property rights in stored water, the owner must fulfill the New Mexico legal requirements for appropriation. In addition to initial filing rules, New Mexico requires the owner of the right to file whenever there is a change in use. In evaluating a change of use request, the state engineer determines the amount of water depleted with the present use, and the proposed use cannot increase that depletion amount. If the user can demonstrate that the new use will cause less depletion (a greater return flow), the state engineer may permit a larger appropriation. The depletion level, however, must remain constant under any change of use.

An owner also has an option to lease all or a portion of a water right for up to 10 years without adversely impacting the original right. Thus, the owner can avoid losing the right due to non-use. A water right unused for 4 consecutive years is subject to forfeiture in New Mexico. A lease option must be filed with the state engineer.

New Mexico's initial laws regulating ground-water usage were adopted by the state legislature in 1931. New Mexico attempted to ban the exporting of ground water outside of its state boundaries. This practice was determined to be unconstitutional in a Supreme Court decision, *Sporhase v. Nebraska*, 458 U.S. 941 (1982). In that case, the court held that ground water is an article of commerce and, as such, a state cannot automatically deny its transport to another state. As a result, New Mexico passed additional legislation in 1983. This law states:

In order to approve an application under this act, the state engineer must find that the applicant's withdrawal and transportation of water for use outside the state would not impair existing water rights, is not contrary to the conservation of water within the state and is not otherwise detrimental to the public welfare of the citizens of New Mexico.

The legislation specifies six factors for the state engineer's evaluation (Harris 1992, p. 28):

- Supply of water available to the State of New Mexico
- Water demands of the State of New Mexico
- Water shortages within the State of New Mexico
- Whether the water that is the subject of the application feasibly could be transported to alleviate the water shortages in the State of New Mexico
- Supply and source of water available to the applicant in the state where the applicant intends to use the water
- Demands placed on the applicant's supply in the state where the applicant intends to use the water

New Mexico Filings on the Rio Grande. The Rio Grande below Elephant Butte Dam has not been adjudicated. In 1906, B.M. Hall, Supervising Engineer for the Reclamation Service, filed a request with the New Mexico Territorial Engineer for appropriation of water for the Rio Grande Project. This application, Filing No. 8, requested a volume of water equivalent to 730,000 acre-feet per year with a maximum diversion or storage of 2 million miner's inches to be stored in the proposed reservoir. The United States requested that the water be withheld from further appropriation and the United States' rights and interests be protected. The application refers to an act passed by the 36th Legislative Assembly of the Territory of New Mexico entitled, "An Act Creating the Office of Territorial Irrigation Engineer, to Promote Irrigation Development and Conserve the Waters of New Mexico for the Irrigation of Lands and for Other Purposes," section 22 of chapter 102, which states:

Whenever the proper officers of the United States authorized by law to construct irrigation works, shall notify the territorial irrigation engineer that the United States intends to utilize certain specified waters, the waters so described, and unappropriated at the date of such notice, shall not be subject to further appropriations under the laws of New Mexico, and no adverse claims to the use of such waters, initiated subsequent to the date of such notice, shall be recognized under the laws of the territory, except as to such amount of the water described in such notice as may be formally released in writing by an officer of the United States thereunto duly authorized.

In 1908, the United States filed a supplemental notice of its intent to use all of the unappropriated water of the Rio Grande and its tributaries for storage and diversion to

support irrigation of lands in New Mexico and Texas. Through legislation, the United States authorized the project and specified limitations on who might use the water. Water in the Rio Grande between Elephant Butte and Fort Quitman became "project water." The United States Court of Claims determined in *Bean v. United States*, 163 F. Supp. 838 (Ct. Cl. 1958), that the United States was entitled to the seepage of the project water under the appropriations of 1906 and 1908. Seepage was defined as return flow, drainage, and operational wastewaters. *Bean* at 845.

Because New Mexico recognizes vested water rights prior to 1907, some rights may exist that have not been filed in the state engineer's office. For example, in a 1980 case, *State ex Rel. Reynolds v. Holguin*, 618 P.2d 359 (1980), the New Mexico State Engineer brought action against David Holguin alleging unlawful diversion of public waters. The New Mexico Supreme Court agreed with trial court findings that Holguin had a vested water right to divert water from the Rio Grande in order to irrigate 90 acres of his land, even though he had never filed a claim with the state engineer. Holguin had a witness who testified from personal memory that the land had been irrigated for farming since 1900. In addition, some filings in the state engineer's office claim a priority date before the 1908 Federal appropriation. These claim file numbers are all preceded with a "0" in the tables at the end of this chapter (see table III-1a). In an adjudication, all claimants would have to come forward, and the court would decide the validity and amount of each water right claim.

Table III-1 at the end of the chapter includes New Mexico filings for water appropriations from the Rio Grande mainstem and tributaries or sources other than the main Rio Grande. Table III-1a lists filings claiming vested water rights with an appropriation date prior to 1907. Table III-1b lists applications that have been canceled or rejected, and table III-1c lists filings that have expired or been withdrawn.

Texas Water Law

Historically, water right law in Texas prior to 1836 was governed by Spanish and Mexican laws which provided that water rights were created through specific grants from the sovereign (A.E. Richardson, speech to Interstate Compact Commissioner's Conference, December 1980). The grants for water rights were sometimes in the same document as the land grant, and at other times in a separate grant. Sometimes the grant was to an individual and other times to several grantees along a stream or canal system. All of the Spanish grants named the stream from which the diversion was to be made, named the grantee(s) of the right, indicated the locations of the lands, and specified at least vaguely the quantity of water attached to the right. Under Mexican law, land was classified as irrigable or arable farmland or pasture. Only irrigable lands carried a right of irrigation when granted.

From 1836 to 1889, the Republic and State of Texas continued the Spanish and Mexican system of water rights. In 1840, Texas adopted the riparian doctrine with some exceptions. It provided that lands next to surface streams had a right for irrigation, railroads, power generation, mining, and recreation. Texas also preserved by statute the Mexican classification of lands. In addition, the legislature made specific grants of water to individuals and companies between 1854 and 1879.

In 1889, the Texas legislature enacted an irrigation act in which the unappropriated water of every river or natural stream in the arid portions of the state became the property of the public (Baade 1986, p. 5). That water became subject to appropriation through the "first in time, first in right" philosophy by filing a sworn description with the local county clerk. That act was followed 6 years later by a more detailed enactment of the appropriation system. Any previous grants of riparian rights were respected.

The *Irrigation Act of 1913* created the Board of Water Engineers and centralized the licensing process by limiting the authority to issue permits to the board. The previous locally filed appropriations had to be refiled with the board, and these later became "certified filings" (Baade 1986, p. 7). The act specified that no diversions would be permitted if the rights of a riparian owner would be harmed, unless the owner consented to the diversion. The certified filing is a license from the state to appropriate state water and can only be perfected by actually applying the water to a beneficial use. The *Irrigation Act* also provided for another type of appropriative right called a permit. Any person wishing to use state water could apply for a permit from the board. A permit, if granted, authorizes the holder to use a specific amount of water and specifies the purpose of use, place of use, and point and rate of diversion (Richardson 1980).

Because of the various claims to water rights, the *Texas Water Rights Adjudication Act* was enacted in 1967. This act provided a procedure to adjudicate these claims. The Texas Natural Resources Conservation Commission (TNRCC) formerly the Texas Department of Water Resources, evaluates all claims of water rights to state water, except for domestic and livestock purposes, for each stream in Texas. That evaluation is subject to judicial review and confirmation. Section 4 of the act required everyone who claimed a right to use water to record that claim with TNRCC on or before September 1, 1969. It only exempted those who already owned permits or certified filings because they were already on record. In addition, even if the water right claim was valid under existing law, it was valid only to the extent that maximum use was made during any calendar year from 1963 to 1967.

Section 5 of the act established procedures for adjudicating the water right claims. The first phase of the process involves a complete investigation of every known water user including every water right claim, permit, certified filing, and even illegal diverters. The results of the investigation are published in a report that includes aerial photo mosaic maps reflecting the original land surveys, ownership limits, claim and water right boundaries, areas of actual irrigation, dam and diversion point locations, and other pertinent information.

The next phase involves evidentiary hearings before TNRCC hearing examiners in which the claimants may present evidence to support the validity of their claim and perfect their permit or certified filing. After these hearings, TNRCC issues its preliminary determination. Parties who disagree with the findings and conclusions may contest this determination. The contest is resolved at subsequent hearings, and then a final determination is issued and the case is automatically filed with the district court. Anyone objecting to the final determination may file exceptions with the court. The district court issues a final judgment, and TNRCC issues certificates of adjudication to each party with a recognized water right. These certificates replace all previous water right documents.

In 1905, the Texas legislature authorized the application of the *1902 Reclamation Act* in Texas. The law authorized the Secretary to make necessary examinations and surveys for the location and construction of irrigation or reclamation works within Texas. Texas Water Code § 11.052 provides authority for the Secretary to conduct any activities in Texas that are necessary in performance of duties under the *Reclamation Act* (Wilson, Interoffice Memorandum, February 24, 1984). Section 58.153 of the Texas Water Code states that an irrigation district may contract with the United States for investigation, construction, extension, operation, and maintenance of any Federal reclamation project of benefit to the district. Such districts also are authorized to contract with Federal reclamation projects to secure water supply and to pay to the United States the agreed cost in the form of construction charges, operation and maintenance charges, and water rental charges.

Texas recently passed legislation authorizing water banking. The law authorizes the Texas Water Development Board to establish and administer a water bank to facilitate the transfer of water and water rights among willing buyers and sellers throughout the state. The legislation allows water deposits from surface water, ground water, or water from any source. It allows the holder of the right to deposit up to 50 percent of the right into the bank. If surface water is deposited, the right is protected from cancellation for an initial 10-year period after deposit. Texas is hoping that water marketing will be facilitated through the water banking process and thus:

- Provide water to growing cities
- Be a tool for managing drought
- Promote the efficient use of water
- Promote water conservation
- Provide water for environmental and recreational needs and uses
- Offer an alternative to new reservoir construction
- Promote political harmony among stakeholders

For more information on the development of the Texas water bank, see *A Report to the Governor and Members of the Texas Legislature Concerning the Texas Water Bank*, prepared by the Texas Water Development Board, 1995.

Texas Filings on the Rio Grande. The portion of the Rio Grande between the New Mexico-Texas border and Fort Quitman is now being investigated by TNRCC. Evidentiary hearings will probably be held in 1996. There are only 15 applications and claims filed in the Texas office (see table III-2 at the end of this chapter).

On April 5, 1993, EPCWID filed application 5433 for a permit and requested that the TNRCC recognize its present use. TNRCC granted the permit on September 8, 1993, recognizing that EPCWID had those:

... rights to that portion of the facilities and water of the Rio Grande Project (the "Project") and the Rio Grande and its tributaries which have been appropriated by or for the benefit of the District and its predecessors and beneficial users or which otherwise have been provided to them by law, equity or contract ...

EPCWID was authorized to divert and use up to 376,000 acre-feet of water per year from the Rio Grande. A priority date of 1914 was specified by TNRCC for the entire 376,000 acre-foot entitlement. The 376,000 acre-feet is derived from the following resources:

- Certified Filing No. 123 (also called the Loomis filing). In 1914, the Rio Grande project manager made a certified filing on behalf of the United States in Texas with respect to a declaration of water appropriation filed by A.M. Loomis on behalf of private parties in 1889. This was in compliance with the 1913 Texas statute. The Loomis declaration in 1889 was for an unspecified amount of water. The 1914 certified filing reflected use of 70,000 acre-feet per year. (No formal request exists in the TNRCC to change the ownership from the United States to EPCWID, but nonetheless TNRCC recognizes EPCWID as the present owner of the right.)
- 67/155 of all water stored in project storage (as defined in the Rio Grande Compact) and legally available for release to EBID and EPCWID plus any additional share of project water obtained through allocation, purchase, and/or operation rules. The 67/155 ratio is based on the September 20, 1937, contract between EPCWID and the United States, which established rules for distribution of water in times of short supply. Under this provision, EPCWID would be entitled to 315,548 acre-feet per year. The Loomis filing discussed above is for irrigation of the same lands, so that water should be included in this entitlement.
- Authorization to divert any water entering Texas in the bed of the Rio Grande from New Mexico including, but not limited to, return flows from New Mexico's use and ground water discharged into the Rio Grande. (The U.S. Government claims seepage as project water.)
- Authorization to divert and re-use any measurable return flows from EPCWID entering the Rio Grande in Texas above Riverside Dam.
- Authorization for EPCWID to use the water listed above for irrigation, municipal, industrial, mining, and recreational purposes and to sell any of this water surplus to EPCWID's needs for these purposes for use in El Paso and Hudspeth Counties. (Use of project water is limited to irrigation use under Federal law.)
- Authorization for the irrigation water to be used by EPCWID on a maximum of 69,010 acres of land within its boundaries.

Under "special conditions," the permit states:

a. This permit does not supersede any legal requirement for the protection of environmental water needs pursuant to international treaty, interstate compact or other applicable law to which permittee is subject irrespective hereof. Nothing in this condition is intended to grant to the State of Texas any authority additional to that provided by law or waive any right of the permittee.

b. This permit is granted without prejudice to the claims and rights, if any, of the United States in or to the waters and facilities of the Rio Grande project.

c. This permit is not intended to in any way compromise or diminish the volume of water which the United States is obligated to provide to Mexico on an annual basis pursuant to the terms of the Convention of May 21, 1906 between the United States and Mexico; nor does the permit grant to EPCWID, for any use whatsoever, any waters to which Mexico is entitled pursuant to the above-referenced 1906 Convention.

Under the above permit, EPCWID is entitled to use all of the project water delivered to Texas except the 60,000 acre-feet destined for delivery to Mexico. Other claims will have to be addressed in the Texas adjudication process (see table III-2 at the end of this chapter). Under a 1951 contract between the United States and Hudspeth, Hudspeth relinquished to the United States all right, title, interest, and claim to any and all Rio Grande water that had vested in Hudspeth as of December 1, 1924. The Texas records do not reflect a change in ownership of the right from Hudspeth to the United States.

Comparison of Texas and New Mexico Water Law

Water laws in Texas and New Mexico differ greatly. Some significant differences to keep in mind when examining Rio Grande issues include:

- New Mexico has never recognized riparian rights, and Texas has a history of recognizing riparian rights as well as appropriated rights.
- New Mexico has special laws that include ground water in their appropriation system, whereas Texas has no special provisions for ground-water use.
- New Mexico treats all beneficial uses equally, and Texas law gives municipal use a higher priority than other uses.
- New Mexico's laws specify a water right can be forfeited after 4 consecutive years of non-use. In Texas, one law authorized cancellation of a water permit if the challenger could show it had not been used for 3 consecutive years and proof of an intent to abandon the right. A subsequent law allows forfeiture of a water permit if one can show 10 consecutive years of non-use. In that situation, there is a conclusive presumption of abandonment.
- New Mexico has no requirement for appropriators with vested water rights (those diverting and using water prior to 1907) to file with the state engineer's office unless there is a change in ownership. Texas passed a law in 1967 which required all claimants to file with the Water Rights Commission on or before September 1, 1969.
- New Mexico provides for water leasing, and Texas has a new law on water banking.

Case Law Analysis

The status of Rio Grande water rights has been interpreted in several court cases. Five of these cases are described in this section.

***City of El Paso v. Reynolds*, 563 F. Supp. 379 (D.N.M. 1983), vacated No. 83-1350 (10th Cir., December 16, 1983)**

In this case, the city of El Paso challenged a 1978 New Mexico law that placed an embargo on the out-of-state use of ground water. The U.S. District Court of New Mexico's 1983 opinion declared that the law was unconstitutional because it violated the Commerce Clause (Article 1, Section 8 of the U.S. Constitution).

In its defense, New Mexico argued that the Rio Grande Compact apportioned the surface water of the river between New Mexico and Texas and also controlled the use of hydrologically related ground water. Consequently, the ground-water embargo law was irrelevant to this dispute. The court disagreed with this argument and stated that the compact did not apportion a specific quantity of water for Texas and New Mexico, and the compact made no mention of ground water. Therefore, the court determined that the issue of the constitutionality of New Mexico's ground-water embargo was properly before the court.

Subsequent to the court's decision, the New Mexico legislature in 1983 repealed that law and passed a new provision dealing with out-of-state use of ground water. The new legislation established application procedures and factors to be considered by the New Mexico State Engineer when ruling on applications for withdrawal and transportation of ground water from the state. On remand, the district court held that the revised New Mexico legislation passed constitutional muster, *City of El Paso v. Reynolds*, 597 F. Supp. 694 (D.N.M. 1984). The court also reaffirmed its earlier position on the compact issue.

***El Paso County Water Improvement District No. One v. City of El Paso*, 133 F. Supp. 894 (W.D. Tex. 1955), reformed in part 243 F.2d 927 (5th Cir. 1957)**

In Federal Court, the fifth circuit held that the scope of the city of El Paso's water right is a right to secondary use of project water and the right to use project facilities under certain circumstances. El Paso had argued that it had an independent right to water under its 1950 permit application to the Texas Board of Engineers.

The city of El Paso was processing both ground water and surface water at its treatment plant and returning the effluent to the river. This constituted a greater return flow than the city diverted. Therefore, the city claimed that it was entitled to divert a quantity of water equal to its return flow without cost.

EPCWID argued that El Paso was bound by contract provisions which stipulated that the city's effluent became project water and the amount of water available to the city was secondary to project needs. The district argued that Rio Grande water had been

committed to the needs and uses of the Rio Grande Project under senior appropriations made by the United States in the Territory of New Mexico and under the Loomis filing in Texas.

The district court determined that Rio Grande water in Texas above Fort Quitman was committed to the Rio Grande Project when Texas agreed to the Rio Grande Compact in 1939. Therefore, the city of El Paso's permit was found to be subordinate to the disposition of water made by the Rio Grande Compact. The court held that the contracts entered into between El Paso and the United States were binding and valid. Therefore, El Paso had no right to claim additional water based on the volume of its effluent. That effluent became project water under the terms of the contract.

Hudspeth County Conservation and Reclamation District No. 1 v. Robbins, 213 F.2d 425 (5th Cir. 1954)

In this case, Hudspeth brought action against Reclamation officials, requesting the court to establish their water rights and for injunctive relief to protect those rights. The U.S. District Court had issued summary judgment on the merits for the defendants. The fifth circuit held that the suit was in essence a suit against the United States to which it had not consented. The case was remanded to the district court with directions to dismiss it for want of jurisdiction.

J.B. Bean v. United States, 163 F. Supp. 838 (Ct. Cl. 1958)

In this action, landowners in Hudspeth County Conservation and Reclamation District No. 1 sued the United States for taking rights to Rio Grande water that they claimed. The U.S. Court of Claims granted summary judgment in favor of the United States.

The Hudspeth landowners contended that their lands were within the geographical area of the Rio Grande Project, and that they therefore acquired vested rights to the water they began to receive from the project in 1924. The United States asserted that the Hudspeth County lands were not a part of the project, that water was delivered to Hudspeth under contracts, and that these contracts gave the recipients no vested rights to use the water they received.

The court found that it was within the discretion of the Secretary to determine what lands to include in the project. The mere fact that Hudspeth's lands lay within the geographical area of irrigation works authorized by the Act of 1905 was of no consequence. The court found that Hudspeth district lands were not a part of the Rio Grande Project. One factor leading the court to this conclusion was that the project's contract with Hudspeth did not provide for levies and assessments against the landowners in the district in order to repay the United States. The project's contracts with EBID and EPCWID did contain such provisions.

Hudspeth district landowners also contended that while the district's 1924 contract with the project covered unused project water, the contract did not apply to seepage and drainage waters received from the El Paso district. Therefore, they acquired

appropriative rights to this water. The court noted that beneficial use alone gives the user no vested right to the water so used in the absence of filing a notice of intent to appropriate the water. No such filing was shown here. The court stated:

The permit #236 granted the predecessor of the Hudspeth District in 1917, and assigned to the Hudspeth District, is of no avail to plaintiffs because of non-use. 163 F. Supp. at 845.

However, the court specified that it did not rest its opinion on this ground. Rather, the court found that the Bureau of Reclamation, under its 1906 and 1908 appropriations, had control of and the right to prescribe the use of the seepage from lands within the project. When the project dumped seepage waters into the bed of the Rio Grande, it abandoned that water, but it did not thereby abandon its right to use these waters when needed in the future. According to the court, this was shown by the fact that it resumed control and use of such water on project lands and later delivered some of them to Hudspeth under contract.

The court observed that "all of [the Hudspeth district landowners'] rights are governed by the contracts of December 1, 1924, and April 27, 1951, and by them only." 163 F. Supp. at 846.

Parker v. El Paso County Water Improvement District No. One, 260 S.W. 667 (Tex. Civ. App.—El Paso 1924), *affirmed* 297 S.W. 737 (Tex. 1927)

This case deals with whether land having riparian rights can lawfully be included in and taxed by an irrigation district. The Texas Court of Civil Appeals held that it may, and this decision was upheld by the Texas Supreme Court.

The opinion of the Court of Civil Appeals is primarily of interest for its finding that the State of Texas consented to the 1906 appropriation by the United States of unappropriated Rio Grande water. At 260 S.W. 670, the court of appeals said that it agreed with the trial court's finding that:

Under what is known as the Reclamation Act of Congress of 1902 and the Texas statute of 1905, authorizing the United States to appropriate all unappropriated waters in (the Rio Grande valley) Texas, the United States in fact made filing on such unappropriated waters of the Rio Grande in Texas.

The Texas Supreme Court did not directly address the issue of whether the United States had appropriated the Rio Grande water in Texas. However, the court did affirm the judgments of the trial court and Court of Civil Appeals.

Table III-1.--New Mexico water appropriations below Elephant Butte Dam
Rio Grande mainstem, tributary, or other source

File No. and name	Source	Pertinent dates	Quantity of water	Purpose, place of use, and comments
Rio Grande Mainstem Source				
8 USA Elephant Butte	Rio Grande, Elephant Butte, NM 120 mi N of El Paso, TX	Filed: 2/2/06	730,000 af/yr 2 million miner's inches to be stored in reservoir	For use on Rio Grande Project Subsequently, in 1908, U.S. claimed all unappropriated Rio Grande water. Rio Grande Compact (1939) provides for 790,000 af/yr
2159 Carrie Tingley Hospital	Rio Grande NW 1/4 of SW 1/4 of Sec 4, T14S, R4W	Filed: 3/16/37 Approved: 5/22/27 Cert and Lic: 7/22/39 NOTE: Discrepancy in dates. File date may be 3/17/37; approval date probably 5/22/37.	Sufficient to irrigate 20.06 acres and store 50,000 gallons	Secs 4, 5, T14S, R4W To irrigate lawns, trees and garden surrounding hospital Diversion made by pumping plant and pipeline to an elevated steel storage tank. Permit for a well also issued in 1976 providing that water appropriation from all sources combined will not exceed 97.14 af/yr
Rio Grande Tributary or Other Source				
3915 USA, Gila National Forest	Mineral Creek, Rio Grande SW 1/4 of Sec 5, T11S, R9W	Filed: 5/11/84 Appropriation: 5/11/84	0.1469 af/yr	Stockwater and wildlife 0.0552 af storage reservoir (20' long by 5' high dam)
4480 Timberon Water and Sanitation District	Carrissa Spring - Sacramento River - Rio Grande SE 1/4 of NE 1/4 of SE 1/4 of Sec 13, T19S, R12E	Filed: 9/18/92 Appropriation: 9/18/92	2,000 af/yr 226.749 acres municipal use	Subdivision of 450 existing homes with projected growth to 10,000 population
4481 Timberon Water and Sanitation District	Sacramento River - Rio Grande NE 1/4 of NE 1/4 of Sec 22, T19S, R12E	Filed: 9/18/92 Appropriation: 9/18/92	500 af/yr 226.749 acres municipal use	Subdivision of 450 existing homes with projected growth to 10,000 population

Table III-1a.—New Mexico water claims below Elephant Butte Dam
Rio Grande mainstem, tributary, or other source

File No. and name	Source	Pertinent dates	Quantity of water	Purpose, place of use, and comments
Rio Grande Mainstem Source				
01276 Simon Grijalba Mayordomo of Arroyo Bonito Ditch	West bank of Rio Grande W 1/2 of SW 1/4 of Sec 30, T16S, R4W	Filed: 11/13/50 Appropriation: prior to 3/19/07 Claimed: 6/14/1893	720 cubic inches/sec	Irrigation Canal is 4 miles long to irrigate land in Secs 12 and 13, T17 Approved by authority of NM territory H.B.113, 2/26/1891
02198 Lawrence Homer	Rio Grande in Elephant Butte Irrigation District NW 1/4 of SE 1/4 of Sec 24, T20S, R2W	Filed: 5/3/73 Appropriation: prior to 3/19/07 Claimed: August 1905	Sufficient to irrigate 23.5 acres 1,200 gpm	Irrigation Sec 24 or 25, T20S, R2W, Dona Ana County Court Order No. CIV-77-71 limited right to 23.5 acres of land 2/4/77
02202 Harlan D. and Margery M. Fought and Larry D. Fought	Rio Grande within EBID S 1/2 of NE 1/4 of Sec 25, T20S, R2W	Filed: 5/8/73 Appropriation: prior to 3/19/07 Claimed: August 1905	Sufficient to irrigate 34.33 acres of cotton, alfalfa, and produce 900 gpm	Irrigation Use at point of diversion
02204 Mary E. Ward	Rio Grande within EBID SW 1/4 of Sec 13, T20S, R2W	Filed: 5/15/73 Appropriation: prior to 3/19/07 Claimed: July to Aug 1905	Sufficient to irrigate 114 acres	Irrigation Use at point of diversion Discrepancy in claim - 104 acres in one place, but 114 acres listed in specific land description
02238 James T. Brewster	Rio Grande within EBID NE 1/4 of Sec 13, T20S, R2W	Filed: 7/10/73 Appropriation: prior to 3/19/07 Claimed: Aug 1905	3 af per acre - 15 acres 2,000 gpm	Irrigation Use at point of diversion Dona Ana County
02239 Fred M. Nelson and William I. Buhler	Rio Grande SE 1/4 of SE 1/4 of Sec 34, T13S, R4W	Filed: 7/17/73 Appropriation: prior to 3/19/07 Claimed: prior to 1905	Enough to irrigate 1.6 acres with 3-1/2 af/yr. for Nelson and 2.2 acres for Buhler. Presently 5" and 6" pipeline	Irrigation Nelson - Sec 34, T13S, R4W, Buhler - Sec 34, T13S, R4W Ownership change recorded on 1.6 acre parcel to Parry A. Larsen 4/24/92 11/4/92 Buhler changed location of diversion to S 1/2 of SE 1/4 of SE 1/4 of Sec 33, T13S, R4W and change use to recreational (fishing pond) authorized 4.65 af/yr
02266 Francis B. Stout	Rio Grande Sec 5, T14S, R4W	Filed: 2/25/74 Appropriation: prior to 3/19/07	Enough to irrigate 3 acres with 3-1/2 af/yr. 4" pipeline	Irrigation Use at point of diversion

Table III-1a.—New Mexico water claims below Elephant Butte Dam
Rio Grande mainstem, tributary, or other source—Continued

File No. and name	Source	Pertinent dates	Quantity of water	Purpose, place of use, and comments
02267 Robley Hedrick	Rio Grande Sec 3, T14S, R4W	Filed: 2/26/74 Appropriation: prior to 3/19/07	Enough to irrigate 30 acres with 3-1/2 af/yr 10" pipeline	Irrigation and livestock Use at point of diversion Change of owner filed 11/22/91 to Diane E. and Joan Hedrick Marclonald
02268 Robley Hedrick	Rio Grande Sec 34, T13S, R4W	Filed: 2/27/74 Appropriation: prior to 3/19/07	Enough to irrigate 1.5 acres with 3-1/2 af/yr 2" pipeline	Irrigation Use at point of diversion
02270 D.F. and Josephine Brungardt	Rio Grande SE 1/4 of SE 1/4 of Sec 34, T13S, R4W	Filed: 2/28/74 Appropriation: prior to 3/19/07	Enough to irrigate 3 acres with 3-1/2 af/yr 4" and 8" pipeline	Irrigation Use at point of diversion Change of owner filed 8/17/76 to Daniel F. Brungardt
02271 Bessie Arnold	Rio Grande Sec 6, T14S, R4W	Filed: 3/1/74 Appropriation: prior to 3/19/07	Enough to irrigate 25 acres with 3-1/2 af/yr 8" pipeline	Irrigation Use at point of diversion
02273 Dorothy M. Averhoff	Rio Grande Sec 34, T13S, R4W	Filed: 3/4/74 Appropriation: prior to 3/19/07 Claimed: prior to 1905	Enough to irrigate 1-1/3 acres with 3-1/2 af/yr 3" pipeline	Irrigation Use at point of diversion Transfer to City of Truth or Consequences 3/27/91
02274 M.B. Doolittle	Rio Grande SW 1/4 of NE 1/4 of NE 1/4 of Sec 4, T14S, R4W	Filed: 3/20/74 Appropriation: prior to 3/19/07	Enough to irrigate 11 acres with 3-1/2 af/yr 10" centrifugal pump with 10" outlet steel pipe	Irrigation Use at point of diversion
02275 Helen Doolittle	Rio Grande SW 1/4 of NE 1/4 of NE 1/4 of Sec 4, T14S, R4W	Filed: 3/19/74 Appropriation: prior to 3/19/07	Enough to irrigate 10 acres with 3-1/2 af/yr 10" centrifugal pump with 10" outlet steel pipe	Irrigation Use at diversion point
02277 Benjamin P. Butler	Rio Grande Sec 34, T13S, R4W	Filed: 3/21/74 Appropriation: prior to 3/19/07 Claimed: prior to 1905	Enough to irrigate 1 acre with 3-1/2 af/yr 1-1/2" pipeline	Irrigation Use at point of diversion Transferred to Truth or Consequences
02278 C.L. Britton	Rio Grande Sec 34, T13S, R4W	Filed: 3/22/74 Appropriation: prior to 3/19/07 Claimed: prior to 1905	Enough to irrigate 1/4 acre with 3-1/2 af/yr 1-1/2" pipeline	Irrigation Use at point of diversion Change of ownership filed 11/30/89 to Claudie Glen or E. Jean McAlpin
02285 James A. Snovall	Rio Grande SW 1/4 of SE 1/4 of Sec 34, T13S, R4W	Filed: 5/17/74 Appropriation: prior to 3/19/07 Claimed: prior to 1905	Enough to irrigate 1.41 acres with 3-1/2 af/yr 2" pipeline	Irrigation Sec 3, T14S, R4W, 1/6 acre Sec 34, T13S, R4W, 1.25 acres

Table III-1a.—New Mexico water claims below Elephant Butte Dam
Rio Grande mainstem, tributary, or other source—Continued

File No. and name	Source	Pertinent dates	Quantity of water	Purpose, place of use, and comments
02710 State Parks and Recreation Division	Polvadera Ditch, MRGCD - original applicant Gerald W. and Carolyn G. Hubbard	Filed: 1/29/80 Appropriation: prior to 3/19/07	55.44 af/yr	Change from irrigation to recreation and storage in Elephant Butte Reservoir Transferred water will offset a portion of the evaporation losses from the 50,000 af recreation pool - permit 1/26/81
02732 Cain Brothers and Company	Rio Grande SW 1/4 of SW 1/4 of Sec 5, T14S, R4W	Filed: 2/11/80 Appropriation: prior to 3/19/07 Claimed: prior to 1905	Enough to irrigate 40 acres with 3 af/yr	Irrigation Use at point of diversion Change of ownership filed 5/22/84 to Billy F. and Lucille Shivers State Engr. Office 9/24/84 memo estimates closer to 20 acres irrigated
02737 Eugene Lincoln and Genevieve Mistee Thomson	Ranchos de Atrisco, MRGCD	Filed: 8/4/80 Appropriation: prior to 3/19/07 Claimed: 5/5/05	5.145 af/yr	Transferred to NM State Parks and Recreation Division for storage in Elephant Butte Reservoir filed 1/26/81 Change from irrigation to recreation and related Transfer used to offset evaporation losses from recreation pool
Rio Grande Tributary or Other Source				
01284 Jackie McCants	Water from Arroyo Bonito Ditch	Filed: 3/12/51 Appropriation: prior to 3/19/07	Irrigate 55.2 acres of land - 3 af per acre	Irrigation Sec 30, T16S, R4W, 21.3 acres Sec 30, T16S, R4W, 23.2 acres Sec 31, T16S, R4W, 5.2 acres Sec 25, T16S, R5W, 5.5 acres Present owners are Joe B. and Jessie Lee Millard, filed 3/6/69
01285 R.A. Strand	Water from Arroyo Bonito Ditch	Filed: 3/12/51 Appropriation: prior to 3/19/07	Irrigate 116.5 acres of land - 3 af per acre	Irrigation Sec 36, T16S, R5W, 116.5 acres
03069 Laney Ranch, Inc.	Dead Cow Spring, Rickerson Draw SE 1/4 of NW 1/4 of SE 1/4 of Sec 25, T18S, R8W	Filed: 1/2/85 Appropriation: prior to 3/19/07 Claimed: April 1905	50 foot canal pipeline	Watering livestock Dead Cow Spring - spring box with pipeline leading to concrete trough
03070 Laney Ranch, Inc.	Lower Rickerson Spring, Rickerson Draw NE 1/4 of NW 1/4 of Sec 6, T19S, R7W	Filed: 1/2/85 Appropriation: prior to 3/19/07 Claimed: 1903	300' of pipe	Watering livestock

Table III-1a.—New Mexico water claims below Elephant Butte Dam
Rio Grande mainstem, tributary, or other source—Continued

File No. and names	Source	Pertinent dates	Quantity of water	Purpose, place of use, and comments
03122 Dale Hopkins and Bill Hopkins	San Miguel Community Ditch, Palomas Creek NW 1/4 of NE 1/4 of SW 1/4 of Sec 14, T13S, R7W	Filed: 9/5/85 Appropriation: prior to 3/19/07 Claimed: 1880	185 acres irrigated, sometimes farmed during alternate years 6-cfs capacity	Stock and domestic purposes Parts of Secs (5, 6, 14, 15, and 23), T13S, R6W Diversion dam, main canals, headgates, laterals
03123 A.B. Cox Estate	Rio Grande SE 1/4 of SE 1/4 of SW 1/4 of Sec 1, T23S, R3E Hayner Resort Spring	Filed: 2/5/87 Appropriation: prior to 3/19/07 Claimed: prior to 1900	5 af/yr 5 to 5(X) gpm	Stock and domestic purposes Rock and cement swimming pool Storage capacity 1.5 af Use at point of diversion Dam 12' high, crest 75' long, base width 3' Change of owner filed 1/19/89 to BLM for recreational facilities, stock, and domestic purposes, 5 af/yr
03124 A.B. Cox Estate	Rio Grande SE 1/4 of SE 1/4 of SW 1/4 of Sec 1, T23S, R3E	Filed: 2/5/87 Appropriation: prior to 3/19/07 Claimed: prior to 1880 by Modoc Mine	10 to 3,000 gpm	Rock and cement dam for domestic and stock purposes Use at diversion point Dam 75' high, crest 50' Change of ownership filed 1/19/89 to BLM for stock and domestic purposes
03215 A.B. Cox Estate	Rio Grande NE 1/4 of NE 1/4 of SW 1/4 of Sec 7, T23S, R4E Water from Dripping Springs	Filed: 2/5/87 Appropriation: prior to 3/19/07 Claimed: prior to 1880 by Van Patten Resort Area	2" iron pipes from storage reservoir to buildings 100 gpm	Domestic and stock purposes Two rock and cement reservoirs with 1.22 combined acre-foot storage capacity Storage dams max. 18' high, crest 50', base width 5' Change of ownership filed 1/19/89 to BLM for stock and domestic purposes
03216 A.B. Cox Estate	Rio Grande SE 1/4 of SW 1/4 of NW 1/4 of Sec 25, T23S, R3E	Filed: 2/5/87 Appropriation: prior to 3/19/07 Claimed: prior to 1880	Spring improvement rock and cement dam, piped approx. 100' to 10'x2'x1' concrete trough 1-1/2" outlet pipe yielding 2 gpm	Stock watering, max. storage capacity 0.68 af Use at diversion point Storage dam is 10' high, crest 50' long, base width 2' max.
03217 A.B. Cox Estate	Rio Grande SE 1/4 of SW 1/4 of NW 1/4 of Sec 11, T23S, R3E Carlizo Spring	Filed: 2/5/87 Appropriation: prior to 3/19/07 Claimed: prior to 1880	Rock and cement dam and trough captures natural flow 1-1/2" outlet pipe yielding 2 gpm, X14 cfs maximum discharge	Livestock watering, max. storage capacity is .94 af Use at diversion point Dam is 12' high, crest 50' long
03218 A.B. Cox Estate	Rio Grande SW 1/4 of SW 1/4 of NE 1/4 of Sec 24, T23S, R3E Cox Spring Development	Filed: 2/5/87 Appropriation: prior to 3/19/07 Claimed: prior to 1880	8'x10' rock tank captures natural flow	Livestock watering Use at point of diversion
03593 Donald C. Phelan	Radium Springs	Filed: 9/24/92 Appropriation: prior to 3/19/07	8.08 af/yr 5 gpm	Commercial/other: bath house SW 1/4 of NW 1/4 of NE 1/4 of Sec 10, T21S, R1W Dona Ana City

Table III-1a.—New Mexico water claims below Elephant Butte Dam
Rio Grande mainstem, tributary, or other source—Continued

File No. and names	Source	Pertinent dates	Quantity of water	Purpose, place of use, and comments
03617 Bob or Alma L. Grantham	Ash Spring - Rio Grande SE 1/4 of SE 1/4 of SW 1/4 of Sec 21, T15S, R4W	Filed: 12/1/92 Appropriation: prior to 3/19/07 Claimed: 1880	2 to 5 gpm pipe capacity	Collect water for human and livestock consumption during wet years
03618 Bob or Alma L. Grantham	Long Bottom Spring - Rio Grande SW 1/4 of NW 1/4 of NW 1/4 of Sec 27, T15S, R4W	Filed: 12/1/92 Appropriation: prior to 3/19/07 Claimed: 1880	8 gpm outlet capacity	Ruins of homestead and old iron pipe scattered between two locations 10,000 gallon storage capacity (6' high by 10' long concrete dam). Main spring has two storage tanks and trough
03619 Bob or Alma L. Grantham	Wild Horse Spring - Rio Grande NE 1/4 of SW 1/4 of SW 1/4 of Sec 27, T15S, R4W	Filed: 12/1/92 Appropriation: prior to 3/19/07 Claimed: 1880	1 to 2 gpm outlet capacity	1.5" pipe into hillside
03620 Bob or Alma L. Grantham	Coyote Spring - Rio Grande NW 1/4 of SE 1/4 of NW 1/4 of Sec 4, T16S, R4W	Filed: 12/1/92 Appropriation: prior to 3/19/07 Claimed: 1880		Spring used for mining shaft less than 100' up canyon. Water also used by cattle and wildlife. Storage capacity of 0.25 af (12' high by 30' long earthen dam)
03621 Bob or Alma L. Grantham	Granite Springs - Rio Grande SE 1/4 of SE 1/4 of NW 1/4 of Sec 4, T16S, R4W	Filed: 12/1/92 Appropriation: prior to 3/19/07 Claimed: 1900	5 to 10 gpm	Original Spanish mining settlement - improved prior to 1900 - 2" iron pipe directly into spring Storage capacity of 0.2 af (3' high by 50' long earthen dam). Fills about 4 times per year. 1934 concrete box. Works now include 15'x10' steel tank and storage tanks at mill site.
03622 Bob or Alma L. Grantham	Burbank Spring - Rio Grande S 1/2 of SW 1/4 of SW 1/4 of Sec 33, T15S, R4W	Filed: 12/1/92 Appropriation: Claimed: prior to 3/19/07	5 to 10 gpm	Reports of Spanish use for mining since mid-1500's. Old mission within 160 acre tract run by Father Larue - also a miner. Also historically used for livestock, drilled caprock and concrete trough was last improvement. Old works were bulldozed and blasted to improve and water continuously used for mining up to 1980. Now active again.
03672 Verbal E. and Lottie M. Scott	Unnamed Spring - Rio Grande NW 1/4 of SE 1/4 of NW 1/4 of Sec 25, T15S, R14E	Filed: 3/1/93 Appropriation: prior to 3/19/07 Claimed: 1884	3.0 af/yr	Irrigate 4 acres of land, domestic use, livestock watering, and six ponds 7000' of 2" underground pipeline and six stockponds

Table III-1a.—New Mexico water claims below Elephant Butte Dam
Rio Grande mainstem, tributary, or other source—Continued

File No. and name	Source	Pertinent dates	Quantity of water	Purpose, place of use, and comments
03677 Patrick A. and Nancy B. Jones	Tierra Blanca Creek - Rio Grande SE 1/4 of SE 1/4 of NE 1/4 of Sec 17, T17S, R7W	Filed: 5/6/90 Appropriation: prior to 3/19/07 Claimed: 1902	1.0 af/yr	Irrigate 200 acres of land Two diversion dams in use
03934 Arthur Apodaca	Cuchillo Negro Creek Chiz (Chise) Community Ditch, Rio Grande - MRQCD SW 1/4 of SW 1/4 of Sec 7, T12S, R7W	Filed: 5/27/94 Appropriation: prior to 3/19/07 Claimed: 1862	7.0 af/yr 4.34 cfs capacity	Irrigation (diversion dam and ditches) of about 21 acres of land Diversion dam 150' long by 4' high

Table III-1b.—Canceled or rejected New Mexico water filings¹ below Elephant Butte Dam
Rio Grande mainstem, tributary, or other source

File No. and name	Source	Pertinent dates	Quantity of water	Purpose, place of use, and comments
120 Eugene Van Patten	Maple Grove Ice Canyon	Filed: 10/21/07 Canceled: 3/29/09		Pl. NE 1/4 of SW 1/4, Pl. SE 1/4 of NW 1/4, Sec 7, T23S, R4E
1689 W.C. Roche	Rio Grande SW 1/4 of SW 1/4, Sec 7, T14S, R4W	Filed: 12/19/25 Rejected: 12/14/35		6305.1 acres T(14, 15, 16)S, R4, 5W
1841 El Paso Electric Company	Montoya Drain Sec 9, T29S, R4E	Filed: 4/26/29 Canceled: 10/23/29		Powerplant
1842 El Paso Electric Company	Frontera Sec 9, T29S, R4E	Filed: 4/26/29 Canceled: 10/23/29		Powerplant

¹ In 1908, the State of New Mexico agreed to the U.S. claim of all unappropriated water of the Rio Grande and its tributaries. Therefore, the State Engineer's office rejects filings that claim appropriations after 1908.

Table III-1c.—Expired or withdrawn New Mexico water filings below Elephant Butte Dam
San Juan-Chama water

File No. and name	Source	Pertinent dates	Quantity of water	Purpose, place of use, and comments
2892 Holloman Air Force Dev. Center	Rio Grande - San Juan-Chama Sec 16, T17S, R9E	Filed: 9/10/56 Expired: 9/10/59		
2893 White Sands Proving Grounds (Army and Navy)	Rio Grande - San Juan-Chama Sec 22, T23S, R4E	Filed: 9/10/56 Expired: 9/10/59		Defense, industrial, domestic
2894 City of Alamogordo	Rio Grande - San Juan-Chama Sec 16, T15S, R10E	Filed: 9/10/56 Expired: 9/10/59		Municipal
2902 New Mexico Game Commission	San Juan-Chama T13S, R3W	Filed: 2/11/57 Expired: 2/11/60		Fish and wildlife
2905 Public Service Co. of NM	San Juan-Chama	Filed: 2/14/57 Expired: 2/14/60		Municipal, domestic, irrigation
2933 City of Albuquerque	San Juan-Chama	Filed: 12/10/57 Expired: 12/10/60		Municipal, industrial, irrigation, domestic
2996 White Sands Missile Range (Army and Navy)	San Juan-Chama T(22,23)S, R4E	Filed: 9/24/59 Expired: 9/24/62		Defense, industrial, domestic
3002 New Mexico Game Commission	San Juan-Chama - Elephant Butte Reservoir T13S, R3W	Filed: 1/11/60 Expired: 1/11/63		Fish and wildlife
3006 Public Service Co. of NM (Santa Fe Division)	San Juan-Chama - Diversion from some point on Rio Grande	Filed: 2/1/60 Expired: 2/1/63		Municipal and domestic
3032 City of Albuquerque	San Juan-Chama	Filed: 12/13/60 Expired: 12/13/63		Irrigation, municipal, industrial, domestic
3041 Holloman Air Force Dev. Center	San Juan-Chama T(16,17)S, R9E	Filed: 5/19/61 Expired: 5/19/64		Above or below town of Socorro on Rio Grande
3096 New Mexico Game Commission	San Juan-Chama - Elephant Butte Lake T13S, R3W	Filed: 1/17/63 Withdrawn: 2/7/63		Fish and wildlife

Table III-2.—Texas water applications and claims from state line to Fort Quitman
Rio Grande mainstem, tributary, or other source

File No. and name	Source	Pertinent dates	Quantity of water	Purpose, place of use, and comments
Applications				
Application 244A (Permit No. 236) Hudspeth Co. Cons and Rec Dist I	Rio Grande	Filed: 11/22/17 Priority: 7/1/13	27,000 af/yr 400 cfs	9,000 acres, 2 diversion points
Application 288 (Permit No. 270) L.R. Allison	Rio Grande	Filed: 3/16/18 Granted: 4/22/18 Issued: 8/20/18	6,000 af/yr 60 cfs	2,000 acres, 1 old river diversion point, 5.5 miles SE of Fabens, TX
Application 194 (Permit No. 192) G.B. Spence Farms, Inc.	Rio Grande	Filed: 4/2/17 Granted: 7/2/17 Issued: 9/4/17	2,220 af/yr 25 cfs	740 acres, 1 old river diversion point, 1 mile S of Fabens, TX
Application 3819 (Permit No. 3544) Indian Cliffs Ranch, Inc.	San Felipe	Filed: 10/11/77 Granted: 2/13/78 Issued: 2/22/78	52 af/yr	Recreation storage (non-consumptive), 7.5 miles NE of Fabens, TX
Application 5433 (Certified Filing No. 123)	Rio Grande	Filed: 5/5/93 Granted: 9/8/93 Priority: 1914 1918	376,000 af/yr	69,010 acres, 3 diversion points (near old Mesilla, American Dam, and Riverside Dam)
Permit No. 293 (Formerly separate Appl. No. 306) EPCWID	Rio Grande (based on trib)		1,899 af/yr 10 cfs	Municipal, industrial, mining, or recreational Diversion at American Dam and Riverside Dam for use on 69,010 acres
Application 1584AB (Permit No. 1535AB) [Formerly Appl. No. 2273 and 2273B] City of El Paso	Rio Grande	Applied: 11/8/48 Issued: 5/10/50 Priority: 11/1/48	11,000 af/yr	2 diversion points (American Dam and river segment of Rio Grande)
Claims				
Claim 3215 Hudspeth Co. Cons and Rec Dist I	Macho Arroyo	First beneficial use Jul 1962	200 af/yr 50 cfs	600 acres, 1 reservoir (200 af conservation storage)
Claim 3216 Hudspeth Co. Cons and Rec Dist I	Madden Arroyo	First beneficial use Jul 1963	200 af/yr 50 cfs	600 acres, 1 reservoir (200 af conservation storage)
Claim 3218 Hudspeth Co. Cons and Rec Dist I	Diablo Arroyo	First beneficial use Jul 1962	1,032 af/yr	1432 acres, 2 reservoirs (200 af total conservation storage)
Claim 3219 Hudspeth Co. Cons and Rec Dist I	Camp Rice Arroyo	First beneficial use Jul 1963	200 af/yr 40 cfs	600 acres (claimed to be 1987 acres), 1 reservoir (200 af conservation storage)
Claim 3217 Hudspeth Co. Cons and Rec Dist I	Alamo Arroyo	First beneficial use Jul 1962	200 af/yr	1,800 acres (600 acres each reservoir), 3 reservoirs (200 af conservation storage each)
Claim 2474 Southwestern Portland Cement	Rio Grande	First beneficial use 1910	178 af/yr 1,600 gpm (pump)	Industrial use, 1 diversion point on Rio Grande upstream of American Dam
Claim 1942 Frank P. Fullerton	Rio Grande	First beneficial use 1918	6 af/yr	2 acres, old lateral from EBID
Claim 40 U.S. Federal Correction Inst. (La Tuna)	Rio Grande	First beneficial use 1931	812 af/yr 4,000 gpm (pump)	400 acres, diversion near old Mesilla

CHAPTER IV

RESOURCE MANAGEMENT ISSUES

This chapter describes the crucial issues of concern relative to Rio Grande Project management as well as the institutional environment in which these issues must be faced. These concerns must be dealt with immediately if the United States is to take a proactive role in resolving the issues rather than trying to control the outcome through crisis management. Understanding the limitations of the current institutional environment will enable Reclamation to implement effective policy changes that allow the flexibility needed for effective water resource management in the future.

ISSUES OF CONCERN

Water managers along the Rio Grande corridor of southern New Mexico and western Texas are presently engaged in a complex process of implementing fundamental changes involving the region's water resources. This complex process includes most of the current western water resource management issues and encompasses the most crucial issues that Reclamation managers face with regard to the Rio Grande Project:

- Claims for project water
- Water transfers
- Social and economic conditions
- Challenges facing project management

Claims for Project Water

Demand for project water will increase as urban development continues. Currently, the cities of El Paso, Texas, and Juarez, Mexico, form the largest population base of the region. It is projected that by the year 2010, there will be 3.5 million people living in this area. These cities now depend mostly on ground-water aquifers for their municipal water supply. However, due to the low rate of ground-water recharge, the level of fresh water from these sources has been declining for a number of years. Therefore, demand for procurement of surface water to meet municipal and industrial (M&I) needs will increase.

Claims and Related Filings

The Texas Natural Resources Conservation Commission (TNRCC) has not accepted the United States' position that all of the water in the Rio Grande from Elephant Butte Dam to Fort Quitman, Texas, is appropriated for use of the Rio Grande Project. TNRCC's position does not conform with the rulings of state and Federal court decisions and continues to allow the city of El Paso and others to file permits to divert water from the Rio Grande.

In this context, questions arise about the potential impacts of El Paso County Water Improvement District No. 1's (EPCWID) Application No. 5433. TNRCC approved the application and issued a permit on September 8, 1993, recognizing that EPCWID had the right to divert and use from the Rio Grande up to 376,000 acre-feet of water per year. The

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priority date was specified as 1914 even though Reclamation delivered water from the project directly to farmers until 1980, at which time operation and maintenance (O&M) of the delivery system was turned over to EPCWID.

Basically, EPCWID claims all project water from return flows, ground-water discharges, the Federal Government's Certified Filing No. 123, and any other sources contributing to the Rio Grande once the river crosses the border from New Mexico into Texas. It is important to remember, however, that the permit has "special conditions" which state that the permit will not:

1. Supersede any legal requirements for environmental protection
2. Prejudice the claims and rights of the United States in or to the waters and facilities of the Rio Grande Project
3. Compromise or diminish requirements for delivery of water to Mexico

New Mexico also has unresolved claims issues. A court could find that the numerous claims of "vested water rights" in New Mexico have a priority right over the United States' right. Filing No. 8 by the United States in 1906 for 730,000 acre-feet per year and the subsequent claim in 1908 for all unappropriated Rio Grande water (in New Mexico at least) are accepted as valid. The Rio Grande is considered fully appropriated, and no claims for future diversions are accepted. The vested water rights issue is the major one in New Mexico because under that state's law, no one needs to file a water right with the state engineer if the diversion is prior to 1907 unless there is a change in ownership or the river is adjudicated.

Adjudications

Texas. Texas currently is in the process of defining Rio Grande water rights from the Texas-New Mexico border to Fort Quitman. TNRCC has conducted surveys and documented findings and soon will conduct evidentiary hearings in which the claimants may present evidence to support the validity of their claims and perfect their permit or certified filing. After the hearings, TNRCC will issue a preliminary determination. Parties who disagree with the findings and conclusions may contest the determination; subsequent hearings may be held to resolve challenges to the findings. A final determination then will be issued and the case automatically filed with the district court. If anyone still objects, that person may file exceptions with the court. The district court then delivers a final judgment, and TNRCC issues certificates of adjudication to each party with a recognized water right. These certificates replace all previous water right documents.

In addition to EPCWID's Permit No. 5433, TNRCC will determine the status of Hudspeth's Permit No. 236 with a priority date of 1913—a higher priority than EPCWID's permit. The application is for 27,000 acre-feet of water per year at 400 cubic feet per second. Hudspeth has been obtaining Rio Grande Project water under a Warren Act contract. In a 1951 contract between the United States and Hudspeth, Hudspeth relinquished to the United States

all right, title, interest, and claim to any and all Rio Grande water which had vested in Hudspeth as of December 1, 1924. The Texas records, however, do not reflect a change in ownership from Hudspeth to the United States.

Reclamation must decide what role to play in the Texas adjudication. The Rio Grande water in Texas is project storage water released from Caballo Dam. Case law advances this position by supporting the project-contracted water rights over the claims by Hudspeth and the city of El Paso (see the case law analysis in chapter III). The Rio Grande Compact does not refer to distribution of the free-flowing waters of the Rio Grande, but rather equitable distribution of project water. Therefore, the water in the Rio Grande crossing the border into Texas is Rio Grande Project storage water and not subject to appropriation under Texas water law. The Congress has not authorized Reclamation to give away Rio Grande Project storage rights.

TNRCC, however, has never accepted the above position and believes that the water belongs to the State of Texas. It has continuously allowed nonproject interests to apply for permits for Rio Grande Project water rather than insisting that applicants acquire water under Federal contract. Thus, TNRCC has attempted to manage distribution of project storage water. The courts thus far have not upheld any such claims for water rights.

The United States did not protest EPCWID's filing of Permit No. 5433 with TNRCC, because the district agreed to add provisions protecting Federal interests in the water. EPCWID has a secondary right to use project water, but legal title remains with the Federal Government. Reclamation also was protecting project interests by allowing EPCWID to file with TNRCC and claim all the available Rio Grande water, thus preventing TNRCC from granting additional permits to nonproject interests.

The Federal Government must soon choose its position. Reclamation could support EPCWID's permit in Texas because it protects existing Rio Grande Project interests. However, this position could limit future water resource management options by giving EPCWID a stronger claim to the water. On the other hand, Reclamation could insist that Rio Grande water in Texas be recognized as project storage water and, therefore, distributed under contracts with the Federal Government. Under EPCWID's permit, the district is authorized to use its allotment for irrigation, municipal, industrial, mining, and recreational purposes and sell any surplus water for use in El Paso and Hudspeth Counties.

New Mexico. Although the New Mexico State Engineer does not want to do a stream adjudication on the Rio Grande from Elephant Butte Dam to the Texas border, a lawsuit filed by Elephant Butte Irrigation District (EBID) may result in the court mandating adjudication. The state engineer in the past has resisted efforts by EBID for a stream adjudication, alleging that it is too costly and time-consuming.

In *Elephant Butte Irrigation District v. Reynolds* (No. CIV-86-848), filed in 1991, EBID requests various injunctions to keep the state engineer from processing ground-water applications and communicating with members of EBID regarding their water rights. EBID also wants the court to stop the city of El Paso from pumping water from the Canutillo well

field. The lawsuit requests that the state engineer conduct a hydrographic survey of the stream system and asks the court, upon review of the survey, to join all persons claiming an interest in the water in a stream adjudication.

In its complaint, EBID alleges that the United States, in its 1906 and 1908 filings, appropriated Rio Grande water in the name of the United States in order to collateralize reimbursable project construction debt owed by EBID's members. Therefore, EBID is arguing that when it completed payment of its construction debt in 1971, EBID became the record owner of the water rights within New Mexico. EBID is further arguing that, because it assumed control of the operation and maintenance of EBID's irrigation and drainage systems in 1979, it is obligated to ensure that the Texas portion of the water reaches Texas and the water owed to Mexico reaches Mexico. In reality, the United States controls the amount of water released from Elephant Butte and Caballo Dams. Reclamation computes how much water is required for delivery to the diversion dams.

EBID also makes several claims about the area's ground-water usage and its effects on the Rio Grande surface water supply. The district claims that the city of El Paso is pumping large amounts of water from New Mexico via the Canutillo well field located across the border in Texas. The city of El Paso's position is that water pumped from the deeper Santa Fe Aquifer is not hydrologically connected to the Rio Grande.

EBID claims that, under Filing No. 8, it is entitled to follow the Rio Grande stream to its underground source and drill wells, taking whatever underground water is necessary to fill the contemplated uses. However, the United States only appropriated the surface water of the Rio Grande and has never addressed ground water in its applications.

Water Transfers

Water transfers are occurring with increasing frequency throughout the Western United States. These transactions may include direct sale of water rights, dry-year options on water rights, sale of land with associated water rights, conservation investments with subsequent assignment of conserved water, and transfer of water from one use to another. The focus of this report with respect to water transfers is on change in use; i.e., transfer from one use to another; specifically the transfer from irrigation to M&I use.

Authorities for Sale and Pricing

Water transfers must be considered in both a general context of authority and policy as well as in the specific context of the Rio Grande Project. While the Congress has authorized other uses for Elephant Butte Dam, the only authorized Rio Grande Project purpose is irrigation. Thus, unless the Congress were to reauthorize Elephant Butte Dam, water transfers coming out of that facility must be done in the context of authorization to use irrigation water for other purposes. While the primary purpose of Elephant Butte Dam is irrigation, it must be remembered that the cost of the dam is not being repaid by irrigators. This is because the districts were relieved of that repayment obligation in 1937, and power users are now paying the costs previously allocated to irrigation. Further, the water supply from Elephant Butte Dam is already fully allocated.

Previous attempts to transfer surplus project water for use by the city of El Paso have not been entirely successful. In a 1941 contract, Reclamation agreed to supply Rio Grande Project water to the city for M&I use equivalent to the quantity authorized for use on up to 2,000 acres of previously irrigated lands which the city could purchase. This contract was authorized under the *Sale of Water for Miscellaneous Purposes Act of 1920*, (43 U.S.C. § 521). That legislation allows the Secretary of the Interior (Secretary) to supply project water for municipalities at rates determined by the Secretary provided that:

- It is not detrimental to irrigation
- There is no other practicable source of water supply
- There is prior approval by the appropriate water district
- Money from such contracts is put into the Reclamation Fund, crediting the project supplying the water

Monies from the 1941 agreement were paid to the United States, and EPCWID received credits to its repayment obligation. A 1944 contract allowed the city to purchase up to 2,000 acres of EBID lands with the same provisions as the 1941 agreement.

In 1949, a subsequent contract between the city and EPCWID, with the Secretary's approval, provided that the city could receive surplus project water during normal water years. Unfortunately, after the contract was executed, severe drought conditions occurred in the 1950's, and EPCWID declared there was no surplus water for the city. A subsequent court case, *El Paso County Water Improvement District No. One v. City of El Paso*, 243 F.2d 927 at 932 (5th Circuit 1957), confirmed that the city only had a secondary interest in the water and the contract was valid. As a result of this ruling, the city did not develop water processing plants for surface water treatment. A 1962 amendment to the 1941 contract provided that the city could negotiate assignment of water rights for a minimum of 25 years from owners of 2 acres or less of district lands, with no limit on the number of assignments. The city pays the district for water received under this agreement.

To attempt to resolve the colonias water supply problems discussed later in this report, the United States entered into a 1988 agreement with EPCWID and the El Paso County Lower Valley Water District Authority (Authority), in which the Authority is able to receive Rio Grande Project irrigation water to meet critical M&I needs. The Authority must acquire assignments of water from current owners of tracts of lands with rights to project water. In addition, EPCWID agreed to provide a supplemental raw water supply for M&I use from the excess irrigation water supply.

Generally, it is not Department of the Interior policy to promote water transfers; however, Department of the Interior (Interior) will facilitate transfers proposed by others that are in accordance with applicable state and Federal law (see attachment E). The Federal Government will suggest a water transfer when it is part of an Indian water rights settlement, a solution to a water rights controversy, or when it may provide a dependable water supply that would otherwise involve the expenditure of Federal funds.

Under the 1920 act, water pricing is set at the discretion of the Secretary. The only limitation is that price cannot be lower than that currently charged for agricultural water. Additional information on policy guidance and legislative authority for water transfers and Reclamation Program Cost Recovery can be found in attachment D.

Water Supplies and Needs

Water is the most critical natural resource in the arid El Paso-Juarez border region. Dramatic population increases in the El Paso-Ciudad Juarez area have stressed this already scarce resource. At present, the two cities depend on two shared underground aquifers (Hueco and Mesilla Bolsons) for the majority of their M&I water supply.

The city of Juarez already is in the middle of a severe water supply crisis. The North American Free Trade Agreement of 1992 is expected to result in increased economic development in Mexico, further exacerbating the problem. The quick development of the Conejos-Medanos well field west of Juarez would provide temporary relief. The Conejos-Medanos well field is a continuation of the Mesilla Bolson aquifer in southern New Mexico. EBID has voiced concerns that development of this well field by Mexico will have a direct impact on the ground-water supply to southern Dona Ana County.

Mexico's Junta Municipal de Agua y Saneamiento must supply potable drinking water to subdivisions in Juarez that are not served by a water distribution system. To do so, the agency operates a fleet of water tanker trucks which delivers water to outlying colonias. This serves to emphasize the dilemma of the "cost of water" versus the "cost of not having water." In this case, the costs of trucking water to unserved subdivisions are much greater than the costs of installing and maintaining a water distribution system. Another immediate concern is the untreated sewage that originates in colonias on both sides of the border, flowing to and becoming a tributary of the river.

El Paso also has problems with its ground-water supply. Prior to the development of the Canutillo well field in the Mesilla Aquifer, the bulk of El Paso's water supply came from wells in the Texas portion of the Hueco Bolson Aquifer. Hueco Bolson is the aquifer east of the Franklin Mountains. There are about 30 million acre-feet (maf) of fresh water in Hueco Bolson. This would be enough to supply El Paso's current pumping needs (with no growth) for 300 years if El Paso had access to all of it, but only 5 maf out of the 30 maf is legally controlled by El Paso. Another 5 maf is under Fort Bliss, and the remainder is not in Texas. Some of the Hueco Bolson ground water is in Mexico, where it furnishes all the water used in Juarez. Most, however, is in New Mexico. Nature replenishes this Hueco Bolson water at a slow rate—much less than the current pumping rate. The result is ground-water mining. Hueco Bolson water level declines range from up to 3 feet per year in El Paso to 10 feet per year in Mexico. The total withdrawals in Mexico and Texas exceed the rate of natural replenishment by as much as 20:1. Obviously, the aquifer cannot long survive this kind of imbalance.

Today, there are about 10 million acre-feet of fresh water in El Paso's portion of the Hueco aquifer, including the Fort Bliss share. As pumping increases with population growth, the

water reserve will be depleted even faster, until it is exhausted some 50 years from now (see table IV-1). Even if the aquifer does last longer, it may become too salty to be the primary water supply for El Paso in about 30 years (Wilson 1984).

Table IV-1.—Depletion of Texas portion of Hueco Bolson

Date	Water In Storage (maf)	Comments
1980	10.0	Ground-water mining increases
1990	9.0	Ground-water mining accelerates
2000	7.8	Assumes all wells drilled by 1995
2010	6.2	Potential salting problems
2020	4.3	Well yields decline dramatically
2030	2.0	No longer viable municipal supply

Since 1951, El Paso has received water from the Canutillo well field, located just across the New Mexico border in Texas, which pumps water from the Mesilla Aquifer. The well field has been the subject of litigation, with EBID claiming that El Paso is illegally taking New Mexico's ground water. The water is pumped from the well field and transported to El Paso's water processing plant using Rio Grande Project facilities, namely the American Canal, the Franklin Canal, and the channel of the Rio Grande. A carriage contract was entered into in 1951 between EPCWID and El Paso with the Secretary's approval. The 1951 contract was for 1 year, but it has been renewed yearly since then. Revenues from this contract go to EPCWID. Even though the project facilities were owned, operated, and maintained by Reclamation in 1951, the district rather than the Federal Government received the benefits of the carriage agreement because El Paso was considered a constituent of EPCWID.

For a discussion of El Paso's water conservation and recycling policies, as well as possible alternatives for future water supply, see attachment B.

Social and Economic Conditions

The region's low tax base makes water quality and pollution prevention lower priorities than more pressing, local concerns. The urban development of El Paso-Juarez is the major water resource management issue because the two border cities are recognized as the region's economic development center. The project region is defined by a variety of factors, including the physical features of the river basin and the economic patterns of trade and transportation. As shown in figure 1, this region includes southern New Mexico up the Mesilla Valley of the Rio Grande past Las Cruces to Elephant Butte Reservoir, and extends south along the river in Texas to Fort Quitman—a total distance of 255 miles. Within the interstate project region, El Paso accounts for more than 80 percent of the population, jobs, and economic revenue. Moreover, El Paso is the engine of the region's economic growth, which generates jobs to keep pace with population increases.

While El Paso is economically dominant in the region, agriculture remains an enormous user of the scarce regional water supplies. For instance, agriculture accounts for only 5 percent of the jobs and 5 percent of economic value added in the region, but accounts for 88 percent of regional water depletions. The agricultural economy of El Paso's hinterlands in both states is of secondary importance economically but is older and better established than the city as a major water consumer. The United States essentially claimed all the surface water of the Rio Grande for interstate irrigation and international treaty obligations.

Rio Grande Project water does not include ground water, which is heavily utilized by New Mexico farmers from thousands of shallow valley alluvium wells and by El Paso from deeper wells. Thus, the project's water budgeting does not completely satisfy agricultural demands in dry years.

Interstate water conflicts also existed long before El Paso emerged as the major source of regional water demands. These conflicts were primarily between New Mexico farmers in the Middle Rio Grande Conservancy District above Elephant Butte and New Mexico and Texas farmers within the Rio Grande Project below Elephant Butte Dam. The conflicts led to an ingenious solution. New Mexico and Texas entered into an interstate compact with Colorado that divided the river water, not at the New Mexico-Texas state line, but at Elephant Butte Dam. Today's conflicts are referred to as El Paso versus New Mexico in pleadings and headlines. A more accurate description of the protagonists might be new urban growth versus politically entrenched and economically secondary agricultural interests.

Several issues can be raised regarding current water distribution practices on the Rio Grande Project. Usually, in a prior appropriation system, a farmer is allocated a specific quantity of water to put to a beneficial use. The farmer then chooses what crops to raise based on this limited water supply. On the Rio Grande Project, a block of water is delivered to EPCWID according to the Rio Grande Compact. EPCWID has separate water service contracts with the end users and is responsible for ensuring that the water is applied to beneficial use. Farmers have been allowed to change production to crops, such as pecan trees, that may require more than 4 acre-feet of water per year. Originally, Reclamation annually supplied only 2-1/2 to 3 acre-feet of water to farmers. The number of irrigable acres has decreased with the area's metropolitan growth. For example, the irrigable acres in Texas in 1950 totaled 67,326; but in 1985, the number of irrigable acres was only 45,605 (see table II-4). However, this decrease in irrigable acres has not resulted in a consistent surplus water supply, because individual farmers have switched to crops demanding more water.

Colonias Issues

In the past 20 years, development of unincorporated rural communities, known as "colonias," along the U.S.-Mexico border formed by the Rio Grande has steadily increased. Many of these developments are located on former agricultural lands within the service area of Reclamation projects. Most residents of the colonias built their own dwellings and hauled their drinking water to their lots, or they drilled shallow wells, typically 16 to 30 feet deep, to pump water from the Rio Grande alluvium. Wastewater is typically handled onsite with cesspools or septic tanks and leach fields. Over time, the cesspools and leach fields have polluted the ground water from which the water supply is drawn.

As a result, a significant public health threat has developed among the population in the colonias. Health surveys indicate that a large percentage of the colonias population has been infected with hepatitis A. The conditions could lead to potentially greater threats from waterborne amoeba and to outbreaks of more serious diseases such as cholera.

Indications are that the spread of hepatitis A results primarily from polluted well water. However, lack of adequate wastewater treatment and solid waste management also are considered major contributors to the undesirable environmental conditions. These conditions are most evident in agricultural drains within the boundaries of those colonias located on former agricultural lands within the Rio Grande Project service area, most noticeably in the Lower Valley of El Paso County.

Reclamation's Lower Valley Drains Health Issues Program report, *A Proposed Program for the Bureau of Reclamation to Respond to Colonias Public Health Issues Associated With the Rio Grande Project Agricultural Drains, Southern El Paso County, Texas* (Bureau of Reclamation, January 1995), presented a strategy for responding to the health threat created by the drains. Initial actions under a short-term program currently are being implemented jointly with EPCWID, and a long-term program is being developed. The report concluded that Reclamation, as a public agency and title owner of a facility that may have become a public health risk, has a degree of liability and, therefore, some responsibility to actively respond to public needs and undertake a program to help alleviate the hazards associated with the drain conditions.

Reclamation has helped provide drinking water supplies for the colonias in the Lower Valley of El Paso County. A contract between the United States and the El Paso County Lower Valley Water District Authority was signed on November 19, 1988. The contract allows the Authority to lease the right to use Rio Grande Project water from the landowners and to divert Rio Grande Project water to the city of El Paso water treatment facilities for the purpose of providing water service to the colonias. Thus, the Authority obtains water converted from irrigation to M&I use. The Authority now provides water to about half of the 50,000 residents in the Lower Valley colonias and plans to furnish water supplies plus wastewater facilities to an additional 12,000 residents by 1996, with more facilities to be completed by the year 2000.

Until adequate wastewater collection facilities are constructed and for some time beyond, the agricultural drains will continue to serve as a collection system for polluted ground water; and until a solid waste collection system is provided, the drains will continue to act as a surface collector for solid wastes unless corrective actions on the drains are taken.

Reclamation has ultimate responsibility for maintaining the drains because title to the drains currently remains with the United States. By contract dated March 14, 1980, Reclamation contracted with EPCWID to operate and maintain the drains. The contract requires EPCWID to maintain the drains to the conditions that existed at the time the contract was initiated. Because current conditions did not exist at the time the contract was signed, it was concluded that EPCWID cannot be held responsible for the conditions that exist at the drains

today and that Reclamation and EPCWID are "injured parties" in that such conditions are a result of the actions or failed actions of others. At the time the subdivision units were sold, Texas law did not require the developers to invest in a water and sewer system.

Reclamation is currently working to transfer title of project rights-of-way and facilities within the jurisdictional area to EPCWID in 1995. Reclamation intends to include the project drains within the Lower Valley colonias in the transfer, but maintain an easement to allow Reclamation to complete planned work.

A solicitor's opinion dated February 13, 1995, determined that the construction costs for corrective actions on the drains are not reimbursable. However, as a condition of the transfer of title, EPCWID will assume the O&M costs of the corrective actions.

Challenges Facing Project Management

Various entities with water interests along the Rio Grande are questioning Federal decisions regarding management of Rio Grande Project water. Questions have been raised not only by the irrigation districts, but also by interested state agencies, Rio Grande Compact Commissioners, the International Boundary and Water Commission (IBWC), environmental groups, and other stakeholders. IBWC and the Texas Department of Parks and Wildlife have expressed concern over the decreasing Federal presence in Rio Grande water management and want to see greater Federal involvement. In order to make policy decisions, Reclamation must determine how much control it wishes to exert over project water and define the extent of its obligations under the law and in the public interest.

Land Management Issues

Transfer of Facilities. Title 33 of Public Law 102-575 authorizes the Secretary to transfer to Elephant Butte Irrigation District and El Paso County Water Improvement District title to such easements, ditches, laterals, canals, drains, and other rights-of-way, that the United States has acquired on behalf of the Rio Grande Project, which are used for the purpose of serving the respective district's lands. Facilities located in New Mexico that are used to jointly serve both districts may be transferred to the two districts upon agreement with the Secretary.

The law specifies that title will transfer at no cost to the districts, and the districts will assume the responsibility for operating and maintaining their portion of the project. Transfer of title and responsibility for O&M of Elephant Butte and Caballo Dams and Percha, Leasburg, and Mesilla Diversion Dams and the works necessary for their protection and operation are specifically precluded by the law.

Transfer of facilities is subject to the *National Environmental Policy Act* (NEPA). Informal scoping was completed in early 1993; and a hazardous waste survey was completed in 1994. Reclamation expected to transfer title near the end of fiscal year 1994, using a quitclaim deed to transfer those portions located within New Mexico and a deed without warranty to transfer those portions within the State of Texas. Transfer was temporarily delayed while work was being done to address health and safety conditions in the colonias along the

work was being done to address health and safety conditions in the colonias along the Reclamation drains (discussed previously). According to a plan developed by Reclamation, the drain work will continue for the next 3 years.

An interdisciplinary team has been designated to pursue the NEPA process, with a target date of 1995 for transfer. Public meetings (informal scoping) were held in four locations. A final determination has not yet been made as to whether an environmental assessment or a full scale environmental impact statement (EIS) is required. If an EIS is required, the government will incur all the costs, and transfer will be delayed for up to 3 years to complete the EIS.

Grazing. Under a memorandum of understanding with the Bureau of Land Management (BLM), Reclamation authorizes BLM to issue grazing permits for the lands surrounding Elephant Butte and Caballo Reservoirs. BLM follows its rules for administration of grazing permits. Generally, revenues from the permits are used to offset administrative costs and improve range conditions. If surplus monies are generated, then that amount is transferred to Reclamation for disbursement to the proper accounts.

One issue in the lawsuit between the irrigation districts and the United States, *Elephant Butte Irrigation District v. United States* (No. CIV-90-95), addresses grazing. The districts would prefer that BLM conduct competitive bidding for grazing permits on Reclamation lands or that the districts be allowed to manage the grazing program. By changing the current management practices, the districts hope to generate revenue to defray their operation and maintenance expenses. Without congressional approval, however, a Federal agency cannot delegate management of public lands to a non-Federal entity; so transfer of management to the districts is not possible. Further, it is not realistic to expect BLM to have separate management practices for Reclamation lands and the adjacent public lands when the properties are not separable.

State Parks. The irrigation districts also argue in their lawsuit against the United States that the 1973 lease agreement between the United States and New Mexico State Parks is invalid because it was outside Reclamation's authority. The districts contend that they should manage and receive the profits from the recreation lands.

In 1962, Congress passed legislation providing for the establishment and administration of basic public recreation facilities at Elephant Butte and Caballo Reservoirs. All costs of the facilities are nonreimbursable and, therefore, the taxpayers rather than the districts paid for them. Congress directed Reclamation to provide recreation facilities to the extent practical for the benefit and enjoyment of the American people, not to maximize profits for an additional subsidy to irrigation districts.

O&M Costs. In ongoing litigation, the districts allege that the United States is charging excessive O&M costs. The O&M costs of Elephant Butte Dam are distributed according to a formula with the following allocations:

Power	20.8 percent
Irrigation	34.4 percent
Flood control	12.9 percent
Recreation	15.9 percent
Fish and wildlife	4.0 percent
Storage for Mexico	11.0 percent
Storage for the city of Albuquerque	1.0 percent

The districts pay only their share of the 34.4 percent for irrigation and do not pay any of the Caballo Dam O&M costs.

An audit of O&M activities by the Office of the Inspector General has determined this O&M cost allocation should be revised because it favors the districts and does not reflect the actual distribution of economic benefits.

Water Management Issues

Water Deliveries. Prior to the transfer of O&M responsibilities for irrigation and drainage facilities to the districts in 1979-80, the Rio Grande Project was operated as a unit, with water allocated to the farmers at a full allotment rate of 3.024 acre-feet per acre. The O&M transfer necessitated computations of allocations to each district diversion point rather than the individual farmers. Because the project serves irrigation districts in different states, a formal water allocation agreement was considered necessary. An agreement was drafted and discussed with the two districts and IBWC. Although all parties informally agreed to operate under this agreement, it was never executed by the parties. In this agreement, the allocation specified delivery of 60,000 acre-feet to Mexico and water for 155,000 acres of water right land in the United States. This entitlement was computed by using two curves based on the historical relationships of:

1. Water deliveries to farms compared to releases from Caballo Dam
2. Caballo Dam releases compared to water delivered to all diversion dams

Application of the curves resulted in the following computation of a full allotment:

- 763,800 acre-feet released at Caballo Dam
- 871,841 acre-feet to authorized United States diversion points (494,979 acre-feet to EBID and 376,862 acre-feet to EPCWID)
- 60,000 acre-feet to Mexico

Any unused allocation would remain in storage and would be available for reallocation between all parties the next year. As stated above, this agreement has never been formally executed.

The parties continue to discuss options for computing allocations. One option would allow carryover storage in Elephant Butte for unused allocations. This carryover water would be an additional entitlement for a particular district rather than being reallocated to the project water supply for next year's distribution. The United States is not comfortable with storing the districts' unneeded supply in Elephant Butte Reservoir. If project water cannot be beneficially used by the districts, it could be classified as surplus water and provided to a secondary interest—either Hudspeth, El Paso, or the colonias.

Another option being discussed is to allocate the available Caballo water based on a 56/43 split: 56 percent for EBID and 43 percent for EPCWID. This would result in EBID receiving less water for delivery and EPCWID receiving all of the return and stormflows. Previous court cases have declared that seepage is project water.

The case of *Bean v. United States*, 163 F. Supplement 838 (Ct.Cl. 1958) affirmed the Rio Grande Project water rights. The court ruled that the prior non-use of project seepage waters by the United States did not constitute abandonment of the right to use such water when needed in the future, and plaintiff's [Hudspeth District] use of such seepage water did not create rights superior to those of the United States to "control and prescribe the use of those waters." Reclamation must decide whether or not EPCWID is to receive all project seepage.

Water Quality and Stormwater Drainage. If Rio Grande Project water is transferred from irrigation to M&I use, some concerns will arise about the potential impact on water quality. Wastewater treatment plants add dissolved solids to the treated effluent returned to the Rio Grande. Records show that water in the Rio Grande above the Montoya drain, which is 4.5 miles upstream of downtown El Paso, averages about 600 to 700 parts per million (ppm) total dissolved solids (TDS); below the drain, the average is 800 to 900 ppm. Depending on the crop, damage can occur when TDS levels reach 1,000 ppm.

While recently conducting excavations for construction work, the city of El Paso encountered significant quantities of ground water that had to be removed so that construction could continue. The water was discharged into the Rio Grande using an old permit. However, the ground water had a high level of dissolved solids that degraded the water quality of the Rio Grande, which is subsequently diverted by EPCWID. EPCWID sought compensation from El Paso for degrading the project water supply. Because many other such excavations are expected in the future, EPCWID and the city entered into a compensation agreement requiring 2.5 cents per acre-foot for each ppm in excess of 500 for the district. The impact on Reclamation results from the fact that EPCWID already is taking more storage water than it is entitled to under its contract in an effort to dilute the TDS in its return flows. Thus, because the district is demanding more storage water to dilute flows with high TDS, the Rio Grande Project will be adversely affected when low quality water is added to the project water supply. This raises an issue as to whether the United States is entitled to all or a portion of the compensation the district receives from the city.

Reclamation currently has an agreement with the city of El Paso that permits use of Reclamation facilities for stormwater drainage. Several agricultural drains have been converted to stormwater conveyance channels, and Reclamation has issued permits to

enlarge and line some of the drains for that purpose. Numerous individual and city contracts have been issued for stormwater discharge to the drains. It has become evident that development of the stormwater conveyance system has not kept pace with urban development.

In 1986, Reclamation wrote a letter to the city stating that additional stormwater permits would not be issued until NEPA compliance was achieved. A draft environmental assessment was prepared by the city in 1990 but failed to pass Interior review. After numerous redrafts and \$500,000 of city funds expended, the city gave up trying to get approval in 1992. The city hopes that the proposed title transfer of distribution facilities and associated lands will occur and Reclamation will be removed from the picture. Numerous requests for stormwater discharge permits are pending.

Evaporation. In *Elephant Butte Irrigation District v. United States*, the district is suing the United States for fair market value of the water lost due to the increased evaporation caused by storing water in Caballo rather than Elephant Butte Reservoir. Caballo Reservoir stores the power releases from Elephant Butte Dam.

Pursuant to the *50-Year Power Lease, Rio Grande Project Act*, a power privilege lease between the United States and the two irrigation districts was entered into on May 10, 1928. This agreement gave the districts the privilege of developing a hydroelectric powerplant. The contract stated that releases from Elephant Butte would be limited to the amount required to fulfill irrigation demands, flood control requirements, and Mexican treaty obligations. Thus, the character of releases from Elephant Butte precluded the development of steady power generation. Reclamation therefore proposed that Caballo Dam—originally developed as a flood control project by IBWC—be enlarged to increase its capacity so that it could act as a “reregulating reservoir” by capturing power releases from Elephant Butte Dam and, thus, firm power could be developed.

Several inquiries have been made by the districts over the years regarding releases from Elephant Butte Dam for power generation to the detriment of the project water supply. Studies conducted by Reclamation indicate that the increased evaporation due to use of Caballo Reservoir as a reregulating reservoir amounts to 21,130 acre-feet per year. This loss is offset by tributary inflows into Caballo Reservoir totaling 17,183 acre-feet per year. These flows would have been lost to the project if Caballo Dam had not been built. In addition, water is saved due to increased project storage capacity of 7,452 acre-feet per year and the retirement of formerly irrigated lands in the Caballo right-of-way, which used 2,604 acre-feet of water per year. Therefore, although 21,130 acre-feet are lost by evaporation, 27,239 acre-feet are gained for project use. The net result from Caballo Reservoir operations is a gain of 6,109 acre-feet per year. However, due to the lawsuit, Reclamation has agreed not to make releases from Elephant Butte Dam for power generation during the nonirrigation season.

Flood Reserve Space. The Texas Rio Grande Commissioner questions Elephant Butte Reservoir operations that reserve 50,000 acre-feet of space for floodflows during years when the reservoir is full and a spill is anticipated. The concern in Texas is based on the impacts of a spill under the Rio Grande Compact. A spill cancels all water delivery debts and

credits. Therefore, the upstream states generally favor a spill computation since they are the states that accrue debts. Texas, the downstream state, wants to make sure that a spill actually occurs.

Reclamation established the policy of not completely filling Elephant Butte Reservoir as a safety precaution to prevent downstream flooding and protect the physical integrity of the dam and its appurtenant works. Truth or Consequences does not get flooded if a heavy rain occurs because there is emergency storage space available in a "flood reserve." Some tributaries that feed into the Rio Grande above Elephant Butte have no control systems, so inflows to the reservoir cannot be regulated. Texas has threatened to file for an injunction against Reclamation reserving this space and has also raised the possibility of a takings claim, alleging that Reclamation is depriving them of project storage space. However, under the Reclamation Act, the Secretary has authority to decide how to safely operate storage facilities, and flood control does not have to be an authorized project purpose to be a safety consideration in project operations.

Protection of Instream Flows For Wildlife and Recreation. John D. Leshy, Solicitor for the Department of the Interior, presented a paper at a conference on water law in February 1994. In his presentation, he noted that in the last 16 years, the Western States have enacted legislation in response to urbanization and growing environmental concerns that calls for protecting instream flows for wildlife and recreation. Several states have endangered species acts that are counterparts to the Federal act, and a few have adopted wild and scenic river systems.

Leshy specifically mentioned the decision of the Nevada Supreme Court in *Nevada v. Morros*, 766 P.2d 263 (Nev. 1988), as an example of the recent state concern for the environment. Leshy stated:

Here was a state court, applying state law to hold that the BLM and the Forest Service could hold state law water rights for wildlife and recreation as well as livestock grazing purposes. Firmly and unanimously rejecting the arguments of the Nevada Farm Bureau, ranchers, and the State Agricultural Board, the Court held that state must make water available for federal needs on the same basis that it did to others. It said: The [state trial judge] correctly stated that the U.S. is not to be feared, given preferential treatment, and certainly not discriminated against.

Two evolving trends underscore the imperative for state-Federal cooperation in water rights matters.

The first is the legislative restructuring of Federal reclamation projects. Congress while slowly turning off the spigot of western water funding, is following up by legislatively overhauling the management of several western water projects. Examples are the Central Valley Project, the Central Utah Project, and Truckee Carson/Pyramid Lake. . . . Project restructuring is emerging as a trend, but the details of each are different, responding to local peculiarities. The common threads are (1) more protection for wildlife and other environmental values,

usually through water transfers or reallocation to improve streamflows; (2) more attention paid to economics and market signals, including increased non-Federal cost sharing; and (3) a more broadly participatory decision making process, opening up to such groups as Indians and environmentalists.

The second and even more important trend is the increasing importance of the Endangered Species Act. It is now influencing most major water management projects in the Western States. Endangered species protection, biodiversity, and ecosystem management pose major challenges to western water managers. The Endangered Species Act has more than anything else required increased cooperation and coordination on problem solving on river systems.

One example of problem-solving on the Rio Grande is the Rio Grande Conveyance Canal/Pipeline and Treatment Plant Project proposed by the New Mexico-Texas Water Commission. This initiative involves pipelines or canals from Caballo Reservoir to El Paso for M&I water and will require cooperation between U.S. Fish and Wildlife Service, New Mexico Environmental Department, and the municipalities. The project would convey water directly from Elephant Butte Dam to El Paso via a lined conveyance system in lieu of river conveyance. The salvaged water would be available for municipal use and other applications. The project also would allow for year-round use of El Paso's two water treatment plants, which currently shut down from October to March. The plants stop operating when farmers stop irrigating because the water quality of return flows makes them unsuitable for municipal use. Reclamation is concerned about the potential environmental and water quality impacts of diverting water at Elephant Butte Dam rather than allowing it to flow downstream.

INSTITUTIONAL ENVIRONMENT

To develop workable solutions and implement effective policy changes, it is important to understand the current institutional environment in which they must be implemented.

Water Conservation Policies

The *Reclamation Reform Act (RRA)* requires those who contract for Federal project water supplies to develop water conservation plans that examine existing water management practices, evaluate alternative water management strategies, and implement appropriate water conservation measures. Improvements in water management on Federal projects can reduce overall operating costs, improve reliability of existing water supplies, postpone the need for new or expanded water supplies, and reduce the impacts of drought. Although the Rio Grande Project is not subject to RRA requirements, Reclamation encourages all districts using water from its facilities to implement water conservation measures.

Section 210(b) of the RRA requires districts that have entered into repayment or water service contracts pursuant to Federal Reclamation Law or the *Water Supply Act* to:

. . . develop a water conservation plan which shall contain definite goals, appropriate water conservation measures, and a time schedule for meeting the water conservation objectives.

Section 210(a) of the RRA further states that:

The Secretary shall . . . encourage the full consideration and incorporation of prudent and responsible water conservation measures in the operations of non-Federal recipients of irrigation water from Federal Reclamation projects, where such measures are shown to be economically feasible for such non-Federal recipients.

To this end, Reclamation is developing guidelines and criteria for evaluating water conservation plans to assist in developing, submitting, and implementating these required water conservation plans. Reclamation is working with states, districts, and other non-Federal interests to identify opportunities for improved water management and water use efficiency. This may include facilitating water transfers between willing parties, encouraging changes in use, and identifying beneficiaries that may be willing to fund the conservation activities of others.

Water Spreading

In July 1994, Interior's Office of the Inspector General published a report of their investigation into unauthorized use of Reclamation project water (U.S. Department of the Interior 1994). The report described many instances of unauthorized water use and concluded that, "Reclamation had not taken actions necessary to ensure that Federal project water was used to irrigate only lands determined to be suitable for irrigation and eligible to receive water under Federal law." The Inspector General directed Reclamation to develop policy to address this situation.

Reclamation is seeking actively to eliminate the use of Reclamation project water in ways, amounts, or locations that are not authorized by Federal law and Reclamation contracts or consistent with state water law or permits. Such unauthorized use includes:

1. Applying project water to lands outside the boundaries defined by the project's authorizing legislation or a contract
2. Applying project water to lands that have not been classified by Reclamation as eligible to receive it, or to lands classified by Reclamation as nonirrigable
3. Any change of use, such as from agricultural to M&I, without the prior written approval of Reclamation
4. Applying project water without the necessary state water right

Environmental Consultation and Compliance

The transfer of Reclamation project water from one use or location to another may require assessment of environmental consequences as directed by NEPA. The extent of NEPA compliance required for a water transfer depends upon whether a Federal action is involved in the transfer and the magnitude of environmental consequences caused by the transfer. Other Federal requirements may be involved, including the *Endangered Species Act*, *National Historic Preservation Act*, and Indian Trust Assets. Health and safety concerns and recreation use are potential issues and concerns to be addressed. While a hazardous waste survey has been completed, mutual agreement on transfer of lands containing hazardous waste must occur before transfer. Similarly, cultural resources agreements must be in place before transfer can occur.

When no Federal action is involved, NEPA is not in effect. Therefore, any transfer of Reclamation project water that the user may unilaterally make under existing law and contract is exempt from NEPA compliance. However, where Reclamation must initiate or approve the transfer, a Federal action has been taken and NEPA requirements must be met.

The amount of water being transferred, the existing water supply situation in the area, the land use changes that may be associated with the transfer, and the duration of the transfer can all play a role in determining what level of NEPA compliance is required. Where the transfer is for a large amount of water, involves a significant land use change, and is long term, the chances increase that an EIS is required. The NEPA process for an EIS generally takes several years to complete and includes a number of mandatory steps, including public scoping, a public draft, formal public comments on the draft, a final EIS, and a record of decision.

Current Reclamation Proposals

Several Reclamation activities are underway that will facilitate water management and improve the capability to accomplish water transfers. Interior's guidelines for transfers, which have been adopted by Reclamation, are being revised to address the concerns expressed in the General Accounting Office report (U.S. Department of the Interior 1994b) discussed in chapter I of this document.

A pricing policy for water transferred from irrigation to M&I is near completion. This policy will provide that price be determined based on the replacement cost of the facilities providing the service. That price will be capped by the market price for M&I water in the area, so that the cost will not inhibit the transfer. A price determined by this methodology can be used in a M&I water service contract negotiated under Section 9c(2) of the *Reclamation Project Act of 1939*.

A legislative proposal is being developed which would authorize M&I as a project purpose on any Reclamation project where it was not previously authorized. Such legislation would remove the problem of restrictions in a project's authorizing legislation. The draft legislation also provides that, in the event the project is paid out, the Secretary has the authority to determine a price to charge for M&I water. In addition, it would restrict contract length to

25 years, in keeping with current Reclamation policy directives. M&I water could be provided pursuant to this act only after the entity enters into a new, amended, or supplementary contract.

Amending the Warren Act also is under consideration. As drafted, the amendment would extend the authority of the Warren Act to municipalities, public water utilities and agencies, other Federal agencies, state agencies, and private entities. Water stored or conveyed under a Warren Act contract could then be used for irrigation, domestic, municipal, fish and wildlife, industrial, hydropower, or any other beneficial purpose. This amendment would broaden the capability of other agencies to use Reclamation facilities for their water management activities, even during periods of drought.

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FINAL DRAFT

ATTACHMENTS

A—Filing No. 8

B—El Paso's Conservation and Recycling Policies

C—Chief Counsel Memorandum, 1947

D—Water Transfer Policy Guidance

E—Principles Governing Voluntary Water Transactions

FINAL DRAFT

ATTACHMENT A
Filing No. 8

Water Appropriations,
Rio Grande Project.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
Reclamation Service

Carlsbad, New Mexico. Jan. 23, 1906.

Mr. David L. White,
Territorial Irrigation Engineer,
Santa Fe, New Mexico

Dear Sir:

The United States Reclamation Service, acting under authority of an Act of Congress known as the Reclamation Act, approved June 17, 1902 (32 Stat., 388), proposes to construct within the Territory of New Mexico certain irrigation works in connection with the so-called Rio Grande project. The operation of the works in question contemplates the diversion of water from the Rio Grande River.

Section 22 of Chapter 102 of the laws enacted in 1905 by the 36th Legislative Assembly of the Territory of New Mexico - an Act entitled, "An Act Creating the Office of Territorial Irrigation Engineer, to Promote Irrigation Development and Conserve the Waters of New Mexico for the Irrigation of Lands and for other Purposes," approved March 16, 1905 - reads as follows:

"Whenever the proper officers of the United States authorized by law to construct irrigation works, shall notify the territorial irrigation engineer that the United States intends to utilize certain specified waters, the waters so described, and unappropriated at the date of such notice, shall not be subject to further appropriations under the laws of New Mexico, and no adverse claims to the use of such waters, initiated subsequent to the date of such notice, shall be recognized under the laws of the territory, except as to such amount of the water described in such notice as may be formally re-leased in writing by an officer of the United States thereunto duly authorized".

ATT-1

In pursuance of the above statute of the Territory you are hereby notified that the United States intends to utilize the following described waters, to-wit:

A volume of water equivalent to 730,000 acre-feet per year requiring a maximum diversion or storage of 2,000,000 miner's inches said water to be diverted or stored from the Rio Grande River at a point described as follows:

Storage dam about 9 miles west of Engle, New Mexico, with capacity for 2,000,000 acre-feet, and diversion dams below in Palomas, Rincon, Mesilla, and El Paso Valleys in New Mexico and Texas.

It is, therefore, requested that the waters above described be withheld from further appropriation and that the rights and interests of the United States in the premises be otherwise protected as contemplated by the statute above cited.

Very truly yours,

(Signed) B.M. Hall,
Supervising Engineer.

Supplemental notice of the intention of the United States to use the waters of the Rio Grande for irrigation purposes on the Rio Grande Project.

Phoenix, Arizona, April, 1908

Mr. Vernon L. Sullivan,
Territorial Engineer,
Santa Fe, New Mexico

Dear Sir:

Claiming and reserving all rights under our former notice of January 23, 1906, addressed to David L. White, Territorial Irrigation Engineer of New Mexico, which said notice advised him of the intention of the United States to use the waters of the Rio Grande for the purpose of irrigation, and is now filed in your office, I do now hereby give you the following notice in addition to said former notice and supplemental thereto.

The United States acting under authority of an Act of Congress, known as the Reclamation Act, approved June 17, 1902, (32 Stat., 388), proposes to construct within the Territory of New Mexico certain irrigation works in connection with the so-called Rio Grande Project. The operation of the works in question contemplates the diversion of the water of the Rio Grande River.

Section 40 of Chapter 49 of the laws enacted in 1907 by the 37th Legislative Assembly of the Territory of New Mexico, an Act entitled, "An Act to conserve and regulate the use and distribution of the waters of New Mexico; to create the office of Territorial Engineer; to create a Board of Water Commissioners, and for other purposes", approved March 19, 1907, reads as follows:

ATT-3

Whenever the proper officers of the United States Authorized by law to construct works for the utilization of waters within the Territory, shall notify the Territorial Engineer that the United States intends to utilize certain specified waters, the waters so described and unappropriated, and not covered by applications or affidavits duly filed or permits as required by law, at the date of such notice, shall not be subject to a further appropriation under the laws of the Territory for a period of three years from the date of said notice, within which time the proper officers of the United States shall file plans for the proposed work in the office of the Territorial Engineer for his information, and no adverse claim to the use of the water required in connection with such plans, initiated subsequent to the date of such notice, shall be recognized under the laws of the Territory, except as to such amount of water described in such notice as may be formally released in writing by an officer of the United States thereunto duly authorized; Provided, that in case of failure to file plans of the proposed work within three years, as herein required, the waters specified in the notice given by the United States to the Territorial Engineer shall become public water, subject to general appropriations.

In pursuance of the above statute of the Territory you are hereby notified that the United States intends to utilize the following described waters, to-wit:

All the unappropriated water of the Rio Grande and its tributaries, said water to be diverted or stored from the Rio Grande River at a point described as follows:

Storage dam about nine miles west of Engle, New Mexico, with capacity for two million (2,000,000) acre feet, and diversion dams below in Palomas, Rincon, Mesilla and El Paso Valleys in New Mexico and Texas.

It is therefore requested that the waters above described be withheld from further appropriation and that the rights and interests of the United States in the premises be otherwise protected as contemplated by the statute above cited.

Very truly yours,

(Signed) Louis C. Hill,

Supervising Engineer.

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ATT-6

ATTACHMENT B
El Paso's Conservation and Recycling Policies

Water conservation and recycling are part of El Paso's response to this problem. Listed below are the key elements of El Paso's conservation program. As a result of this program, El Paso's per capita water consumption is lower than any comparably situated city. Even more important, whereas national per capita water use is on an upward trend, per capita needs in El Paso are stable or decreasing—which is a sign that conservation efforts are paying off.

Metering and rate structures:

- All use is metered.
- Rate structure for the most "elastic" types of water use (residential) is inverted; commercial rates decline slightly.
- Rate increases have been based on marginal cost principles.

Higher-cost renewable resources (Rio Grande) are used in order to conserve lower-cost but diminishing resources (Hueco Bolson). Rates generally are comparable with other major cities in the southwestern United States. Recent increases have been substantial, and rates are expected to double over the next 5 years.

Reuse:

- All wastewater is to be reused.
- In the year 2005, such reuse will account for 80,000 acre-feet per year:
 - 10,000 acre-feet will be recycled for drinking water.
 - 10,000 acre-feet will help meet industrial and recreation demands.
 - 60,000 acre-feet will help meet agricultural needs.

Other:

- Building codes require water savings fixtures.
- Leak detection program results in replacement of 6 to 10 miles of pipe annually.
- Educational programs include presentations, bill stuffers, distribution of flow-reduction devices, and desert landscaping.

The annual cost of conservation and recycling will be about \$10 million per year. It is expected that demand for pumping of Hueco Bolson water will decrease by 60,000 acre-feet per year.

Recycling is the single most effective conservation measure available, and El Paso is the most advanced city in the U.S. with respect to recycling. The outstanding example of El Paso's commitment is the \$30 million Hueco Bolson Recharge Project (Environmental Protection Agency

1980). This project will put reclaimed sewage wastewater into the Hueco aquifer where it will become part of the city's water supply. Recycled water will start showing up in El Paso's taps in small amounts in about 5 years.

Conservation can and should be expanded, but most of what remains to be done will have a relatively small impact. Unless El Paso bans lawns and city parks, shuts down the refineries and other major water users that provide jobs, and rations water, conservation by itself simply cannot begin to overcome the incredible stress that 3-percent annual population growth puts on El Paso's water supply. Thus, El Paso plainly must find a new water supply to supplement and eventually replace the Texas portion of the Hueco Bolson.

New Supplies

The options for finding new water for El Paso are not numerous. Studies conducted for the Environmental Protection Agency's review of the Hueco Bolson Recharge Project indicate that only six alternatives are feasible at this time:

1. Recycling
2. Desalting
3. Rio Grande surface water
4. Ground water from Texas
5. Hueco Bolson, New Mexico
6. Mesilla Bolson, New Mexico

Alternative 1

El Paso could expand recycling efforts by implementing the Northwest Area Wastewater Reuse Project.

Alternative 2

Desalting is not a viable alternative in the near term because it involves enormous cost, a big energy appetite, unreliability, and the serious environmental problems associated with brine disposal.

Alternative 3

Rio Grande surface water is an alternative because over the years the riverflow is renewed by snowmelt and rainfall. To obtain a sufficiently large and usable river supply, El Paso would have to obtain project water rights for much of the water currently available to Texas under the Rio Grande Compact. Even if the city could get a much larger share of available river water, the Rio Grande may, because of drought possibilities, be too unreliable to be the primary solution to the water shortages that face El Paso.

Alternative 4

The city could acquire land for ground-water rights to various smaller aquifers in the Trans-Pecos area. These scattered aquifers contain only about 7 maf of fresh water.

The city of El Paso, through its water board, has purchased two "water ranches" in the Trans-Pecos area. In February 1992, the city purchased a 24,500-acre water ranch in Antelope Valley, in the vicinity of Valentine, Texas (160 miles southeast of El Paso). The total yield of this water ranch is expected to be approximately 5.6 maf; however, U.S. Geological Survey (USGS) estimates a more conservative 3.4 maf. The annual yield

is expected to be 45,000 acre-feet per year. In February 1995, the city purchased a 20,947-acre parcel of land called the Wild Horse Ranch near Van Horn, Texas (120 miles southeast of El Paso), as a future "water ranch." Wild Horse Ranch has a total 1 maf of fresh water (salinity less than 1,000 ppm) and is expected to have an annual yield of 7,000 to 10,000 acre-feet per year. There is an additional 400,000 acre-feet of moderately brackish water (approximately 1,500 ppm) at Wild Horse Ranch.

The resulting pipeline and pumping costs would make the water three to five times more expensive than the current supply. Such a long pipeline also raises reliability questions. Finally, the total amount of water involved is not enough to solve the problem, only to postpone the water crisis by as little as 10 or 20 years.

Alternative 5

El Paso could obtain access to significant quantities of ground water in the Hueco Bolson in New Mexico, which has about 17 maf of fresh water in storage. This is nearly equal to all of the Texas aquifers within 150 miles of El Paso. The costs of pumping and transportation would be slightly more than the present supply. Most of the water is beneath Federal land, so there is no need to buy drilling rights from private landowners. El Paso would need to obtain ground-water permits from the New Mexico State Engineer.

Alternative 6

El Paso could obtain water from the Mesilla Bolson in New Mexico, which is an even larger aquifer than the Hueco Bolson. Recent USGS studies reveal that at least 60 maf of fresh ground water is contained in the Mesilla Bolson, with more in unexplored areas to the west. Although this water is still close enough to El Paso to be economical, it is many miles west of the Mesilla Valley, where irrigation agriculture is located. This mesa portion of the aquifer contains about 30 maf. Most of the mesa water underlies Federal lands, and current pumping is almost nil. El Paso would need to obtain ground-water permits from the New Mexico State Engineer.

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ATT-10

ATTACHMENT C
Chief Counsel Memorandum, 1947
(RETYPE FOR LEGIBILITY)

March 26, 1947

MEMORANDUM

To: Commissioner
Attention: Director, Branch of Project Planning

From: Chief Counsel

Subject: Provision for Repayment on Allocations to Municipal Water Supplies

1. In his memorandum of September 11, 1946, the Director, Branch of Project Planning, indicated that the conferees at an office conference on November 23, 1945, had arrived at the consensus that within applicable provisions of law, interest should be charged on allocations to municipal water supply. That memorandum indicates further that the particular rate or rates of interest, which should be established, remained undetermined. As a matter preliminary to the establishment of interest rates, the memorandum elicits my opinion concerning three specific questions, as follows:

a. Can the Bureau legally charge municipal water users an appropriate share of operation and maintenance under section 9(c)(1) of the Reclamation Project Act of 1939 (53 Stat. 1157, 43 U.S.C. 4g5h(c))?

b. Can the Bureau legally charge interest under section 9(c)(2) of the Act?

c. Shall it be the choice of the Secretary or of the municipality as to which of the two alternatives is to be adopted?

2. For reasons which follow, the answer to each of the first two questions is in the affirmative. With respect to the third question, the selection of the basis for contracting for furnishing a water supply for municipal or miscellaneous purposes as between the alternative methods provided for in section 9(c) of the 1939 Act, supra, is within the discretion of the Secretary of the Interior.

3. No contracts have yet been entered into pursuant to the provisions of and in accordance with allocations made under the Reclamation Project Act of August 4, 1939, supra. Plans relating to the Central Valley Project, the Missouri Basin Project, and others however, contemplate a number of contracts to be made for furnishing water for municipal and miscellaneous purposes under that Act. Therefore, while conclusions regarding the specific questions mentioned above may be quite readily reached, a brief consideration here of prior legislation and practice thereunder may be useful.

4. Prior to the 1939 Act, supra, there had been little legislation dealing with this subject. The original Reclamation Act (32 Stat. 388) does not mention it. The matter was first given legislative attention in 1906 as a corollary to the establishment, in connection with irrigation projects, of towns on public lands. By section 4 of the Act of April 16, 1906 (34 Stat. 116), the Secretary was authorized to supply water for municipal purposes to towns established thereunder and to towns or

cities on or in the immediate vicinity of irrigation projects. Section 4 of that Act provides, in part, as follows:

"... charges shall be not less nor upon terms more favorable than those fixed by the Secretary of the Interior for the irrigation project from which the water is taken."¹

5. That provision is confined to municipal water supply and to one special class. No express legislative authority for furnishing a water supply for municipal or miscellaneous purposes generally existed until passage of the Act of February 25, 1920 (41 Stat. 451), authorizing the Secretary to contract for the delivery of water for other than irrigation purposes "upon such conditions of delivery, use, and payment as he may deem proper." It will be noted that the standards in the two statutes for fixing charges differ somewhat and that the later Act requires a showing that no source of supply other than the irrigation project supply is available.

6. A study of available sources does not disclose an entirely consistent pattern in fixing rates for water for miscellaneous purposes, but in several instances they appear to have been fixed on substantially the same basis as those for an irrigation water supply.²

7. The two earlier statutes cited differ substantially from the 1939 Act, which provides in pertinent part of section 9(c) relating to furnishing water for municipal or miscellaneous purposes, as follows:

"... the Secretary is authorized to enter into contracts to furnish water for municipal water supply or miscellaneous purposes: Provided, that any such contract either (1) shall require repayment to the United States, over a period of not to exceed forty years from the year in which water is first delivered for the use of the contracting party, with interest not exceeding the rate of 3 1/2 percentum per annum if the Secretary determines an interest charge to be proper, of an appropriate share as determined by the Secretary of that part of the construction costs allocated by him to municipal water or other miscellaneous purposes; or (2) shall be for such periods, not to exceed forty years, and at such rates as in the Secretary's judgment will produce revenues at least sufficient to cover an appropriate share of the annual operation and maintenance cost and an appropriate share of such fixed charges as the Secretary deems proper, and shall require the payment of said rates each year in advance of delivery of water for said year.

"... No contract relating to municipal water supply or miscellaneous purposes ... shall be made unless, in the judgment of the Secretary, it will not impair the efficiency of the project for irrigation purposes."

8. The legislative history of the 1939 Act, with respect to the last quoted provision, is in itself wholly uninformative.³ It is necessary to contrast the legislative pattern of basic provisions governing the establishment of projects and repayment of costs which obtained at the time of enactment of the 1906 and 1920 provisions with that embraced in the 1939 Act as a whole, in the light of which section 9(c) must be considered. Thus, there became discernible substantial differences in the relationship of contracts under the 1939 Act for furnishing water for municipal and miscellaneous purposes and that which existed under such contracts made under prior acts. For example, the 1920

Act forbids the furnishing of water for these uses; "if the delivery of such water shall be detrimental to the water service for such irrigation project." The corresponding provision in the 1939 Act, however, is that no such contract shall be made unless, in the judgment of the Secretary, it will not impair the efficiency of the project for irrigation purposes. The earlier provisions seemed to proceed compatibly with the concept of a single purpose project or in any event in the light of the fact that irrigation water users were required to assume the primary obligation for repayment of the entire project construction cost, such revenues as might be derived from furnishing a water supply from the project for municipal and miscellaneous purposes to serve only to reduce, but not to be in substitution for such primary obligation of irrigation water users.

9. Section 9 of the 1939 Act, on the other hand, provides for findings of feasibility, allocation of costs among various purposes for which the project is constructed, and execution of contracts for repayment to the United States in the aggregate of so much of the project cost as has not been charged to flood control or navigation. It seems to follow that the limitation on making contracts for a water supply for municipal and miscellaneous purposes under the 1939 Act properly should be construed as one to confine such contracts quantitatively only to the portion of the total supply allocated in advance to municipal and miscellaneous purposes incident to the corresponding cost allocation to those purposes.

10. Against this background, as well as the express provisions of the 1939 Act, a brief consideration of the three questions first mentioned will suffice. The first question is whether in a municipal water supply contract under section 9(c)(1) of the 1939 Act where may be included provisions requiring also the payment by the contracting entity of an appropriate share of operation and maintenance costs. Operation and maintenance charges are not mentioned in section 9(c)(1) of the Act. However, subsection (1) specifically provides for repayment of construction charges and must therefore, be read in pari materia with section 6 of the same Act, the relevant portion of which is as follows:

"In connection with any contract, relating to construction charges, entered into pursuant to the authority of the Act, the Secretary is hereby authorized to require such provisions as he deems proper to secure adoption of proper accounting, to protect the condition of the project works and to provide for the proper use thereof, and to protect project lands against deterioration due to improper use of water. Any such contract shall require advance payment of adequate operation and maintenance charges." (emphasis added)

Operation and maintenance costs not only can, but must therefore, be covered by the charges fixed pursuant to subsection (1).

11. Your second question asks whether in contracts under alternative (2) of section 9(c), the Bureau can legally charge interest. The answer is yes. Alternative (2) is concerned with the rates to be fixed in contracts for furnishing of water for municipal water supply or miscellaneous purposes. It requires that they shall be at least sufficient to cover an appropriate share of the annual operation and maintenance cost and an appropriate share of such fixed charges as the Secretary deems proper. In my opinion, an interest charge is one the items which can properly be included within the classification "fixed charges." It is to be noted that alternative (1) specifically mentions the item of interest for inclusion if the Secretary deems an interest charge to be proper. This obviously leaves the matter to the discretion of the Secretary. It is apparent from an examination of the balance of

section 9(c), that it is intended that the Secretary should exercise his discretion in this same regard under alternative (2). Thus, in the part of section 9(c) dealing with power sales rates, the following appears:

" . . . and at such rates as in his judgment will produce power revenues at least sufficient to cover an appropriate share of the annual operation and maintenance cost, interest on an appropriate share of the construction investment at not less than 3 percentum per annum, and such other fixed charges as the Secretary deems proper:"

In the power sale clause, the item of interest is expressly made a required element of the rate base. The Secretary is given no discretion with reference to its use. Alternative (2) of the provision dealing with municipal water supply, conforms substantially to the language of the power sale clause without the express provision which requires the inclusion of the interest element. The inference to be drawn from the form in which these three provisions are cast, is plain and that it was intended in alternative (2) to preserve in the Secretary the like discretion which had been expressly given to him under alternative (1).

12. Your third question asks whether it shall be the choice of the Secretary or of the municipality as to which of the two alternatives is to be adopted. The answer is it shall be the choice of the Secretary. Section 9(c) authorizes the Secretary to enter into contracts for the furnishing of water for municipal water supply or miscellaneous purposes under either of the two alternatives. Thus, under the law, the choice must ultimately be made by him as to the alternative to be employed in any instance. As already indicated, either alternative permits proper charges for interest and for operation and maintenance.

13. The foregoing conclusions apply with equal force to contracts for industrial and other miscellaneous water supply, which contracts come within the category "miscellaneous purposes" as used in section 9(c) as distinguished from contracts relating to an irrigation water supply.

/s/ Clifford E. Fix

cc: Solicitor

¹ This provision is more nearly like the import of that in the Warren Act (Act of February 21, 1911, 36 Stat. 925, sec.1) relating to surplus water supplies for irrigation purposes which require that such charges shall be "just and equitable as to water users under the Government project."

² For a list of contracts for the sale of water for municipal or miscellaneous purposes see chart attached to Regional Directors' letter ??? dated November 30, 1945.

³ There is no special analysis or discussion in the committee reports or in the testimony before the House or Senate committees of the provisions relating to the sale of water for municipal and miscellaneous purposes.

ATTACHMENT D

Water Transfer Policy Guidance

The existing Reclamation policy guidance for water transfers is embodied in the "1988 Departmental Principles Governing Water Transfers" (see attachment E). Principle 1 holds that primacy for water allocation and management decisions rests principally with the states and voluntary water transactions must be in accordance with applicable state and Federal law.

Principle 2 contains five criteria that dictate when Interior intends to become involved in a transfer action. Specifically, the second states there will be involvement when "there is an existing water right held by the Federal Government that may be affected by the transaction." The third and fourth criteria require Federal Government involvement when "it is proposed to use federally-owned storage or conveyance capacity" or "the proposed transaction will affect Federal project operations." These particular criteria are applicable to the transactions proposed in the Rio Grande basin.

The sixth principle states that one of Interior's objectives will be to ensure that the Federal Government is in an acceptable financial, operational, and contractual position following the transaction. Except as may be required by existing law, contracts, or regulations, Interior will refrain from burdening the transaction with additional costs, fees, or charges, except for those actually incurred in the performance of a particular transaction.

Particular note should be paid to the specific criteria under principle 6, which need to be considered in determining rates to be charged for M&I water. First, subsidies are not transferable. That is, the purchaser, if nonagricultural, is not entitled to the interest subsidy provided to irrigation. Secondly, a conversion from irrigation to M&I requires a change in the repayment of costs to include interest during construction and interest on investment, but only to the extent of the remaining years in the payout period. Additional discussion of this issue follows. A current interest rate for the interest bearing obligations will be utilized, unless otherwise provided by law. In the case of M&I, this rate will be the rate determined at the conversion from the formula provided in the *Water Supply Act of 1958*.

Legislative Authority

Several acts provide the Secretary authority to contract for M&I water. The earliest reference is the *Town Sites and Power Development Act of 1906*. In that statute, the Secretary is prohibited from charging less than the rate charged to irrigators. In the *Sale of Water for Miscellaneous Purposes Act of 1920*, the Secretary is authorized to sell excess water for purposes other than irrigation under such terms as the Secretary deems proper.

The broadest authority is contained in section 9 of the *Reclamation Project Act of 1939*. Section 9(c)(2) of the act provides authority to enter into water service contracts for a period not to exceed 40 years at "such rates as in the Secretary's judgment will produce revenues sufficient to cover an appropriate share" of annual operation and maintenance (O&M) cost and "such fixed charges as the Secretary deems proper." Fixed charges may include a charge based upon an interest calculation. This act was used as the authority for a number of M&I contracts until the *Water Supply Act of 1958* was enacted.

The *Water Supply Act* recognizes the primary responsibilities of the states and local interests in developing water supplies for domestic, municipal, industrial, and other purposes. It further states

the Federal Government should participate and cooperate with the states and local interests in developing such water supplies in connection with the construction, maintenance, and operation of Federal navigation, flood control, irrigation, and multipurpose projects. The *Water Supply Act* states it is to be treated as an alternative to, not a substitute for, the *Reclamation Project Act*. Reclamation has primarily used the 1958 act for establishing repayment provisions for M&I water supply on projects proposed for authorization since 1958.

At present, the highest interest rate prescribed for water projects is that prescribed by the Congress in section 301(b) of the *Water Supply Act*. This statute dictates an interest rate determined by the Secretary of the Treasury based upon "outstanding marketable public obligations, which are neither due nor callable for redemption for fifteen years from the date of issue." Reclamation policy is to use the interest rates derived from the provisions of this act in determining current and future interest charges attributable to M&I capital investment, unless use of a project interest rate is required by law.

Solicitor Clifford E. Fix rendered several opinions in his March 26, 1947, memorandum related to the pricing of water for municipal and miscellaneous purposes (attachment C). The memorandum addresses the question of whether Reclamation can legally charge interest for municipal service and concludes the answer is "yes." Thus, a contract negotiated under the provisions of section 9(c)(2) of the *Reclamation Project Act* may contain interest as a proper charge. The memorandum also addresses the issue of whether the Secretary or the municipality has the choice of which alternatives to use for contracting. The Solicitor concludes it is the choice of the Secretary, since section 9(c) of the act authorizes the Secretary to enter into the contracts for the purpose of providing municipal service.

Reclamation Program Cost Recovery

Reclamation's procedures for establishing the rates charged for providing water service to beneficiaries are based on recovery of the Federal cost of providing the service and not on a commodity-based market price. The conceptual and legal basis for Reclamation's repayment policy; i.e., cost recovery, is generally based on the Federal cost of providing the service to each of the various functions. The policies are derived from a number of laws, including:

- *Reclamation Act of 1902* (Sec. 4, 43 U.S.C. § 419, 461)
- *Reclamation Project Act of 1939* (43 U.S.C. § 485)
- *Water Supply Act of 1958* (43 U.S.C. § 390b)
- *Federal Water Project Recreation Act of 1965* (43 U.S.C. § 460l-12)
- *Water Resources Development Act of 1974* (Sec. 40, 42 U.S.C. § 1962 d-5c)
- *Rehabilitation and Betterment Act of 1949* (43 U.S.C. § 504)
- *Small Reclamation Projects Act of 1956* (43 U.S.C. § 422)
- *Fish and Wildlife Coordination Act of 1958* (16 U.S.C. 661 et seq.)
- *Reclamation Reform Act of 1982* (43 U.S.C. § 390aa-zz)
- *Flood Control Act of 1936* (33 U.S.C. § 701b-e)
- *Flood Control Act of 1938* (33 U.S.C. § 701c-l)

In addition to Reclamation law, Reclamation operates under a January 24, 1984, letter from President Reagan to Senator Laxalt that established a seven-point financing and cost-sharing policy for water projects. Under this policy, a case-by-case negotiation process is followed to permit voluntary cost-sharing to exceed the minimum requirements for repayment.

In order to discuss cost recovery from each of the functions, it is first necessary to describe the derivation of the costs of providing service for the various functions, including irrigation and M&I water service. It is useful to distinguish between cost allocation and repayment.

Cost Allocation

Since most water resource projects constructed by the Bureau of Reclamation are multipurpose in nature, the initial step in determining repayment obligations is to allocate project costs among the purposes served. This is done to distribute the costs between the reimbursable and nonreimbursable functions.

Cost allocation is concerned with the distribution of total project costs among the purposes served by a project according to relatively straightforward principles of economic efficiency and equity. Once costs have been allocated, repayment policy is concerned with the amount and manner by which costs allocated to a purpose will be repaid. This involves a broader range of considerations with respect to national goals and objectives, legislative and policy directives, institutional characteristics of a society, and the repayment ability of the beneficiaries. It also provides a basis for cost-sharing or upfront financing by non-Federal interests during project development.

The most widely accepted method of cost allocation is the separable costs-remaining benefits method. The result is that multipurpose project costs are allocated among purposes in proportion to the relative magnitude of benefits accruing from each purpose. No purpose is supported by the benefits of another purpose, and each purpose receives its fair share of the advantages resulting from the multipurpose development plan. Cost allocation is independent of repayment policy. Knowledge of ability to repay or preconceived notions of desirable water rates do not influence the allocation of project costs among purposes. Once the allocation has been performed, the cost-sharing, upfront financing, and repayment policies determine the manner of funding and repayment of reimbursable costs for each group of project beneficiaries.

Repayment

Irrigation. The *Reclamation Project Act of 1939* provided irrigation repayment be based on the irrigator's ability to pay for water from the increased net income received from irrigated farming. In order to measure this level of repayment, Reclamation uses farm budget analyses to determine the ability to pay for the allocated costs to irrigation. Farm sizes and crop yields are projected to that date. Farm budgets are based on representative, full-time, family size units with and without the project. Returns to increased labor, management, and capital are deducted from the increased net farm income resulting from the project to determine payment capacity.

Contracts for the repayment of the irrigation construction obligation are based on the payment capacity remaining after operation, maintenance, and replacement (OM&R) costs have been deducted. Section 9(d) of the *Reclamation Project Act* provides for irrigation repayment contracts which become a fixed obligation of the contracting district. Most states require voter approval by the members of a district for fixed obligation contracts and will not permit revision of the contract after it is executed without going through the approval process again. For this reason, amendment of repayment contracts at periodic intervals based on changes in payment capacity is not practical.

Section 9(e) of the *Reclamation Project Act* provides for irrigation water service contracts that may provide for renewal at the end of 40 years and does not prohibit a review of the payment capacity at 5-year intervals. There are a number of ratesetting and cost-recovery procedures in use for water service contracts, including cost of service or payment capacity.

Under Reclamation law, the costs allocated to irrigation are fully repaid without interest over a repayment period not to exceed 40 years. However, newly developed lands are permitted to have a development period for up to 10 years before the 40-year repayment period begins. A development period is not used for supplemental irrigation projects. Also, specific project legislation may provide for a 50-year or longer repayment period in some instances.

In most of Reclamation's operating area, assistance is available from Federal power revenues to repay the costs that are beyond the irrigators' ability to pay. Irrigators pay construction costs up to their ability to pay, and the balance is paid from power revenues. Thus, 100 percent of the construction costs allocated to irrigation are repaid without interest. However, under the provisions of the *Reclamation Reform Act of 1982*, certain landholdings are required to pay the full cost of water which includes interest charges.

Municipal and Industrial. Development of storage for M&I supplies began in the 1920's and has increased in importance over time. Reclamation's role in the provision of M&I service is primarily for storage and major delivery facilities.

The basis for the repayment of M&I was established in the *Reclamation Project Act of 1939* and the *Water Supply Act of 1958*. The 1939 act provides that interest may be charged for costs allocated to M&I water supply up to 3-1/2 percent at the discretion of the Secretary and allows a repayment period of up to 40 years. The *Water Supply Act* requires repayment of M&I costs over a repayment period of up to 50 years with interest based on a formula specified in the act. Reclamation primarily has used the 1958 act in establishing repayment provisions for M&I water supply on projects proposed for authorization since 1958.

The *Water Supply Act* recognizes the primary responsibilities of the states and local interests in developing water supplies for domestic, municipal, industrial, and other purposes. It further states that the Federal Government should participate and cooperate with the states and local interests in developing such water supplies in connection with the construction, maintenance, and operation of Federal navigation, flood control, irrigation, or multipurpose projects. The act permits storage capacity to be included in any Reclamation reservoir for present or anticipated future demand or need by states or local interests for municipal or industrial water.

Up to 30 percent of the project storage cost included to meet future demand can be deferred, subject to repayment within the life of the project or the 50-year repayment period. Interest charges on these deferred costs may be waived for a period up to 10 years, and payments on construction investment may be deferred until the block of water allocated to future demand is first used.

Hydropower. Costs allocated to hydropower are reimbursable with interest. Most Reclamation hydropower projects are incorporated into basinwide funds for power repayment and power marketing. Typically, the repayment period for the investment is 50 years, and the power rate is set at a level to cover all allocated investment costs, interest, OM&R expenses, and irrigation assistance.

Initially, power was included in a project to provide energy for project purposes; i.e., project pumping. Energy in excess of project demands was permitted to be sold to preference customers, which are public entities such as municipalities. For many years, Reclamation had this power marketing responsibility. However, with the creation of the Department of Energy in 1977, this responsibility was transferred to the power marketing agencies. These agencies determine the wholesale power rates necessary to recover the costs allocated to the power function, including power assistance to irrigation. Reclamation determines the allocated and irrigation assistance costs to be recovered.

Recreation and Fish and Wildlife Enhancement. The *Fish and Wildlife Coordination Act of 1958* authorized the modification of projects to accommodate means and measures for the conservation of wildlife. Although the act was initially passed in 1934, it was amended several times and was eventually named the "Fish and Wildlife Coordination Act" in 1958. The act provides that conservation of wildlife; i.e., mitigation, may be included in the planning of a water resource development project, and the cost of acquiring land or modifying the operation of a project for wildlife purposes may be an integral part of the cost of the project.

The *Federal Water Project Recreation Act of 1965* provided the first general authority for the repayment of some portion of the construction cost allocated to recreation and fish and wildlife. Prior to passage of this act, specific project legislation addressed recreation and fish and wildlife cost allocation and repayment matters. For example, the Colorado River Storage and the Fryingpan-Arkansas Projects have specific provisions for recreation and fish and wildlife in their authorizing legislation. Under the 1965 act, 50 percent of the separable construction costs are reimbursable with interest by a non-Federal entity over a 50-year period.

Most recreation areas are turned over to other Federal and non-Federal agencies for management, and those agencies incur the O&M expenses. Reclamation manages a number of areas under specific legislative authority; however, there are a number that have been returned to Reclamation by the managing entity, and Reclamation only has authority to provide minimum health and safety facilities for these areas.

The *Water Resources Development Act of 1974* (P.L. 93-251) amends the 1965 act and provides that 25 percent of the separable costs allocated to fish and wildlife enhancement are to be reimbursable with interest. Non-Federal entities incur these costs along with all of the O&M expenses. Reclamation has specific authority for a number of fish and wildlife activities, and these are usually operated or managed in cooperation with Federal and state wildlife agencies.

Fish and wildlife mitigation is treated as a joint project cost and is allocated to the project purposes served by the specific project. Repayment is subject to the applicable procedures for each respective function.

Flood Control. The authorizing legislation normally provides for the nonreimbursability of the costs of flood control on a project. The *Flood Control Act of 1936* established the philosophy that flood control was for the general welfare of the country and provided that the states would share in the development costs. The *Flood Control Act of 1938* repealed the provision for state participation. Consequently, the Federal Government has assumed the responsibility for funding flood control on Federal projects.

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December 16, 1988

DEPARTMENT OF THE INTERIOR
PRINCIPLES GOVERNING VOLUNTARY WATER TRANSACTIONS
THAT INVOLVE OR AFFECT FACILITIES
OWNED OR OPERATED BY THE DEPARTMENT OF THE INTERIOR

PREAMBLE:

Transactions that involve water rights and supplies are occurring pursuant to State law with increasing frequency in the Nation, particularly in the Western United States. Such transactions include direct sale of water rights; lease of water rights; dry-year options on water rights; sale of land with associated water rights; and conservation investments with subsequent assignment of conserved water.

The Federal Government, as owner of a significant portion of the Nation's water storage and conveyance facilities, can assist State, Tribal, and local authorities in meeting local or regional water needs by improving or facilitating the improvement of management practices with respect to existing water supplies. Exchanges in type, location or priority of use that are accomplished according to State law can allow water to be used more efficiently to meet changing water demands, and also can protect and enhance the Federal investment in existing facilities. In addition, water exchanges can serve to improve many local and Indian reservation economies.

DOI's interest in voluntary water transactions proposed by others derives from an expectation that, to an increasing degree, DOI will be asked to approve, facilitate, or otherwise accommodate such transactions that involve or affect facilities owned or operated by its agencies. The DOI also wishes to be responsive to the July 7, 1987, resolution of the Western Governors' Association, which was reaffirmed at the Association's July 12, 1988, meeting, that the DOI "develop and issue a policy to facilitate water transfers which involve water and/or facilities provided by the Bureau of Reclamation."

The following principles are intended to afford maximum flexibility to State, Tribal, and local entities to arrive at mutually agreeable solutions to their water resource problems and demands. At the same time, these principles are intended to be clear as to the legal, contractual, and regulatory concerns that DOI must consider in its evaluation of proposed transactions.

For the purpose of this statement of principles, all proposed transactions must be between willing parties to the transaction and must be in accordance with applicable State and Federal law. Presentation of a proposal by one party, seeking Federal support or action against other parties, will not be considered in the absence of substantial support for the proposal among affected non-Federal parties.

VOLUNTARY WATER TRANSACTION PRINCIPLES

1. Primacy in water allocation and management decisions rests principally with the States. Voluntary water transactions under this policy must be in accordance with applicable State and Federal laws.
2. The Department of the Interior (DOI) will become involved in facilitating a proposed voluntary water transaction only when it can be accomplished without diminution of service to those parties otherwise being served by such Federal resources, and when:
 - (a) there is an existing Federal contractual or other legal obligation associated with the water supply; or
 - (b) there is an existing water right held by the Federal government that may be affected by the transaction; or
 - (c) it is proposed to use Federally-owned storage or conveyance capacity to facilitate the transaction; or
 - (d) the proposed transaction will affect Federal project operations; and
 - (e) the appropriate State, Tribal, or other non-Federal political authorities or subdivisions request DOI's active involvement.
3. DOI will participate in or approve transactions when there are no adverse third-party consequences, or when such third-party consequences will be heard and adjudicated in appropriate State forums, or when such consequences will be mitigated to the satisfaction of the affected parties.
4. As a general rule, DOI's role will be to facilitate transactions that are in accordance with applicable State and Federal law and proposed by others. In doing so, DOI will consider the positions of the affected State, Tribal, and local authorities. DOI will not suggest a specific transaction except when it is part of an Indian water rights settlement, a solution to a water rights controversy, or when it may provide a dependable water supply the provision of which otherwise would involve the expenditure of Federal funds. Such a suggestion would not be carried out without the concurrence of all affected non-Federal parties.
5. The fact that the transaction may involve the use of water supplies developed by Federal water resource projects shall not be considered during evaluation of a proposed transaction.

December 16, 1988

6. One of DOI's objectives will be to ensure that the Federal government is in an acceptable financial, operational, and contractual position following accomplishment of a transaction under this policy. Unless required explicitly by existing law, contracts, or regulations, DOI will refrain from burdening the transaction with additional costs, fees or charges, except for those costs actually incurred by DOI in performance of its functions in a particular transaction.
7. DOI will consider, in cooperation with appropriate State, Tribal and local authorities, necessary measures that may be required to mitigate any adverse environmental effects that may arise as a result of the proposed transaction.

VOLUNTARY WATER TRANSACTIONS

CRITERIA AND GUIDANCE

To assist in the implementation of the December 16, 1988, principles, the following criteria and guidance are provided. It is anticipated that each specific proposed voluntary water exchange will be unique, and that it should be evaluated on its own merits under the overall guidance of this policy statement.

Principle 1. Primacy in water allocation and management decisions rests principally with the States. Voluntary water transactions under this policy must be in accordance with applicable State and Federal laws.

Criterion: Does the proposed exchange comply with applicable State and Federal laws?

Guidance: Apparent conflicts with State laws or water rights will be reconciled with the appropriate State agency. State laws generally provide procedures for transferring water rights, and should be the primary mechanism for protecting the sellers/lessors of water, as well as third parties.

Proposed transactions that involve a new use not specifically authorized as a Federal project purpose, or that propose a place of use not within the Federal project service area, may require authorizing legislation. The primary responsibility for such legislation will rest with those entities proposing the transaction.

Principle 2. The Department of the Interior (DOI) will become involved in facilitating a proposed voluntary water transaction only when it can be accomplished without diminution of service to those parties otherwise being served by such Federal resources, and when:

- (a) there is an existing Federal contractual or other legal obligation associated with the water supply; or
- (b) there is an existing water right held by the Federal government that may be affected by the transaction; or
- (c) it is proposed to use Federally-owned storage or conveyance capacity to facilitate the transaction; or
- (d) the proposed transaction will affect Federal project operations; and
- (e) the appropriate State, Tribal, or other non-Federal political authorities or subdivisions request DOI's active involvement.

Criterion: Does the proposed action:

- 2.(a) involve water that is encumbered by an existing Federal contractual obligation?

Guidance: If revision of existing water service or repayment contracts is required to facilitate an otherwise desirable water exchange proposal, negotiations for those changes will be initiated expeditiously under the guidance of these principles and the appropriate legal authorities pertaining to the subject water.

Criterion: Does the proposed action:
2.(b) potentially affect a Federal water right?

Guidance: In those instances where the United States' water rights may be affected by a water transaction, DOI will work to facilitate the transfer so long as its rights or the rights of its contractors are protected or adequately compensated. In the evaluation of a proposed action, effects on existing water rights should be an initial consideration. If the proposed action would appear to involve lengthy and costly legal procedures in either the State or Federal courts, this information should be provided to the proposing parties. This policy does not provide for the avoidance of State and Federal laws and procedures in the establishment of water allocations and water rights.

Criterion: Does the proposed action:
2.(c) propose the use of Federal storage/conveyance capacity?

Guidance: Federal delivery systems may be used to store/transfer both federally and non-federally-supplied water. The Warren Act provides the basis for storage/transfer of non-federally supplied water for irrigation. Storage/transfer of non-federally supplied water for municipal and industrial (M&I) purposes can be accomplished generally under the authority of Section 9(c) of the Reclamation Project Act of 1939.

Except by mutual consent of affected parties, contracts for additional storage/conveyance will take into account existing Federal contracts, conveyance capacity and project obligations which must be honored as a first priority.

Approval to transfer water cannot obligate the Federal Government to incur extra non-reimbursed expense to store water or to convey it to a new location.

Approval to transfer water will not establish any right to future transfers beyond those expressly provided for in negotiated agreements.

Use of storage/conveyance will require a supporting contract to use federally built storage/conveyance systems.

Charges will be set to recover normally allocable storage, delivery, or extra costs incurred by the U. S.

If any additional pumping power is needed to effect a given transfer, the transfer entities must provide or pay for such power, and may have to secure it from non-Federal sources.

Criterion: Does the proposed action:
2.(d) affect existing Federal project operations?

Guidance: With a change in type, location, or priority of use, the potential for effects on the authorized purposes and project operations must be investigated. For example, such effects could result from changes in operation of a reservoir or delivery system, that might change minimum stream flow or power generation. If these potential effects are identified, avoidance of these consequences, or mitigation of such consequences to the satisfaction of the affected party is necessary.

As stated in the guidance area 2.(b), DOI will work to facilitate the proposed transfer so long as its (water) rights or the (water) rights of its contractors are protected or adequately compensated; and in guidance area 2.(c), except by mutual consent of affected parties, contracts for additional storage/conveyance will take into account existing Federal contracts and project obligations.

Power interference charges or similar compensation measures will be the responsibility of those entities proposing the transaction.

In addition to the evaluation of effects on existing project operations, and authorized project beneficiaries, the following general issues must also be addressed:

- 1) Third party effects
- 2) Documentation for compliance with NEPA
- 3) Land classification
- 4) Reclamation Reform Act of 1982

(1) Third party effects .. see Principle 3.

(2) NEPA .. see Principle 7.

(3) Land Classification

If the proposed action is a change in location of use for irrigation water, land classification is necessary to ensure that the land is capable of sustaining irrigation activities without damage to the land or water resource, and demonstration that sufficient payment capacity exists during the term of the transfer may also be required. The level of detail, amount of original work, and depth of analysis, will be determined on the merits of each situation.

(4) Reclamation Reform Act of 1982

If the existing contract must be changed to allow the proposed exchange, the discretionary provisions of the Reclamation Reform Act of 1982, must be considered. For further guidance on supplemental or additional benefits and the amendments to existing contracts, refer to the Solicitor's memorandum dated May 20, 1988, " Interpretation of Section 203(a) of the Reclamation Reform Act of 1982 and Sections 105 and 106 of Public Law 99-546."

Criterion: Does the proposed action:

2.(e) stem from a request by a State, Tribe or non-Federal agency?

Guidance: DOI will continue its policy of providing technical assistance to State, Tribal or local agencies. A positive and expeditious technical assistance/consultation program will continue within available budget resources.

The specific involvement of DOI necessary to accommodate the requested exchange will determine the type of Reclamation involvement. Existing procedures for approving new or amendatory contracts should be followed.

Principle 3. DOI will participate in or approve transactions when there are no adverse third-party consequences, or when such third-party consequences will be heard and adjudicated in appropriate State forums, or when such consequences will be mitigated to the satisfaction of the affected parties.

Criterion: Concerns for third party effects must be addressed from both the State and the Federal perspective. Any consideration of the "public trust doctrine" is left to the State.

Guidance: Concerns for authorized project functions and operations were addressed in Principle 2. This Principle addresses the concerns for "third party" effects. Third parties are identified as those entities who may have some identifiable interest in the exchange, and would have a legal standing in an adjudication process in an appropriate State forum. The identification of these entities, the validity of their concerns and the appropriate satisfaction of their concerns rests with the States and their adjudication process.

Principle 4. As a general rule, DOI's role will be to facilitate transactions that are in accordance with applicable State and Federal law and proposed by others. In doing so, DOI will consider the positions of the affected State, Tribal, and local authorities. DOI will not suggest a specific transaction except when it is part of an Indian water rights settlement, a solution to a water rights controversy, or when it may provide a dependable water supply the provision of which otherwise would involve the expenditure of Federal funds. Such a suggestion would not be carried out without the concurrence of all affected non-Federal parties.

Criterion: Does the proposed action:

4.(a) displace the need for expenditure of Federal funds?

Guidance: Within Reclamation's resource management program, opportunities will be explored to achieve management objectives through the use of voluntary exchanges of water. The intent of this policy is to ensure that voluntary exchanges of water are considered as alternatives in water resource management within Reclamation's planning, operation, and other resource development programs. For example, a water exchange may be considered as an alternative to construction of a storage or delivery facility that otherwise would or could require Federal investment.

Criterion: Does the proposed action:
 4.(b) provide for an opportunity for the Indian tribe or community to benefit economically from the lease or transfer of water rights that it may secure under a settlement with the Federal Government or with non-Federal parties?

Guidance: It is a common situation that the water rights available to Indian tribes represent a significant portion of their resource base. It also is a common situation that the use of those water resources for agricultural purposes is marginally feasible, and that local water demands by non-Indians are such that the lease or transfer of the tribal water resources can be a mutually beneficial transaction.

DOI will facilitate transfers in its capacity as a trustee for an Indian tribe to the extent that it results in assisting local water users in resolving their water resource management problems, within appropriate State law. The specific authorities involved will be determined on a case specific evaluation of the water rights, Federal and State laws, and the specific nature of the proposed transaction.

Principle 5. The fact that the transaction may involve the use of water supplies developed by Federal water resource projects shall not be considered during the evaluation of a proposed transaction.

Criterion: Is the water to be transferred, exchanged, leased, sold, etc. available by virtue of a Federal Reclamation project?

Guidance: If the Federal government is not made worse off financially by the transaction, if the proposed transaction has been approved by the State and local authorities, and if the proposed transaction complies with Federal and State law, then it may be in the public interest to allow that Federally developed water to be employed. The fact that it was developed by virtue of a subsidized Federal project or program should not, in and of itself, be a barrier to the transaction.

On the other hand, DOI should seek the most appropriate source for water to be transferred, exchanged, leased, or sold without regard to presently available supplies from Federal projects.

Principle 6. One of DOI's objectives will be to ensure that the Federal government is in an acceptable financial, operational, and contractual position following accomplishment of a transaction under this policy. Unless required explicitly by existing law, contracts, or regulations, DOI will refrain from burdening the transaction with additional costs, fees, or charges, except for those costs actually incurred by DOI in performance of its functions in a particular transaction.

Criterion: The financial terms negotiated between entities do not concern DOI.

Repayment subsidies associated with the original type of use of the water are not transferable to a different type of use of the water.

Exchanges cannot result in a reduction in the present worth of the outstanding obligations remaining to be repaid to the Federal government.

If the proposed exchange would involve the execution of a contract with a "new" entity, that entity must have sufficient legal authority to enter into such a contract and be able to perform all functions required by the contract.

Any additional costs associated with the transfer shall be advanced or repaid in a manner negotiated by the entities involved.

Guidance: A distinction must be made between financial terms between the entities proposing the exchange and Federal repayment considerations associated with the water. Financial terms between the non-Federal entities are extraneous to the repayment considerations discussed herein.

- (a) The costs or subsidies associated with the original use are not transferable to a different use of the water.
- (b) A change in use from irrigation to municipal and industrial purpose would require a change in the repayment of costs to include interest during construction and interest on investment, but only to the extent of the remaining years in the payout period. It is not the intent of this water transfer policy to recover subsidies originally allocated to that block of transferred water during the time it served the irrigation purpose.

A short-term transfer should recognize the repayment of the appropriate cost, with the repayment interest rate, calculated for the year of the transfer, after which the irrigation rate would be reestablished.

A current repayment interest rate for the interest bearing obligations will be utilized, unless otherwise provided by law.

Any repayment of principal above the level that would have been repaid by the irrigators (i.e., the power assistance amount) should be reflected in a reduction in the amount to be repaid through power assistance.

- 7
- (c) An exchange involving change in location and contracting entities, but not a change in use (i.e., irrigation to irrigation) could involve the continuation of the repayment subsidies.
 - (d) An exchange in which there would be a change in use from a reimbursable function to a nonreimbursable function (e.g., irrigation to anadromous fishery) will require special negotiations. In lieu of special legislation, specific contractual obligations will be identified to ensure that repayment to the Federal Government after the exchange will be no less than the conditions that existed prior to the exchange.
 - (e) To the maximum extent possible, financial or economic disincentives to the transfer or exchange are to be avoided.

The additional costs to the water users, as discussed in these principles, (i.e. NEPA documentation, power interference charges, recalculation of water rates, or incremental pumping costs) are all required by existing law, contracts, or regulations. While these are costs to the water user, they are not the disincentives that are to be avoided.

The disincentives to be avoided can be characterized as charging a percentage of any "profit" that might be envisioned as the difference between appropriate costs, and the market value of the water.

Principle 7. DOI will consider, in cooperation with appropriate State, Tribal and local authorities, necessary measures that may be required to mitigate any adverse environmental effects that may arise as a result of the proposed transaction.

Criterion: Is approval of the transaction subject to NEPA requirements?

Guidance: Documentation for compliance with NEPA could range from a categorical exclusion to an environmental impact statement. The type of documentation required will be a function of the specific action being proposed. Any Federal NEPA compliance costs associated with the transfer shall be advanced or repaid in a manner negotiated by DOI and the entities involved.



United States Department of the Interior

BUREAU OF RECLAMATION
EL PASO FIELD DIVISION
700 E. SAN ANTONIO AVENUE, RM. B-318
EL PASO, TEXAS 79901-7020

IN REPLY REFER TO:

03 DEC 1998

EP-431
WTR-4.00

Mr. Gary Esslinger
Manager/Treasurer
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Las Cruces, NM 88004

Mr. Edd Fifer
General Manager
El Paso County Water
Improvement District No. 1
294 Candelaria
El Paso, TX 79907-5599

Mr. John Bernal
Commissioner
International Boundary
& Water Commission - U. S. Section
The Commons Bldg. C, Suite 310
4171 N. Mesa
El Paso, TX 79902

Subject: Bureau of Reclamation's Proposal to Limit Caballo Reservoir's Releases in 1999
to Comply With Rio Grande Compact Requirements (Rio Grande Project)

Gentlemen:

In Articles I, VII, VIII of the Rio Grande Compact, reference is made to an average yearly release of 790,000 acre-feet (AF) from Rio Grande Project (Project) storage. Based on Article VII, a definition of an average yearly release could be construed as the sum of releases from Caballo Reservoir in years after the most recent spill from Project storage divided by the number of years since the most recent spill. The following table utilizes the Rio Grande Compact accounting figures for 1996 and 1997, and Reclamation's figures for 1998.

Derived from Release and Spill from Project Storage, Rio Grande Compact Accounting:

YEAR	MEASURED FLOW AT CABALLO GAGING STATION (1,000 AF)	INTERVENING DIVERSIONS TO CANALS (1,000 AF)	TOTAL RELEASE (1,000 AF)	USABLE RELEASE (1,000 AF)
1995	Spill Year declared by the Rio Grande Compact Commission.			
1996	774.4	1.1	775.5	775.5
1997	798.8	1.1	799.9	799.9
1998*	808.9	1.2	810.1	810.1

TX v. NM # 141

New Mexico Exhibit

NM_EX-450

es for 1998 are estimated by the Bureau of Reclamation based on actual figures from

US0210711

January through October, 1998 and estimated for November through December, 1998.

Clearly, the average yearly release from Caballo Reservoir for the last three years is 795,200 AF, which is above the average 790,000 AF yearly release defined by the Rio Grande Compact. These releases directly impacted Texas' portion of the Rio Grande Compact accounting in 1997 and will also impact the 1998 accounting as a result of these accrued departures from normal releases.

Reclamation plans to reduce the four-year average yearly release from Project storage to 790,000 AF at the end of 1999. We plan to release no more than 775,000 AF from Caballo Reservoir during 1999, and that release will bring the four-year average down to 790,000 AF.

In order to ensure that no more than 775,000 AF is released from Caballo Reservoir in 1999, we propose the attached plan be implemented with the first release for irrigation in 1999.

Reclamation realizes that there is no Rio Grande Compact requirement to reduce the average release from storage to 790,000 acre-feet in one year and will consider a two year implementation if the Project water users feel that the impacts of a one year implementation are too severe.

If you have any comments or questions, feel free to contact me at (915) 534-6301.

Sincerely,

A handwritten signature in black ink, appearing to read "Filiberto Cortez", with a stylized flourish at the end.

Filiberto Cortez
Manager, El Paso Field Division

Enclosure

cc: Mr. Carlos Marin
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bc: Area Manager, Albuquerque Area Office, Albuquerque, NM
ATTN: ALB-100, ALB-430

Manager, Elephant Butte Field Office, T or C, NM
ATTN: EB-600

EP-433, EP-434, EP-435, EP-700, ALB-120
(All w/cy of encl)

BUREAU OF RECLAMATION
EL PASO FIELD DIVISION
RIO GRANDE PROJECT

**PROPOSAL TO MONITOR RIO GRANDE PROJECT
TO ENSURE THAT CABALLO RESERVOIR
RELEASES WILL NOT EXCEED 775,000 AF in 1999**

OBJECTIVE: Insure delivery of Project Allocation to all Project water users while staying within the 790,000 AF average release from Project storage for a four year period.

1. Caballo Reservoir releases will meet orders using present method of gate calculations.
2. Gaging stations at Leasburg, Mesilla, and Courchesne Bridge will be monitored continuously to ensure that flows meet orders.
3. Propose Rio Grande Project water accounting change in procedures for Elephant Butte Irrigation District to be charged at each heading the water ordered or the actual diversion, whichever is greater.
4. Measure the four major Project drains (Del Rio, La Mesa, East, and Montoya), the flow at Courchesne Bridge, and the flow at the coffer dam of the Riverside Diversion Dam and adjust the Project accretions accordingly on the next order.
5. Coordinate with IBWC to receive more timely information when Mexico releases water downstream of the International Diversion Dam, so that El Paso County Water Improvement District No. 1 may have advanced warning to be able to pick up additional flow at Riverside Diversion Dam into Riverside Canal, if hydraulically possible.
6. Propose to El Paso County Water Improvement District No. 1 that the early season release on January 22, 1999 be re-evaluated.
7. Track irrigation orders vs. 1998 orders and total releases from Caballo Reservoir vs. 1998, especially after peak demand periods (March, mid-June through late July) to assess whether we will go over the 775,000 AF total release out of Caballo Reservoir. Reclamation will periodically meet with the Districts and IBWC to discuss the status of the 1999 Caballo Reservoir release and monitoring of the Rio Grande Project.

1 IN THE SUPREME COURT OF THE UNITED STATES

2 October Term 1967

3 STATE OF TEXAS and]
4 STATE OF NEW MEXICO,]

5 Plaintiffs,]

6 vs.]

7 STATE OF COLORADO,]

8 Defendant.]

NO. 29, ORIGINAL

Deposition of:

RAYMOND A. HILL

Taken December 4, 1968.

9 The deposition of RAYMOND A. HILL taken pursuant to
10 stipulation of counsel in the Meeting Room, Capitol Life Center,
11 Denver, Colorado, commencing at 9 o'clock a.m., Wednesday,
12 December 4, 1968, before VESTA WINE, Notary Public and Certi-
13 fied Shorthand Reporter, State of Colorado.

14 A P P E A R A N C E S:

15 VINCE TAYLOR, Assistant Attorney General, State
16 of Texas, Austin, Texas; and LOUIS A. SCOTT, Attorney, Rio
17 Grande Compact Commissioner, El Paso, Texas, appearing on be-
18 half of the State of Texas.

19 F. HARLAN FLINT, PAUL BLOOM, CLAUD MANN, Attorneys,
20 State Engineer's Office, Santa Fe, New Mexico, appearing on
21 behalf of the State of New Mexico.

22 GLENN G. SAUNDERS and JOHN DICKSON, Special Assis-
23 tants to the Attorney General, State of Colorado, appearing on
behalf of the State of Colorado.

DONALD W. REDD, Attorney, Division of Lands and

1 Natural Resources, Department of Justice, appearing on behalf
2 of the United States Government.

3 RAPHAEL J. MOSES, Attorney, Boulder, Colorado,
4 appearing on behalf of Colorado Water Conservation Board.

5 ROBERT S. WHAM and ROBERT M. GORDON, JR., Attorneys,
6 appearing on behalf of Rio Grande Water Conservation District.

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P R O C E E D I N G S

MR. TAYLOR: At this point let the record show that this deposition is taken in compliance with and under the stipulated agreement to perpetuate testimony dated the 9th day of May, 1968, correct copies of which will be inserted into the original and all copies of the deposition, which I take it all parties have.

Let the record show that Texas and New Mexico will introduce into evidence Hill Exhibit No. 1 entitled "Development of the Rio Grande Compact of 1938," which will be identified by the witness and testified to, and that with the original deposition Exhibit No. 1 will be attached thereto and filed and that insofar as additional copies for this deposition are concerned, the respective interested parties or their attorneys will use the correct copies which have heretofore been furnished to them by Mr. Hill and mailed to them on or about the 6th day of November, 1968.

RAYMOND A. HILL

being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. TAYLOR:

Q Please give your name, address and occupation, Mr. Hill.

A My name is Raymond A. Hill. My home address is 1200 California Street, San Francisco, California. My office

1 address is 120 Montgomery Street, San Francisco. I am a
2 consulting civil engineer in private practice, have been for
3 approximately 50 years.

4 Q Mr. Hill, I am handing you what has been marked as
5 Hill Exhibit No. 1, and I ask you to turn to page -- they are
6 unnumbered pages -- to the unnumbered third page, which is
7 entitled "Personal History of Raymond A. Hill" and consisting
8 of that page and the two following pages. I will ask you to
9 state whether or not those pages contain your accurate personal
10 history, including your education, your business associations,
11 your professional associations, your Federal Government assign-
12 ments, your Federal Court engagements, your State Government
13 engagements, Foreign Governments and Agencies, and Other
14 General Practice?

15 A It does.

16 Q All right, sir.

17 MR. SAUNDERS: And if the intent is to qualify Mr.
18 Hill as an expert in the field of engineering, I think every-
19 one recognizes that he is such, and we certainly do in this
20 case.

21 MR. TAYLOR: That was the intent for which it was
22 offered. Thank you, Mr. Saunders.

23 Q [By Mr. Taylor] Mr. Hill, I will ask you to state
24 whether or not at the request of the Attorney General of Texas
25 you prepared a true and correct history of the development

1 of the Rio Grande Compact of 1938.

2 A I did.

3 Q You are referred to Hill Exhibit No. 1, which is
4 in front of you. I will ask you to examine it and tell me
5 whether or not that document is the true and correct history
6 of the development of the Rio Grande Compact of 1938 that I
7 referred to in my previous question.

8 A It is. The report entitled "Development of the
9 Rio Grande Compact of 1938" was prepared by me, and to the
10 best of my knowledge and belief, it is a true and accurate
11 history of the negotiations leading up to the Compact.

12 Q All right. Now, Mr. Hill, reviewing with you the
13 exhibit which you have identified as Hill Exhibit No. 1, the
14 second page consists of an affidavit that you signed in the
15 presence of a notary public, is that correct?

16 A That is correct.

17 Q And then the next three unnumbered pages are the
18 personal history of Raymond Hill - yourself - that you have
19 already testified to, is that correct?

20 A That's correct.

21 Q And then you have a page entitled "Development of
22 the Rio Grande Compact of 1938," with your name on the bottom
23 as consulting engineer, San Francisco, California, is that
24 correct?

25 A Yes, that is the title page.

1 water, is it not?

2 A It is wasteful of water simply because it brings
3 the water close to the surface, and even though there is no
4 vegetation, you get evaporation through the soil, and the
5 other is, in the peculiar situation in Colorado, the waters
6 which are diverted to bring the ground waters high, when they
7 drain off they don't drain back to the river, they drain into
8 the sump, and they are no longer usable.

9 MR. REDD: I have no further questions.

10 MR. FLINT: We have no questions.

11 MR. GORDON: No questions.

12 ...Deposition closed at 11 o'clock a.m....

13 *Raymond A. Scott*
14

15 Subscribed and sworn to before me this 2nd
16 day of January 1969. My commission expires Feb 2, 1971

17 *Mary Lou Damon*
18 Notary Public within and for
19 the State of California

20 
21
22 My Commission Expires February 2, 1971

23
24
25
CO - 002423

NOTARIAL CERTIFICATE

STATE OF COLORADO]
COUNTY OF DENVER] SS

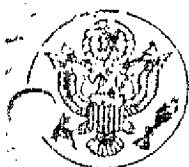
I, VESTA WINE, a Notary Public and Certified Short-hand Reporter, State of Colorado, do hereby certify that pursuant to stipulation of counsel there came before me on the 4th day of December, 1968, at 9 o'clock a.m., at the Meeting Room, Capitol Life Center, Denver, Colorado, RAYMOND A. HILL, who was by me duly sworn to testify the truth in relation to the matters in controversy between the parties hereto; that said deposition was taken in stenotypy by me at the time and place hereinbefore set forth and was thereafter reduced to typewritten form by me personally, and that the same is a true and correct transcription of my stenotype notes then and there taken.

I further certify that I am not employed by, related to nor of counsel for any of the parties herein, nor otherwise interested in the outcome of this action.

IN WITNESS WHEREOF, I have affixed my signature
and seal this 31st day of December, 1968.

My commission expires November 27, 1972

Notary Public within & for
the State of Colorado



Dart
INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO
UNITED STATES SECTION

El Paso, Texas
June 29, 1956

View per...
See Lee
CHK of file
W-OW.G
Exhibit 1.

MEMORANDUM OF CONVERSATION - June 29, 1956

SUBJECT: 1906 Treaty Deliveries to Mexico

Participants: Project Manager W. F. Resch, Rio Grande Project, Bureau of Reclamation
Principal Engineer (Supervising) J. F. Friedkin and Chief of Operations C. S. Kerr, International Boundary and Water Commission

Pursuant to your instructions the writer and Mr. Kerr met with Mr. W. F. Resch in his office on June 29, 1956, to learn the manner of determination during years of inadequate supply, of the allotment of water to lands in United States Rio Grande Project, which allotment in turn determines the allotment to Mexico under the 1906 Treaty.

We explained to Mr. Resch that our inquiry stems from a request by the Mexican Section for information relative to the manner of determining Mexico's allotment.

In response Mr. Resch advised that the determination is made by the Bureau of Reclamation in conference with the Elephant Butte Irrigation District and the El Paso County Water Improvement District No. 1, on the following bases:

1) At the beginning of an irrigation season determination is made of the amount of water available for irrigation at that time, which is the amount of water then in project storage (Elephant Butte and Caballo Reservoirs) less the estimated evaporation losses from the reservoirs during the season and less silt encroachment since the last reservoir survey. He explained however that for the current year (1956) evaporation and silt

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New Mexico Exhibit

NM_EX-452

US00033604

encroachment were not taken into account for the computation made in March as it appeared likely, and the risk was taken, that inflows into the reservoirs would be sufficient to offset evaporation and silt deposit so that for the current year the total amount in storage on March 1, 1956 - 229,800 acre-feet, was determined to be the supply available for the United States project and for 1906 Treaty deliveries to Mexico, and this amount was used as the basis of the first allotment. Mr. Resch emphasized that in making the first allotment no allowance is made for inflows which may later occur into the reservoirs, particularly when the monthly water supply forecasts are discouraging.

2) On the basis of experience and judgment, determination is then made as to the probable "operating efficiency" of the Rio Grande Project, which he defined as the ratio of the quantity of water applied to lands (delivery at the farmers' gates) to the total release at Caballo Dam. He explained that for the initial allotment for the current season the "efficiency" factor was estimated at 25%*. He explained that in previous years return flows had been taken into account in determining the "efficiency" factor, but in the current year such flows are practically negligible and accordingly no account was taken thereof.

3) The "efficiency" factor is then applied to the total amount in project storage to determine tentatively the water available for delivery to United States project lands (159,628 acres) and the resulting amount (57,450 acre-feet in 1956) is converted to inches per acre (4.3 inches in 1956). The percentage of normal delivery to the project lands is then computed on the basis of 36.26 inches being normal (the average during the period 1946 to

* Mr. Resch explained that during years of full supply the efficiency factor ranges from 60% to 70%.

1950). For 1956 the tentative percentage thus computed of normal delivery amounted to 11.86%.

4) The tentative per cent of normal delivery to United States lands is then applied to Mexico's full treaty allotment to determine its tentative prorata allotment which for 1956 amounted to 7,116 acre-feet ($11.86\% \times 60,000 = 7,116$). This amount was then deducted from the first tentative total amount available for delivery to project lands.

5) The "efficiency" factor is then reapplied to the balance remaining for delivery to United States project lands and computations outlined in steps 3) and 4) are repeated until by trial and error process the percentage of full delivery to United States project lands is the same as the percentage of the full treaty allotment to Mexico. For 1956 the computations resulted in an allotment of slightly less than 4 inches to the project lands, but the gamble was taken that that amount (4 inches) or 11.0314% of the normal allotment would be available which in turn resulted in a determination of the allotment to Mexico of 11.0314% of its full allotment which amounted to 6,619 acre-feet.

6) In the event of inflows into the reservoirs following the first allotment additional allotments are made to United States project lands and to Mexico on the basis of the additional amount available in storage in the same manner as outlined above.


7) With respect to return flows, Mr. Resch considers that since such waters are developed within the project, they are separate from storage waters although principally of storage origin. He points out that they may or may not be available for use below the point of return and hence may or may not be available for delivery to Mexico. He explained that such

waters are included in and as a part of the allotted deliveries to project lands when the return waters occur during times when releases from storage are in the river. At other times the return waters are not included as a part of the allotment to the project lands. He points out, however, that in either event any return waters delivered to Mexico are included as a part of the treaty allotment to that country.

8) With respect to flood waters entering into the river below Caballo Dam, he explained that at times when the flood inflows are relatively small, and cannot as a practical matter be distinguished from the irrigation waters in the river, they are included as a part of the allotment to project lands. At times when the arroyo flows are relatively large or when they occur when there is no irrigation water in the river, they are not included as a part of the allotment to project lands.

Commenting upon the above formula, Mr. Resch stated that it is in strict accord with his understanding of the Treaty which distinguishes between deliveries to lands in the United States and to the head of the Acequia Madre for Mexico. Mr. Resch stated that to his knowledge there has heretofore been no question raised as to the procedure followed in making the allotment to Mexico.

Mr. Resch was most cooperative in describing the procedure followed which he emphasized is carried out jointly by the Bureau and the Elephant Butte and El Paso County Irrigation Districts. He stated that he would be glad to assist in any further way that he can to clarify our understandings of the procedure.


F. Friedkin

July 24, 1950

RIO GRANDE PROJECT

Water Charged to Farms, and Acres Irrigated

1946 - 1950

	Acre-Feet Charged To Farms	Project Lands Irrigated Acres
1946	498,960	156,899'
1947	466,910	158,111'
1948	451,750	155,809'
1949	479,600	159,124'
1950	<u>488,023</u>	<u>158,783'</u>
Total	2,385,243	788,726

Average Charged to Farms $\frac{2,385,243}{788,726} = 3.0241$ feet

$3.0241 \times 12 = 36.29$ inches

RIO GRANDE COMPACT COMMISSION
72nd Annual Meeting
March 30, 2011

Albuquerque, New Mexico

New Mexico Rio Grande Compact Commissioner John D'Antonio called the 72nd Annual Meeting of the Rio Grande Compact Commission to order at 9:12 a.m. at the MCM Elegante Hotel in Albuquerque, New Mexico. Commissioner D'Antonio chaired the meeting in the absence of a Federal Chairman. Commissioner Wolfe thanked the Middle Rio Grande Conservancy District (MRGCD), the law firm of Trout, Raley, Montañño, Witwer & Freeman, Harwood Consulting, the Egolf Law Firm, and SWCA Environmental Consultants for sponsoring the reception and dinner the evening before and breakfast.

Commissioner D'Antonio discussed changes to the agenda. First, a discussion of the Cochiti Deviation Request from Normal Operations was inserted after the USACE report in Agenda Item Number 6. Next, a break will be taken after Agenda Item Number 5. With these changes, a motion to approve the agenda was made, and the agenda was approved.

New Mexico Engineer Adviser Rolf Schmidt-Petersen presented and summarized the Report of the Engineer Advisers to the Rio Grande Compact Commission for 2010. The report gave details on compact accounting including: streamflows, reservoir storage and other pertinent data, scheduled and actual deliveries, release of usable water from project storage, and budget proposals, as well as various activities and ongoing and planned projects which impact the water resources within the basin. A copy of the Report of the Engineer Advisers is included in the 2010 Report of the Commission. Commissioner D'Antonio asked for a motion to approve the Engineer Advisers' report. The motion was made and seconded to approve the complete written Report of the Engineer Advisers.

New Mexico Commissioner John D'Antonio began by introducing his staff and audience members from New Mexico. Staff members included Estevan Lopez (Director of the Interstate Stream Commission (ISC)), Amy Haas (General Counsel), Rolf Schmidt-Petersen (Engineer Adviser), Chairman Jim Dunlap (ISC), and Commissioner Buford Harris (ISC). Also introduced from the ISC were Nabil Shafike and Chris Stageman who assisted in preparation of the Engineer Advisers' Report, and Page Pegram and Linda Tenorio who helped to organize the meeting, Chris Shaw and Grace Haggerty. From the Office of the State Engineer, D.L. Sanders (Chief Counsel), Karen Stangl, Maureen Haney, and Myron Armijo were introduced.

In addition, introductions from the floor included Maria O'Brian, counsel for El Paso Water Improvement District No. 1 (EPCWID), Patricia Dominguez (Senator Bingaman's office), Sarah Cobb (Senator Udall's office), Ken Knox (URS, Colorado), John Fleck (Albuquerque Journal), Elizabeth Hurst-Waitz (Court Reporter), Andrew Lieuwen

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New Mexico Exhibit

NM_EX-551

NM_00427017

(Albuquerque Bernalillo County Water Authority), Bill Miller (William J. Miller Engineers), Stephanie Moore (Daniel B. Stephens & Associates), Janet Bair and Wally Murphy (U.S. Fish and Wildlife Service (FWS)). Representatives from the U.S. Army Corps of Engineers (USACE) included Lieutenant Colonel Jason Williams (Albuquerque District Commander), Ryan Gronewold, Dennis Garcia, Mark Yuska, Deb Foley, Don Gallegos, Curtis McFadden, Amy Louise, Steven Kisson, Arian Pirson, Susan Bittick, Kris Schafer, and Susan Grant. Representatives from the Bureau of Reclamation (Reclamation) included Mike Hamman (Area Manager), Lisa Croft, Carolyn Donnelly, Leanne Towne, Tod Tilman, Michelle Estrada-Lopez, Ed Kandl, and Brent Rhées; Chris Banet, John Sandoval, and Holly O'Grady from the Bureau of Indian Affairs (BIA); Subhas Shah, Adrian Oglesby and Bill Turner from the MRGCD; Anne Marie Matherne and Linda Weiss from the U.S. Geological Survey (USGS); Gary Esslinger, James Salopek, Samantha Barncastle, Steve Hernandez and Robert Faubian from Elephant Butte Irrigation District; Joseph Fluder from SWCA; and Matt Zidovsky from Representative Martin Heinrich's office.

Commissioner D'Antonio reported that in 2010, New Mexico has remained in an accrued credit delivery status. Relatively low annual flows at the Otowi gage have meant relatively low delivery requirements, with significant inflows occurring below the gage helping to meet the delivery requirements. Commissioner D'Antonio thanked the ISC Commissioners, Reclamation, and the MRGCD for their efforts in maintaining compliance and recognized the City and County of Santa Fe and the board of Buckman Direct Diversion for completing river diversions and beginning operations since January.

Commissioner D'Antonio discussed the ongoing La Niña and drought conditions in New Mexico and that they are anticipating only 53 percent of the normal runoff and precipitation statewide. He also mentioned two Middle Rio Grande projects that directly divert San Juan-Chama Project water for drinking water purposes which will help sustain groundwater supplies and provide greater certainty for Albuquerque and Santa Fe water supplies in the future.

The Aamodt and Taos Indian water rights settlements were discussed by Commissioner D'Antonio relative to the federal legislation of December 8, 2010, which resolved the litigation claims that began about 50 years ago and provides funds for projects to implement the settlements.

Commissioner D'Antonio discussed the *Bounds v. The State Engineer of New Mexico* lawsuit. Commissioner D'Antonio indicated the lawsuit challenges the constitutionality of the domestic well statute in New Mexico. A district court decision that held the well statute unconstitutional was appealed. The appellate court held that the statutes were constitutional, and the issue is now before the State Supreme Court. Also discussed was the *Tri-State Generation and Transmission* lawsuit which is related to the Active Water Resource Management (AWRM) initiative. In that litigation, a New Mexico District Court held a portion of the AWRM regulations unconstitutional on separation of powers and due process issues. However, both the New Mexico District court and Court of Appeals have ruled that the State Engineer has authority to create water administration

rules through State Engineer licenses and the adjudication of the courts. The case is now on appeal before the State's Supreme Court.

Commissioner D'Antonio mentioned the Lower Rio Grande Adjudication and negotiations related to the 2008 Rio Grande Project Operating Agreement (2008 Operating Agreement). He stated that the negotiations have not been successful due to concerns New Mexico has about the 2008 Operating Agreement and because EBID and the United States' claim that groundwater should now be considered Rio Grande Project water.

Commissioner D'Antonio reported on the Rio Grande silvery minnow litigation. The Court has ruled that the 2003 Middle Rio Grande Water Operations Biological Opinion (BiOp) rendered the Plaintiff's claim obsolete regarding Reclamation's discretion to allocate Middle Rio Grande Project water to maintain streamflows for the silvery minnow and subsequent violation of Section 7 of the Endangered Species Act (ESA). The Plaintiff's appeal was dismissed and sent back to the Federal District Court and remains unresolved. Regarding the MRGCD Quiet Title Cross-Claim, the U.S. 10th Circuit Court of Appeals affirmed the District Courts' dismissal of MRGCD's quiet title suit under the statute of limitations, but held that the lower court exceeded authority in ruling that the United States holds title to MRGCD project properties (including El Vado Dam).

Commissioner D'Antonio discussed development of the new Middle Rio Grande Water Operations BiOp. During 2010, New Mexico continued to seek a long-term sustainable BiOp that better balances the needs of the silvery minnow with existing and future water uses in the Middle Rio Grande. Essential issues include: 1) the recognition and inclusion of recent scientific information; 2) long-term coverage; 3) a single BiOp with a collaborative program serving as the ESA compliance vehicle; and 4) broad depletion-based coverage for nonfederal participants. Commissioner D'Antonio expressed concern about the success of developing a new BiOp with multiple Federal agencies individually conducting and seeking coverage for actions which are currently covered under the 2003 BiOp.

Commissioner D'Antonio discussed the concerns regarding the quality of data collected and reported for the Rio Grande Project reservoir stage and river gage data. He indicated there was an apparent mass balance discrepancy of about 45,000 acre-feet for the reach below Elephant Butte Reservoir and Caballo Reservoir which represents a significant deviation from the past relationship in this reach. He was disappointed that Reclamation has not yet provided documentation of the methodology of data collection for the gage below Caballo Reservoir and information previously requested by the Rio Grande Compact Commission. He requested that Reclamation comply with this request so his adviser can determine the reliability of the data for certification.

Commissioner D'Antonio also expressed concerns about the reliability of other data which has no documentation of the methodology nor rigorous external review. He stated his commitment to funding the USGS as a neutral party to conduct measurements at Elephant Butte and Caballo river gages.

Commissioner D'Antonio discussed the 2008 Operating Agreement and manual. He stated that New Mexico has raised a number of significant issues and has listened to the Reclamation and the districts when they asked in 2008 for the State Engineer to take a wait-and-see approach. However, from New Mexico's perspective, there are a number of continuing issues to be considered: 1) New Mexico is paying for the effects of Texas' groundwater pumping on the Rio Grande Project, and Texas needs to pay for that pumping; 2) reasonable caps must be placed on annual diversions by EPCWID and EBID; 3) the Rio Grande Project allocation methodology must reflect actual stream efficiencies; and 4) there needs to be better transparency in operations, including gaging, credit accounting, and documentation.

Commissioner D'Antonio stated that the 2008 Operating Agreement has changed the proportion of water delivered to each of the districts. The average ratio from 1951 to 2005 was 57 percent to EBID and 43 percent to El Paso Number 1. Since the new Operating Agreement took effect, the allocation of usable water has been split 38-62 percent in favor of EPCWID. EBID has incurred a decrease of 149,000 to 189,000 acre-feet per year, or about a 30 to 38 percent decrease of its historical allocation. The decreases would have been lower if EPCWID had taken a larger part of its allocation or if New Mexico had not agreed to relinquish accrued New Mexico Credit Water, both of which helped to increase project supplies. Even though there has been about a 50-50 split for charged deliveries between EBID and EPCWID. Due to the carryover provisions of the Agreement, EBID does not have enough usable water to make an allotment to its farmers this irrigation season.

Commissioner D'Antonio discussed problems with the carryover provisions of the 2008 Operating Agreement and that they have resulted in reallocation of usable water due to the changes in measurement methods, natural variability, changes in allocation procedures, groundwater pumping by Texas and credits, not by any physical changes in the system caused by New Mexicans.

Commissioner D'Antonio stated that operations under the 2008 Operating Agreement are lopsided and unsustainable, and expressed his desire to continue discussions with the parties concerning what adjustments can be made.

Commissioner D'Antonio concluded his report with a discussion of the request by EBID and the Texas Rio Grande Compact Commissioner for relinquishment of 100,000 acre-feet of New Mexico's accrued credits to increase EBID's allocation of Rio Grande Project water. He stated that New Mexico has estimated that EBID would receive less than half of the relinquishment, and since EPCWID would receive a similar amount, it would create even more carryover water for them in 2012. Commissioner D'Antonio would like to find a way to help New Mexico farmers while not impacting the lake elevations and recreation in Elephant Butte Reservoir or providing additional water to EPCWID. He indicated New Mexico will work to evaluate the request based on the April 1, 2011 snowmelt forecast.

Texas Commissioner Pat Gordon welcomed everyone to the meeting and introduced his staff and Texas attendees. Commissioner Gordon introduced Herman Settemeyer (Engineer Adviser), Priscilla Hubenak (Texas Attorney General's Office), and Suzy Valentine (Texas Commission on Environmental Quality). From EPCWID, he introduced Chuy Reyes, Art Ivey, Al Blair, Miguel Teran, Indar Singh and Johnny Stubbs and their counsel Maria O'Brien. Commissioner Gordon acknowledged EBID representatives and their counsel, as well as Ed Drusina from the International Boundary and Water Commission (IBWC), and Bert Cortez and Derrick O'Hare from the Bureau of Reclamation-El Paso.

Commissioner Gordon expressed thanks to the sponsors for providing a great reception, including the MRGCD, the law firm of Trout, Raley, Montañio, Witwer & Freeman, Harwood Consulting, P.C., the Egolf Law Firm, and SWCA Environmental Consultants.

Commissioner Gordon began by indicating Texas' appreciation to Colorado and New Mexico for their fulfillment of required deliveries of water under the Compact. Colorado ended up with a credit of 2,700 acre-feet, up from 1,500 acre-feet last year, and New Mexico now has an accrued credit of 164,700 acre-feet, down from 180,500 acre-feet last year. However, Commissioner Gordon noted that New Mexico relinquished 80,000 acre-feet last year, so this year was actually an improvement. Commissioner Gordon stated that Elephant Butte Reservoir and the Compact went in and out of Article VII conditions, as the elevation of Elephant Butte fluctuated. He indicated that in 2010, the ongoing cooperation and communications between the Texas, New Mexico, and Colorado Commissioners was helpful to the Project and Compact overall.

Commissioner Gordon then provided a summary of the 2010 Project operations. The total amount allocated was 870,655 acre-feet, with releases of 661,200 acre-feet. Mexico received 56,883 acre-feet, EBID received 282,082 acre-feet with a carryover of 20,015 acre-feet, and EPCWID received 304,937 acre-feet with a carryover of 224,348 acre-feet. Elephant Butte Reservoir peaked at 604,100 acre-feet and ended the year at 437,200 acre-feet. Reservoir levels were okay last year, but there may be some significant declines this year.

Commissioner Gordon expressed appreciation to the IBWC for continuing their projects to clean up the river and ditch levees and improve water quality. He also discussed the Rio Grande Salinity Management Program and the efforts of Dale Doremus on improving the quality of water in the Rio Grande. Commissioner Gordon expressed concerns over the zebra and quagga mussels and his support for efforts to ensure they do not infiltrate basin reservoirs. He also thanked New Mexico for their efforts on the pilot channel which will have significant positive impacts on deliveries into Elephant Butte Reservoir.

Commissioner Gordon expressed his concern about the gaging inconsistencies previously discussed by Commissioner D'Antonio and the difficulties this causes for the Commissioners and Engineer Advisers in handling the Compact allocation issues. He agreed with Commissioner D'Antonio that this is a serious problem which needs to be resolved this year.

Commissioner Gordon acknowledged Commissioner D'Antonio's statement about the meetings being held to discuss the concerns about the Operating Agreement and operations. He indicated that during 2010, the third year of operations under the 2008 Operating Agreement, the Districts and Reclamation have been working closely together. Commissioner Gordon agreed that the operating manual of the 2008 Operations Agreement needs to be modified and tweaked and looked forward to doing this. The Canutillo Well Field Study has been completed and is ready to be reviewed by the parties.

Commissioner Gordon discussed that the focus on the 2008 Operating Agreement is due to the current water adjudication issues in New Mexico. Commissioner Gordon also stated that he respectfully disagreed with some of Commissioner D'Antonio's statements about the 2008 Operating Agreement. Commissioner Gordon went on to state that the 2008 Operating Agreement has been good and has brought the Districts together, that it can be modified and corrected as necessary, and that he hopes it will continue.

Commissioner Gordon agreed that the purpose of the 2008 Operating Agreement was to allocate water between the Districts with the 57/43 percent ratio required by the Compact. However, he stated that the allocation needs to take into account the diversions in each state, and he believes that it attempts to do that, while the calculations may be the issue.

Commissioner Gordon disagreed with New Mexico's claim that the 2008 Operating Agreement violates the Compact. He stated that it helps to reduce or stop potential violations of the Compact regarding the apportionments of water. Without the carryover component, Commissioner Gordon stated that the lake would have 200,000 acre-feet less water and is an important component of the Agreement. He indicated that while the carryover may have an impact on Article VII of the Compact, that in itself does not mean that it's a per se violation of the Compact. Commissioner Gordon expressed his hopes that the Commissioners, advisers, Districts and Reclamation can meet, come to an understanding, and work out the issues in order to keep the 2008 Operating Agreement going while addressing New Mexico's concerns.

Commissioner D'Antonio thanked Commissioner Gordon and introduced Steve Farris, New Mexico's attorney general, who was in the audience.

Commissioner Dick Wolfe began the Colorado report by thanking Commissioner D'Antonio and New Mexico for hosting the meeting, the reception sponsors and the Engineer Advisers for their work on the report and throughout the year. He then introduced his staff and Colorado attendees. Commissioner Wolfe introduced: Craig Cotten (Division Engineer and Engineer Adviser), Pete Ampe (Assistant Attorney General), Mike Sullivan (Deputy State Engineer), and Matt Hardesty (Assistant Division Engineer). Commissioner Wolfe also introduced from the Rio Grande Water Conservation District, David Robbins, Steve Vandiver, Brian David, and George Whitten; from the Rio Grande Water Users Association, Bill Paddock and Greg Higel; and from the San Luis Valley Water Conservancy District, Mike Gibson. Commissioner

Wolfe introduced other Colorado attendees including Erin Minks (Senator Mark Udall's office), Ken Knox (URS, former Chief Deputy State Engineer for Colorado), and Bennett Raley from the law firm of Trout, Raley, Montañño, Witwer & Freeman.

Commissioner Wolfe described the 2010 streamflows in the Rio Grande and Conejos River systems as below average. The Rio Grande produced 539,000 acre-feet which is about 83 percent of average, and the Conejos produced 283,000 acre-feet which is 91 percent of the annual average. The snow pack melted early due to significant dust-on-snow events which produced earlier-than-anticipated runoff.

Commissioner Wolfe indicated that the 2011 snowmelt runoff is anticipated to be below average. As of March 1, the forecast was 83 percent for the Rio Grande and 84 percent for the Conejos system. Rainfall has been low, so the April 1st forecast could be even lower. Therefore, Colorado users were allowed to begin diverting water from area rivers earlier than usual under the new irrigation season policy.

There have been minimal dust-on-snow events thus far this year, so no significant effects are anticipated. However, it will depend on how warm the temperatures get in April and May.

Commissioner Wolfe provided an update on the groundwater administration for the Upper Rio Grande Basin to develop new rules and regulations for well use compliance. The special advisory committee is in its third year of the process, and they expect to have them completed and submitted to the Water Court for their approval this year.

Commissioner Wolfe discussed the work being done on updating the Rio Grande Decision Support System Model used as the basis for rulemaking in the basin. The goal is to get the model updated with new well pumping data from 2009 and 2010. Updated information will be available on the Colorado web site.

The first groundwater subdistrict's plan and creation has gone through the Water Court and is currently on appeal to the Colorado Supreme Court. Hopefully, a decision will be made by this fall on the development of the first subdistrict. There are an additional six or seven subdistricts yet to be created which are looking for guidance based on the Court's decision.

Commissioner Wolfe also discussed the Vance Case which determined that water produced from oil and gas wells was under the regulation and jurisdiction of the State Engineer. The State Engineer developed rules that resulted in identification of areas within the state considered to be non-tributary which covered most of the oil and gas wells in the state. However, all of the approximately 5,000 coal bed methane wells that exist in Colorado were required to get permits. This was completed by August of last year. Most of these wells are in the San Juan Basin, and there are still some ongoing court cases regarding the well-operation plans. Commissioner Wolfe indicated that the 2009-2010 rulemaking was appealed by six of the seven water divisions in the State. The Rio

Grande Basin was the only one with no rules since there were no oil and gas wells in the basin.

Commissioner Wolfe discussed the irrigation season in the Rio Grande/Conejos system which started on March 28 according to a formal irrigation season policy promulgated on April 14, 2010. The policy also enhances Colorado's ability to comply with the Compact. The new policy is also on the Colorado web site for reference.

Commissioner Wolfe stated that like everyone, Colorado has experienced budget issues, but seems to be in recovery. Colorado has done restructuring in response to reduced budgets, and Commissioner Wolfe thanked everyone for their assistance during this process.

Commissioner Wolfe ended his report with a discussion of the Caballo gaging station issue. He expressed appreciation for the efforts of Mr. Hamman and Reclamation in working with the Commission and agencies to address the concerns. Colorado will make available equipment, if needed, to assist with those efforts.

Commissioner D'Antonio thanked Commissioner Wolfe and introduced Dale Doremus, New Mexico Environment Department, Mike Bitner from Daniel B. Stephens & Associates, and Hilary Brinegar from New Mexico Department of Agriculture.

Mike Hamman, the new Albuquerque Area manager for Reclamation, presented the Reclamation report with highlights of the 2010 activities and hydrology and 2011 highlights of projected activities. A bound copy of the report was also provided.

Mr. Hamman showed slides of the snowpack data which was near average for 2010. He also provided data for the 2010 Otowi gage hydrograph, the runoff and a total annual volume of 984,100 acre-feet.

Mr. Hamman discussed the Closed Basin Project which has 170 salvage wells, 42 miles of canals, 115 miles of pipelines and laterals. The Closed Basin project had a total project production of just over 17,000 acre-feet, with 12,849 acre-feet of Compact deliveries. Deliveries of 800 acre-feet of Priority 2 water were made to the Bureau of Land Management Blanca Wildlife Habitat Area, which is required on an annual basis. In addition, deliveries of 2,713 acre-feet were made to the Alamosa National Wildlife Refuge.

The San Luis Valley is in a fairly significant drought which has caused some operations to be curtailed. A cooperative agreement has been made with the Rio Grande Water Conservation District to do maintenance on the Closed Basin Project. At the Platoro Dam, Reclamation funded installation of a stop-log gate for necessary conduit inspections. These were completed and no significant damage was found. Additional testing will be made for the Conejos Water Conservation District's new system to provide base winter flows.

Mr. Hamman described the operations of the San Juan-Chama Project, including diversions from the Azotea Tunnel from March 18 to November 3, 2010. A total of 89,403 acre-feet was diverted from the three project river diversion dams. This is compared to a 10-year running average of 93,829 acre-feet per year which is below the 10-year authorization criteria for the project.

The total release from Heron Reservoir to downstream contractors was 106,832 acre-feet, including waiver water from the previous year. Also, Reclamation leased about 20,000 acre-feet of supplemental water for the minnow, and delivered the MRGCD allocation of 20,900 acre-feet in 2010. Water was delivered to the Albuquerque Bernalillo County Water Utility Authority (Authority) both at Abiquiu Reservoir and Elephant Butte Reservoir. The Authority moved about 15,000 acre-feet to Elephant Butte and to the City of Santa Fe about 13,300 acre-feet.

Reclamation has been migrating its accounting model from an Excel spreadsheet into the RiverWare system. This work will continue into 2011 as they work with the Engineer Advisers to test the new accounting procedures.

Mr. Hamman reported that the Rio Grande Project storage was below the 400,000 acre-feet Article VII limitations for most of the calendar year, specifically from January 1 through February 28, from March 16 through May 9, and then from July 8 through December 31. On May 9, New Mexico relinquished 80,000 acre-feet of credit water which allowed the Rio Grande Project to be out of Article VII conditions until July. Mr. Hamman presented a slide that showed the long-term Rio Grande Compact status for credit water for New Mexico. Since about 1990, New Mexico has been in credit status, with current accumulated credit of 164,700 acre-feet.

Mr. Hammon discussed the El Vado operations which included releases for emergency drought water, general native Rio Grande water storage and San Juan-Chama water for irrigation in the Middle Valley. The reservoir was filled during 2010, and Reclamation ended the year with 9,200 acre-feet of emergency drought water in storage, just under 34,000 acre-feet of Rio Grande water, and 65,000 acre-feet of MRGCD water. Additional waters (16,500 acre-feet) were stored for Prior and Paramount water needs for the six Middle Rio Grande Pueblos, and there were no calls on this water in 2010.

Mr. Hamman discussed the river maintenance projects which are part of Reclamation's authorizations. These include inspections and analysis of river conditions, sediment transport and erosion prevention, vegetation management and flood prevention, including the Bosque del Apache Refuge area levee improvements, bankline repairs in several pueblos, and maintenance of the pilot channel referenced previously.

The Middle Rio Grande Endangered Species Collaborative Program continues to work on the silvery minnow issues. Reclamation would like to transition from an ESA Section VII consultation process to a long-term recovery program including developing a long-term plan and implementing adaptive management.

Mr. Hamman discussed the new activities conducted in 2010, which included peer review of program projects, development of an adaptive management program, development of a Scientific Code of Conduct, and effectiveness monitoring at habitat restoration projects. He also provided an overview of the Middle Rio Grande ESA BiOp compliance. He stated that Reclamation and the USACE have fully complied with all reasonable and prudent measures associated with the 2003 BiOp and river flow requirements. Progress has been made on the silvery minnow propagation and reintroduction programs and the fish passage program at San Acacia.

In addition, Mr. Hammon discussed Southwestern willow flycatcher habitat locations along the river, including in the Elephant Butte Reservoir pool as the water elevation retreated and more habitat for the flycatcher has become available. As a result, he stated that the existing Elephant Butte Reservoir Water Operations ESA consultation would be withdrawn. He discussed Reclamation's evaluations of approaches in dealing with a proposed Biological Assessment (BA). He also discussed the activities related to preventing infestations of the quagga and zebra mussels in New Mexico's water bodies.

Mr. Hammon then discussed the Rio Grande Project 2010 operations, including a total release from Caballo Reservoir of 659,679 acre-feet for irrigation and the allocations between the districts and of that release there was 94,000 acre-feet delivered to Hudspeth County. Also, there was district-to-district transfer of 10,000 acre-feet. He noted that the 2008 Operating Agreement has not changed how the total usable project storage is calculated, but that project delivery efficiencies have changed due to groundwater use and drought conditions. The technical team, consisting of representatives from EBID, EPCWID, and Reclamation, met in March to review and amend the operating manual. Amendments under consideration included the incorporation of a new cableway below Mesilla Dam, sharing of staff between EBID and EPCWID to improve diversion measurements, and tighter control of releases from Caballo Reservoir. Mr. Hamman indicated the Technical Committee (team) reviews the monthly allocation updates and accounting of delivered water and will be reviewing the losses in the Project which have not been consistent with historical trends. This information will be provided to the Rio Grande Compact Commission and Engineer Advisers as soon as possible.

Mr. Hammon discussed the 2011 snowpack to date which is tracking below average. He provided estimates of the El Vado operations, emergency drought water stored for MRGCD, and minnow operations and operations forecasts for Caballo and Elephant Butte reservoirs.

Mr. Hammon indicated that 2011 snowpack and projected storage look to be lower than average, with Elephant Butte Reservoir projected to reach a low point of 232,000 acre-feet. Also, he mentioned that Reclamation's current Rio Grande Project allocations are as follows: 241,000 acre-feet for EPCWID; 42,000 acre-feet for EBID; and 16,498 acre-feet for Mexico, which indicates 28 percent of average annual supply.

The Middle Rio Grande BA, which he mentioned previously, will cover the items that Reclamation has control over, including Heron Reservoir operations, the Middle Rio

Grande water operations, and the River Maintenance Program. A coordinated effort will be undertaken to work with stakeholders to determine their contributions in developing a long-term solution to be incorporated into the resulting BiOp. The draft will be released in August 2011 for review, with a goal of submitting a final BA to the FWS by October 2011.

Mr. Hammon discussed several 2011 programs and activities which will include Reclamation working on the URGWOM modeling effort, developing a real-time water operations model, a review, in concert with the USGS, of the Elephant Butte and Caballo reservoir gage measurements and accounting, bi-monthly accounting reviews (which will include weekly spreadsheets from the El Paso Office on the Elephant Butte and Caballo effort), implementing a San Juan-Chama call for water procedure, adding the Buckman Direct Diversion and Santa Fe's San Juan Chama water into the accounting model, continuing work on hydrologic database (HDB), and responding to the Engineer Advisers' requests.

Commissioner D'Antonio questioned Mr. Hamman about the 2010 allocations, the recent departure from the historical norms in the data, the effects of groundwater pumping in Texas, the lack of transparency and data sharing with the State and the Commission, the lack of use of the acoustic doppler velocity meter (ADVM) that the Commission had paid for, the time frame to complete the new BiOp since the current one was expiring, and Mr. Hamman's ability to complete the list of recommendations provided to Reclamation by the Engineer Advisers.

Mr. Hamman described his understanding of the 2008 Operating Agreement as a rebalancing of the allocation of surface water by accounting for the groundwater pumped by EBID to guaranteed supply to EPCWID. He responded that Reclamation did not know what was affecting the delivery efficiencies, if it was the drought or the increases in pumping. They are continuing to evaluate the effects of pumping on the delivery efficiencies. He stated that Reclamation was expanding the evaluations to include the Canutillo Well Field. In the future, the evaluations could be further expanded to include additional areas of pumping. Mr. Hamman also responded that it was their responsibility to do everything possible to ensure the measurements, data information and accounting quality was monitored for quality for management of the system. Reclamation had initially used the ADVM, and he planned to get it up and running again.

He also reiterated that Reclamation would have a draft BA submitted in August, a final one to the FWS in October, which would give them a year to negotiate the terms of a new BiOp. He stated that Reclamation should be able to complete the recommendations provided by the Engineer Advisers without a problem and planned to provide monthly progress reports.

Commissioner Gordon also stated that Reclamation should provide any information that was requested by New Mexico, and that everyone gets all the data that exists so that the groundwater issues can be resolved.

Commissioner Ed Drusina presented the report and accomplishments of the IBWC during 2010. Commissioner Drusina discussed the development of a comprehensive 5-year plan and coordination with local, State and federal officials. He reported that the IBWC Planning Department is now the Master Planning Group, including the GIS, real estate and strategic planning. The Planning Group has focused on the American Recovery and Reinvestment Act (ARRA) funding, primarily on the Federal Emergency Management Agency (FEMA) accreditation for the levees. The IBWC was provided \$220 million in ARRA funding to restore levees and bring levee heights to FEMA and IBWC standards. All of the funds have now been obligated, and the projects are 61 percent complete. Half of the money is being spent in the El Paso/Las Cruces area and half in the lower Rio Grande. Commissioner Drusina discussed the environmental reports and activities, ongoing operation and maintenance, the channelization and rectification projects, and the border safety issues.

Lt. Col. Williams presented the report of the USACE. After introducing his staff in attendance (Mark Yuska, Deb Foley, Dennis Garcia, Don Gallegos, and Ryan Gronewald), he said that 2010 was a below-average year in the basin; however, flood control release operations did occur at Abiquiu Reservoir during the snowmelt runoff. They are expecting below-average spring runoff this year, but are forecasting flood operations at two of the reservoirs.

Lt. Col. Williams discussed the low-flow turbine installed at Abiquiu Reservoir which will create additional electric generating capacity. He also discussed the 2009 Cochiti Deviation which is in its final year unless an extension request is made to the Division Office, and the overbanking flows at the Albuquerque gage which were just below the flow target. The USACE plans to seek approval for a minor Cochiti Deviation this year for recruitment flows for the silvery minnow, if necessary. Monitoring for the zebra mussels and plankton sampling has continued at Abiquiu and Cochiti lakes. The tests have been negative, and continued sampling will occur for both reservoirs in 2011.

The USACE continued work on four flood risk management projects: feasibility studies at Sparks Arroyo, Texas; at Hatch, New Mexico; the reevaluation reports for the Middle Rio Grande, Bernalillo to Belen, New Mexico; and the Rio Grande Floodway, San Acacia to Bosque del Apache, New Mexico. Lt. Col. Williams discussed several other projects and studies including the Rio Grande Salinity Management study, the Espanola Valley/Middle Rio Grande restoration, the Las Cruces Dam/Dona Ana County study, several studies for the Rio Grande pueblos, and the Cochiti Baseline Study. Construction projects in 2010 included completion of the ecosystem restoration of Route 66 and Acequia Del Concepcion, Rio Arriba County, and the initiation of the first phase of the Southwest Valley Flood Damage Reduction Project.

Lt. Col. Williams discussed the Middle Rio Grande BA operations for the silvery minnow and the 2003 BiOp and the Collaborative Program. He indicated the USACE continues coordination with other partners concerning development of a new BiOp to replace the current one which expires in 2013, and the current completion date for a draft BA is April 2011.

Lt. Col. Williams discussed the USACE's activities in Iraq and Afghanistan, plus the USACE's national disaster and emergency response missions.

Commissioner D'Antonio and Lt. Col. Williams discussed the USACE's efforts to get authorization to acquire water for offset of depletions from the Cochiti deviation actions and other habitat restoration actions. Lt. Col. Williams stated they have had discussions with their delegation, but for now, they must rely on their partners to provide water. Commissioner D'Antonio requested information regarding New Mexico's cost share portion for the San Acacia Project and the time frame for completing the BA. Lt. Col. Williams stated that the BA target dates were April 21 for draft BA, with a final draft BA delivery on May 23 to the FWS. Regarding cost share, Lt. Col. Williams stated that the USACE is currently reviewing their reevaluation study report and considering what the cost share agreements should be.

Mr. Dennis Garcia then finished the USACE's report with a deviation request of about 5,000 acre-feet at Cochiti to extend the 2,000 cubic-feet per second releases for the silvery minnow. Commissioner D'Antonio offered a motion to approve the deviation under the condition that the USACE include a hypothesis to be tested and prepared to monitor, evaluate and report the results to the Engineer Advisers by September of 2011. The motion was seconded and passed.

The report of the BIA was presented by Chris Banet. Mr. Banet indicated the BIA is responsible for the administration and management of the senior water rights and for stored water for the six Pueblos in the Middle Rio Grande: Pueblo of Cochiti, Pueblo of Kewa, Pueblo of San Felipe, Pueblo of Santa Ana, Pueblo of Sandia, and Pueblo of Isleta. In 2010, the Prior and Paramount amount stored was 16,500 acre-feet in El Vado Reservoir. There were no releases required. Because Article VII of the Compact was not in effect when the water was stored, the unused Prior and Paramount water (less evaporation) was retagged as native Rio Grande water at the end of the irrigation season. A preliminary amount of 26,000 acre-feet was estimated to be stored in El Vado Reservoir in 2011; however, the final amount is expected to be less than this when the May forecasts are issued. Mr. Banet acknowledged his staff's contributions to 2010 BIA effort since the designated engineer position is vacant.

Mr. Wally Murphy presented the report of the FWS. Mr. Murphy discussed the status of the Rio Grande silvery minnow in 2010, provided an update on the Southwestern willow flycatcher status, discussed compliance with the 2003 BiOp and the consultation re-initiation, and provided an overview of their involvement with the tribal rights settlement negotiations. Mr. Murphy reported that in October 2010, silvery minnow were present in 15 of the 20 sample sites, with densities decreased from 2009 in all reaches. There was general agreement among the scientists that the decline was not attributable to one single factor. There were 28.2 miles of river drying in the middle valley in 2010 for 42 days. Spawning was documented in the river in 2010 at several locations. Mr. Murphy indicated that catch rates were lower in 2010, indicating a need for augmentation which was conducted at eight sites in the Middle Rio Grande in November 2010 and in the Big Bend

reach of the Rio Grande in Texas in October. Over 488,000 silvery minnows were released in the Big Bend reach in 2010.

Monitoring of the minnow is ongoing, with evidence of successful reproduction detected in the Big Bend reach. A revised recovery plan for the silvery minnow was issued in February 2010. Currently, a new position has been created to focus on developing new reintroduction efforts within the historic range of the silvery minnow in other reaches of the Rio Grande, including the Cochiti reach.

Mr. Murphy discussed the Southwestern willow flycatcher and the decrease in reported numbers as well as successful nests at San Marcial and Elephant Butte in 2010 from 2009, which was attributed to predation. He also addressed Bosque del Apache, where 23 nests were identified, up from 12 in 2009. As a part of settlement of litigation, the FWS has agreed to re-designate critical habitat for the Southwestern willow flycatcher throughout its range. Mr. Murphy indicated the FWS will issue a draft rule by July 31, 2011 and a final rule by July 31, 2012.

Regarding compliance with the 2003 BiOp, water targets have been met for the last eight years. 2010 was designated as a dry year based on the Otowi gage forecast of less than 80 percent of the average streamflow and Article VII restrictions in effect from the Rio Grande Compact. However, all requirements were met. Consultation has been reinitiated on the Middle Rio Grande due to expected reduced reserves of supplemental water used to meet the current flow targets.

Regarding the Collaborative Program, Mr. Murphy indicated the action agencies and non-federal parties are continuing on their path to shift to a recovery-based approach for ESA compliance. This Collaborative Program approach would use information from the recovery plans to develop a long-term plan. The FWS preference is to issue one programmatic BO that covers all Collaborative Program parties in the basin in place before the current BiOp expires. The FWS is continuing to assist in the development of population viability analysis models for the silvery minnow and to develop an Adaptive Management Plan for the Program.

The FWS also continues to participate on Indian water rights settlements and other projects in the Middle Rio Grande for habitat enhancement and restoration projects.

Commissioner D'Antonio asked what the FWS was doing to make the three BiOp development efforts seamless. Mr. Murphy indicated they are working through the Collaborative Program on developing work flow process documents and other materials to assist with the Section 7 process for Reclamation and the USACE. The EPA's BA and BiOp will be separate from those of USACE and Reclamation.

Dale Doremus, New Mexico Environmental Department, gave a presentation on the Rio Grande Salinity Management Program, a multistate program to manage salinity in the Rio Grande Project area which was initiated by the Rio Grande Compact Commission, in collaboration with local water management entities. New Mexico and Texas have

committed to contributing the nonfederal cost share match for the first two phases of the Project, and the USACE, under Water Resources Development Act Section 729 authority, will contribute the federal portion. The first phase was completed in early 2010 and resulted in three deliverables: first, the Rio Grande salinity assessment and plan of study; second, a geospatial database compilation from known sources; and third, a preliminary economic impact assessment study.

Ms. Doremus indicated that Phase 2 was initiated in June 2010 to evaluate salinity management alternatives in identified high concentration areas followed by a comparative cost estimates for each alternative which will ultimately identify the most promising salinity control projects. Texas is currently working with the USACE on an agreement and scope of work to continue the evaluations of the selected alternatives in the second part of Phase 2. The timeframe is to identify potential pilot project areas in early 2012 and begin feasibility assessment efforts later in 2012. Construction of pilot projects would begin in 2013, if funding allows. The Commissioners all thanked Ms. Doremus for her work on the project.

After a short recess, Anne Marie Matherne from the USGS provided information on Rio Grande Compact Commission operation costs related to gaging data collection and administrative costs. For the fiscal year ending June 30, 2010, the costs totaled \$186,462, of which \$54,334 was borne by the United States and each of the states contributing \$44,043. For the upcoming fiscal year, the 2012 budget is \$195,328, of which \$56,241 will be borne by the United States and \$46,362 will be borne by each of the states. A motion was made and passed to approve the budget reports. A motion was made and passed to approve the Joint Funding Agreement with the USGS for accounting services. A motion was made and passed to approve the Minutes of the 71st Meeting in Alamosa, Colorado on March 26, 2010.

The Commissioners introduced and passed a Resolution acknowledging Mr. Kevin G. Flanigan for his devoted service as Assistant to the New Mexico Engineer Adviser to the Rio Grande Compact Commission.

The letters to the Governors of each state updating Compact activities during 2010 were approved by the Commissioners.

The next meeting of the Rio Grande Compact Commission will be in Texas.

The meeting was adjourned at 1:49 pm.

BUDGET FOR FISCAL YEAR ENDING JUNE 30, 2011

Item	Total Cost	Borne by United States	Borne by		
			Colorado	New Mexico	Texas
GAGING STATIONS					
In Colorado	\$61,087		\$61,087		
In New Mexico, above Caballo Reservoir	\$72,174	\$39,559		\$32,615	
In New Mexico, Caballo Reservoir and below	\$29,180	\$7,040		\$3,130	\$19,010
Subtotal	\$162,441	\$46,599	\$61,087	\$35,745	\$19,010
ADMINISTRATION					
U.S.G.S. Technical Services	\$16,625	\$6,875	\$3,250	\$3,250	\$3,250
Other expenses*	\$3,928		\$1,309	\$1,309	\$1,309
Subtotal	\$20,553	\$6,875	\$4,559	\$4,559	\$4,559
GRAND TOTAL	\$182,994	\$53,474	\$65,646	\$40,304	\$23,569
EQUAL SHARES			\$43,173	\$43,173	\$43,173

*Discussion - includes cost of court reporter and publication of Annual Report.

BUDGET FOR FISCAL YEAR ENDING JUNE 30, 2013

Item	Total Cost	Borne by United States	Borne by		
			Colorado	New Mexico	Texas
GAGING STATIONS					
In Colorado ¹	\$66,673		\$66,673		
In New Mexico, above Caballo Reservoir	\$75,060	\$41,141		\$33,919	
In New Mexico, Caballo Reservoir and below	\$24,314	\$6,117		\$3,256	\$14,941
Subtotal	\$166,047	\$47,258	\$66,673	\$37,175	\$14,941
ADMINISTRATION					
U.S.G.S. Technical Services	\$17,290	\$5,884	\$3,802	\$3,802	\$3,802
Other expenses ²	\$3,000		\$1,000	\$1,000	\$1,000
Subtotal	\$20,290	\$5,884	\$4,802	\$4,802	\$4,802
GRAND TOTAL	\$186,337	\$53,142	\$71,475	\$41,977	\$19,743
EQUAL SHARES			\$44,398	\$44,398	\$44,398

¹Includes \$4,305 to Colorado USGS for review and publication of Colorado Rio Grande Compact gage records.

²Includes cost of court reporter and publication of Annual Report.

LHM cost to date

Basin Study Steering Comm. Call Call
5/10/11 10:00 AM

5/9/11

Mtg w / TX Re: RGP DA
El Paso, TX.

TX Pat Gordon

NM: JDA

Herman Selteneyer

RSP

Carlos Pulcastein

ERL

Cuevas

Pat Gordon: What did TX get under the Compact?

Intent was not to reallocate Compact water
it was only an agreement to reallocate Project
water

Brantley

PG: Total Pumping in NM from EB to SL
Average 80 KAF

HS: Agree on an equity point for

TX deliveries

Next Mtg

5/31

2:30 AM
ABQ

No. 141, Original

In the
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff,
v.

STATE OF NEW MEXICO and
STATE OF COLORADO,

Defendants

OFFICE OF THE SPECIAL MASTER

UNITED STATES OF AMERICA’S RESPONSES TO NEW MEXICO’S
SECOND SET OF REQUESTS FOR ADMISSION

JEFFREY B. WALL
Acting Solicitor General
JEAN E. WILLIAMS
Deputy Assistant Attorney General
FREDERICK LIU
Assistant to the Solicitor General
JAMES J. DuBOIS
R. LEE LEININGER
DAVID W. GEHLERT
JUDITH E. COLEMAN
JOHN P. TUSTIN
Attorneys, Environment and Natural Resources Division
U.S. Department of Justice

Counsel for the United States



Pursuant to the Case Management Plan adopted September 6, 2018, as amended (“CMP”), and Rules 33 and 36 of the Federal Rules of Civil Procedure, the United States of America (“United States”) hereby submits the following responses to the State of New Mexico’s (“New Mexico”) Second Set of Requests for Admission to the United States.

OBJECTIONS INCORPORATED BY REFERENCE

In addition to the objections specifically noted in the United States’ responses below, the United States incorporates by reference the general objections and the objections to the Definitions and Instructions stated in the United States’ Objections to the State of New Mexico’s First Set of Discovery Requests to the United States, served October 18, 2019.

REQUESTS FOR ADMISSION

REQUEST FOR ADMISSION No. 79: Admit that Reclamation acts “as a sort of ‘agent’ of the Compact, charged with assuring that the Compact’s equitable apportionment to Texas and part of New Mexico is, in fact, made.” *Texas v. New Mexico*, 138 S. Ct. 954, 959 (2018).

ANSWER: The United States objects to Request for Admission No. 79 because it seeks to admit the truth of a legal conclusion, *see* Fed. R. Civ. P. 36(a)(1)(A), and because the terms “as a sort of ‘agent’ of the Compact,” “charged,” “assuring,” “the Compact’s equitable apportionment to Texas and part of New Mexico,” and “made” are vague and ambiguous, as used by the Supreme Court in its opinion, and as used by New Mexico in this request. Furthermore, the sentence from the Supreme Court’s opinion is not quoted accurately in the Request. Quoting from a brief filed by the State of Texas, the Court actually wrote: “In this way, the United States might be said to serve, through the Downstream Contracts, as a sort of “ ‘agent’ of the Compact, charged with assuring that the Compact’s equitable apportionment” to Texas and part of New Mexico “is, in fact, made.”” The request does not include the internal quotation marks indicating the reference to Texas’s brief, or the initial portion of the sentence and preceding sentence that provides context for the quoted portion.

Subject to these objections, the United States admits that Reclamation implements the Compact through its operation of the Rio Grande Project. The United States also admits that the quoted portion of the Supreme Court’s opinion reflects a general recognition of Reclamation’s role in implementing the Compact. The request is denied in all other respects, and the United States specifically denies that Reclamation has a legal agency relationship or any particular legal obligation other than those imposed on Reclamation by statute or undertaken by Reclamation by contract issued pursuant to its statutory authority.

REQUEST FOR ADMISSION No. 80: Admit that Reclamation includes calculations of stream gains and losses when determining how much water to release from Caballo Dam in order to meet a water order by EBID and/or EPCWID.

ANSWER: The United States objects to Request for Admission No. 80 because it is vague as to the time frame for the request. Subject to this objection, the United States admits the request as general matter. The United States denies the request to the extent it seeks an admission with respect to any particular water order.

REQUEST FOR ADMISSION No. 81: Admit that HCCRD is only entitled to receive from the Rio Grande Project excess or drainage flows that cannot be put to beneficial use on Project lands.

ANSWER: The United States objects to Request for Admission No. 81 because it seeks to admit the truth of a legal conclusion, *see* Fed. R. Civ. P. 36(a)(1)(A), and because the term “excess or drainage flows” in the request is vague and ambiguous. Subject to these objections, the request is admitted in part and denied in part. The United States admits that HCCRD receives water from the Project pursuant to a contract under the Warren Act (43 U.S.C. §§ 523-525). The United States denies the remainder of the request.

ANSWER: The United States objects to Request for Admission No. 165 because “formally seek to change” is vague and ambiguous, and the referenced “directive” had no legal effect. Subject to those objections, the request is admitted in part and denied in part. The United States admits that it did not ask the Rio Grande Compact Commission to rescind the “directive” or issue a superseding “directive” during the 2011 water year. The United States otherwise denies the request.

REQUEST FOR ADMISSION No. 166: Admit that the New Mexico State Engineer declined to relinquish Credit Water to Texas in 2011.

ANSWER: Denied. The United States avers that the New Mexico State Engineer offered to relinquish credit water to Texas in 2011 and Texas did not accept the relinquishment.

REQUEST FOR ADMISSION No. 167: Admit that the New Mexico State Engineer and representatives of Texas were discussing a relinquishment or loan of New Mexico’s 2011 Credit Water when the 2011 Credit Water was released.

ANSWER: The United States objects to Request for Admission No. 167 because the term “were discussing” and “released” are vague. Notwithstanding and without waiving this objection, the United States admits that that the New Mexico State Engineer and representatives of Texas had been exchanging correspondence regarding a relinquishment or loan of New Mexico’s 2011 Credit Water, but denies that New Mexico’s 2011 Credit Water was released from storage.

Respectfully submitted this 28th day of August, 2020,

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Acting Solicitor General
JEAN E. WILLIAMS
Deputy Assistant Attorney General

/s/ James J. Dubois
James J. Dubois, Trial Attorney

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No. 141, Original

**In the
SUPREME COURT OF THE UNITED STATES**

STATE OF TEXAS,

Plaintiff,

v.

**STATE OF NEW MEXICO and
STATE OF COLORADO,**

Defendants.

OFFICE OF THE SPECIAL MASTER

**UNITED STATES OF AMERICA'S SUPPLEMENTAL RESPONSES
TO NEW MEXICO'S FIRST SET OF DISCOVERY REQUESTS**

NOEL J. FRANCISCO
Solicitor General
JEAN E. WILLIAMS
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Assistant to the Solicitor General
JAMES J. DuBOIS
STEPHEN M. MACFARLANE
R. LEE LEININGER
DAVID W. GEHLERT
JUDITH E. COLEMAN
JOHN P. TUSTIN
THOMAS K. SNODGRASS
Attorneys, Environment and Natural Resources Division
U.S. Department of Justice

Counsel for the United States

TX v. NM # 141

New Mexico Exhibit

NM_EX-608

Michel letter to Espinosa de los Reyes, 3/11/1986	US0249104-05
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INTERROGATORY No. 19: Explain in detail Your procedure for allocating Project water between Project water users in EBID and Project water users in EPCWID from 2008 to present.

RESPONSE TO INTERROGATORY No. 19:

The United States incorporates its previously served objection to Interrogatory No. 19. Notwithstanding that objection, the United States explains as follows:

Since the transfer of operation and maintenance responsibility in 1980, the United States has allocated water to the irrigation districts, not to Project water users within the districts. The annual diversion allocations for each District are developed consistent with the Operating Agreement and the corresponding Operating Manuals as shown in the Project Allocation Spreadsheets for 2008-2018.

SUPPLEMENTAL RESPONSE TO INTERROGATORY No. 19:

The Operating Agreement and corresponding Operation Manual detail the allocation procedure. In summary: Each month, or as needed, Reclamation determines the amount of Project Water in storage and already released for the current year and determines the carryover allocation, carryover obligation, and Project Supply available for remaining current year allocation. These determinations are made using reservoir and gage data, the accounting data from the previous year, and the current estimate of the Diversion Ratio. Then, based on these determinations, Reclamation estimates the available Project allocation to the lands using the D1 Curve, which is used to compute the diversion allocation to Mexico. Reclamation then computes the diversion allocation to each district using the D2 curve. The diversion allocation is split

57/43 between EBID and EPCWID. Reclamation applies a diversion ratio adjustment to calculate the portion of annual allocation that EBID voluntarily surrenders to compensate for losses in delivery efficiency caused by, among other things, the impacts of groundwater pumping. The total allocation to the Districts is a sum of carryover and current year allocations.

INTERROGATORY No. 21: Explain in detail how the diversion ratio equation referenced in the 2008 Operating Agreement on page 5 was derived, including identifying the data, policies, contracts, and other sources used to derive the diversion ratio equation.

RESPONSE TO INTERROGATORY No. 21:

The United States incorporates its previously served objection to Interrogatory No. 21 and further objects that the term “derived” is vague and ambiguous in this context.

Notwithstanding that objection, the United States explains as follows:

The terms of the Operating Agreement, including the diversion ratio equation, were developed through negotiations between Reclamation and the districts. The diversion ratio is based on accounting and for the purpose of ensuring that diversion allocations do not exceed the amount of water that can be physically delivered under water accounting procedures.

Consequently, the diversion ratio indicates the amount of water that Reclamation can deliver and charge to each district against its annual allocation based on the usable Project water available for release.

SUPPLEMENTAL RESPONSE TO INTERROGATORY No. 21:

Operation and maintenance responsibility for certain Project facilities was transferred to EBID and EPCWID in 1979 and 1980, respectively. In the contracts effectuating the transfer, the Districts and the United States agreed that “a detailed operational plan will be concluded

Recommendation of Changes to Rio Grande Project Operation Manual Proposed on 5/8/12	US0323097-US0323115
Analysis of Multi-Year Drought and D2 Linear Regression Equation, 5/21/12	US0399596-US0399600
WW 18 RGP Approval Form	TX_00283987

INTERROGATORY No. 49: Identify all Documents related to the sale of Project water from EPCWID or the City of El Paso to HCCRD.

RESPONSE TO INTERROGATORY No. 49:

The United States incorporates its previously served objection to Interrogatory 49. Notwithstanding that objection, the United States responds that it is not aware of any documents responsive to the request.

SUPPLEMENTAL RESPONSE TO INTERROGATORY No. 49:

The United States is not aware of any contract under which EPCWID or the City of El Paso sells or has sold Project water to the Hudspeth County Conservation District. *See* Supplemental Response to Interrogatory 50, *infra*, regarding Request for Admission 71.

INTERROGATORY No. 50: To the extent Your responses to any of Request for Admission Nos. 1 – 78 are anything other than an unqualified admission, state the factual basis for such denial or partial denial.

RESPONSE TO INTERROGATORY No. 50:

The United States incorporates its previously served objection to Interrogatory No. 50. Notwithstanding these objections, the United States refers New Mexico to the United States of America's Responses to New Mexico's First Set of Requests for Admission, served on November 4, 2019.

SUPPLEMENTAL RESPONSE TO INTERROGATORY No. 50:

Request for Admission 5: Reclamation did not “administer” the referenced program. On page 4 of the cited brief, the *Mestas* plaintiffs represented that “[t]he Government is not involved in the program except . . . to deliver 'offset water' that has been pumped into the system.”

Request for Admission 8: Reclamation is an agency of the United States. Reclamation does not act as an agent for EBID or EPCWID without express congressional authorization. The use of the term “agent” on page 4 of the cited brief is the *Mestas* plaintiffs’ characterization. Reclamation had obligations under its contracts with EBID and EPCWID to operate and maintain Project infrastructure prior to 1980. Those contractual obligations do not establish an agency relationship.

Request for Admission 19: The quoted declaration was submitted in *EPCWID v. EBID, et al.*, No. 3:07-cv-00027 (W.D. Tex.), in which EPCWID sought an injunction requiring Reclamation to “carry-over” 74,200 acre-feet of water for EPCWID from 2006 to 2007. In Paragraph 19, Mr. Cortez was referring to storage and Project supply as accounting figures, not to physical water (or physical water supply in storage).

Request for Admission 20: Reclamation does not allocate more than 67/155 of the annual available water supply to EPCWID. Reclamation continues to allocate 43% of current year available Project water supply to EPCWID along with the unused allocation from the previous year (up to 60% of a full allocation, see 2008 Operating Agreement Section 1.10). The 2006 situation addressed in the declaration refers to Reclamation’s first, experimental, allowance of carryover accounting. In the 2006 experiment, Reclamation allowed each district to carry-over 50% of its unused allocation in order to determine the effects of carry-over on the Project.

EPCWID protested that 50% carry-over of unused allocation was insufficient and demanded 100% carry-over as part of the experiment. Mr. Cortez, in his declaration, pointed out that 100% carry-over in this untried procedure had the potential to be very disruptive, as final procedures and effects had not been promulgated or calculated. In the 2008 Operating Agreement, annual allocation carry-over was capped at 60% of a full allocation for each district,

Request for Admission 21: Before 1980, Reclamation allocated water to Project lands that were under irrigation in a given year. This allocation was made per acre irrigated, without regard to the district in which the land was located. Thus, in some years, it is possible that water delivered to lands in EBID would not precisely equal 57% (or 88/155) of available Project water supply and water delivered to EPCWID would not precisely equal 43% (or 67/155) of available Project water supply, if the acres under irrigation were not in the same proportion. After 1980, Reclamation has allocated water to the districts, not to irrigated acres. The allocation is 88/155 of available Project water supply to EBID and 67/155 to EPCWID, prior to carryover accounting.

Request for Admission 29: Under the 2008 Operating Agreement, Reclamation allocates Project water supply based on predicted deliveries at the districts' points of diversions. Reclamation continues to allocate 57% of available Project water supply to EBID. Under the Operating Agreement, EBID voluntarily surrenders a portion of its annual allocation to compensate for loss in delivery efficiency caused by, among other things, the impacts of groundwater pumping in New Mexico.

Request for Admission 33: Reclamation does not allocate water to "New Mexico Project beneficiaries" because Reclamation does not allocate water to individual water users. Reclamation allocates water to EBID, for delivery at its points of diversion. Under the 2008

Operating Agreement, EBID voluntarily surrenders a portion of its allocation, as stated above regarding Request for Admission 29. Reclamation and the Districts have also modified the allocation procedure for extreme drought using the drought correction factor, which reduces the allocations to EPCWID and EBID equally for deviation from D2 calculations due to drought.

Requests for Admission 38, 39, 40, 41. *See* Response regarding Request for Admission 20, *supra*.

Request for Admission 43: EPCWID continues to be allocated 43% of each current year's available Project water supply. *See* Response regarding Request for Admission 29, *supra*.

Requests for Admission 47 & 48: Reclamation calculated how much of New Mexico's Credit water had physically evaporated to date in determining the amount of Project water available for release. Reclamation tracks Compact credit accounts and evaporation in order to determine what water is available to the Project. Reclamation does not itself reduce physical water in storage to reflect evaporation.

Request for Admission 49: The relinquishment of New Mexico credit water is to Texas and Texas' water goes into usable Project storage. Water in storage is never allocated to the Districts 57/43 but instead water storage is released and combined with return flows and other sources of water for the allocation process 57/43 and as stated above in response to Request for Admission Nos. 29 & 33.

Request for Admission 50: The minutes of the Commission meeting on March 23, 2006 state

The Engineer Advisers had three recommendations to the Commission: [1] The Engineer Advisers requested that the Commission direct that credit water be held constant during the year, and [2] that the Commission direct the Engineer Advisers to meet if the total combined accrued credit water exceeds 150,000 acre-feet and Usable Water is less than full allocation or if the

combined accrued credit water exceeds 50 percent of Project Storage and make a recommendation to the Commission regarding optimum use of water in Project Storage, and [3] That the Commission direct Reclamation to allocate or release credit water only as directed by the Commission. The recommendations were approved by the Commission.” NM_0007938-39.

No resolution was issued in connection with the approval of these recommendations and no direction was given to Reclamation about what it “was to [do]” in relation to credit water.

Requests for Admission 52 & 53: Reclamation calculates the evaporation on credit water on a monthly basis, or as needed, in order to determine how much Project water is in storage. The reduction referenced in the request was an accounting change, not a reduction in the physical water in storage. Reclamation did not release credit water in June 2011. Due apparently to human error, Reclamation accounted for a relinquishment of credit water by New Mexico by transferring that amount of water to the Project’s account. There was no movement of physical water associated with this accounting change. Upon recognition of its error, Reclamation restored the credit to New Mexico’s account. Releases were made to the districts in accordance with the initial 2011 allocations. During 2011, New Mexico delivered Rio Grande water to Elephant Butte Reservoir, which was classified by Reclamation as usable water in Project storage and available for release to the Districts.

Request for Admission 54: The level of the Hueco Bolson aquifer is estimated to be so low that it is no longer connected to the Rio Grande and the connection has varied over time historically.

Request for Admission 67: At the time Reclamation responded to this Request, the United States had not yet responded to Interrogatory No. 13. The US denies that Reclamation allocates water to individual water users, but admits that a full allocation was made to the Districts and to Mexico in 1985-2002 as set out in the response to Interrogatory No. 13.

Request for Admission 68: Annual releases of usable water from Project storage are not capped at 790,000 acre-feet. The Compact refers to 790,000 acre-feet as the “normal” or “average” release from the Project. In the allocation equation, 790,000 acre-feet represents the amount of water in storage that, as supplemented by return flows or other inflows downstream, would result in delivery of a full supply of 3.024 acre-feet/acre to the lands in each district. This number does not “cap” releases by Reclamation, and Reclamation has released more than 790,000 acre-feet of useable water in some years.

Request for Admission 71: The water referenced in the 1998 contract at EPCWID_063882-87 is effluent from city of El Paso, not Project water. EPCWID does not sell Project water to the Hudspeth County Conservation District. EPCWID receives effluent from the City of El Paso under its 1920 Act contract with the City. The effluent originates primarily from groundwater pumping from the Hueco Bolson aquifer, which is no longer hydrologically connected to the Rio Grande. Although some effluent may originate from Project water provided to El Paso under the 1920 Act contract, the amount of effluent originating from Hueco Bolson pumping is more than adequate to cover the entire amount of the effluent provided in this contract.

Request for Admission 73: The referenced statutes authorize channel maintenance activities but do not impose a legal obligation.

Request for Admission 76: Reclamation and the IBWC are not aware of any instance in which either agency directed New Mexico or Texas to engage in channel maintenance activities in the Project area. It is possible that channel maintenance is or has been “required” as a matter of legal obligation in the abstract.

Respectfully submitted this 18th day of March, 2020.

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Top Skills

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Water Resources

Water

Herman Settemeyer

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Castell, Texas

EXHIBIT

Settemeyer 02

exhibitsticker.com

Summary

Proud Texas Aggie with over 40 years experience in Texas water issues:

- Texas water policy and procedures
- Interstate river compact administration
- Interstate river compact Supreme Court litigation
- International treaty compliance
- Adjudication of Texas' water rights
- Water rights permitting and enforcement
- Texas' member of Association of Western States Engineers
- Western States Water Council participant
- Coordination of issues involving federal agencies - Bureau of Reclamation, Corps of Engineers, U. S. Geological Survey, U. S. Fish and Wildlife Service, International Boundary and Water Commission
- Contracted federal studies through the Corps of Engineers

Experience

RSAH2O, LLC

Partner

September 2015 - Present (4 years 11 months)

Austin, Texas

Provide consulting expertise on environmental activities primarily related to consultation, assistance, and advice regarding water resources policy, permits, projects, or compliance.

RSAH2O, LLC - Carlos Rubinstein, Principal; Herman Settemeyer, Partner; Ricky Anderson, Partner

Texas Commission on Environmental Quality

Engineer Advisor - Rio Grande Compact Commission

September 2012 - August 2015 (3 years)

Austin, Texas

- Complete technical analysis required to administer the Rio Grande Compact

- Manage administrative and budget issues for the Rio Grande Compact
- Member of Texas team assembled to conduct research to file Rio Grande Compact Supreme Court litigation v. New Mexico and Colorado
- Member of team that assembled the technical and legal team required to file the Supreme Court litigation and conduct the required technical evaluations
- Provided technical support to administered Rio Grande 1944 Water Treaty and 1906 Convention

Texas Commission on Environmental Quality

Engineer Advisor/Manager

1987 - 2012 (25 years)

Austin, Texas

- Engineer Advisor to the Canadian, Pecos, Red, Rio Grande, and Sabine River Compacts
- Manage administrative, technical, and budget issues required to administer each compact
- Provided technical support to the Pecos and Canadian River Compact Supreme Court litigations
- Member of the Rio Grande Silvery Minnow Recovery Team
- Represented Texas on the Association of Western States Engineers
- Provided technical support to administer the Rio Grande 1944 Water Treaty and the 1906 Convention
- Managed contractual projects related to the Rio Grande with the Corps of Engineers
- Completed the Rio Grande above Fort Quitman adjudication
- Representative on the Edwards Aquifer Recovery Implementation Program
- Provided support and guidance on water right applications
- Served as Section Manager for the Waters Rights Permitting Program
- Served as Team Leader for the Interstate Compacts Team
- Provided support to the National Flood Insurance Program
- Represented Texas' member of Western States Water Council at council meetings

Texas Water Rights Commission and Subsequent Agencies (TCEQ)

Engineer

1975 - 1987 (12 years)

Austin, Texas

- Completed water right adjudications regarding the Bosque, Trinity, Neches, and Red Rivers requiring technical field investigations and testimony at hearings

- Conducted compliance investigations for water right complaints
- Processed applications for water rights

Education

University of Wyoming

Master's Degree, Agricultural Engineering · (1973 - 1974)

Texas A&M University

Bachelor of Science, Agricultural Engineering · (1968 - 1972)

No. 141, Original

IN THE
SUPREME COURT OF THE UNITED STATES

STATE OF TEXAS,

Plaintiff,

v.

STATE OF NEW MEXICO AND
STATE OF COLORADO,

Defendants.

OFFICE OF THE SPECIAL MASTER

**THE STATE OF TEXAS'S SUPPLEMENTAL RESPONSES TO THE STATE OF
NEW MEXICO'S FIRST SET OF REQUESTS FOR ADMISSION**

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October 29, 2020

TX v. NM # 141

New Mexico Exhibit

NM_EX-610

REQUEST FOR ADMISSION NO. 45:

Admit that the Rio Grande Project is the mechanism by which the Rio Grande Compact apportions and delivers Compact water to Texas.

OBJECTIONS AND RESPONSE TO REQUEST NO. 45:

Texas objects to Request for Admission No. 45 because it is unduly burdensome, impermissibly compound, overbroad, vague, and ambiguous. Texas further objects on the grounds that the Request is impermissibly compound, overbroad, vague, and ambiguous. Texas further objects on the grounds that the words and/or phrases “mechanism,” “Rio Grande Project is the mechanism,” “apportions,” “delivers,” “apportions and delivers,” and “Compact water” are undefined as used by New Mexico, overbroad, vague, and ambiguous, making a response impossible without speculating as to the meaning of the Request. Texas further objects on the grounds that the Request improperly seeks an admission as to the truth of a legal conclusion, *see* Fed. R. Civ. P. 36(a)(1)(A). Texas further objects to this Request because contract interpretation is a question of law, which is an improper subject of a Request for Admission. *See* Fed. R. Civ. P. 36(a)(1)(A).

Without waiver of and subject to the foregoing objections, Texas responds as follows: Texas admits the Rio Grande Compact requires that New Mexico deliver specified amounts of Rio Grande water to Texas into Elephant Butte Reservoir, a storage feature of the Rio Grande Project. All water delivered into Elephant Butte Reservoir is apportioned to Texas, subject to the 1906 treaty with Mexico, and subject to the downstream contracts with Rio Grande Project beneficiaries in southern New Mexico and in Texas. In order for water to be properly allocated to Rio Grande Project beneficiaries pursuant to downstream contracts, it must be released from Rio Grande Project facilities,

and allowed to flow unimpeded through Rio Grande Project lands in southern New Mexico, and then across the state line into Texas. Otherwise, this Request is denied.

REQUEST FOR ADMISSION NO. 46:

Admit that the Rio Grande Project is the mechanism by which the Rio Grande Compact apportions and delivers Compact water to New Mexico below Elephant Butte Reservoir.

OBJECTIONS AND RESPONSE TO REQUEST NO. 46:

Texas objects to Request for Admission No. 46 because it is unduly burdensome, impermissibly compound, overbroad, vague, and ambiguous. Texas further objects on the grounds that the Request is impermissibly compound, overbroad, vague, and ambiguous. Texas further objects on the grounds that the words and/or phrases “mechanism,” “Rio Grande Project is the mechanism,” “apportions,” “delivers,” “apportions and delivers,” and “Compact water” are undefined as used by New Mexico, overbroad, vague, and ambiguous, making a response impossible without speculating as to the meaning of the Request. Texas further objects on the grounds that the Request improperly seeks an admission as to the truth of a legal conclusion, *see* Fed. R. Civ. P. 36(a)(1)(A). Texas further objects to this Request because contract interpretation is a question of law, which is an improper subject of a Request for Admission. *See* Fed. R. Civ. P. 36(a)(1)(A).

Without waiver of and subject to the foregoing objections, Texas responds as follows: Texas admits the Rio Grande Compact requires that New Mexico deliver specified amounts of Rio Grande water to Texas into Elephant Butte Reservoir, a storage feature of the Rio Grande Project. All water delivered into Elephant Butte Reservoir is apportioned to Texas, subject to the 1906 treaty with Mexico, and subject to the

downstream contracts with Rio Grande Project beneficiaries in southern New Mexico and in Texas. In order for water to be properly allocated to Rio Grande Project beneficiaries pursuant to downstream contracts, it must be released from Rio Grande Project facilities, and allowed to flow unimpeded through Rio Grande Project lands in southern New Mexico, and then across the state line into Texas. Otherwise, this Request is denied.

REQUEST FOR ADMISSION NO. 47:

Admit Texas did not formally demand of any State or entity, between 1950 and 1959, that New Mexico curtail groundwater pumping to ensure Project water deliveries could reach Texas.

OBJECTIONS AND RESPONSE TO REQUEST NO. 47:

Texas objects to Request for Admission No. 47 because it is unduly burdensome, impermissibly compound, overbroad, vague, and ambiguous, in both temporal and geographic scope. Texas further objects on the grounds that the words and/or phrases “formally,” “demand,” “of any State or entity,” “between 1950 and 1959,” “curtail,” “groundwater pumping,” “ensure,” “Project water deliveries,” and “could reach” are undefined as used by New Mexico, overbroad, vague, and ambiguous, making a response impossible without speculating as to the meaning of the Request. Texas objects that the Request purports to seek an admission as to the truth of a legal conclusion, *see* Fed. R. Civ. P. 36(a)(1)(A). Requests for Admission should address singular, relevant facts which can be clearly admitted or denied and not with complicated situations involving many distinct and vital controversial issues of facts. The deficiencies are too vast to enable Texas to reasonably respond to this Request in whole or in part and, as such, Texas stands on the foregoing objections.

Master on or about March 31, 2020. Requests for Admission should address singular, relevant facts which can be clearly admitted or denied and not with complicated situations involving many distinct and vital controversial issues of facts. The deficiencies are too vast to enable Texas to reasonably respond to this Request in whole or in part and, as such, Texas stands on the foregoing objections.

Respectfully submitted,



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FILED

2013 APR 24 PM 2:45

DISTRICT COURT
DOÑA ANA COUNTY, NM

THIRD JUDICIAL DISTRICT COURT
STATE OF NEW MEXICO
COUNTY OF DOÑA ANA

STATE OF NEW MEXICO *ex rel.*,
New Mexico State Engineer,

Plaintiff,

vs.

ELEPHANT BUTTE IRRIGATION
DISTRICT, *et al.*,

Defendants.

No. CV-96-888

Honorable James J. Wechsler

Stream System Issue

SS-97-104

United States Interests

UNITED STATES' MEMORANDUM IN SUPPORT
OF MOTION FOR SUMMARY JUDGMENT

TX v. NM # 141

New Mexico Exhibit

NM_EX-611

JK
4/24/13

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COMES NOW the United States and, under Rule 1-056 (D) (2) NMRA, submits this Memorandum in Support of its Motion for Summary Judgment regarding the issue designated by the Court: "The next issues to be litigated in Stream System Issue SS-97-104 are the amounts of water and the priority date(s) for the United States' Rio Grande Project right." Order on Next Issues and Schedule for Litigation Regarding the US Rio Grande Project, filed October 12, 2012, at 1.

Summary judgment is appropriate if the facts of the case are undisputed and it is only the legal interpretation of the facts that remain. Rule 1-056 (C) NMRA; *see Self v. United Parcel Service, Inc.*, 970 P.2d 582 (N.M. 1998); *Board of County Comm'rs v. Risk Mgmt. Div.*, 899 P.2d 1132, 1133 (N.M. 1995). The two issues presented are appropriate for summary judgment. Priority for the Rio Grande Project is based on historical fact for which there should be no dispute. The quantity of water appropriated for the Project is also based on a historical record for which there should be no dispute of fact. The United States is entitled to an award of summary judgment because there is no reasonable dispute as to a material fact and priority and quantity may be decided as a matter of law.

I. Summary of Argument

As shown below priority for the Project should be no later than March 1, 1903, the date that relates back to when the federal government possessed both the requisite intent to appropriate and initiated surveys, soil borings and other activities at the site of the Elephant Butte Dam sufficient to constitute a "first step" under New Mexico law. The quantity of the water for the Project includes an amount for storage and an amount to divert at river headgates. This

includes a right to store 2,638,860 acre-feet in Elephant Butte and Caballo Reservoirs and continuously fill and refill those reservoirs; a right to divert water at Project headgates in New Mexico based on the maximum historical diversions; a right to deliver to Mexico; and, a right to deliver to Project facilities in Texas acknowledging and recognizing the decree of Project water rights by the Texas District Court.

II. Factual Background

In April 1889, U.S. Army Major Anson Mills received orders to investigate the feasibility of a large-scale storage and irrigation project on the Rio Grande in the vicinity of El Paso.

[Mills] is authorized to extend his services in every proper way, when they may be requested, to the officers of the Interior Department in charge of the Geological Survey on that part of the Rio Grande 60 miles north and 60 miles south of the El Paso, Texas, this survey having for its object the redemption of areas of irrigable lands in the Rio Grande Valley.

Report of the Special Committee of the U.S. Senate on the Irrigation and Reclamation of Arid Lands. Vol. 3 -- Rocky Mountain Region and Great Plains Hearing Date: Sep. 6-9, 11-14, 16-17, 19, 22, 1889, Special Committee on Irrigation and Reclamation of Arid Lands, 51 S. Rpt. 928, Pt. 4, 38 (Statement of Anson Mills, Major, Tenth Cavalry, U.S. Army, Consulting Engineer of the U.S. Geological Survey at El Paso) (quoting Special Orders, No. 85, Headquarters of the Army, Adjutant-General's Office (Apr. 12, 1889)). Exh. 1. The work would be conducted in coordination with United States Geological Survey officers who were engaged in investigations regarding potential water development at multiple sites on the Rio Grande from Colorado to El Paso.¹ See U.S. GEOLOGICAL SURVEY, SECOND ANNUAL REPORT OF THE RECLAMATION SERVICE

¹ "In reply [to Special Orders, No. 85,] I hereby request that you will act as the advisory agent of this Bureau in respect to matters connected with improvements of the Rio Grande River near El

1902-03, H.R. DOC. NO. 58-44, at 375-76 (2d Sess. 1904) (hereinafter "SECOND ANNUAL REPORT")(describing work of previous surveys at multiple sites on the Rio Grande).² Exh. 2.

The results of the survey were published in a report issued by the International Boundary (Water) Commission on November 25, 1896. See *Equit. Distr. of the Waters of the Rio Grande*, 55 S. Doc. 229, 31 (April 7, 1898). Exh. 3. In the publication, civil engineer W.W. Follett details the government's investigations of the Rio Grande for use of the water in irrigation and potential locations for a dam and reservoir. In this study, Follett describes the area at Elephant Butte as a potential reservoir site for the first time:

This is a large reservoir site on the Rio Grande west of the Jornada del Muerto. The dam site and main part of the reservoir site lie on the Pedro Armendaris Grant No. 33, to which the United States has given patent. The projectors claim 235,000 acre-feet capacity with an 80-foot dam. I reconnoitered the site on October 7 and estimated its capacity to be 230,000 acre-feet with a 100-foot dam.

Equit. Distr. of the Waters of the Rio Grande, 55 S. Doc. 229, at 104. Exh. 5. The report also recommends that the federal government "in some way prevent the construction of any large reservoirs on the Rio Grande in the Territory of New Mexico" by any private actors so that the U.S. could secure an equitable supply of water to the State of Texas and Republic of Mexico.

Paso, and relation to the use of its waters for purposes of irrigation." *Id.* at 38 (quoting Written Instructions from the Director of the U.S. Geological Survey to Major Anson Mills (Apr. 20, 1889)). **Exh. 1.**

²Initially, these early investigations and surveys led to interest in a potential dam and reservoir on the Rio Grande above El Paso, Texas. On April 29, 1890, Congress passed a Concurrent Resolution concerning "the irrigation of arid lands in the valley of the Rio Grande River, the construction of a dam across said river at or near El Paso, Tex., for the storage of its waste waters, and for other purposes." See *International Dam in Rio Grande River, Near El Paso, Tex.*, 54 H. Doc. 125, 6 (Jan. 7, 1896) (reprinting April 29, 1890 Concurrent Resolution). Although an El Paso dam was the early focus, other surveys and investigations at alternative sites were also undertaken. **Exh. 4.**

See id. at 41; *see also* 3rd Annual Report of the Bureau of Reclamation, 396-97 (1903-04). Exh. 6.

Acting on this recommendation, on December 5, 1896, the Secretary of Interior directed the Commissioner of the General Land Office to “suspend action on any and all applications for right of way through public lands for the purpose of irrigation by using the waters of the Rio Grande River or any of its tributaries in the State of Colorado or in the Territory of New Mexico until further instructed by this Department.” This order became known as the “Embargo.” *See Waters of the Rio Grande and its Tributaries*, 62 H. Doc. 39, 2 (April 29, 1911); *Equit. Distr. of the Waters of the Rio Grande*, 55 S. Doc. 229, 17-18 (April 7, 1898). Exhs. 7 and 3. The Embargo was broad in that it encompassed not only the Rio Grande, but all of its tributaries in both Colorado and New Mexico. It effectively prohibited any further large-scale appropriation of Rio Grande waters until the United States completed its survey work, selected an appropriate Project site and ultimately constructed what is today the Elephant Butte Dam and reservoir.³

On March 1, 1903, Reclamation began more substantial investigations on the Rio Grande in and around Elephant Butte. *SECOND ANNUAL REPORT*, at 377. According to the *Second Annual Report*, a small party worked through the summer and into the fall. By August 1903, “a

³ The Embargo was formally lifted in 1925, nine years after the completion of Elephant Butte Dam. After the issuance of the 1896 Embargo, the United States diligently litigated to enjoin private actors from constructing other reservoirs on the river. The United States sued to enjoin the Rio Grande Irrigation and Land Company from constructing its reservoir near Elephant Butte on the theory that the Rio Grande was a navigable waterway of the United States, requiring the consent of the Secretary of War to the erection of any dam. *See United States v. Rio Grande Dam & Irrigation Co.*, 174 U.S. 690, 707 (1899); 21 Op. Atty. Gen. 518 (1897).

contour survey was begun in order to map and classify the lands which would be involved in the construction of a diversion dam" at Elephant Butte. *Id.* On October 26, investigators began borings at the proposed dam site. *Id.* The initial assessment was that a dam should be built to a height of 170 feet forming a reservoir nearly 40 miles in length. *Id.* at 378. Reclamation further reported that:

The reservoir [at Elephant Butte] has a much larger capacity than any other on the river, and is ample to store the floods of wet years and to hold them to reinforce the supply in times of extreme drought. It is the only proposed reservoir with a capacity large enough to utilize the entire flow of the drainage basin. It is situated sufficiently low in the basin to intercept, practically, all of the waters, and yet sufficiently high to command enough land to consume all the available water supply.

SECOND ANNUAL REPORT, at 379. Reclamation's Third Annual Report to Congress included a discussion comparing the Elephant Butte site (at the time known as the Engle Dam site) to other potential sites. U.S. GEOLOGICAL SURVEY, THIRD ANNUAL REPORT OF THE RECLAMATION SERVICE 1903-04, H.R. DOC. NO. 58-28, at 395-420 (3d Sess. 1905) (hereinafter "THIRD ANNUAL REPORT"). Exh. 6. In this Report, Reclamation concluded that:

It therefore appears that the best solution . . . is the construction of one big reservoir of great depth, with a capacity to store all the water and equalize the irregular flow over a number of years, . . . So far as known, the only site for such a dam and reservoir on the river is the site selected by the reclamation engineers below Elephant Butte near Engle, New Mexico.

Id. at 420. This position was reiterated in reports to the Twelfth National Irrigation Congress in 1904, where Reclamation explained its analysis and reasoning for building a dam and reservoir at the Elephant Butte site. NATIONAL IRRIGATION CONGRESS, OFFICIAL PROCEEDINGS OF THE 12TH NATIONAL IRRIGATION CONGRESS 213 (Guy E. Mitchell ed., 1905). Exh. 8. Based on this

discussion, the Irrigation Congress passed a unanimous resolution during its November 15-18, 1904 meeting, supporting Reclamation's plans at that site:

[W]e heartily endorse and approve the proposal of building the Elephant Butte dam as a happy solution of a vexed question that has embarrassed the parties interested, providing that an equitable distribution of the waters of the Rio Grande with due regard to the rights of New Mexico, Texas, and Mexico.

Id. at 107. On February 25, 1905, Congress passed the Rio Grande Reclamation Project Act extending the Reclamation Act of 1902 to those portions of Texas that can be irrigated by "a reservoir near Engle, N.M.," and directing the Secretary to proceed with construction of the dam "as part of a general system of irrigation" once the cost feasibility and return of the federal outlay of monies to the reclamation fund was assured. Pub. L. No. 58-104, ch. 98, 33 Stat. 814. The Chief Engineer of the Reclamation Service, F.H. Newell, testifying at hearings on the 1905 Project Act, explained to a Committee of the House of Representatives:

It is possible to build at that [Engle] site a large reservoir holding the entire flood flow of the river. By constructing this reservoir under the terms of the reclamation service act of June 17, 1902, it will be possible to store all the flood waters in the Rio Grande, discharge them back into the river as needed, and divert them in the Mesilla Valley and upon the irrigated lands above and below El Paso, on both sides of the river.

H.R. 17939; Committee on Foreign Affairs, January 24, 1905, at 6. Exh. 9.

After Congress' authorization of the extension of the 1902 Act to Texas for purposes of the Rio Grande Project, the New Mexico Territorial Legislature enacted in March 1905 a territorial law specifically establishing notice requirements for the appropriation of water by the United States. 1905 N.M. Laws, Ch. 102, § 22. Two years later, in 1907, the New Mexico Territorial Legislature adopted a more expansive law on prior appropriation that repealed the 1905 law. 1907 N.M. Laws Ch. 49. The United

States complied with both of these laws by providing notice to the territorial engineer in 1906, and again in 1908 describing a dam and reservoir capable of holding 2,000,000 acre-feet of water.⁴ Exhs. 12 and 13.

Conflicts over the fair market value of land being acquired delayed construction until 1910.⁵ Meanwhile, new surveys in 1907 at the Elephant Butte site revealed the feasibility of a higher dam to store even more water, approximately 2.6 million acre-feet (maf). *See Project Histories of the Rio Grande Project, From Inception to December 31, 1912*, at 12. Near the time of completion in 1916, active storage capacity was estimated to be 2,642,292 acre-feet. Construction began on a second major storage dam in 1936, the Caballo Dam and Reservoir. It was completed in 1938 and has a storage capacity of approximately 344,000 acre feet. *See Project Histories of the Rio Grande Project, From Inception to December 31, 1912*, at 7-17; and *Project Histories of the Rio Grande Project, Project History, Calendar Year 1915*, at 137-45. (Southwest Micropublishing, Inc.) (1992). Exh. 10.

⁴ Reclamation's Third Annual Report to Congress, covering years 1903-1904, gives detailed specifications for the dam as projected by Reclamation's surveys including notes that "[t]he reservoir will be about 40 miles in length, and will have a storage capacity of 2,000,000 acre-feet to the level of spillway. It will furnish about 600,000 acre-feet per annum for irrigation, and will irrigate 180,000 acres of land.

⁵ A dispute with the Armandaris Spanish Land Grant then owned by Victorio Land & Cattle Co. lead to a stop work order for Elephant Butte Dam except for survey work effective May 1st, 1909 until condemnation proceedings granted title to the United States. However, during the legal hiatus at the Elephant Butte site, construction work on the Leasburg division as well as other features of the Project went on. *See Project Histories of the Rio Grande Project, From Inception to December 31, 1912*, at 7-17; *see also*, http://www.caminorealheritage.org/PH/0509_armendaris.pdf.

In 1938, New Mexico signed the Rio Grande Compact ("Compact") with Colorado and Texas "for the purpose of effecting an equitable apportionment" of the Rio Grande River above Fort Quitman, Texas. *Rio Grande Compact*, 53 Stat. 785-792 (1939), at Preamble. Under Article IV of the Compact, New Mexico obligated itself to deliver specified quantities of Rio Grande water at San Marcial, just upstream from Elephant Butte Reservoir. The Compact recognized and incorporated the Rio Grande Project into the equitable apportionment of the Rio Grande, in part by expressly recognizing "project storage" as the combined capacity of Elephant Butte Reservoir and all reservoirs below Elephant Butte Reservoir "and above the first diversion to lands in the Rio Grande project" for not more than 2,638, 860 acre feet. *Id.* at Art. I(k). The Compact further recognized, as "Usable water," "all water, exclusive of credit water, which is in project storage and which is available for release in accordance with irrigation demands, including deliveries to Mexico." *Id.* at Art. I(l).⁶ Usable water, released from Project storage, is delivered under Reclamation contracts to the Elephant Butte Irrigation District in New Mexico and the El Paso County Water Improvement District No. 1 in Texas, as well as to Mexico pursuant to a Treaty with the United States.⁷

⁶ Actual Release is defined as the amount of usable water released in any calendar year from the lowest reservoir comprising project storage.

⁷ See Convention Providing for the Equitable Distribution of the Waters of the Rio Grande for Irrigation Purposes, U.S.-Mex., signed, May 21, 1906, 34 Stat. 2953 (entered into force Jan. 16, 1907).

III. Argument.

C. Priority Date.

1. The Doctrine of Relation in the State of New Mexico.

New Mexico law follows the doctrine of prior appropriation. See *United States v. Rio Grande Dam & Irr. Co.*, 51 P. 674, 679 (1898); *Albuquerque Land & Irrigation Co. v. Gutierrez*, 61 P. 357, 361 (N.M. 1900). In applying the doctrine of prior appropriation, the Supreme Court of New Mexico has recognized that the priority of a right to appropriate may relate back to the time when there is both a bona fide intent to appropriate and a "first step" evincing that intent, known as the doctrine of relation. See *State ex rel. Reynolds v. Mendenhall*, 362 P.2d 998, 1001-02 (N.M. 1961); *Hagerman Irr. Co. v. McMurry*, 113 P. 823, 825 (N.M. 1911) ("If the application to beneficial use is made in proper time, it relates back and completes the appropriation as of the time when it was initiated."); *Rio Puerco Irr. Co. v. Jastro*, 141 P. 874, 875 (N.M. 1914) ("The doctrine of relation has been universally applied by the courts, in arid states, in the appropriation of water. Where notice is required by statute of the intention to appropriate, the right relates back to the time such notice is given, in the authorized manner; in the absence of a statute, requiring notice, or other act, the right relates back to the time when the first step was taken.") (emphasis added); *Farmers' Dev. Co. v. Rayado Land & Irr. Co.*, 213 P. 202, 204 (N.M. 1923) (finding that the right "relate[s] back to the initiation of the claim upon the diligent prosecution to completion of necessary surveys and construction for the application of the water to a beneficial use; and there is substantial evidence to support the fact that such a claim was initiated."); See also *Harkey v. Smith*, 247 P. 550 (N.M. 1926); *Carlsbad Irr. Dist. v.*

Ford, 128 P.2d 1047 (N.M. 1942); *State ex rel. State Eng'r v. Crider*, 431 P.2d 45, 48-49 (N.M. 1967); *State ex rel. Reynolds v. Rio Rancho Estates*, 624 P.2d 502, 505 (N.M. 1981).

In New Mexico the doctrine of relation is applied differently depending upon whether the date claimed is prior to the enactment of statutes establishing written notice requirements. In the absence of a statute, the right relates back to the time when the first step was taken; after the enactment of an applicable statute, the right relates back to the time when notice is provided in the manner required by statute. *Rio Puerco Irr. Co.*, 141 P. at 876. ("Where notice is required by statute of the intention to appropriate, the right relates back to the time such notice is given, in the authorized manner; in the absence of a statute, requiring notice, or other act, the right relates back to the time when the first step was taken.")

New Mexico's Irrigation Act of 1907, 1907 N.M. Laws, § 2, c. 49, is the first statutory expression for the doctrine of relation in the State. In this Act, New Mexico codified its appropriation requirements to require a written application to the territorial engineer providing notice of intent to appropriate.

All claims for the use of water initiated after the passage of this act shall relate back to the date of receipt of an application therefore in the office of the territorial engineer, subject to compliance with the provisions of this act....

Id. While prospective in application, the Irrigation Act of 1907 explicitly made the doctrine of relation applicable to those claims initiated before the Act's effective date. Specifically, the Act provides that, "[i]n all cases of claims to the use of water initiated prior to the passage of this act, the right shall relate back to the initiation of the claim."

Id. For purposes of applying the doctrine of relation in New Mexico, the Irrigation Act of 1907 draws a bright line. For claims initiated after enactment, an application with the

Territorial Engineer is the exclusive means of providing notice of the intent to appropriate. For all claims initiated before enactment, however, the common law doctrine of relation applies. In construing the 1907 Act, the New Mexico Supreme Court stated that, "[i]f a claim to water was actually initiated by the appellee prior to March 19, 1907, then the right would relate back to the initiation of the claim upon the diligent prosecution to completion" of the right. *Farmers*, 213 P. at 206. The *Farmers* court went on to explain what it means to initiate a right under New Mexico law:

The mere intention to appropriate water for the irrigation of land, of course, is not sufficient to initiate a right under the general law. There must be an act which the courts have termed "the first step," as an inception of the right to be followed with the exercise of diligence in construction and the application of the water to a beneficial use. These conditions precedent, being performed, the right relates back to the time when the first step was taken.

Id. at 369.

In establishing the "first step" as the test, the *Farmers* court built upon the plain language in the Irrigation Act of 1907, which provides that the "right shall relate back to the initiation of the claim, upon diligent prosecution to completion of the necessary surveys and construction for the application of the water to a beneficial use." 1907 N.M. Laws, § 2, c. 49. *Farmers* further held that the "'first step' may be work in excavating ditches, necessary surveying, or any substantial act necessary to, and giving notice of, the building of the contemplated system for the irrigation of lands." 213 P. at 209; *See also* 2 KINNEY ON IRRIGATION § 747 (2d ed. 1915) (approvingly cited in *Farmers*) ("[T]he right relates back to the first substantial act of the appropriator, for the acquisition of the right, whether that act be the actual commencement of construction of the works necessary, or

whether it be the survey necessary prior to the beginning of the construction work proper.”).

Written notice of an intent to appropriate is not required for claims initiated before the Irrigation Act of 1907. In an opinion predating the Irrigation Act of 1907, the New Mexico Supreme Court opined that the “laws of this territory do not require a written notice of intent” and that “the failure to post such notice would not be fatal.” *Millheiser v. Long*, 61 P. 111, 114 (N.M. 1900). *Millheiser* does acknowledge, however, that there must be a bona fide intent to appropriate and that such intent must be gathered from some source, in justice to junior appropriators. *Id.*

Thus, based on the above case law, for those claims that pre-date statutory notice requirements, the critical test is identifying the date when there was both a bona fide intent to appropriate and a “first step” towards the appropriation of the right.

2. Under the Doctrine of Relation as applied by the New Mexico courts, the United States is entitled to a priority date of March 1, 1903.

The United States took the “first step” required by New Mexico law when it placed a survey team on the ground from March through October of 1903 and undertook a series of investigations necessary to construct a dam. *See e.g., Farmers*, 213 P. 202; *see also* 1907 N.M. Laws, § 2, c. 49 (describing a survey as sufficient to establish relation for claims initiated before enactment). As part of the survey, Reclamation conducted a topographic survey of the river and valley and by fall of the same year borings were begun at the proposed dam site to determine the depth and character of bedrock. These borings were continued through the winter and showed bedrock of sandstone at varying depths from fifty to sixty-five feet below the surface. *See U.S.*

BUREAU OF RECLAMATION, PROJECT HISTORIES OF THE RIO GRANDE PROJECT, 1912-1988 at 5.

Exh. 10. This survey was the first step in the process that led to actual construction and operation of the Project. Such action constitutes "the survey necessary prior to beginning the construction work proper." See 2 KINNEY ON IRRIGATION § 747.

The surveys and investigations at the Elephant Butte site confirmed that the physical and natural conditions made this site far superior to any other on the river as the site for the storage of water for irrigation of the Mesilla and El Paso Valleys. *Id.* This work which began in 1903 specifically meets the standards for relation back.⁸ Reclamation's extensive surveying and the

⁸ Reclamation's Third Annual Report to Congress, at 421-22, covering years 1903-1904, gives detailed specifications for the dam as projected by Reclamation's surveys including:

The [Elephant Butte Dam] . . . will be arched upstream on a 6 degree curve, the upstream edge of the crest having a radius of 955 feet. The dimensions are as follows:

- Height from bed-rock foundation to top of parapet walls on crest, 255 feet.
- Height from river bed (sand) to top of parapet walls on crest, 190 feet.
- Thickness at bottom, 180 feet.
- Thickness at crest from outside to outside of parapet walls, 20 feet.
- Length of crest, 1,150 feet. Length of dam at river level, 400 feet.
- From upstream edge parapet wall of crest a triangle section gives upstream batter 1 inch to the foot; downstream batter, 7 ½ inches to the foot.
- Downstream edge of crest 3 feet 6 inches vertical and curved to meet the downstream batter with a 100 foot radius.
- Roadway 5 feet below crest between parapet walls on each side and 14 feet wide.
- Height of spillway, 10 feet below roadway of crest and 15 feet below top of parapet wall.
- Depth of river bed to spillway, 175 feet.
- Strains calculated for possible high water at crest 255 feet above foundation, with weight of masonry 141 pounds per cubic foot, or a specific gravity of 2.25.
- Spillway to be at a gap on west side of valley several miles above the dam. This spillway will be 175 feet above the level of the present river bed at dam site, and will have a length of 800 feet.

initiation of boring work to characterize bedrock depth constitute the exact "first steps" contemplated under *Farmers*.

Along with a first step, an appropriator under the New Mexico doctrine of relation must also demonstrate a bona fide intention to appropriate and this intent must be known to the public. *Millheiser v. Long*, 61 P. 111, 114 (N.M. 1900). The government's intent to appropriate was demonstrated by the extensive federal activities in the Rio Grande basin beginning no later than 1890, and notice to all potential claimants of the United States' intent was effective, at the very latest, when the Secretary of the Interior issued the embargo order. The Embargo of December 5, 1896, suspending "all applications for right of way through public lands for the purpose of irrigation by using the waters of the Rio Grande River or any of its tributaries in the State of Colorado or in the Territory of New Mexico" effectively precluded any individual or company from filing applications with the General Land Office for rights of way on public lands for potential irrigation purposes. See H.R. DOC. 63-39, at 3 (1911) (Waters of the Rio Grande and its Tributaries: Letter from the Secretary of the Interior); DOUGLAS R. LITTLEFIELD, CONFLICT ON THE RIO GRANDE 186 (2008). Exh. 11.

Under New Mexico case law, the purpose of providing notice is in part to protect junior appropriators. *Millheiser*, 61 P. at 114. Suspension of the issuance of rights of way by the General Land Office provided clear notice to potential junior appropriators regarding the United

-The reservoir will be about 40 miles in length, and will have a storage capacity of 2,000,000 acre-feet to the level of spillway. It will furnish about 600,000 acre-feet per annum for irrigation, and will irrigate 180,000 acres of land.

Exhibit 6.

States' intention to use the waters of the Rio Grande for the Project. For several years after the date of the Embargo, the Department of the Interior refused to grant rights of way for reservoirs or canals on headwaters of the Rio Grande in the San Luis Valley in Colorado. H.R. DOC. 63-39, at 5. The Embargo thus supports the United States' claim that all potential appropriators had notice regarding the federal claim.

This very issue plays into the second reason the Embargo is critical to establishing the United States' priority date for the Rio Grande Project. In 1907, following increased pressure from those in the San Luis Valley wishing to develop rights, the Embargo was amended to reflect:

the general policy that until the development of irrigation on the upper Rio Grande, in the State of Colorado and the Territory of New Mexico, shall furnish sufficient data to determine the effect of the storage and diversion of water in that vicinity upon the water supply for the Engle Reservoir of the Rio Grande project, no further rights of way be approved which involve the storage or diversions of the waters of the upper Rio Grande and its tributaries, except applications of two kinds: First, those in connection with which there is a showing that the rights of the parties were initiated prior to the beginning of active operations by the Reclamation Service for the Rio Grande project, namely, March 1, 1903; second applications which involve the diversions or storage of not exceeding 1,000 acre-feet of water per annum.

Id. at 6-7 (emphasis added). This provided an opportunity for individuals in Colorado and New Mexico to "prove up" claims which had been initiated prior to March 1, 1903--the date in which active operations of the Reclamation Service commenced at Elephant Butte. Only those who could establish that their rights were initiated before March 1, 1903 could obtain rights of way in the upper Rio Grande. This policy provides further support for the conclusion that, no later than 1907, it was understood and recognized by Congress that the priority date for the Rio Grande Project was March 1, 1903.

3. Subsequent actions show that Reclamation followed the 1903 Survey with diligent effort through the completion of storage and the actual use of the water.

Having selected a dam site and conducted the necessary topographic survey work for the scope of irrigable Project area, Reclamation presented its plan to the Twelfth Annual Irrigation Congress in 1904.⁹ At the Twelfth Congress, B.M. Hall, Supervising Engineer for the United States Reclamation Service presented Reclamation's plan for the Elephant Butte dam near Engle, New Mexico. Hall discussed the proposal of "a dam that will form a reservoir 175 feet deep at its lower end and 40 miles long, with a storage capacity of two million acre feet, that will impound enough water to furnish 600,000 acre feet per annum, and irrigate one hundred and eighty thousand acres of land, distributed as follows:

110,000 acres in New Mexico.
20,000 acres in Texas above El Paso.
50,000 acres in El Paso Valley below El Paso.

OFFICIAL PROCEEDINGS OF THE 12TH NATIONAL IRRIGATION CONGRESS 215. Exh. 8. The plan was well received and culminated in the adoption of a unanimous resolution signed by five New Mexico representatives, five Texas representatives and five representative from Mexico. The resolution read: "That we heartily approve the valuable work of the Reclamation Service under the Department of the Interior of Washington, whose officers of the Rio Grande have been in New Mexico and elsewhere, and we heartily endorse and approve the proposal of building the Elephant Butte dam...." *Id.* at 107. After the unanimous resolution passed by representatives at the Twelfth Irrigation Congress, the United States Congress authorized the extension of the

⁹Beginning in 1891 and ending in 1916, the Irrigation Congress held annual meetings, usually in the Western United States. By 1916 the organization had changed its name to International Irrigation Congress. It was comprised of representatives from most of the 48 states and covered a range of topics centering broadly on irrigation.

Reclamation Act of 1902 to Texas, which was not originally a Reclamation state. Rio Grande Reclamation Project on February 25, 1905. Pub. L. No. 58-104, ch. 98, 33 Stat. 814.

Then, on March 16, 1905, the Territory of New Mexico enacted "An Act Creating the Office of the Territorial Irrigation Engineer, to Promote Irrigation Development and Conserve the Waters of New Mexico for the Irrigation of Lands and for other purposes." The act reads as follows:

Whenever the proper officers of the United States authorized by law to construct irrigations works, shall notify the territorial engineer that the United States intends to utilize certain specified waters, the waters so described, and unappropriated at the date of such notice, shall not be subject to further appropriations under the laws of New Mexico and no adverse claims to the use of such waters, initiation subsequent to the date of such notice, shall be recognized under the laws of the territory, except as to such amount of the water described in such notice as may be formally re-leases in writing by an officer of the United States thereunto duly authorized.

1905 N.M. Laws, Ch. 102, § 22. This was the first requirement of its kind promulgated by the Territory of New Mexico and specific to the United States. The United States dutifully complied by letter from B.M. Hall, the Supervising Engineer, dated January 23, 1906. The letter specifically sets forth:

In pursuance of the above statute of the Territory you are hereby notified that the United States intends to utilize the following described waters, to-wit:

A volume of water equivalent to 730,000 acre-feet per year requiring a maximum diversion or storage of 2,000,000 miner's inches said water to be diverted or stored from the Rio Grande River at a point described as follows:

Storage dam about 9 miles west of Engle, New Mexico, with capacity for 2,000,000 acre-feet, and diversion dams below in Palomas, Rincon, Mesilla, and El Paso Valleys in New Mexico and Texas.

It is, therefore, requested that the waters above described be withheld from further appropriation and that the rights and interests of the United States

in the premises be otherwise protected as contemplated by the statute above cited.

Exh. 12. In other words, the storage dam referenced in the United States's 1906 notice was for the same dam that the Reclamation Service initiated work on in 1903.

In 1907, the New Mexico Territorial Legislature passed another statute similar to the one enacted in 1905. 1907 N.M. Laws, § 2, c. 49. To remain in compliance, Louis C. Hill, the Supervising Engineer at that time, again made the requisite filing required of the United States by letter dated April, 1908. That letter begins by stating: "Claiming and reserving all rights under our former notice of January 23, 1906, addressed to David L. White, Territorial Irrigation Engineer of New Mexico..." and continues with the following:

In pursuance of the above statute of the Territory you are hereby notified that the United States intends to utilize the following described waters, to-wit:
All the unappropriated water of the Rio Grande and its tributaries, said water to be diverted or stored from the Rio Grande River at a point described as follows:
Storage dam about 9 miles west of Engle, New Mexico, with capacity for 2,000,000 acre-feet, and diversion dams below in Palomas, Rincon, Mesilla, and El Paso Valleys in New Mexico and Texas.

It is therefore requested that the waters above described be withheld from further appropriation and that the rights and interests of the United States in the premises be otherwise protected as contemplated by the statute above cited.

Exh. 13. Again, the storage dam referenced in this notice was the same dam for which the Reclamation Service commenced work in 1903.

These notices reflect the federal government's diligence in creating the Project and appropriating water, but do not themselves establish the priority date for the Project. As previously discussed, if the intent to appropriate water was initiated prior to any statutory notice requirement (whether the 1905 and 1907 Acts specific to the United States or the Irrigation Act

of 1907 applicable to all appropriators), “then the right would relate back to the initiation of the claim upon the diligent prosecution to completion” of the right. *Farmers*, 213 P. at 205-6. The notices, therefore, were merely further steps in the diligent prosecution, begun no later than March 1, 1903, to completion of the Project.

In 1911, Reclamation commenced construction of the Elephant Butte site and began filling the reservoir in 1915, completing the construction in 1916. The above shows that from commencement of the 1903 survey through construction, Reclamation diligently took the steps necessary to put the water to use up through actually impounding and using the waters of the Rio Grande. Whether it be through further refinement of the studies, working with the Irrigation Congress in 1904, receiving an authorization from Congress for Texas participation in the Reclamation project in 1905, providing notice in accordance with New Mexico territorial law in 1906 and 1908, or active construction in 1910-1916, there was a continuous course of conduct during which Reclamation was studying, analyzing, and perfecting its appropriation of water at Elephant Butte for the Project.

B. Quantity.

In New Mexico, “beneficial use shall be the basis, the measure and the limit of the right to the use of water.” N.M.Const. art. XVI § 3; 72-1-2 NMSA (1978). Beneficial use in this state includes avoidance of waste and “[m]aximum utilization [] is a fundamental requirement which prevents waste of water.” *Jicarilla Apache Tribe v. United States*, 657 F.2d 1126, 1133 -1134 (10th Cir. 1981) (citing *Kaiser Steel v. W. S. Ranch Co.*, 81 N.M. 414, 467 P.2d 986 (1970)); .

In quantifying the Project right under state law, therefore, the amount of water appropriated is that amount that can be fully and beneficially utilized. This concept of beneficial

use is also expressed in the authorizing statute for the Rio Grande Project, the Reclamation Act of 1902. The provision in the Reclamation Act, Pub. L. No. 57-191, Chap. 1093, 32 Stat. 388, codified at 43 U.S.C.A. § 372, requires that "[t]he right to the use of water acquired under the provisions of the reclamation law shall be appurtenant to the land irrigated, and beneficial use shall be the basis, the measure, and the limit of the right." This quantity is further defined under federal law through Reclamation contract. To divert or receive project water a contract with the United States is required. *Strawberry Water Users Ass'n v. United States*, 576 F.3d 1133, 1148 (10th Cir. 2009).

The New Mexico Supreme Court, reviewing the U.S. Supreme Court's decision in *Ivanhoe Irrigation District v. McCracken*, 357 U.S. 275 (1958), acknowledged that "the rights and duties of the United States under Reclamation contracts are matters of federal law . . . and that Section 8 [of the 1902 Reclamation Act], providing that state laws shall govern, merely requires the United States to comply with state law when, in the construction and operation of the Reclamation Project, it becomes necessary for it to acquire water rights." *Holguin v. Elephant Butte Irr. Dist.*, 575 P.2d 88, 95 - 96 (N.M. 1977). Accordingly, State law beneficial use and federal law contracts define the rights and duties of the United States under this Project and the amount of water to which Reclamation is entitled. Further, the State of New Mexico, in signing the Rio Grande Compact in 1938, recognized that the storage and delivery of water by the Rio Grande Project was an essential element of the equitable apportionment agreed to in the Compact and obligated itself to deliver water to the Project that the Project would store, release, and deliver to Reclamation's contractors in New Mexico and Texas and by treaty to Mexico. See *Hinderlider v. La Plata River & Cherry Ditch Co.*, 304 U.S. 92 (1938) (holding that an equitable

apportionment of interstate waters by Congress or the Supreme Court may not be defeated by state law claims); *Banco Nacional de Cuba v. Sabbatino*, 376 U.S. 398, 427 (1964) (“[*Hinderlider*] implies that no State can undermine the federal interest in equitably apportioned interstate waters....”).

When the Tenth Circuit Court of Appeals examined the Project during the severe drought in the early 1950s, it specifically noted the Project right to storage of water for delivery to Mexico pursuant to treaty and to irrigate lands in New Mexico and Texas pursuant to Reclamation contract:

The dam and reservoir is an integral part of the reclamation project [and]. . . [t]he purpose of the project which could be accomplished only by the storage of water of the Rio Grande River, was to supply water to fulfill the obligations of a treaty entered into with the Republic of Mexico, . . . and to irrigate approximately 200,000 acres of arid land in New Mexico and Texas.

New Mexico v. Backer, 199 F.2d 426, 427 (10th Cir. 1952). The contracts with the irrigation districts, the Court opined, “required delivery of the water as specified in the contracts.” *Id.* The court further noted that the quantity of water appropriated by the Secretary of the Interior to meet the irrigation contracts requirements and delivery obligations to Mexico is “all the unappropriated waters in the Rio Grande River [sic].” *Id.*

All the unappropriated waters in the Rio Grande appropriated by the Interior Secretary for Project purposes may be described with two components. One, a right to store a certain amount of water. Two, a right to release and then divert a certain amount of water for Project or other congressionally-authorized purposes, including the right to recapture return flows. The United States addresses each of these elements below.

1. Quantity of water for storage.

As discussed above, and as recognized by the Tenth Circuit Court of Appeals, the intent of the Project was to utilize all the unappropriated water of the Rio Grande, store it, release it, recapture it downstream, and divert it to meet irrigation demands below Elephant Butte Reservoir in New Mexico and in Texas, and to make delivery to Mexico. *See* SECOND ANNUAL REPORT, at 379 (“The reservoir . . . is ample to store the floods of wet years and to hold them to reinforce the supply in times of extreme drought. . . . It is situated sufficiently low in the basin to intercept, practically, all of the waters, and yet sufficiently high to command enough land to consume all the available water supply”); THIRD ANNUAL REPORT AT 420 (recognizing the “best solution . . . is the construction of one big reservoir of great depth, with a capacity to store all the water and equalize the irregular flow over a number of years, . . .”); H.R. 17939, at 6 (“It is possible to build at that [Engle] site a large reservoir holding the entire flood flow of the river. . . . to store all the flood waters in the Rio Grande, discharge them back into the river as needed, and divert them in the Mesilla Valley and upon the irrigated lands above and below El Paso, on both sides of the river.”)

The means to store all the waters of the Rio Grande was limited only by the size of a dam and reservoir built to contain the highly variable flood flows of the river. The initial surveys for construction of a large dam at Elephant Butte calculated a storage volume of 2,000,000 acre-feet. By 1907, however, surveyors went to the field at the reservoir site to “extend the topographic surveys with the view to planning for a higher dam.” *See* Project Histories of the Rio Grande Project, From Inception to December 31, 1912, at 12. This dam would be capable of holding approximately 2.6 million acre-feet in storage. *Id.* at 7, 12-17. Having already informed the

Territorial Engineer in the April 1908 letter that "the United States intends to utilize. . . . All the unappropriated water of the Rio Grande and its tributaries," no further notice was necessary. Through diligent efforts of the Reclamation Service, the United States completed the Elephant Butte Dam and Reservoir in 1916 with a capacity of 2,600,000 acre-feet. The United States added additional storage capacity in 1938 with the completion of Caballo Dam and Reservoir. The capacity of Caballo reservoir is 343,990 acre-feet. The storage capacity of the Project dams and reservoirs relates back to the manifest intent to build the large irrigation project in 1903 and utilize all the unappropriated water of the Rio Grande.

After years of operations, it was possible to further define the amount of storage necessary for the Rio Grande Project. When the State approved the Rio Grande Compact in 1938, it acknowledged that Project Storage is the "combined capacity of Elephant Butte Reservoir [and Caballo reservoirs] , . . . but not more than 2,638,860 acre-feet." Compact, art. I(k). More recently, the State of New Mexico, ex rel. Office of the State Engineer (OSE) produced a Subfile Offer of Judgment (Offer) on August 26, 2011 that recognizes a water right for the Rio Grande Project in the name of the United States. The Offer contains a paragraph "Amount of Water," at para. F., that declares a "maximum amount of water available for storage in Elephant Butte Reservoir and all other reservoirs below Elephant Butte and above the first diversion to lands of the Rio Grande Project shall not exceed 2,638,860 acre-feet with the right to continuously fill and refill." This is an acceptable description of the quantity of water for Project storage and should be incorporated into a final decree.

2. Quantity of water diverted.

The State's Offer also recognizes a Project right to "divert at river diversion dams," but does not quantify the amount of water necessary for diversion. Offer at para. F.1. It is well established in New Mexico that a right to store water includes a right to divert the water released from storage at headgates downstream. *See Hagerman Irr. Co. v. McMurry*, 113 P. 823, 823 (N.M.Terr. 1911) (recognizing the right of an irrigation company that impounded a natural stream to "distribute it to those who may require it for purposes of irrigation, whether it has land connected with such irrigation system or not.") Moreover, the State has enacted special laws and provisions to ensure the viable and continued use of water for federal irrigation projects. It has declared that nothing in the State Water Code "shall be construed as applying to or in any way affecting any federal reclamation project heretofore or hereafter constructed pursuant to the act of congress approved June 17, 1902, known as the Federal Reclamation Act." § 72-9-4 NMSA 1978 (Federal reclamation projects unaffected). In construing this provision, the New Mexico Supreme Court ruled that "The legislature's distinction between federal reclamation projects and other areas of water use in this state is not at all unreasonable or arbitrary. It recognizes the federal interest in projects intended to conserve or preserve water availability." *City of Raton v. Vermejo Conservancy Dist.*, 678 P.2d 1170, 1174-75 (N.M. 1984). .

Taken together, New Mexico laws and the cases interpreting those laws hold that the Rio Grande Project's water right, once established, is protected from diminution by operation of law. Put another way, the Project is entitled to the maximum utilization of Project water measured by the amount of water that has historically been diverted at river diversion dams. Diversions at dam headgates, of course, are not limited to just that quantity of water released from storage and

carried down the main stem of the Rio Grande. Water released and diverted upstream is used for irrigation and a substantial amount of the water used in irrigation returns to the river for re-use by downstream Project irrigators. *See Ide v. United States*, 263 U.S. 497, 508 (1924) (return flows in the Shoshone Project were not subject to appropriation because the United States had the right to reuse the return flows).

The re-use of water in the form of return flows is an important component of the Project right and necessary to ensure deliveries to Districts and to Mexico. As this Court has determined, "The parties do not appear to dispute that reuse of Project water is an inherent component of the Project operation . . . *See Order Granting the State's Motion to Dismiss the United States' Claims to Groundwater and Denying the United States' Motion for Summary Judgment* (hereinafter the "August 16 Order"), dated August 16, 2012, at 6.

In addition to return flows, another source of water for the Project is water tributary to the river. *See Cortez Affidavit*, attached as Exh. 14, para. 20. During the period in which the United States was constructing the Project, the Reclamation Service purchased existing downstream ditches and conveyance structures. The Project is entitled to a water right to divert the natural flow, including tributary inflows, at these ditches and diversion structures that are now incorporated into the Project. *See State ex rel. Reynolds v. Allman*, 427 P.2d 886, 889 (N.M. 1967) (where rights of a canal company which were incorporated into the 25,000 acre Bureau of Reclamation project carried a priority date relating back to the commencement of the ditch whereby water was diverted from the Pecos River and the beneficial use was accomplished.)

While the priority dates for the natural flow rights that were obtained are generally earlier than March 1, 1903, the United States operates the Project as a unified whole with water from

Elephant Butte Reservoir supplementing natural flows to the ditches, and the ditches not curtailing storage at Elephant Butte. Splitting the priority dates would not be of assistance in operating the Project. Therefore the priority date claimed for the direct flow water rights at the diversion dams is March 1, 1903.

The amount of water the Project may divert at river headgates within New Mexico from the Rio Grande under the United States' direct flow rights, water released from storage, and water used and returning to the river is defined by the maximum flow rate that has historically been diverted at the diversion dams in the Project in New Mexico. Based on Bureau of Reclamation Records, those flows are:

<u>Canal</u>	<u>Diversion Rates</u>	<u>Diversion Dam</u>
Arrey	414 cfs	Percha Dam (8-12-1930)
Leasburg	837 cfs	Leasburg Dam (6-28-1924)
Eastside	347 cfs	Mesilla Dam (4-14-1948)
Westside	784 cfs	Mesilla Dam (8-11-1948)
Del Rio	60 cfs	Mesilla Dam (4-22-1989)
California Ext.	25 cfs	Mesilla Dam (daily diversion data not available)

Cortez Affidavit, attached as Exh.14 , at paras. 16-18.

Flow rates notwithstanding, the Project water right is limited by the volume historically diverted and placed to beneficial use. Bureau of Reclamation records show that the maximum annual volume diverted at the Project diversion dams in New Mexico within the Rincon and Mesilla Valleys was 853,048 acre-feet.¹⁰ The United States is entitled to a decree for these flow and volume amounts.

¹⁰ See year 1924, Table 1 of the Cortez Affidavit.

However, a decree for storage and diversion at Rio Grande headgates within New Mexico is not the full extent of the Project water right. As discussed in the background section, above, New Mexico has an obligation to provide usable water "for release [from Project storage] in accordance with irrigation demands, including deliveries to Mexico." Compact, art. I(l). This irrigation demand includes deliveries to Project headgates in Texas. Pursuant to Reclamation law and federal contracts, the water stored behind Elephant Butte dam, released and diverted downstream provides irrigation service to 155,000 acres of land comprising the Elephant Butte Irrigation District (EBID) in New Mexico (88,000 acres) and El Paso County Water Improvement District No. 1 (EPCWID) in Texas (67,000 acres). *See Cortez Affidavit*, attached as Exh.14, at para. 7; *see also City of El Paso v. Reynolds*, 563 F. Supp. 379, 383 (D. N.M. 1983); *New Mexico v. Backer*, 199 F.2d at 427. Overall, the Project, which is protected by the Rio Grande Compact, and thus made a part of New Mexico law, allocates 43% (67,000/155,000) of the annual diversion allocation to Texas, and another 60,000 acre-feet to Mexico. The portion of the Project water deliverable to Mexico and to the EPCWID must be decreed as part of the Project water right.

Just as in New Mexico, the 43% diversion allocation to Texas, including EPCWID are a combination of all waters diverted at the Project headgates, including return flows and tributary inflows. This Court has recognized that the Project delivers an annual average of 930,000 acre feet from an annual release of roughly 790,000 acre feet of water stored in Project reservoirs, with these deliveries allocated according to contract and treaty among EBID in New Mexico,

EPCWID1 in Texas, and Mexico.¹¹ See August 16 Order, at 6. A decree in this matter must adjudicate to the Project sufficient water to meet the Project obligation to divert and deliver downstream to Project diversion structures in Texas and Mexico in their respective proportions.

The Texas facility of the Project was decreed a water right in 2007 as an amount of up to 376,000 acre-feet per year. See attached Final Judgment and Decree, No. 2006-3219, 327th Judicial District, District Court of El Paso County, Texas. Exh. 15. New Mexico should give full faith and credit to the Texas judicial decision and decree.

Accordingly, the quantity of water diverted for the Project should, in addition to the amounts specific for diversion at Project headgates in New Mexico, include:

The right to deliver to Project diversion dams in Texas an amount of water equal to an annual diversion allocation as determined by the Secretary of the Interior consistent with federal law and contract, and as recognized by the Texas District Court decree of Project water rights, Civ. No. 2006-3219, up to a diversion amount of 376,000 acre-feet per annum, plus delivery to Mexico.

V. Conclusion

The United States Rio Grande Project is entitled to a right to impound and store the surface waters of the Rio Grande. The surface waters are stored behind Elephant Butte Dam on the Rio Grande in Sierra and Socorro Counties, and Caballo Dam on the Rio Grande in Sierra County, New Mexico. The amount of surface water the United States is entitled to store is

¹¹ The reference to 790,000 acre-feet in the Court's Order should actually be 763,842 acre feet. As the United States explained in our Motion for Summary Judgment, "[f]rom 1950 to 1972, a release of 763,842 acre-feet of water from Project storage resulted in an average delivery of Project water to EBID, EPCWID and Mexico of 931,841 acre-feet (494,979 acre-feet to EBID, 376,862 to EPCWID and 60,000 acre-feet to Mexico)." Brief at 15. The correct numbers reflecting the appropriate ratio of releases to deliveries are set forth in Bert Cortez's affidavit.

2,638,860 acre-feet with the right to continuously fill and refill in Elephant Butte Reservoir and Caballo Reservoirs.

The United States is also entitled to release from storage the amount of water required to meet irrigation demands for the Project and deliveries to Mexico, and such other uses authorized by Reclamation law and all contracts entered into pursuant to Reclamation law. Additionally, the United States is entitled to a delivery of water at downstream canal headings and diversion points to meet Project purposes. The delivered water consists of water released from storage in Elephant Butte and Caballo reservoirs and all water entering the Rio Grande within the Project whether from return flows of water used for irrigation or municipal and industrial purposes (or any other purpose authorized under Reclamation Law) or tributary waters.

The quantity of water the United States is entitled to divert at diversion headgates on the Rio Grande in New Mexico is the maximum amount it has ever diverted and applied to a beneficial use, or 853,048 acre-feet, and the maximum amount of flow it has diverted at diversion headgates in New Mexico (see table above). The quantity must also be defined as the right to deliver the proportionate share of Project water to Texas including EPCWID, and deliveries to Mexico. The priority date for the United States Rio Grande Project is March 1, 1903 based upon the doctrine of relation as recognized in the State of New Mexico.

FOR THE UNITED STATES:

A handwritten signature in black ink, appearing to read 'R. Lee Leininger', is written over a horizontal line.

R. LEE LEININGER
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Environment and Natural Resources
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Phone: (303) 844-1364

51st Congress, }
1st Session. }

SENATE.

{ REPORT 928,
Part 4.
}

REPORT

OF THE

SPECIAL COMMITTEE

OF THE

UNITED STATES SENATE

ON THE

IRRIGATION AND RECLAMATION OF ARID LANDS.

VOL. III.—ROCKY MOUNTAIN REGION AND GREAT PLAINS.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1890.

The accompanying papers, reports, and statements were received and ordered filed by the committee.
Adjourned.

STATEMENT OF ANSON MILLS, MAJOR TENTH CAVALRY, U. S. ARMY, CONSULTING ENGINEER OF THE U. S. GEOLOGICAL SURVEY AT EL PASO.

While on leave of absence here last fall, I submitted to the city council of El Paso the project for a dam and reservoir in the Rio Grande, above this place; later on, while in Washington, I presented the same to the Director of the Geological Survey, Major Powell, who gave me such kindly encouragement that on the 10th of December, at the request of the then Secretary of State, Mr. Bayard, I wrote and he had printed a detailed explanation of my project, which is inclosed herewith, marked A.

In April, 1889, at the instance of Major Powell, I received the following order from the War Department:

Special Orders, } HEADQUARTERS OF THE ARMY,
No. 65. } ADJUTANT-GENERAL'S OFFICE,
Washington, April 12, 1889.

(Extract.)

3. With the approval of the Secretary of War, Maj. Anson Mills, Tenth Cavalry, will report for temporary duty to the commanding officer, Fort Bliss, Tex. In addition to his military duties at that post, he is authorized to extend his services in every proper way, when they may be requested, to the officers of the Interior Department in charge of the Geological Survey on that part of the Rio Grande 60 miles north and 60 miles south of the El Paso, Texas, this survey having for its object the reclamation of areas of irrigable lands in the Rio Grande Valley. The travel enjoined is necessary for the public service.

By command of Major-General Schofield.

R. C. DRUM,
Adjutant-General.

Official.

J. C. KILTON,
Assistant Adjutant-General.

Major MILLS,
Worcester, Mass.

On reporting to the Director of the Geological Survey I received verbal instructions from him to make all reasonable investigations that would tend to develop the feasibility of my project, and the following written instructions:

DEPARTMENT OF THE INTERIOR, U. S. GEOLOGICAL SURVEY,
Washington, D. C., April 20, 1889.

Sir: I have the honor to acknowledge the receipt of your letter of 15th instant transmitting a copy of Special Orders, No. 65, current series, from the commanding general of the Army, authorizing you to extend your services, in every proper way, when they may be requested by the officers of the Interior Department in charge of the Geological Survey and its action with reference to improvements of the Rio Grande River, near El Paso.

In reply thereto I hereby request that you will act as the advisory agent of this Bureau in respect to matters connected with improvements of the Rio Grande River near El Paso, and relation to the use of its waters for purposes of irrigation. You are requested to keep this Bureau informed of all projects looking to such purposes and to communicate to it your opinions and advice thereon. In view of the fact that any works affecting the flow of the Rio Grande River must be matters of equal solicitude to the people of the United States and of Mexico, and to their respective governments, you are especially requested to acquaint yourself, so far as may be, with the views of the Mexican officials and people in relation to such matters, maintaining in your intercourse with them a most friendly attitude and representing to them a sin-

MAJOR MILLS' LETTER TO THE SECRETARY OF STATE. 39

care and earnest desire of this office to treat all matters relating to the use of the waters of the Rio Grande for purposes of irrigation with a due regard for their rights.

It is the purpose of this Bureau to establish at El Paso a station for gauging the annual flow of the river, for measuring the evaporation, and for other purposes, and I should be pleased if you will exercise a supervision over this work of the employees, who will be instructed to report to you, and I further request that you will assist them in securing facilities for their work.

Very respectfully, sir,

Maj. ANSON MILLS,
Tenth Cavalry, U. S. Army, Worcester, Mass.

J. W. POWELL, Director.

EXHIBIT A.

HARRIS HOUSE, Washington, December 10, 1888.

Sir: Agreeable to promise at our interview this morning, I have the honor to submit the following general outline of my projected scheme for an international dam and water storage in the Rio Grande, near El Paso, Tex., for the control of the annual floods and the preservation of the national boundary to the Gulf, and for other purposes.

The Rio Grande, 1,800 miles long, rises from an unusual number of tributaries in the very high altitudes of southern Colorado and northern New Mexico, where the rain and snow fall is extraordinary, and the ice formed therefrom in the long winter enormous. As it flows southward the precipitation gradually decreases for 600 miles, when the Mexican boundary is reached, at El Paso, Tex., where there is neither snow nor ice, and but 8 inches annual rain-fall; from thence, 1,200 miles south, to the Gulf of Mexico, the rain-fall is only sufficient to compensate for the loss by evaporation (which latter is very great); and, for these reasons, the river has but few tributaries, and no increase of flow below El Paso.

The annual floods, caused by the melting of the snow and ice in the mountains, take place in May and last for about seventy-five days, during which period the average flow may be estimated at 200 yards in width by 2 yards in depth, with a velocity of 6 miles per hour, although in recurring periods of about seven years it is much greater. During the remaining two hundred and ninety days of the year the average flow is, perhaps, not over 30 yards wide by 1 yard deep, with the same velocity; and in the same recurring periods in the intervals between the high tides the river goes dry for months, as it is at this time, or at least has no current, with not enough water in the pools to float the fish.

There is a present popular opinion that this want of water comes from its diversion by the numerous irrigating canals lately taken out in Colorado and New Mexico, and while it is problematical what effect this may have, if any, I am of the opinion that most of this water returns to the stream again, either through the atmosphere, by evaporation and precipitation, or by the earth, through overflow and drainage, as, from personal observation, I know that these seasons of flood and drought were of about the same character thirty years ago.

After leaving the mountains the river passes through low valleys of bottom lands from 1 to 12 miles wide, and from 4 to 6 feet above low water level, of a light, sandy alluvium formed during annual overflows by sedimentary deposits from silt, which the water always carries in a greater or less degree.

In ascending along the Texas bank of the river, as a land surveyor, from the New Mexican line to a point below Fort Quitman, in 1858, 1859, 1860, I observed that the deposit was from one-half to 3 inches annually; that during the floods the bed of the river was constantly changing by erosion and deposit; and that in regular cycles it shifted from one of its firm rocky or clay banks to the other as the deposits had raised the side of the valley through which it then flowed above the level of the opposite side. Generally this change took place slowly by erosion and deposit of matter entirely in suspension; but frequently hundreds of acres would be passed in a single day by a cut-off in a bend of one channel and sometimes the bed would suddenly change from one firm bank to the other, a distance of perhaps 20 miles in length by 6 in width, for instance.

When surveying "El Camello," a valley a short distance above El Paso, the river was moving westward, and about the middle of the valley, which was some 6 miles wide, old Mexicans who had lived in the vicinity informed me that in 1821 the river ran close along the eastern bluff, where its bed was plainly to be seen, as was also a less plainly outlined bed along the bluff on the opposite side where the river flows at this date, and gives evidence of returning abruptly to the eastern bluff again at

58TH CONGRESS, } HOUSE OF REPRESENTATIVES. } DOCUMENT
2d Session. } No. 44.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
CHARLES D. WALCOTT, DIRECTOR

SECOND ANNUAL REPORT
OF THE
RECLAMATION SERVICE

1902-3

F. H. NEWELL
Chief Engineer



WASHINGTON
GOVERNMENT PRINTING OFFICE
1904

NEW MEXICO.

In this Territory irrigation has been practiced longer than in any other part of the United States, as water has been applied to the land by the Pueblo Indians since time immemorial. The early Spanish settlers coming from Mexico watered their gardens and diverted the Rio Grande at numerous points. This stream, the largest river in the Territory, rises in Colorado, where a number of large canals have been constructed to take water to lands in San Luis Valley. Entering New Mexico the river flows through canyons where reservoirs might be constructed and then passes through broad valleys in which a considerable part of the water is lost. By the time it reaches the southern boundary of New Mexico the river has shrunk in volume, and during many months of the year the channel is dry.

Not only is the water supply of the Rio Grande uncertain in quantity and volume, but difficulties are encountered in using it because of the large amount of sediment in suspension. The fine mud or silt comes in largely from Chuama, Puerco, and other tributaries in New Mexico. These in times of flood wash the soft earth into the Rio Grande, where it is deposited in part or carried into the irrigating ditches, necessitating continual work in keeping them clean. Reservoirs built along the river will in time be filled by this sediment, and all plans for water storage necessarily take into account the question of the life of the reservoir, or period before it will be filled, and also the probability of keeping the reservoir moderately free from silt.

Not only are the physical problems very difficult as regards the storage of the flood waters of the Rio Grande, but there are in addition interstate and international matters. At the southern end of New Mexico the river forms the boundary of the State of Texas for several miles and then becomes the international boundary between Texas and the Republic of Mexico. The Mexicans claim certain prior rights to the use of the water of the Rio Grande and also certain treaty rights as regards navigation. Any project to store water on the Rio Grande must take cognizance of the claims of Mexico to certain uses of the water before conclusions can be reached as to what may be done toward reclamation. Extensive surveys must be made to ascertain the opportunities and cost of water storage. For this purpose reservoir sites have been surveyed on the main stream and irrigable lands examined. These examinations have not progressed to a point where definite conclusions can be given, but they indicate that water storage may be feasible, provided suitable arrangements can be made with the claimants to water rights.

The most important tributary of the Rio Grande is the Pecos, which flows through the eastern part of the Territory. The waters of this river are utilized for irrigation, particularly in the vicinity of the town

SUMMARY OF OPERATIONS.

of Carlsbad. Storage reservoirs have been built, but there are still available certain other sites for water conservation. In particular, one what is known as Urton Lake, northeastern waters of the Pecos may be stored for reclamation of the reservoir.

Another project which may be feasible is the waters of Hondo River west of Roswell. The Hondo River, near the town just mentioned. The Pecos River is the large quantity of gypsum in solution. The country to a considerable extent contains large amounts of gypsum already brought under irrigation has been damaged or by an accumulation of gypsum due to unskillful use of water in irrigation. It is by careful consideration of all these matters to plan and construct irrigation and drainage of large bodies of arid land without ultimately wasting waters.

NORTH DAKOTA.

North Dakota, although included in the operation of the reclamation law, contains reclaimable land. The western part of the State, but settlers are rapidly pouring in for dry farming which in ordinary years. Drought-resisting crops are being planted adopted suitable for the prevailing climate.

A general examination has been made of reclamation in North Dakota. Many rivers of streams entering Missouri River from the north. The valleys of these streams are as a rule very fertile. The rivers is frequently so gentle that water can be carried to tracts of large size. None of the streams and all of them receive water from local sources. During the summer season is small and water is scarce wherever practicable. The topography, however, is favorable to water storage, and problems pertaining to reclamation.

The best opportunity for reclamation at present is by a tract of land in the area between Yellowstone and Missouri rivers. This can possibly be irrigated by a long canal leading on the west or left bank of Yellowstone River, carried around the edges of the bench lands, and then to the cultural lands in North Dakota. The land

NEW MEXICO.

igation has been practiced longer than in any States, as water has been applied to the land since time immemorial. The early Spanish exico watered their gardens and diverted the points. This stream, the largest river in the ado, where a number of large canals have been er to lands in San Luis Valley. Entering ows through canyons where reservoirs might passes through broad valleys in which a con- ter is lost. By the time it reaches the south- exico the river has shrunk in volume, and the year the channel is dry.

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of Carlsbad. Storage reservoirs have been constructed on the stream, but there are still available certain other storage sites and possibilities of water conservation. In particular, one of these localities is at what is known as Urton Lake, northeasterly from Roswell, where the waters of the Pecos may be stored for reclamation of lands south of the reservoir.

Another project which may be feasible is that of the storage of the waters of Hondo River west of Roswell. This stream flows into Pecos River, near the town just mentioned. The chief difficulty as regards Pecos River is the large quantity of gypsum and alkaline salts carried in solution. The country to a considerable extent is composed of Red Beds containing large amounts of gypsum, and much of the land already brought under irrigation has been injured by being water-logged or by an accumulation of gypsum near the surface mostly due to unskillful use of water in irrigation. It is believed, however, that by careful consideration of all these matters it will be found practicable to plan and construct irrigation and drainage systems so as to reclaim large bodies of arid land without ultimately injuring it by the alkaline waters.

NORTH DAKOTA.

North Dakota, although included in the list of States under the operation of the reclamation law, contains comparatively little arid reclaimable land. The western part of the State is deficient in moisture, but settlers are rapidly pouring in and are adopting methods of dry farming which in ordinary years are moderately successful. Drought-resisting crops are being planted and methods of cultivation adopted suitable for the prevailing climate.

A general examination has been made of the opportunities for reclamation in North Dakota. Many river valleys, particularly those of streams entering Missouri River from the west, have been examined. The valleys of these streams are as a rule narrow, and the fall of the rivers is frequently so gentle that water can not be diverted by gravity to tracts of large size. None of the streams head in a mountain area, and all of them receive water from local storms, so that the flow during the summer season is small and water storage must be resorted to wherever practicable. The topography, however, is not well suited to water storage, and problems pertaining thereto are not easy of solution.

The best opportunity for reclamation at present known is that offered by a tract of land in the area between Yellowstone and Missouri rivers. This can possibly be irrigated by a long and somewhat expensive canal heading on the west or left bank of Yellowstone River in Montana and carried around the edges of the bench lands or bluffs out to the agricultural lands in North Dakota. The land under the preliminary canal

REPORT OF RECLAMATION SERVICE.

region and the low values of produce, due to it inadvisable to pursue further investigation of the San Pedro, Los Angeles, and Salton rivers in this valley as it is at present surveyed. Above "The Narrows," it might be well to investigate facts, and possibly consider the storage of water in the creek, which waste during the winter months. In 1863 by younger members of various Morongo Valley. Tradition says that nearly 4,000 bushels of grain were thrashed at St. Thomas. The largest crop has not exceeded 7,000 bushels, on 1,512 acres under cultivation, and at times during the months of July and August, the waste in the application of the water is estimated that 3 acre-feet should be sufficient, but is wasted, some of the settlers believing that the main stream and then wasting it they are not getting the water taken. At present there are 8 ditches on the east side of the creek, and 3 on the west side of the work, with according waste of water, and main ditches.

"The Narrows" would probably conserve an additional 1,000 acres of land, and proper water would enable 500 more acres to be irrigated; which is 1,000 less than was irrigated in 1870 without storage.

A flood would make this additional acreage not be well to investigate further to see if the loss would be offset by the value of added

SUMMARY.

It is shown there are no Government lands of value in the region.

Certain reservoir sites and dam sites which

on the Colorado River are not economically used, and possibly reclaim 1,500 acres more.

If better and better markets afforded, further at the value of additional acres reclaimed

INVESTIGATIONS IN NEW MEXICO.

By ARTHUR P. DAVIS.

WATER STORAGE ON RIO GRANDE.

The total drainage basin of the Rio Grande covers an area of about 100,423 square miles, of which the major portion is included in the basin of Pecos River and other tributaries which enter the river in Texas. The area drained by the Rio Grande above the town of El Paso is about 30,000 square miles.

This was one of the first streams to be investigated by the Geological Survey, a station having been established at Embudo, N. Mex., in December, 1888. Since that time observations have been taken at Del Norte, Embudo, Rio Grande, San Marcial, and El Paso. No stream in the west has a more complete record of discharge than the upper Rio Grande.

The problem of water storage on the Rio Grande is very complicated. All of the ordinary flow of the river has long since been appropriated for irrigation purposes in Colorado, New Mexico, Texas, and Mexico. It is claimed by the inhabitants of Texas and Mexico that their water rights have been infringed by the later diversions above their lands, and these facts must be considered in connection with any contemplation of the storage project.

Flood waters of the Rio Grande carry a very large quantity of sediment, especially in the lower course. In Colorado and northern New Mexico the low-water flow is comparatively clear, but in southern New Mexico this is seldom or never the case. Large quantities of light sediment are brought into the river in its course through New Mexico, especially by the Rio Puerco, and the river usually resembles a stream of thin mud. Some observations on the amount of sediment, under the direction of W. W. Follett, for the International (Water) Boundary Commission, show the sediment problem to be one of extreme gravity.

PREVIOUS SURVEYS.

Various projects have from time to time been investigated and reported upon for the storage and utilization of the flood waters of this river. The most completely worked out of these projects is that of the so-called International dam and reservoir, a short distance above El Paso. This project was first investigated by the United States Geological Survey, under the direction of Gen. Anson Mills, in 1899.

The project involves the construction of a masonry dam to reach about 60 feet above low water in the Rio Grande. Such a dam would form a reservoir about 15 miles in length and 4 miles in greatest width, covering 26,000 acres, and having a capacity of about 540,000 acre-feet.

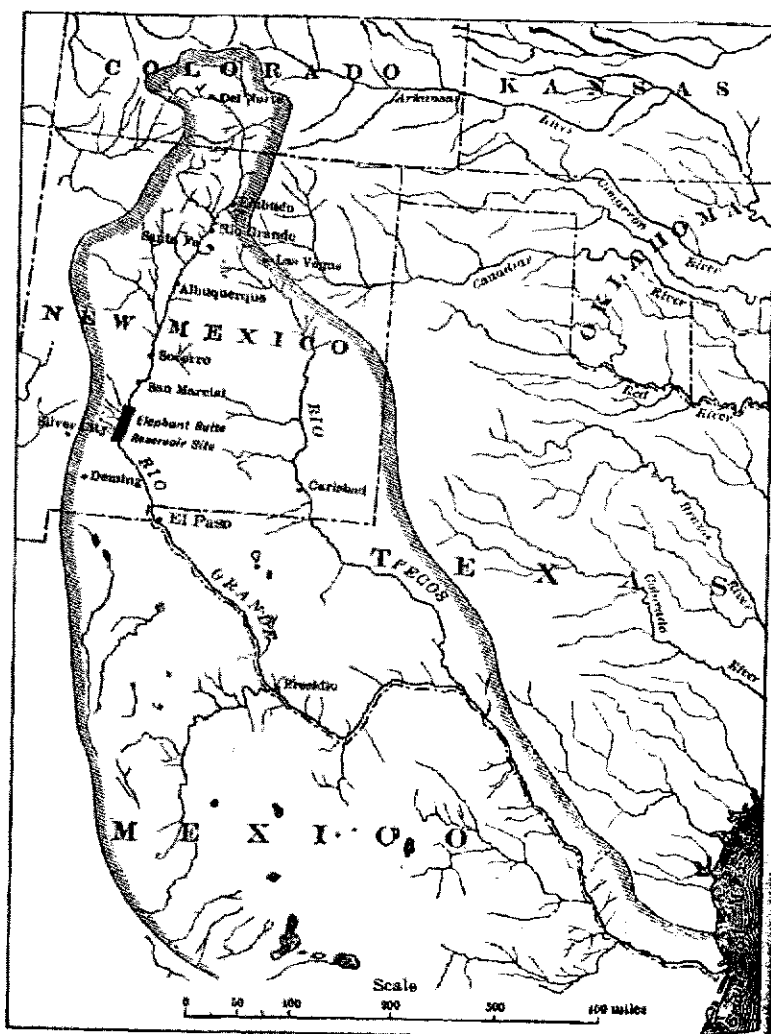


FIG. 89.—Drainage basin of the Rio Grande.

It would submerge over 16 miles of railway line, the removal of which would greatly increase the cost of the project. This enterprise has been reported upon by W. W. Follett, chief engineer of the International (Water) Boundary Commission.

NEW MEXICO: STORAGE ON RIO

The estimated cost of the entire project large proportion is the estimated cost of the reach of high waters in the reservoir.

Other projects have been examined in a the authority of the Hydrographic Branch of the most promising of which is the reservoirs which has been reported on by P. E. Harri feet in height should store about 300,000 ac mated cost of such a dam, according to M This site, which was surveyed in 1889, is at station of the narrow-gage railway below would be 90 feet high. The dam site wou the reservoir site would be of fair capac about 6 miles of railway and the Indian villa would be expensive and otherwise objectior

A reservoir site was selected by W. W. Joseph Jacobs in 1890, in the canyon below. This site was numbered 38. The proposed capacity of reservoir estimated at 175,0

Another site was surveyed by Mr. Jacob
dam was located in sec. 20, T. 16 S., R. 4 W
and was about 40 feet high. The reserv
100,000 acre-feet.

ELEPHANT BUTTE RESERV

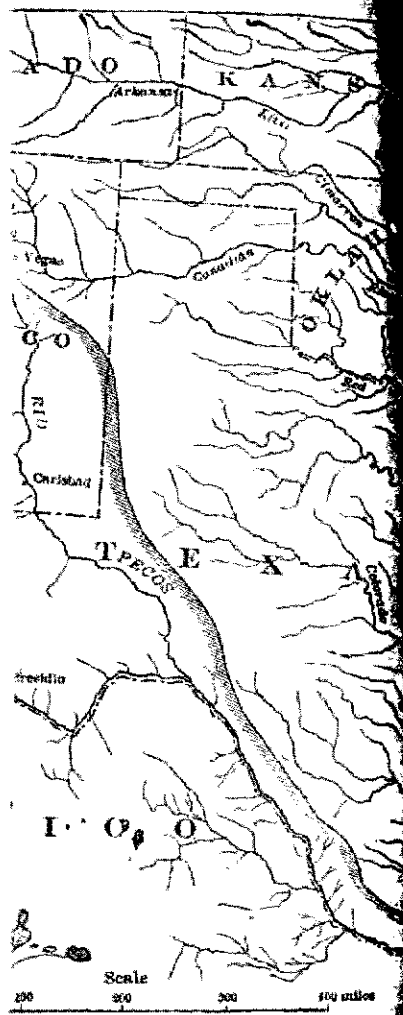
Between the two reservoir sites mentioned of the Rio Grande, is an eruptive mass, known as "Butte," from its striking resemblance to a butte. Below this butte the river forms a narrow entrance of which the Rio Grande Dam was proposed to construct a dam. This dam was intended to store 230,000 acre-feet of water. The project was never made and, so far as investigations of foundation.

The Reclamation Service of the United States began investigations on the Rio Grande work being inaugurated by C. H. Fitch, in charge of James A. French.

A small party was kept at work during the day making a graphic map of the canyon lying between Nos. 38 and 39 of the irrigation survey.

A more detailed survey was made of the area below the one selected for the Elephant

the construction of a masonry dam to store water in the Rio Grande. Such a dam would be 10 miles in length and 4 miles in width, having a capacity of about 540,000 acre-feet.



—Drainage basin of the Rio Grande.

6 miles of railway line, the removal of the cost of the project. This estimate was made by V. W. Follett, chief engineer of the Reclamation Commission.

The estimated cost of the entire project is \$2,300,000, of which a large proportion is the estimated cost of moving the railways above the level of high waters in the reservoir.

Two projects have been examined in a preliminary way under the authority of the Hydrographic Branch of the Geological Survey, the first of which is the reservoir site at Whiterock Canyon, as has been reported on by P. E. Harroun. A masonry dam 80 feet high should store about 300,000 acre-feet of water. The estimate of such a dam, according to Mr. Harroun, is \$1,200,000. The second project, which was surveyed in 1889, is at Rio Grande, a water-tank of the narrow-gauge railway below Espanola. The dam here is 90 feet high. The dam site would be in volcanic rock, and the reservoir site would be of fair capacity, but would submerge 10 miles of railway and the Indian village of San Ildefonso. This project is expensive and otherwise objectionable.

The reservoir site was selected by W. W. Follett, and surveyed by Mr. Jacobs in 1890, in the canyon below the town of San Marcial. The site was numbered 38. The proposed height was 80 feet, and the capacity of reservoir estimated at 175,000 acre-feet.

Another site was surveyed by Mr. Jacobs and numbered 39. The site is located in sec. 20, T. 16 S., R. 4 W., Sierra County, N. Mex., and is about 40 feet high. The reservoir was estimated to hold 100,000 acre-feet.

ELEPHANT BUTTE RESERVOIR SITE.

Between the two reservoir sites mentioned above, on the left bank of the Rio Grande, is an eruptive mass, locally known as "Elephant Butte" from its striking resemblance to an elephant's head. Just above this butte the river enters a narrow canyon of sandstone, at the mouth of which the Rio Grande Dam and Irrigation Company propose to construct a dam. This dam was to have a height of 80 feet and store 230,000 acre-feet of water. Only meager surveys for the project were ever made and, so far as known, there were no data for foundations of foundation.

The Reclamation Service of the United States Geological Survey made investigations on the Rio Grande on March 1, 1903, the field work being inaugurated by C. H. Fitch, and its execution placed in charge of James A. French.

A small party was kept at work during the summer making a topographic map of the canyon lying between the dam sites of reservoirs 38 and 39 of the irrigation survey.

A more detailed survey was made of a dam site a short distance above the one selected for the Elephant Butte project in order to

*Twenty-first Ann. Rept. U. S. Geol. Survey, pt. 4, 1900, pp. 263-269.

investigate the feasibility of a higher dam than that project contemplated. It has been found that a dam can be built about one-half mile below Elephant Butte to a height of 170 feet, which would throw the water through a divide to the west, forming a natural spillway. The surveys show that such a dam would form a reservoir nearly 40 miles in length and with large storage capacity.

The following table shows the area and storage capacity for each 10-foot contour up to 160 feet, the river bed being approximately 4,210 feet above sea level:

Capacity of Elephant Butte reservoir site.

Contour.	Capacity between contours.	Total capacity.
<i>Feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>
4,210	00	00
4,220	260	260
4,230	700	960
4,240	3,775	4,735
4,250	11,735	16,470
4,260	23,810	40,280
4,270	38,885	79,165
4,280	54,165	133,330
4,290	69,375	202,705
4,300	83,480	286,165
4,310	97,400	383,565
4,320	115,380	498,945
4,330	135,920	634,865
4,340	159,690	794,555
4,350	190,525	985,080
4,360	234,125	1,219,205
4,370	275,570	1,494,775

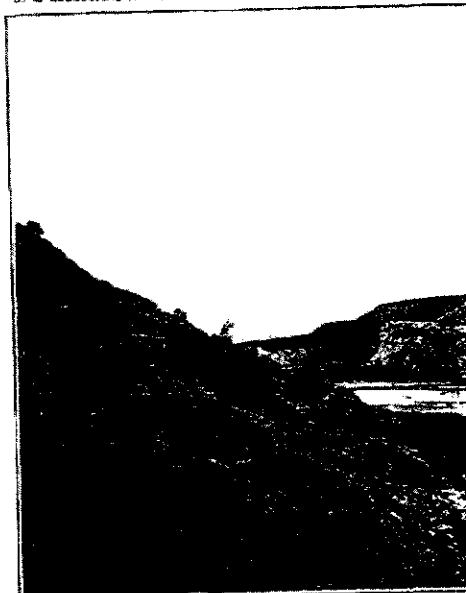
By a moderate amount of excavation a spillway, remote from the dam, can be provided which will have an ample capacity.

Borings at the proposed dam site were begun on the 26th of October to determine the depth and character of the bed rock. This work was in immediate charge of W. E. Jones, foreman, under the general direction of James A. French. In August, 1903, a contour survey was begun in order to map and classify the lands which would be involved in the construction of a diversion canal, and which would be covered by such a canal for irrigation. This survey has proceeded satisfactorily, an area of about 100 square miles having been completed to date.

It is possible that considerable power can be developed by the co-

U. S. GEOLOGICAL SURVEY

SECOND ANNUAL REPORT



A. VIEW OF ELEPHANT BUTTE, NEW MEXICO, SHOWING LOOKING UPSTREAM



B. VIEW OF GORGE BELOW ELEPHANT BUTTE, NEW MEXICO, SHOWING SITE, LOOKING DOWNSTREAM

rection of an irrigating canal in such a manner as to concentrate the surplus fall at points where it may be utilized for this purpose, and the power developed might be used in pumping water from beneath the valley to extend the irrigated area.

Until the borings for foundations have been completed the feasibility of this project can not be determined. The reservoir, however, has a much larger capacity than any other on the river, and is ample to store the floods of wet years, and to hold them to reinforce the supply in times of extreme drought. It is the only proposed reservoir

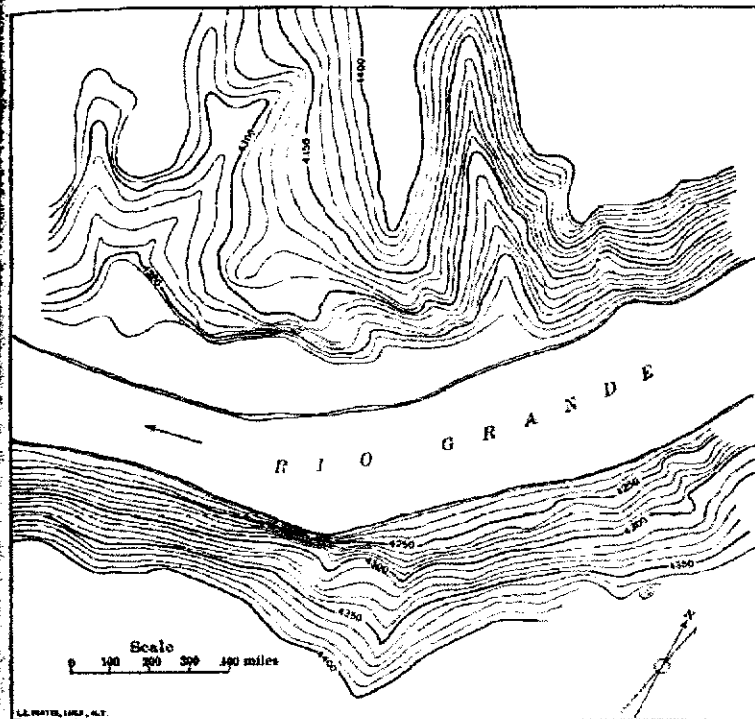


FIG. 40.—Contour map of proposed dam site below Elephant Butte, New Mexico.

with a capacity large enough to utilize the entire flow of the drainage basin. It is situated sufficiently low in the basin to intercept, practically, all the waters, and yet is sufficiently high to command enough land to consume all the available water supply.

The extremely large capacity here proposed is intended largely for the solution of the sediment problem, which is the most difficult and serious obstacle to the utilization of the flood waters of the Rio Grande Basin. The proposed reservoir will not cover any large area of valley land, but depends for its great capacity upon the high dam

and a river canyon of very moderate declivity, the form of the reservoir being long and relatively narrow.

When such a reservoir is partly filled with sediment, as it will be soon after construction, large sluiceways may be opened to provide for the outflow of water at the bottom of the dam by emptying the reservoir. The stream will be made to cut a channel for itself through the impounded sediment, which, according to the best authority, will assume side slopes of about 8 to 1.

It is estimated that by this method the river can be made to sluice out the reservoir, and thus maintain the storage capacity of more than one-half of the original capacity of the reservoir.

To obtain this result without injury to the irrigation interests below it will be necessary to construct an auxiliary reservoir farther upstream in the same drainage basin which will provide the water supply during the sluicing process. The cost of constructing such an auxiliary reservoir and the operation of the gates of both reservoirs would be the only expense attached to the solution of the sediment problem by this method.

The reservoir being relatively deep in proportion to its surface area there will not be excessive evaporation.

WATER STORAGE ON HONDO RIVER, NEW MEXICO.*

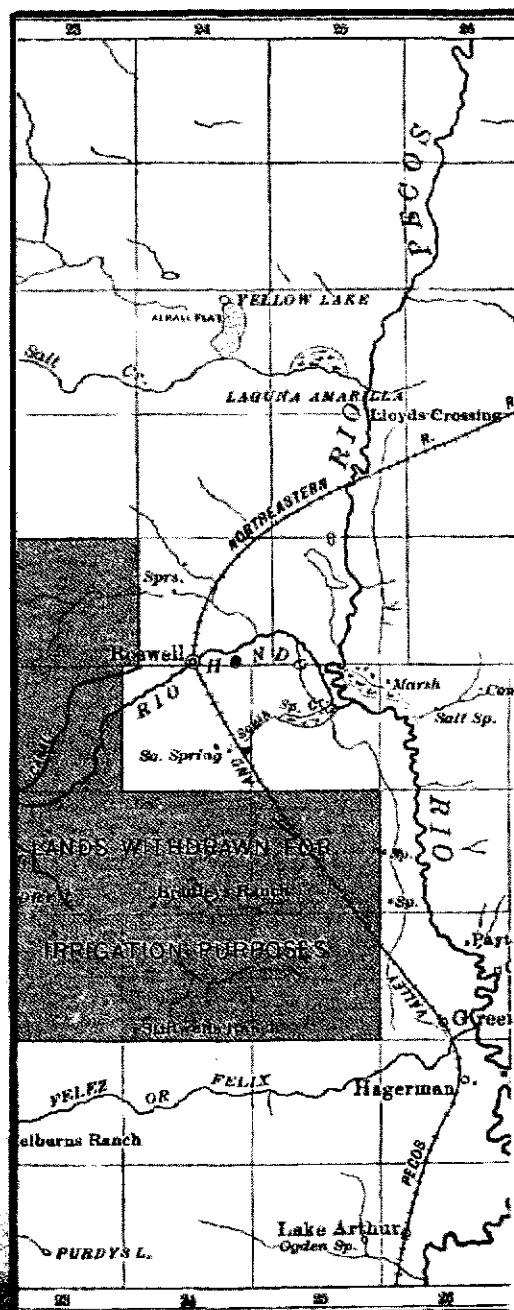
Hondo River has its source in the White Mountains in Lincoln County, N. Mex., and flows in an easterly direction into Pecos River at a point 5 miles east of Roswell, N. Mex., in T. 11 S., R. 25 E., New Mexico principal meridian.

Previous to the year 1869 this stream had a perennial flow; irrigation was carried on to a considerable extent on the fertile lands lying to the southwest and almost adjacent to the site of the present town of Roswell. For many years before some irrigation had been practiced upon the upper waters of the Hondo, but about this time many more people moved into this section and occupied all the available land on the Ruidoso and Bonito rivers (the two streams that join and form the Hondo proper). The use of water became so great that the perennial flow ceased and the lower part of the river received no water, except in the nonirrigating season and during the floods of spring and summer.

Those living on the lower portion of the stream became dissatisfied with the results obtained from the use of the irregular flood flow and abandoned their lands—some going farther up the river and getting land where the flow was constant and some leaving the region altogether.

There are still visible many traces of the former cultivation in the section adjacent to Roswell, and some of the old ditch lines have been utilized by farmers in later days in attempts to use the flood water for irrigation.

* Extract from report by W. M. Reed.



EQUITABLE DISTRIBUTION OF THE WATERS OF THE RIO
GRANDE.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING,

IN RESPONSE TO RESOLUTION OF THE SENATE OF FEBRUARY
26, 1898, REPORTS FROM THE SECRETARY OF STATE, THE SEC-
RETARY OF WAR, THE SECRETARY OF THE INTERIOR, AND
THE ATTORNEY-GENERAL, WITH ACCOMPANYING PAPERS,
RELATIVE TO THE EQUITABLE DISTRIBUTION OF THE WATERS
OF THE RIO GRANDE RIVER.

APRIL 7, 1898.—Read, referred to the Committee on Foreign Relations, and ordered
to be printed.

To the Senate:

In response to the resolution of the Senate of February 26, 1898,
requesting the President—

if not incompatible with the public interest, to transmit to the Senate the proceed-
ings of the international commission authorized in the concurrent resolution of
Congress of April twenty-ninth, eighteen hundred and ninety, and a subsequent
international convention between the United States and Mexico of May sixth,
eighteen hundred and ninety-six, and also the correspondence relating thereto
with Mexico by the Department of the Interior, Department of War, and Depart-
ment of Justice, as well as the Department of State, relating to the equitable dis-
tribution of the waters of the Rio Grande River, including the draft of an
incomplete treaty between said Governments, negotiated between the late Secre-
tary of State, Mr. Olney, on the part of the United States and Mr. Romero on the
part of Mexico, and all the correspondence between said officials relating thereto—

I transmit herewith reports from the Secretary of State, the Secretary
of War, the Secretary of the Interior, and the Attorney-General, with
accompanying papers.

WILLIAM MCKINLEY.

EXECUTIVE MANSION, *April 7, 1898.*

The PRESIDENT:

The undersigned Secretary of State has the honor to lay before the
President, with a view to their transmission to Congress, copies of
the correspondence called for by the resolution of the Senate of Feb-

There appears to have been a controversy as to filing of papers by William E. Baker for the Mesilla company in the local land office on January 18, 1896, the register refusing to receive them because offered after 4 o'clock. The question involves a matter of a few minutes: and as the papers were filed on the 20th and within the proper time, it is not necessary to go into the controversy.

Very respectfully,

S. W. LAMOREUX, *Commissioner.*

Two papers attached: First. This case to be held until October 15, 1896, for filing of brief by Mr. McGowan. (Signed) J. P. Dated September 22, 1896. Second. Ernest Dale Owen, 916 Stock Exchange Building. Chicago, Ill., attorney Mesilla Valley Land and Irrigation Company.

DEPARTMENT OF THE INTERIOR,
Washington, December 19, 1896.

The honorable the SECRETARY OF STATE.

SIR: I have the honor to submit, in response to your communication of November 30, the inclosed paper, prepared under the direction of the Assistant Attorney-General, which fully sets forth the claims and contentions of the Rio Grande Dam and Irrigation Company, and discusses at considerable length the laws of the State of Colorado and Territory of New Mexico relating to waters, and the acts of Congress and rulings of this Department relating to irrigation.¹

The application of the Rio Grande Dam and Irrigation Company was approved by my predecessor on the 1st day of February, 1895. In my opinion I have no right, under the law, to revoke this approval. It has been decided by the Supreme Court of the United States in the case of *Noble v. Union River Logging Railroad Company* (147 U. S., 165) that the approval by the Secretary of the Interior of a right of way for railroad purposes over the public land can not be revoked by his successor, and upon the principle therein declared I deem it beyond my authority to revoke my predecessor's approval of the map filed by the Rio Grande Dam and Irrigation Company.

Assuming that I had such power, I submit to you whether or not the exercise of it would be proper in view of the opinion of the Attorney-General of your Department under date of December 12, 1895. (21 Op. Att. Gen., p. 274.)

It is not the duty of this Department to protect the citizens of the United States against unlawful appropriation of the waters of the States and Territories by the inhabitants thereof, and if no treaty obligations of the Government are involved, I do not believe that I should assume to interfere.

Since the receipt of your communication complaints have been made to this Department by parties now having applications for irrigation privileges pending for the vacation of my order of December 6, 1896, upon the ground that the effect of such order is to imperil their rights by subordinating them to the claims of persons who may hereafter for lawful or nefarious purposes enter lands along the rights of way applied for. Very grave inconvenience would arise if such claims are filed, and I therefore submit for your consideration whether or not there is further need for continuing the suspension heretofore declared.

Immediately upon receipt of your communication I addressed to the Commissioner of the General Land Office directions that he suspend all applications for right of way through the public lands for

¹ Omitted.

the purposes of irrigation by using the waters of the Rio Grande River or any of its tributaries in the State of Colorado or the Territory of New Mexico until further instructed by this Department. A copy of said order is hereto attached.¹

Very respectfully,

D. R. FRANCIS, *Secretary.*

N. B.—The printed inclosures, with your letter of November 30, are herewith returned.

DEPARTMENT OF STATE,
Washington, January 4, 1897.

Col. ANSON MILLS, U. S. A.,
Commissioner, etc., Washington, D. C.

SIR: Referring to previous correspondence on the subject, I have to inform you that on the 5th of December last the Secretary of the Interior, acting on the suggestion of this Department, issued the following order to the Commissioner of the General Land Office:

Your office is hereby directed to suspend action on any and all applications for right of way through public lands for the purpose of irrigation, by using the waters of the Rio Grande River or any of its tributaries in the State of Colorado or in the Territory of New Mexico, until further instructed by this Department.

This order was based upon a request made in your letter to this Department October 29, 1896, wherein you recommended that the Secretary of the Interior should "withhold action on all these applications for dams and reservoirs on the Rio Grande and its tributaries in New Mexico," and it follows your language.

The representatives of individuals or companies who have applied for rights of way to build dams and reservoirs for irrigation purposes across the River Pecos have informed this Department that the order of suspension has been applied to their applications as well as to those for dams on the Upper Rio Grande, and they request the Department to withdraw its objection to action by the General Land Office on applications for rights of way in the public lands along the Pecos River. That river flows into the Rio Grande far below the location of the proposed international dam, but before acting on this request I would like to know from you (1) whether you intended that the order of suspension should apply to the Pecos, and (2) whether the building of additional dams on the Pecos will affect the question at issue between the United States and Mexico, or the remedy proposed of storing the surplus water in an international reservoir. To what extent the cutting off of the waters of the Upper Pecos in New Mexico would injuriously affect the navigation of the Rio Grande and the rights of the citizens of Mexico under international law and treaty is a question upon which it is hoped your report may also throw light; but I realize that information on that phase of the question may not be so completely at your command as in respect of the relation of the Pecos dams to the proposed international reservoir.

As an entirely distinct matter, I desire to know whether the Rio Grande River is a navigable water of the United States within the sense of the constitutional provision giving Congress the power to regulate commerce among the several States (Constitution, Art. I, sec. 8, clause 3.) I will briefly define a navigable river in this sense,

¹ Omitted.

CORRESPONDENCE TOUCHING AND THE PROCEEDINGS OF
THE INTERNATIONAL COMMISSION ON THE SUBJECT
OF THE EQUITABLE DISTRIBUTION OF THE
WATERS OF THE RIO GRANDE.

DEPARTMENT OF STATE,
Washington, May 13, 1896.

Col. ANSON MILLS, U. S. A.,
Commissioner, etc., El Paso, Tex.

SIR: I transmit herewith copies of instruments in English and Spanish, one signed by Mr. Romero, the Mexican minister at this capital, on behalf of Mexico, and one by myself, on behalf of the United States, empowering Mr. Osorno, the chief of the Mexican commission, and yourself to examine and report upon certain questions involving the equitable distribution and use of the Rio Grande between the two Republics.¹

I understand that Mr. Romero has brought to the notice of Mr. Osorno the texts of this instrument, with a view to its prompt fulfillment. I shall, however, out of abundant caution, and following the suggestion in my note to Mr. Romero, inclose a copy of both texts to Mr. Osorno for his full and complete information.

It is the desire of both Governments that the subjects mentioned in the commissions herewith be prosecuted without unnecessary delay to a completion within the stipulated period of eight months from May 6, 1896. The concluding part of these commissions contemplates that you and your colleague, in case of agreement as to results, "shall make a joint report to each Government, and if they disagree, and so far as they disagree, shall make separate reports to each."

Commending the subject to your careful and earnest consideration, and enjoining prompt and energetic action, I am, sir, your obedient servant,

RICHARD OLNEY.

EL PASO, TEX., *November 25, 1896.*

Hon. SECRETARY OF STATE,
Washington, D. C.

SIR: I have the honor to submit herewith the report of the joint commission on the investigations into the distribution of the waters of the Rio Grande and the construction of a dam and reservoir near El Paso, Tex., with the following inclosures:

1. Letter of Mr. E. P. Ripley, president of the Atchison, Topeka

¹ For copy of protocol see p. 1 of Journal of August 17, 1896.

and Santa Fe Railway Company, submitting a proposition to remove his roadbed from the proposed reservoir.

2. Letter of Mr. J. Kruttschnitt, general manager of the Southern Pacific Railway Company, making a similar proposition with reference to his roadbed.

3. Letter from Messrs. Magoffin, Zimpelman & Crosby, and a separate letter from Mr. Magoffin, naming a price upon about 7,000 acres of land to be submerged.

4. Joint report of the engineers of the respective countries regarding the technical investigations on the subject, with accompanying appendixes and maps.

In explanation of the large excess of the present estimates, compared with that of the preliminary investigations made in 1889, I beg to make the following remarks:

First. President Ripley has increased Mr. Follett's estimate about \$98,000 for the removal of the Santa Fe road. Mr. Ripley, however, claims \$48,000 as compensation for increased maintenance by the increase of the number of bridges, etc., over the many ravines.

I am satisfied, however, and I believe that Mr. Ripley will be so satisfied, that the maintenance of these trestles will be no greater from year to year than the present cost of riprapping against the encroachments of the river and ballasting in the soft bottom lands. I am of the opinion that on further examination Mr. Ripley will be willing to remove his road at Mr. Follett's estimate. However, I have thought best to place his figures in the estimates to insure a sufficiency of funds.

Second. Mr. J. Kruttschnitt's (general manager of the Southern Pacific Railway Company) estimates are more difficult of explanation, because he has given no items and has made a large increase over Mr. Follett's estimates. However, there is no doubt but the principal increase is due to a necessary new bridge. When Mr. Follett made his estimate there was an old wooden bridge, about worn out, which the road was contemplating moving, and has since replaced by an iron and stone structure at large cost. This will have to be torn down and a new one built of larger dimensions, some 22 feet higher, and while Mr. Kruttschnitt does not state so, I think he has made an estimate for a very expensive bridge, for otherwise I think the road could be moved for something very near Mr. Follett's estimate. However, I have thought best in this case also to place the amount at Mr. Kruttschnitt's figures.

Third. The increase in the estimate for the condemning of the land is partly accounted for by the fact that the limekiln, which was estimated by Mr. Follett at \$1,000, has since become a very valuable plant, supplying the Kansas City smelter at this place. There are many valuable buildings and works, which probably cost about \$30,000 or \$40,000, all of which will probably have to be submerged, and then farther above there is a brick factory which cost several thousand dollars. The land itself (about 27,000 acres) is not worth over \$3 or \$4 an acre in the public market, and the title to about 10,000 acres to be submerged in New Mexico is on unconfirmed grants, the title probably still resting in the United States, in which case it would cost nothing; but in this case also I have thought best to estimate that it would have to be bought and paid for, and that in the course of condemnation the owners would get larger prices for their land than it is actually worth.

Fourth. Regarding the dam proper, it is the most disappointing

INTERNATIONAL DAM IN RIO GRANDE RIVER, NEAR
EL PASO, TEX.

JANUARY 7, 1896.—Ordered to be printed.

Mr. HITT presented the following

LETTER FROM COL. ANSON MILLS, MAJOR TENTH CAVALRY, TO
THE SECRETARY OF STATE, DATED DECEMBER 10, 1888.

EBBITT HOUSE,
Washington, D. C., December 10, 1888.

SIR: Agreeable to promise at our interview this a. m., I have the honor to submit the following general outline of my projected scheme for an international dam and water storage in the Rio Grande River, near El Paso, Tex., for the control of the annual floods and the preservation of the national boundary to the Gulf, and for other purposes.

The Rio Grande, 1,800 miles long, rises from an unusual number of tributaries in the very high altitudes of southern Colorado and northern New Mexico, where the rain and snow fall is extraordinary, and the ice formed therefrom in the long winter enormous. As it flows southward the precipitation gradually decreases for 600 miles, when the Mexican boundary is reached at El Paso, Tex., where there is neither snow nor ice, and but 8 inches annual rainfall; from thence 1,200 miles south, to the Gulf of Mexico, the rainfall is only sufficient to compensate for the loss by evaporation (which latter is very great), and for these reasons, the river has but few tributaries, and no increase of flow below El Paso.

The annual floods, caused by the melting of snow and ice in the mountains, take place in May and last for about seventy-five days, during which period the average flow may be estimated at 200 yards in width by 2 yards in depth, with a velocity of 5 miles per hour, although in recurring periods of about seven years it is much greater. During the remaining two hundred and ninety days of the year the average flow is perhaps not over 30 yards wide by 1 yard deep, with the same velocity, and in the same recurring periods, in the intervals between the high tides, the river goes dry for months, as it is at this time—or at least has no current, with not enough water in the pools to float the fish.

There is a present popular opinion that this want of water comes from its diversion by the numerous irrigating canals lately taken out in Colorado and New Mexico, and while it is problematical what effect this may have, if any, I am of the opinion that most of this water returns to the stream again, either through the atmosphere, by evaporation and precipitation, or by the earth, through overflow and drainage, as from personal observation I know that these seasons of flood and drought were of about the same character thirty years ago.

After leaving the mountains the river passes through low valleys of bottom lands from 1 to 12 miles wide and from 4 to 8 feet above low-water level, of a light, sandy alluvium formed during annual overflows by sedimentary deposits from silt, which the water always carries in a greater or less degree.

In meandering along the Texan bank of the river, as a land surveyor, from the New Mexican line to a point below Fort Quitman, in 1858, 1859, and 1860, I observed that the deposit was from one-half inch to 3 inches annually, that during the floods the bed of the river was constantly changing by erosion and deposit, and that in regular cycles it shifted from one of its firm rocky or clay banks to the other, as the deposits had raised the side of the valley through which it then flowed above the level of the opposite side. Generally this change took place slowly, by erosion and deposit of matter entirely in suspension; but frequently hundreds of acres would be passed in a single day by a cut-off in a bend of one channel, and sometimes the bed would suddenly change from one firm bank to the other, a distance of perhaps 20 miles in length by 6 in width. For instance, when surveying "El Canutillo," a valley a short distance above El Paso, the river was moving westward, and about the middle of the valley, which was some 6 miles wide. Old Mexicans who had lived in the vicinity informed me that in 1821 the river ran close along the eastern bluff, where its bed was plainly to be seen, as was also a less plainly outlined bed along the bluffs on the opposite side, where the river flows at this date, and gives evidence of returning abruptly to the eastern bluffs again at the next greatest high tide, to its old channel along the bed of the track of the Santa Fe Railroad.

In another case, more recent and extensive, in the great valley below El Paso, some 12 miles in width and 20 miles long, the river, as was plainly evident at the time I was surveying the land, had made a sudden change from the bluffs on the eastern or Texan side to the western or Mexican side of the valley.

Mexicans who had been residents continuously in that vicinity informed me that this change took place in 1842.

Again, in 1884, in this vicinity, the river swept suddenly from the Mexican side, crossed the Southern Pacific Railroad, and destroyed both track and bed for a distance of 15 miles, stopping traffic for a period of three months and causing the removal of the road to hills above the valley.

Though these are the most extensive changes that came within my personal observation, similar ones are being made annually, from El Paso to the Gulf, which not only prevent the settlement and development of such of the lands as are sufficiently above the overflow (were the banks and boundaries secure), but, by reason of the river being the national boundary between the United States and Mexico for over 1,200 miles, cause fatal embarrassments to the citizens and officials of both Republics in fixing boundaries and titles to lands, in preventing smuggling, collecting customs, and in the legal punishment of all crimes and misdemeanors committed near the supposed boundary line, it being easy at almost any point in its great length to produce evidence sufficient to raise a reasonable doubt in the minds of the jurors as to which side of the line the arrest was made or the act committed.

At the last session of Congress the House passed a joint resolution (No. 112) requesting the President to appoint a commission, in conjunction with a similar one from the Republic of Mexico, to consider the matter above referred to. While surveying these lands in 1858, and prospecting for a crossing of the Rio Grande for the Memphis, El Paso

and Pacific Railroad, which was then projected—and in fact in course of construction—I examined the pass about 3 miles above the present city of El Paso, and discovered that it had solid rock bed and walls, the latter but about 400 feet apart, and that the valley above which came close down to the spur of the Rocky Mountains which crossed the river and formed the pass was from 4 to 8 miles wide, with a fall of about 4 feet to the mile, so that it would be an easy matter to build a dam in this pass and create an immense lake.

The water coming through this pass for ages has deposited at its lower end a great mass of rocks, over which is formed rapids with about 12 feet fall, and the aborigines of prehistoric ages made use of this to carry the water on to the lands below, no one knows how long ago, but it is known that the Mexicans have used it for two hundred years under most disadvantageous and unsatisfactory circumstances.

I have witnessed, each succeeding year, hundreds of Mexicans piling loose stones on the top of this drift of rocks to raise the level to that carried away by the floods of the preceding year; and it has been estimated by a federal engineer sent from the City of Mexico, that, had the labor thus expended been reduced to silver, the dam could have been built of the solid metal. The difficulty has been and always will be that there is neither bed rock nor solid earth in the bottom or banks, each being composed of quicksand.

In other places in the valley temporary willow dams 1 or 2 feet high are made at convenient places, and the water carried several miles below on to the lands that are above the usual overflow; but these dams are carried away annually and have to be rebuilt, and frequently the river bed moves miles away from the mouth of the ditch or acequia, rendering it useless; but even if these difficulties in carrying the water from the bed of the river to the lands are overcome in the usual manner, it is evident that by reason of a great overflow, say every seventh year, and a dry river in a like period, no system of irrigation for the Rio Grande can prove satisfactory that does not embrace a grand storage system sufficient both to restrain, to a great extent at least, the tidal flow and maintain a constant annual flow, especially since the great emigration and settlement in its valley is constantly doubling the demand for water.

Being on leave of absence in the city of El Paso recently, where I was a citizen before the war, having surveyed the first plat of the town and being well known to most of its citizens, I was invited by the city council to submit to it a plan for water supply and irrigation that would overcome the difficulties above referred to.

It at once occurred to me that as the Rio Grande was the joint property of the two nations and especially as the Mexicans had used its waters since time when "the memory of man runneth not to the contrary," that any plan to be acceptable and satisfactory must be international in character, and the works, both before and after completion under the joint federal control of the two nations, the more so as riparian rights in this country, so far as regards irrigation, are not well defined by law and could be best brought about in this instance by treaty stipulations between the two countries.

The matter of restraining the tidal flow by storing the water, and thus protect the constantly changing national boundary, occurred to me—if it could be introduced into the project—as likely to secure encouragement and substantial aid by liberal appropriations in money from both Governments.

And further, that El Paso, being now a city of over 11,000 population, and having every prospect of being a large manufacturing city at no distant day—there being no place within 500 miles likely to compete with it—the subject of water power ought also to enter into the problem, which of necessity is of such vast proportions as to require all incidental aid possible to attach to it to insure its success.

It will be apparent, from what has been written, that the Rio Grande is one of the first magnitude, not only in length and breadth, but for short, annual periods in devastating flow of waters, and that its general characteristics, as compared with other rivers, with reference to irrigation, are so abnormal as to require different or more heroic treatment.

I therefore projected a scheme which may be briefly outlined as follows:

To build a strong dam of stones and cement—say 60 feet high—in the pass before referred to and by submerging about 60,000 acres of land now subject to overflow and of little comparative value, create a vast lake 15 miles long by 7 wide, with a probable storage capacity of 4,000,000,000 cubic yards of water; place gates on each side of the river in the dam at the 50-foot level for wastewaters and irrigating canals to supply each side of the river and keep up a flow in its bed which would bring the water in the canals 70 feet above the streets in the cities of El Paso and Juarez, respectively.

The gates at the 50-foot level would give an available reserve of water of 10 feet over the entire surface of the lake—over 2,000,000,000 cubic yards—which would be exhausted during the long season of little flow for the purposes of irrigation and other needs, as well as maintaining a constant stream in the river beds so arranged as to exhaust the reserve about the period of annual flood, which would be checked and held in reserve for the next season of little flow, and in this manner produce a comparatively constant and unvarying flow of water for each entire year below the dam, redeeming many times the number of acres submerged above in the lake from overflow below, and fixing permanently the national boundary, the banks of the river, as well as the boundaries and titles to private lands, and making it an easy matter to collect duties and prevent smuggling, detect crimes and misdemeanors generally, arrest and punish criminals, as it is along other national boundaries.

The assumed flow given for the seventy-five days of high water will give about 6,500,000,000 cubic yards, and that for the remaining two hundred and ninety days 1,500,000,000, making an aggregate annual flow of 8,000,000,000 cubic yards. If we allow 2,000,000,000 of this for loss by evaporation and other wastes, which former in this dry atmosphere is very great, perhaps 20 inches, we have 6,000,000,000 cubic yards remaining. This should be divided into three equal parts, one for each side of the river, for irrigation and other needs, and the third for overflow, through water motors, to furnish power to the future manufacturing cities on each side and to maintain a constant flow in the river below to the Gulf, as would no doubt be demanded by the people there as their right ere they would permit the scheme to be carried out.

The 2,000,000,000 cubic yards falling a distance of 50 feet over the dam, estimating the weight of a cubic yard of water at 500 pounds, and 1 horsepower the energy required to lift 33,000 pounds 1 foot in a minute, would expend energy equal to over 10,000 horse power for eight hours every day in the year, and produce a constant stream in the bed of the river 26 yards wide by 1 foot deep, running with a velocity of 5 miles per hour, to say nothing of the probability that the

greater part of the other two-thirds would find its way again to the river bed through the earth and air, the whole flowing in a steady, continuous stream to the mouth of the river to be used as required at any season of the year, instead of, as is now the case, six-eighths of the entire mass of the annual flow going rapidly to the Gulf in the short period of seventy-five days untaxed.

Estimating the amount of water required for annual irrigation at 20 inches, the water reserved for that purpose would be sufficient for 1,000,000 acres on each side of the river—all that could be reclaimed from the desert for 100 miles below.

To carry out this project I recommended to the people on each side of the Rio Grande that they petition to the executive authority of their respective nations for the creation of a joint commission to draw up the necessary treaty stipulations to protect the work and the rights of all interested in them, the fundamental feature of which should certainly be that each nation should have the right to divert no more than one-third of the flow at any period, and that one-third of the flow should be maintained in the bed of the river, and that this international commission have charge and control of the work after completion as well as during construction.

That the legislative authorities of the two nations be asked to appropriate, after complete investigations and estimates have been made, money sufficient to complete the work, probably \$100,000 for the dam proper, \$100,000 for the condemnation of the 50,000 acres of land to be submerged, and \$100,000 for the removal of some 15 miles of the road bed of the Atchison, Topeka and Santa Fe Railroad to bluffs above the old bed of the river, where the track now lies, subject to annual damage, and sooner or later total destruction, unless removed.

It will also be apparent that the waters of this great lake will be clear and fresh, the silt held in suspension in the current of the river being precipitated as soon as it enters the still water of the lake, doing away with the great trouble and expense now necessary in keeping the canals and ditches cleansed of sedimentary deposits, and a further great benefit derived from using water reduced in temperature by exposure for months in a warm climate far below that used in the early spring, which comes in three days from snow and ice and is immediately applied to the young and tender sprouting plants, chilling and checking their growth.

I know of no point in the Rio Grande, between Albuquerque and the Gulf of Mexico, where nature has provided both the natural basin and rim for a lake of such great dimensions, for indeed it can be made 100 feet deep if desired, and it may be questioned whether a depth of 60 feet, with 10 feet reserve to draw from, will afford sufficient storage to control perfectly the tide at its highest flow.

This project was well received by the people and has been earnestly discussed in the public press of the locality ever since, with general approbation and a disposition to endeavor to carry it out as quickly as possible; the only question exciting any general distrust being that of the sedimentary deposit in the lake, it is held by some, will shorten the life of the reservoir by filling the lake at such an early period as to render the scheme of doubtful expediency, and opinions differ very widely upon this subject, which is, indeed, a problematical one, and can only be determined, even approximately, by actual measurements of a great majority of the annual flow, for the quantity of sediment changes with flow and season.

That the bed of the river will eventually be filled, of course, is only a

matter of time, but whether in fifteen or one hundred and fifty years, can only be ascertained by prolonged, actual measurements; but, even if filled in the near future, it seems to me that the difficulty may be overcome by raising the dam, unless, indeed, that should be required too often.

The matter has already been referred to Major Powell, chief of the Geological Survey, who has sent Capt. Clarence Dutton, of his Department, to El Paso, to investigate and report on the feasibility of the scheme, but as the initial steps, should it be pronounced feasible, must come from your Department in the nature of international treaty stipulations, I have thought it proper to thus early acquaint you with the grand project.

I beg to refer you to Hon. Mr. Lanham, Member of Congress from Texas, who is acquainted with me personally and my projected scheme.

ANSON MILLS,
Major Tenth Cavalry,

Brevet Lieutenant-Colonel, United States Army.

The SECRETARY OF STATE,
Washington, D. C.

CONCURRENT RESOLUTION concerning the irrigation of arid lands in the valley of the Rio Grande River, the construction of a dam across said river at or near El Paso, Tex., for the storage of its waste waters, and for other purposes.

Whereas the Rio Grande River is the boundary line between the United States and Mexico; and

Whereas by irrigating ditches and canals taking the water from said river, and other causes, the usual supply of water therefrom has been exhausted before it reaches the point where it divides the United States of America from the Republic of Mexico, thereby rendering the lands in its valley arid and unproductive, to the great detriment of the citizens of the two countries who live along its course; and

Whereas in former years annual floods in said river have been such as to change the channel thereof, producing serious avulsions and oftentimes and in many places leaving large tracts of land belonging to the people of the United States on the Mexican side of the river and Mexican lands on the American side, thus producing a confusion of boundary, a disturbance of private and public titles to lands, as well as provoking conflicts to jurisdiction between the two Governments, offering facilities for smuggling, promoting the evasion and preventing the collection of revenues by the respective countries; and

Whereas these conditions are a standing menace to the harmony and prosperity of the citizens of said countries and the amicable and orderly administration of their respective Governments, therefore,

Resolved by the Senate (the House of Representatives concurring), That the President be requested, if, in his opinion, it is not incompatible with the public interests, to enter into negotiations with the Government of Mexico with a view to the remedy of all such difficulties as are mentioned in the preamble to this resolution, and such other matters connected therewith as may be better adjusted by agreement or convention between the two Governments.

The President is also requested to include in the negotiation with the Government of Mexico all other subjects which may be deemed to affect the present or prospective relations of both Governments.

Passed April 29, 1890.

EQUITABLE DISTRIBUTION OF THE WATERS OF THE RIO
GRANDE.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING,

IN RESPONSE TO RESOLUTION OF THE SENATE OF FEBRUARY
26, 1898, REPORTS FROM THE SECRETARY OF STATE, THE SEC-
RETARY OF WAR, THE SECRETARY OF THE INTERIOR, AND
THE ATTORNEY-GENERAL, WITH ACCOMPANYING PAPERS,
RELATIVE TO THE EQUITABLE DISTRIBUTION OF THE WATERS
OF THE RIO GRANDE RIVER.

APRIL 7, 1898.—Read, referred to the Committee on Foreign Relations, and ordered
to be printed.

To the Senate:

In response to the resolution of the Senate of February 26, 1898,
requesting the President—

if not incompatible with the public interest, to transmit to the Senate the proceed-
ings of the international commission authorized in the concurrent resolution of
Congress of April twenty-ninth, eighteen hundred and ninety, and a subsequent
international convention between the United States and Mexico of May sixth,
eighteen hundred and ninety-six, and also the correspondence relating thereto
with Mexico by the Department of the Interior, Department of War, and Depart-
ment of Justice, as well as the Department of State, relating to the equitable dis-
tribution of the waters of the Rio Grande River, including the draft of an
incomplete treaty between said Governments, negotiated between the late Secre-
tary of State, Mr. Olney, on the part of the United States and Mr. Romero on the
part of Mexico, and all the correspondence between said officials relating thereto—

I transmit herewith reports from the Secretary of State, the Secretary
of War, the Secretary of the Interior, and the Attorney-General, with
accompanying papers.

WILLIAM MCKINLEY.

EXECUTIVE MANSION, *April 7, 1898.*

The PRESIDENT:

The undersigned Secretary of State has the honor to lay before the
President, with a view to their transmission to Congress, copies of
the correspondence called for by the resolution of the Senate of Feb-

probability, have been so dissipated by the intervention of lawyers, claim agents, and others that the true sufferers would be little compensated, and the further fact that it is believed that there is a moral obligation resting on the two Governments—and it is reasonably practicable—to rescue the perishing communities here from the heretofore unwitting spoliation of others above, who now in turn must perish themselves if compelled to desist from using the water which they have unlawfully appropriated. The commissioners therefore make the following recommendations:

RECOMMENDATIONS.

The joint commission therefore recommend to the two Governments they represent, that a treaty be entered into, as a final settlement of all questions past and future, regarding the distribution of the waters of the Rio Grande.

(1) That the United States cede to Mexico the small tract of land before referred to, but reserving corporate rights of the Southern Pacific Railway Company to the United States.

(2) Construct the dam as designed by the joint engineers.

(3) Remove the railroads from the bed of the proposed reservoir.

(4) Acquire the land to be submerged.

(5) And in some way prevent the construction of any large reservoirs in the Rio Grande in the Territory of New Mexico, or in lieu thereof, if that be impracticable, restrain any such reservoirs hereafter constructed from the use of any waters to which the citizens of the El Paso Valley, either in Mexico or in the United States, have right by prior appropriation, and provide some legal and practicable remedy and redress, in case such waters should be used, to the citizens of both countries. And that thereafter the two Governments provide by joint representatives or mixed commission who are to reside at their respective ends of the dam, for a permanent distribution of the flow, as follows:

One-half or so much of one-half as may be required to the Mexican side of the river for such use as the Mexican Government may see proper to apply it.

One-half or so much of one-half as may be required to the United States side for similar use by the United States.

And all the remaining flow not required by either nation to the bed of the river, so regulated by partially depleting and refilling the reservoir as to maintain as far as practicable, a constant and uniform flow, for the purpose of avoiding a change of its bed (the boundary) by erosion or avulsion.

And in consideration of all the foregoing, that Mexico relinquish all claims for indemnity for the unlawful use of waters in the past, and accept the dam so constructed as an equitable distribution, past and future, of the waters of said river, so long as the United States conform to what is stipulated above.

That the United States defray all the expenses of the works of the dam, waste ways, outlets, etc.; the removal of the two railroads from the bed of the reservoir; the condemnation of the land; and have charge of the construction of the dam; and that Mexico be put to no pecuniary expense in the matter save the salaries and maintenance of such representatives as may be desired to witness the construction of the work and see that it be carried out according to the stipulations of the treaty and the specifications of the work.

In view of the importance in getting this subject before the present Administration in Washington in time to receive attention from both the executive and legislative departments, and thus avoid the long delay that would necessarily occur should the matter be laid over to a new Administration, having given the matter no previous study, it was decided that the United States commissioner would proceed at once, upon the signing of this journal, to Washington, to hand in person to the Secretary of State his copy of the proceedings, and that the Mexican commissioner would proceed at once to Mexico, to carry his copy to his Government, with a request that the Mexican Government approve or disapprove these proceedings at as early a date as practicable, and telegraph the result to the Mexican minister in Washington, in order that there may be as little delay as practicable in the two Governments bringing this matter to a final determination.

If the United States permits the construction of the Elephant Butte Dam (or other similar structures) on the river in New Mexico, the commissioners concur in the opinion of the engineers that the work should be done under United States or international supervision, as the release of such a vast body of water would not only endanger life and property below it, but possibly destroy the international dam, 120 miles below, should it be built, and entail further destruction.

The population of the El Paso Valley is at least 50,000, all dependent upon the flow of the water in the Rio Grande. The engineers, in their report, place the population at 20,000.

A. RESERVOIRS ALREADY BUILT.

1. *Saguache*.—This is in district 26, Colorado, and was built by the State. The water supply is scanty, and in its present condition the reservoir will not hold what water does enter it, the bottom being porous. None of the water to be diverted into this reservoir ever reaches the river, so that its construction has not affected the water supply of the Rio Grande. Its capacity is said to be 1,200 acre-feet.

2. *Cove Lake*.—This lies in district 22, Colorado, and is filled by surplus waters from Conejos and San Antonio rivers. Water diverted to it would otherwise enter the Rio Grande. While the capacity of the lake is 9,700 acre-feet, there is not land enough under it to utilize more than a third of this amount, so that the reservoir should be charged with a probable draft on the drainage of not over 4,000 acre-feet.

3. *Santa Fe*.—This is built above Santa Fe. The water it impounds would otherwise be used for irrigation, as the stream has not for many years delivered any water to the river, except in time of flood. This reservoir serves as an equalizer, distributing the use of water more uniformly throughout the year. Its capacity is 4,000 acre-feet. It can be omitted from the discussion.

4. *Blue Water*.—This is a Government reservoir site No. 33, and is built on Blue Water Creek, in the Zuni Mountains, to a capacity of 20,000 acre-feet. It can be made to hold 70,000 acre-feet, but the water supply is uncertain. It stores no water that would ever reach the Rio Grande, and so may be omitted from the discussion.

B. RESERVOIRS PROJECTED WITH A FAIR PROSPECT OF CONSTRUCTION.

1. *Santa Maria Lakes*.—This site is in district 20, Colorado, near the head waters of the Rio Grande. If utilized, it will furnish water for one of the large canals in the San Luis Valley. All of its capacity of 20,000 acre-feet would be drawn from water which would otherwise flow down the river.

2. *Mormon*.—This site is in district 22. It may never be built, but I thought it possible that it might be, and so listed it. All of its capacity of 20,000 acre-feet would be drawn from water which would otherwise flow down the Conejos.

3. *Western Homestead Land and Investment Company's Reservoir*.—This site lies northwest of Albuquerque and would be filled from the flood waters of the Puerco. While it would draw a supply from the sudden summer floods of this river, much of which water would otherwise sink away into the sand, it must be considered as menacing 20,000 acre-feet of flow, as this is its capacity.

4. *Elephant Buttes*.—This is a large reservoir site on the Rio Grande west of the Jornada del Muerto. The dam site and main part of the reservoir site lie on the Pedro Armendaris Grant No. 33, to which the United States has given patent. The projectors claim 235,000 acre-foot capacity with an 80-foot dam. I reconnoitered the site on October 7 and estimated its capacity to be 230,000 acre-feet with a 100-foot dam. This must be considered for the reason that, while its construction is not at all assured and may not even be a future probability, its effect, if built, on the flow of the river would be very serious, and so it should be carefully studied.

58TH CONGRESS, } HOUSE OF REPRESENTATIVES. } DOCUMENT
3d Session. } No. 28.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
CHARLES D. WALCOTT, DIRECTOR

THIRD ANNUAL REPORT
OF THE
RECLAMATION SERVICE

1903-4

[SECOND EDITION]

F. H. NEWELL
Chief Engineer



WASHINGTON
GOVERNMENT PRINTING OFFICE
1905

Government to determine the exact boundary line of the irrigated lands. The construction of the reservoir were opened at Reservoir No. 1, September 6, 1904.

URTON LAKE PROJECT.^a

On Pecos River, in eastern New Mexico, about 10 miles west of Lordsburg, in the vicinity of old Fort Sumner, in Chaves and Mora counties. The project is to divert the waters of the Pecos by means of a dam 1.5 miles long, the flood waters to be stored in a large reservoir provided with an outlet tunnel and dam. The irrigable lands are nearly all in public ownership. The reservoir site and on the east side of Pecos is excellent in quality, the climate is good, and the irrigable portions will be immediately entered. The irrigable tract is about 100 miles from Santa Rosa, 10 miles from the Santa Fe and Northern Railway, and 25 miles from Kenna. Probably 60,000 acres can be reclaimed under the estimated cost of \$1,000,000.

Work was begun in May, 1903. The inlet canal has been dug and test pits have been dug along its entire length. A considerable amount of irrigation has been worked over by a topographical survey. At present one man is stationed near the head of the canal, making river gaging and daily rod reading for determining the amount of water available for the project.

To determine the cost and the stability of proposed structures, in this winter, when drill men now employed will be available for work in warmer climates.

LAS VEGAS PROJECT.^b

Is situated about 5 miles north of Las Vegas, on what is known as the "Las Vegas grant." This grant is owned by the State of Las Vegas and is governed by a board of directors.

The project is to conduct the water from both the Gallinas and the Rio Grande at a point about 5 miles north of the town of Las Vegas. It is to be done by means of a dam constructed across a narrow canyon. The regular flow of these streams has been maintained. It is contemplated to store the flood waters coming from the mountains to the west, which are claimed by the residents of this vicinity to be large in amount. Gaging stations have been established on both these streams to determine the amount of water available.

Surveys have been taken by the board of trustees looking to the transfer of the United States of such lands as will be occupied by the project and those to be irrigated under this project. A map of the reservoir site and of the lands susceptible of irrigation under this project has been made and the inlet and outlet canals have been surveyed. The legal matters pertaining to the transfer of the lands, etc., are being investigated by the representatives of the grant. The surveys will be made soon to determine the underlying strata in the reservoir site and at the point of proposed structures. The investigations of water supply will also be continued.

RIO GRANDE PROJECT.^c

Is proposed to store the flood waters of the Rio Grande at some point in New Mexico for the development of the open valleys along the course of the river. Surveys made in past years show that at a number of localities water may be held along the course of the stream, especially above Mesilla Valley and above El Paso.

The survey of the Engle reservoir site and of the dam site was completed in August, 1903. A survey of the irrigable lands was then made and continued through Mesilla Valley to El Paso, Tex. Borings for the foundations at the Engle dam site were begun in October, 1903, and completed in February, 1904. Borings near Fort Selden, Tex., for a diverting dam have also been made and other studies of the Rio Grande conducted with reference to storage possibilities and supply of water. Consideration is being given to the international questions involved between the United States and the Republic of Mexico. The office work has been transferred to the Trust Building, El Paso, Tex., with B. M. Hall, consulting engineer, in charge. Plans and estimates have been made for a storage dam at the Engle site and for a system of canals for irrigating all the good land below it in New Mexico and for furnishing water to be used in the vicinity of El Paso.

The engineers of the Reclamation Service have received requests from the residents and from the Chamber of Commerce of Las Cruces, N. M., that the Government construct a diversion dam and several miles of canal on the Rio Grande, near Penasco Rock, to deliver water to the present ditches near Las Cruces. These applicants have been asked to make definite organization and submit application from the necessary area of land to guarantee the return of the cost of the project under the requirements of the reclamation act, so as to put

^a For detailed report, see pp. 368-369.
^b For detailed report, see pp. 369-372.

^c For detailed report, see pp. 419-426.

the matter in definite form for consideration. The diversion dam is an essential part of the main reclamation project on the Rio Grande, and its construction is requested at once for the purpose of giving immediate partial relief to the inhabitants of Mesilla Valley. The flow of the Rio Grande at this point is so fluctuating in its character that sufficient water for irrigation can not be furnished any large tract without regulation in storage reservoirs: although a small tract can be provided with a supply which would permit the raising of crops and relieve temporary distress, if permanent headworks were placed in the river and connected with existing canals. At present the rock and brush dams, which are all the inhabitants can afford, are frequently washed out by floods, and can not be replaced until the river again goes dry. This frequently leads to a total loss of crops and consequent distress and actual suffering. It is to relieve this condition quickly that the work is urged upon the Reclamation Service.

LA PLATA VALLEY PROJECT.^a

This project is located on La Plata River, in San Juan County, in northwestern New Mexico. The water supply will be obtained mainly from Animas River and its tributaries, and possibly from Los Pinos River, in Colorado. This supply will be diverted from Animas River, either by means of canals near the Colorado-New Mexico line of an aggregate length of approximately 100 miles, or by means of comparatively short tunnels through the high divide between Animas and La Plata rivers and a much shorter line of canals connecting with the end of the tunnel.

For this project it will be necessary to supplement the minimum flow in Animas River during a portion of the irrigation season by storage, both at the head of La Plata Valley and on Animas River, there being an abundance of water for this purpose during the high-water period. The development of this project contemplates the reclamation of approximately 50,000 acres of land.

A preliminary investigation of this project was made by M. C. Hinderlider from June 14 to 24, 1904. This investigation consisted of a trip over a portion of the lands to be watered and along a portion of the proposed canal line, also a collection of data concerning lands, crops, water supply, storage facilities, etc., which were included in a report to the chief engineer, dated July 12, 1904. After examining the report, the chief engineer, under date of July 21, 1904, approved the recommendations and directed that preliminary surveys be begun.

In addition to the investigations described above a reconnaissance of the drainage basin of Florida River from its headwaters nearly to

^a For detailed report, see pp. 392-394.

SUMMARY OF OPERATIONS IN NEW

the Colorado-New Mexico line was made in April for locating storage facilities. Nothing feasible was found at Bishop Lakes, lying north of Durango and were also investigated to determine their utility for storage, but it was discovered that these sites had been and are being developed by a local corporation. Fifteen townships in and tributary to La Plata in New Mexico, aggregating approximately 30 and one-half townships in Colorado along Animas River, aggregating approximately 80,640 acres, have been with a view to future development, pending future examinations, these will be requested under date of August 8 and 15, respectively. Two field parties, consisting of a level and a canal line and a plane-table party on the reservation in the field, under the supervision of Mr. Hinderlider, will complete the necessary surveys and examinations.

RECONNAISSANCE SURVEYS.

Instructions have been issued by the chief engineer for investigations and reconnaissances of other projects as time and opportunity offer. In April, 1904, the reservation was visited by Frank S. Dobson, engineer, and a reconnaissance being made from Springer, N. Mex., to the

SILT INVESTIGATIONS.^a

Owing to the long-continued drought in New Mexico the storage reservoir of the Pecos Irrigation Company, north of Carlsbad, N. Mex., was nearly empty. On making a visit to this reservoir in January, 1904. A. J. Sander, engineer, and J. H. Quinton and W. H. Sander recommended that should this reservoir be empty, investigations of the silt deposit should be made by the company to obtain information to be used where conditions on the Pecos River exist. These investigations showed that the reservoir had been filled 42 per cent in ten years, or 4 per cent per year, and would soon become useless unless remedies were taken.

SUMMARY OF OPERATIONS IN NEW

A general examination of this State was made in April, 1904. Much attention was concentrated on the position of the Colorado-New Mexico line.

^a For detailed report, see pp. 379-380.

topography started. The triangulation of the reservoir site on Animas River has indicated that all field work in connection with this project will be completed by March 1, 1905.

vicinity of Gallajos, and the water flumed over the latter or stored in a reservoir. A thorough survey and examination will be made for such a site.

PLANS FOR IRRIGATION OF THE RIO GRANDE VALLEY.^a

GENERAL STATEMENT.

Rio Grande rises in Colorado and flows south through the entire length of New Mexico to the north boundary of Texas, near El Paso. From this point to "The Pass," about 4 miles above El Paso, Tex., it forms the boundary between New Mexico and Texas. Below "The Pass" it becomes the boundary line between the United States and Mexico, and continues as such for about 1,300 miles to the Gulf of Mexico.

As far as its history is known it has always been a torrential or flood water stream, subject at times to great floods and at other times to periods of minimum flow, when its bed was dry or carried an insignificant amount of water along certain parts of its course.

Above El Paso it has a length of about 900 miles and a drainage area of about 38,000 square miles. In this section its ordinary flow, which is known as its permanent water, comes almost entirely from a comparatively small area in Colorado and upper New Mexico, where there is a heavy snowfall in the mountains.

The country through which it flows is very fertile, but the rainfall is so meager and so erratic that it is an arid desert and no crops can be raised without artificial irrigation.

Before the middle of the sixteenth century the Spaniards entered the valley of the Rio Grande in New Mexico and there found the Pueblo Indians living in towns, cultivating the land and bringing water onto it by irrigating ditches, many of which are still in use at the present time.

A Spanish colony was established at Chamita, N. Mex., in 1598, and Santa Fe in 1605. The latter colony existed until 1680, when it was driven out by the Pueblo Indians. Spanish supremacy was again established in 1692. From that time to near the middle of the nineteenth century the Rio Grande Valley in New Mexico was under the dominion of Spain and Mexico and was settled by Spaniards and Mexicans, who irrigated and cultivated the lands. In the excellent report made by Mr. W. W. Follett in 1896 to the International Boundary Commission he says:

"While quite a large native population has come into the Rio Grande drainage of New Mexico since the construction of railroads in 1880, it is confined principally to the towns, and to-day fully 90 per cent of the irrigating in this section is done by Mexicans and Indians."

^aFrom report by B. M. Hall, supervising engineer.

WATER ALONG UTE CREEK.^a

A site, which is located about 8 miles west of Logan, at a bend of Ute Creek, was indicated by W. G. Russell, hydrographer, in 1902. A reservoir constructed there would be a valuable body of the lands near Logan, and would be a Canadian River. Other objections to the site, especially on the left bank, where the width is one-half mile, are that the stream and the bottom lands are expensive and uncertain. It was estimated that it would cost up to 50 feet of elevation on the left bank, but it was not thought advisable to raise the water to the end of the back flow. The places along the creek, gave an average fall of 12.6 feet. It was estimated that a maximum fall of 12.6 feet would not be of sufficient value to justify the expense.

Along the land along Canadian River, the condition of irrigation, and this condition continues for miles farther down. At the time of the survey, a second-foot of water was flowing in the Canadian River was too high to force water into the creek indicate that at the present time, the magnitude, though their frequency, is not earned with any degree of certainty.

Martinez ranch, about 1 mile below Logan, and an assistant employed to the project.

The stream was cross sectioned at the site. In the extensive watershed, a gaging station will be established at the place selected is perhaps as good as any.

Irrigable land lying north of Logan could be put on it. If a reservoir is constructed on the River near the third guide meridian, the Canadian and over to Ute Creek.

^aReport by W. G. Russell.

In the same report Mr. Follett says:

The El Paso Valley was occupied by Spaniards over three hundred years. In the year 1600 El Paso del Norte (now called Juarez) was an important city and records are in existence over two hundred and eighty years old which refer to the Acequia Madre of El Paso del Norte as being in use.

In speaking of his investigations in El Paso Valley Mr. Follett says:

From all I could learn, I should judge that in former years some 40,000 acres of land were filled in this valley, more than half of which was on the Mexican side of the river.

During recent years there has been a great scarcity of water in the Rio Grande in New Mexico and in the El Paso Valley of Texas and Mexico. The deficiency of flow at El Paso brought about a complaint from the Republic of Mexico. The question was referred to a protocol, dated May 6, 1896, to the International Boundary Commission for a full investigation and a report upon the following points:

1. The amount of water of the Rio Grande taken by irrigation canals in the United States of America.
2. The average amount of water in said river, year by year, before the construction of said irrigation canals and since said construction.
3. The best and most feasible mode of so regulating the use of the waters of said river as to secure to each country concerned and to its inhabitants their legal and equitable rights and interests in the waters.

On November 25, 1896, the Commission, composed of Col. A. A. Mills for the United States and Señor Don F. Javier Osorondo for the Republic of Mexico, having before them the full and complete report of Mr. W. W. Follett, United States engineer for the Commission, reported as follows:

1. The increase in the acreage irrigated from the Rio Grande in the State of Colorado from the year 1880 to the year 1896 was 197,000 acres. The increase of acreage irrigated in New Mexico during the same years was 3,000 acres, making a total of 200,000 acres.
2. The flow of the river at El Paso has been decreased about 200,000 feet of water per annum by the taking of water for irrigation by canals constructed in the United States of America, the great mass of these waters consisting of flood waters utterly unavailable for irrigation without large reservoirs.
3. As "the best and most feasible mode of regulating the use of waters securing to each country and its inhabitants their legal and equitable rights in said waters," the Commission recommended that the United States Government should buy all necessary land, pay all damages, and construct at its expense an international dam at "The Pass," about 4 miles above El Paso, to submerge 25,565 acres of good land in the United States with water; and the Mexican boundary upstream to the dam site, giving Mexico 98 acres of international territory in order that one end of the dam may be on Mexican

NEW MEXICO: PLANS FOR RIO GRANDE VALLEY

half of the dam, the reservoir, and the water supply system, and in some way prevent the construction of any levee on the Rio Grande in the Territory of New Mexico.

The Commission estimated the cost of this project at \$2,317,113.36, the cost of the project would be \$42.12, per acre. The Commission is a correct one. There is no doubt that this estimate is too low; but aside from the money for the land to be irrigated there is another item to be considered. The reservoir would cover 25,565 acres of land with mud and water and would cause marshing of the flat valley at the head of the lake, amounting to an additional, making a total destruction of about 25,565 acres in Mesilla Valley, which is just as near to El Paso as any of the land that would be irrigated. While the published report of the Commission only sets forth the fact that increased irrigation would result in a shortage of water in Mexico, Texas, and Arizona, the Commission's recommendations not only leave New Mexico out of the picture, but derived from a project inaugurated for the purpose of relieving a shortage, but give part of her territory to the United States, and part of it by the proposed reservoir, and the United States Government shall prevent the construction of a reservoir on the Rio Grande in the Territory of New Mexico. A reasonable explanation of these recommendations is the fact that the Commission had no alternative, and thought that the plan recommended was the only means that could be adopted for restoring the river to its old laid claim by virtue of ancient prior use. At the time with the prospect of an El Paso dam, New Mexico, not under Government management, was owned, and operated by a stock company. Those plans contemplated the construction of a dam without sufficient storage capacity for the United States above and leaving a surplus for Mexico. The plan is completely changed, and there is an alternative plan claimed will accomplish just as much for

Mr. Follett says:

occupied by Spaniards over three hundred years. El Norte (now called Juarez) was an important place over two hundred and eighty years old which El Paso del Norte as being in use.

Investigations in El Paso Valley Mr. Follett

should judge that in former years some 40,000 acres of valley, more than half of which was on the Mexican

There has been a great scarcity of water in Mexico and in the El Paso Valley of Texas. The flow at El Paso brought about a scarcity of water in Mexico. The question was referred to the International Boundary Commission in 1896, to the International Boundary Commission for investigation and a report upon the following

order of the Rio Grande taken by irrigation in the United States of America.

The flow of water in said river, year by year, being regulated by irrigation canals and since said construction is a feasible mode of so regulating the use of water as to be secure to each country concerned and to secure equitable rights and interests in the

the Commission, composed of Col. Andrew D. B. Follett and Señor Don F. Javier Osorno, having before them the full and complete report of the United States engineer for the Commission

the area irrigated from the Rio Grande in the State of New Mexico the year 1890 was 197,000 acres. The increase in the year 1900 was 3,000 acres.

El Paso has been decreased about 200,000 acres. The taking of water for irrigation by canals in the State of America, the great mass of these waters is unavailable for irrigation without large reservoirs.

A feasible mode of regulating the use of water and of securing to the inhabitants their legal and equitable rights is recommended that the United States Government should, and pay all damages, and construct at its own expense a dam at "The Pass," about 4 miles above El Paso, and in the United States with water; extending to the dam site, giving Mexico 98 acres additional. The end of the dam may be on Mexican soil.

half of the dam, the reservoir, and the water supply to the Republic of Mexico, and in some way prevent the construction of any large reservoirs on the Rio Grande in the Territory of New Mexico.

The Commission estimated the cost of this project at \$2,317,113.36. As above mentioned, Mr. Follett estimates that about 40,000 acres had prior rights under the old canals in El Paso Valley, and deprived of irrigation by the acts of American citizens on the Mexican side of the river. As the restoring of these waters; and that something more than one-half of this 40,000

water rights is the primary object of the proposed expenditure of \$2,317,113.36, the cost of the project would be \$57.92 per acre. However, it will be shown further along in this paper that the proposed reservoir could be made to irrigate 55,000 acres in El Paso Valley which would put the cost per acre at \$42.12, provided the estimate of the Commission is a correct one. There is every reason for

believing this estimate too low; but aside from the monetary cost per acre for the land to be irrigated there is another item of cost to be considered. The reservoir would cover 25,565 acres of good valley with mud and water and would cause marshes to form in the flat valley at the head of the lake, amounting to perhaps 15,000 acres additional, making a total destruction of about 40,000 acres of land in Mesilla Valley, which is just as near to El Paso and just as valuable as any of the land that would be irrigated.

While the published report of the Commission and its engineers only sets forth the fact that increased irrigation in Colorado caused shortage of water in Mexico, Texas, and New Mexico, the recommendations not only leave New Mexico out of all the benefits to be derived from a project inaugurated for the purpose of making good this shortage, but give part of her territory to Mexico; cover up the other part of it by the proposed reservoir, and distinctly ask that the Government shall prevent the construction of any other large reservoir on the Rio Grande in the Territory of New Mexico. The only reasonable explanation of these recommendations lies in the probable fact that the Commission had no alternative plan for consideration, and thought that the plan recommended was the only feasible means that could be adopted for restoring the water to which Mexico laid claim by virtue of ancient prior use. Indeed they were confronted at the time with the prospect of an Elephant Butte dam in New Mexico, not under Government management, but to be constructed, owned, and operated by a stock company of private capitalists, whose plans contemplated the construction of a comparatively low dam without sufficient storage capacity for irrigating a large area above and leaving a surplus for Mexico. Now that conditions have completely changed, and there is an alternative plan which is claimed will accomplish just as much for Mexico and a great

deal more for the United States, it becomes necessary to compare these two plans and choose between them.

The alternative plan suggested by the Reclamation Service is to build a storage dam opposite Engle, N. Mex., across the river at a point about one-third mile below the site selected by the Elephant Butte Company and one-half mile below Elephant Butte, which is a conical mountain peak rising abruptly from the river to a height of about 500 feet. At this site it is proposed to build a dam that will form a reservoir 175 feet deep at its lower end, 10 miles long, with a storage capacity of 2,000,000 acre-feet of water to furnish 600,000 acre-feet per annum and irrigate 600,000 acres of land, distributed as follows:

Land irrigable from Engle reservoir, New Mexico.

New Mexico
Texas above El Paso.....
El Paso Valley below El Paso, in Texas and Mexico.....

In considering these projects or any other plans of water storage on the Rio Grande it is well to keep in mind the following conditions:

(1) While the floods on the river are enormous, they do not come with any regularity, and the total flow in some years is less than one-tenth of the total flow in other years.

(2) Any reservoir constructed on the river will stop all the water that comes down the river in suspension. Hence a small amount of mud will accumulate as many acre-feet of mud per year as a reservoir until it is filled with mud.

(3) All the water that comes down the river is needed for irrigation, and none should be wasted.

These three conditions make it imperative that the reservoir be as large and as deep as possible, and should have capacity for storing a supply of water over from year to year to equalize the inequalities, a surplus capacity for mud accumulations, and a capacity for evaporation that is as small as possible in comparison with the quantity of water in storage.

FLOOD STORAGE ON THE RIO GRANDE.

The following is a study of the service that could have been formed by the proposed "international dam" at El Paso, and by the proposed dam near Engle, N. Mex., from January 1, 1904, inclusive, in the storage of the flood waters of the Rio Grande and their distribution for irrigation.

This study necessarily requires a knowledge of the following conditions:

(1) The quantity of water flowing in the river during each year of the period specified.

(2) The percentage of mud, or silt, carried in suspension by the water to be deposited in the reservoir.

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Depth of evaporation from the surface of the reservoir in the year.

Storage capacity and area of water surface at various levels from bottom to top.

A fair estimate may be made of the quantity of mud that will be carried in suspension, and the total number of years that will be required without cleaning out the reservoir, has been assumed that either reservoir will be filled with mud in it fills 60 per cent of its capacity.

PERCENTAGE OF SILT IN WATER.

For making silt measurements of Rio Grande water samples taken under the supervision of the consulting engineer of the International Irrigation Commission, the percentage of silt being determined by the International Irrigation Commission and Mechanical College of Texas. The volume for seven days' settlement with 100 cubic centimeters of muddy water was placed in a glass jar, and reading the height of mud in the water, the percentage by weight was obtained by dividing the deposit and comparing its weight with the weight of water.

Measurements made in September, 1900, are given in Bulletin No. 119, Office of Experiment Station, Department of Agriculture. Those for 1901 and 1902 are given in Bulletin No. 113, of same Department. Those for 1903, and for June, 1900, were obtained by Mr. W. W. Follett. The percentage by weight will be used in this report, and converted into percentage by volume by a

Percentage of silt in the waters of the Rio Grande at various points.

Date.	Per cent of silt, by volume, after standing 7 days.
.....	3.39
.....	5.04
.....	15.94
1897.....	2.76
.....	1.52
1898.....	.74
.....	.6
.....	8.41
1900.....	22.20

States, it becomes necessary to compare between them.

suggested by the Reclamation Service is to site Engle, N. Mex., across the Rio Grande a mile below the site selected by the old and one-half mile below Elephant Butte, a peak rising abruptly from the river bank east. At this site it is proposed to build a reservoir 175 feet deep at its lower end and of a capacity of 2,000,000 acre-feet, enough to store 100,000 acre-feet per annum and irrigate 180,000 acres. The following are the facts:

from Engle reservoir, New Mexico.

	Acres.
-----	110,000
-----	20,000
in Texas and Mexico	50,000

jects or any other plans of water storage. It is well to keep in mind the following facts:

the river are enormous, they do not come from the total flow in some years is less than one year in other years.

tructed on the river will stop all the silt in suspension. Hence a small reservoir of 100,000 acre-feet of mud per year as a large one.

comes down the river is needed for irrigation. It is wasted.

make it imperative that the reservoir should be as large as possible, and should have capacity for carrying over from year to year to equalize the yearly capacity for mud accumulations, and a surface as small as possible in comparison with the size of the river.

RANGE ON THE RIO GRANDE.

ly of the service that could have been performed by an "international dam" at El Paso, Tex., and at Engle, N. Mex., from January, 1897, to the present. The storage of the flood waters of the Rio Grande for irrigation requires a knowledge of the following conditions:

water flowing in the river during each month.

mud, or silt, carried in suspension by the river to the reservoir.

(3) The depth of evaporation from the surface of the reservoir for each month in the year.

(4) The storage capacity and area of water surface of the reservoir at different levels from bottom to top.

From these a fair estimate may be made of the amount of water available for irrigation, the quantity of mud that will accumulate in the reservoir, and the total number of years that the reservoir can be used for the service required without cleaning out the accumulated mud. It has been assumed that either reservoir will give good service until the mud in it fills 60 per cent of its capacity.

PERCENTAGE OF SILT IN WATER.

The following silt measurements of Rio Grande water at El Paso, Tex., are from samples taken under the supervision of the United States consulting engineer of the International Boundary Commission, the percentage of silt being determined by Prof. J. C. Nagle, of the Agricultural and Mechanical College of Texas. The percentage of silt by volume for seven days' settlement was obtained by filling a tube with 100 cubic centimeters of muddy water, allowing it to stand for a week, and reading the height of mud in the bottom of the tube. The percentage by weight was obtained by drying and weighing the mud deposit and comparing its weight with that of the 100 cubic centimeters of water.

The measurements made in September, 1900, are published on page 32, Bulletin No. 119, Office of Experiment Stations, United States Department of Agriculture. Those for 1901 and 1902 are published on page 206, Bulletin No. 113, of same Department. Those for 1897, 1898, and 1903, and for June, 1900, were obtained from a letter from Prof. J. C. Nagle to Mr. W. W. Follett. The whole data is given here, but only the percentage by weight will be used, and this will be converted into percentage by volume by a method hereinafter described.

Percentage of silt in the waters of the Rio Grande at El Paso, Tex.

Date.	Per cent of silt by volume, after standing 7 days.	Per cent of silt by weight, dry.	Discharge of river in second-feet when sample was taken.
July 7, 1897	3.39		5,980
July 11, 1897	5.04		7,240
September 23, 1897	15.94		550
July 11, 1898	2.76		1,700
September 8, 1898	1.52		
September 27, 1900	.74		95
September 29, 1900	.64		45
September 9, 1900	8.40	3.91	830
October 10, 1900	22.20	5.52	830

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Percentage of silt in the waters of the Rio Grande at El Paso, Tex.—Continued.

Date.	Per cent of silt.		Discharge of river in second- feet when sam- ple was taken.
	by volume, af- ter standing 7 days.	by weight, dry.	
September 13, 1900.....	15.74	3.70	1,000
Do.....	17.67	4.29	1,690
September 15, 1900.....	18.40	5.15	740
September 18, 1900.....	17.74	4.90	680
September 20, 1900.....	23.22	8.66	160
September 24, 1900.....	12.81	3.37	45
February 14, 1901.....	6.05	1.36	90
February 15, 1901.....	5.86	1.47	110
February 16, 1901.....	6.02	1.47	180
May 2, 1901.....	12.42	3.98	1,020
May 4, 1901.....	10.29	2.96	1,520
May 5, 1901.....	6.07	1.92	1,880
May 6, 1901.....	6.01	2.03	2,380
May 7, 1901.....	5.83	1.95	3,050
May 8, 1901.....	5.84	1.99	3,100
May 9, 1901.....	5.86	1.64	2,340
April 26, 1902.....	8.22	1.56	460
April 28, 1902.....	13.55	3.61	420
April 30, 1902.....	5.45	1.35	140
May 2, 1902.....	6.81	2.06	60
May 7, 1902.....	.40	.06	15
June 3, 1902.....	8.23	2.46	15
February 27, 1903.....	8.88	1.60	1,300
March 11, 1903.....	16.51	4.04	40
March 24, 1903.....	2.91	1.82	1,000
April 10, 1903.....	8.04	2.69	60
April 24, 1903.....	1.53	1.41	2,400
May 9, 1903.....	4.35	1.80	5,000
May 16, 1903.....	2.45	.64	4,400
May 25, 1903.....	1.12	.52	2,800
May 31, 1903.....	2.20	.64	2,800
June 6, 1903.....	1.29	.40	16,000
June 18, 1903.....	4.66	.89	16,000
June 26, 1903.....	1.58	.53	12,000
June 29, 1903.....	.76	.22	10,000
July 2, 1903.....	1.06	.15	3,000
July 7, 1903.....	.94	.28	1,000
July 12, 1903.....	1.27	.17	1,000
July 16, 1903.....	.98	.15	1,000
July 24, 1903.....	1.39	.70	1,000

NEW MEXICO: PLANS FOR RIO G

On June 29, 1904, Messrs. Follett and Ha-
silt mud from the bed of the Rio Grande
temperature and weighed by Mr. Arthur
weighed 5,789 grains, and shows that a cul-
but will weigh 53 pounds, which is 85 per cen-
foot of water.

In the following table column A shows
Rio Grande water by weight in different r-
estimated and tabulated by Mr. Follett from tl
ments and from his observed changes in t
sons and stages of the river. Column B sh-
and in a compacted state by volume, base
cubic foot of such mud, found, as above desc-
the weight of a cubic foot of water. The
therefore, obtained by dividing the figures
are the figures used for estimating the mud
from month to month.

Percentage of silt, by weight, "A," and by compacted
Rio Grande from January, 1897, to Ju-

[By W. W. Follett and B. M. I.]

Month.	1897.		1898.	
	A.	B.	A.	B.
January.....	2.40	2.82	0.90	1.06
February.....	2.40	2.82	.90	1.06
March.....	2.40	2.82	.90	1.06
April.....	2.06	2.42	2.38	2.80
May.....	.81	.95	1.00	1.18
June.....	.52	.61	1.00	1.18
July.....	.52	.61	1.00	1.18
August.....	4.00	4.71	1.00	1.18
September.....	5.45	6.41	1.00	1.18
October.....	3.75	4.41		
November.....	2.06	2.42		
December.....	.90	1.06	1.00	1.18

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of the Rio Grande at El Paso, Tex.—Continued

	Per cent of silt, by volume, af- ter standing 7 days.	Per cent of silt, by weight, dry.	Discharge river in feet when pile was
	15.74	3.70	1
	17.67	4.29	1
	18.40	5.15	
	17.74	4.90	
	33.22	8.66	
	12.81	3.37	
	6.05	1.36	
	5.86	1.47	
	6.02	1.47	
	12.42	3.98	1
	10.29	2.96	1
	6.07	1.92	1
	6.01	2.03	2
	5.83	1.95	3
	5.84	1.99	3
	5.86	1.64	2
	8.22	1.56	
	13.55	3.61	
	5.45	1.35	
	6.81	2.06	
	.40	.06	
	8.23	2.46	1
	8.88	1.69	
	16.51	4.04	1
	2.91	1.82	
	8.04	2.69	1
	1.53	1.41	6
	4.35	1.80	2
	2.45	.64	5
	1.12	.52	4
	2.20	.64	2
	1.29	.40	2
	4.66	.89	16
	1.58	.53	16
	.76	.22	12
	1.06	.15	10
	.94	.28	3
	1.27	.17	1
	.98	.15	9
	1.39	.70	1

On June 29, 1904, Messrs. Follett and Hall cut a 3-inch cube of wet mud from the bed of the Rio Grande and had it dried at a low temperature and weighed by Mr. Arthur W. Houck, assayer. It weighed 5,789 grains, and shows that a cubic foot of silt mud dried out will weigh 53 pounds, which is 85 per cent of the weight of a cubic foot of water.

In the following table column A shows the percentage of silt in Rio Grande water by weight in different months and years, as estimated and tabulated by Mr. Follett from the foregoing silt measurements and from his observed changes in turbidity for different seasons and stages of the river. Column B shows the percentage of silt mud in a compacted state by volume, based on the dry weight of a cubic foot of such mud, found, as above described, to be 85 per cent of the weight of a cubic foot of water. The figures of column B are, therefore, obtained by dividing the figures of column A by 0.85, and are the figures used for estimating the mud accumulations by volume from month to month.

Percentage of silt, by weight, "A," and by compacted volume, "B," in the waters of the Rio Grande from January, 1897, to June, 1904, inclusive.

[By W. W. Follett and B. M. Hall.]

Month.	1897.		1898.		1899.		1900.	
	A.	B.	A.	B.	A.	B.	A.	B.
January	2.40	2.82	0.90	1.06	0.90	1.06	0.90	1.06
February	2.40	2.82	.90	1.06	.90	1.06	.90	1.06
March	2.40	2.82	.90	1.06	1.40	1.65	.50	.59
April	2.06	2.42	2.38	2.80	2.00	2.35	.30	.35
May .....	.81	.95	1.00	1.18	1.40	1.65	1.62	1.91
June .....	.52	.61	1.00	1.18			1.00	1.18
July .....	.52	.61	1.00	1.18	4.90	5.76	.30	.35
August	4.00	4.71	1.00	1.18	.50	.59		
September	5.45	6.41	1.00	1.18			4.94	5.81
October	3.75	4.41						
November	2.06	2.42						
December .....	.90	1.06	1.00	1.18	.90	1.06	1.00	1.18

H. Doc. 28, 58-3—26

402 THIRD ANNUAL REPORT OF RECLAMATION SERVICE.

Percentage of silt, by weight, "A," and by compacted volume, "B," in the waters of the Rio Grande from January, 1897, to June, 1904, inclusive—Continued.

Month.	1901.		1902.		1903.		1904.	
	A.	B.	A.	B.	A.	B.	A.	B.
January.....	1.00	1.18	0.50	0.59	1.70	2.00	1.00	1.18
February....	1.43	1.68	.50	.59	1.69	1.99	.50	.59
March.....	1.40	1.65	.30	.35	2.38	2.80		
April.....			2.17	2.55	2.06	2.42		
May.....	1.62	1.91	2.06	2.42	.90	1.06		
June.....	1.00	1.18	2.46	2.89	.52	.61		
July.....	4.94	5.81			.29	.34		
August.....	4.94	5.81	4.94	5.81	1.40	1.65		
September..	4.94	5.81	4.94	5.81	1.40	1.65		
October.....	4.94	5.81	.50	.59	1.40	1.65		
November..	1.43	1.68	.50	.59	.50	.59		
December..	.50	.59	.50	.59	1.00	1.18		

EVAPORATION FROM SURFACE OF RESERVOIR.

The figures given below, showing evaporation at Fort Bliss, near El Paso, Tex., in 1889 and 1890, were published in Twelfth Annual Report United States Geological Survey, part 2, page 235, and in Thirteenth Annual Report, part 3, page 411.

Estimated evaporation from surface of proposed reservoir at El Paso.

Month	In inches.	Decimals a foot.
January.....	2.0	0.
February....	2.0	
March.....	7.0	
April.....	7.3	
May.....	10.8	
June.....	11.2	
July.....	9.6	
August.....	11.4	
September..	9.2	
October.....	6.8	
November..	4.6	
December..	2.9	
Annual.....	84.8	7.

NEW MEXICO: PLANS FOR RIO GR

In the following discussion it is assumed that the plans for the El Paso reservoir are applicable alike to the El Paso reservoir, and they will be used in the volume of mud deposited and the loss of water for each month and the capacity and content of the reservoir at all levels of water. It is evident that the data entering into these calculations will be considered separately for each reservoir.

PROPOSED INTERNATIONAL RESERVOIR

The proposed El Paso dam would be constructed about 10 miles above El Paso, and would be of a height of 63.5 feet of water just above the dam. The surface of water would be 25,565 acres. With a depth of 63.5 feet just above the dam its surface would be 25,565 acres and its contents would be only one-third of the capacity of the reservoir. Thirteen thousand acres of land would be submerged to a depth of less than 10 feet. The following table of capacities and areas is made by the U. S. Army, based on its own surveys and contour maps of the basin.

Capacities and surface areas of proposed El Paso reservoir.

[By W. W. Pollett.]

Elevation above sea level (Southern Pacific Rwy. datum).	Depth of water in feet.	Area of water surface in acres.	Capacity in acre-feet.	Elevation above sea level (Southern Pacific Rwy. datum).
Feet.				Feet.
3,710	0	0	0	3,728
3,715	5	180	0	3,729
3,716	6	333	256	3,730
3,717	7	486	666	3,731
3,718	8	639	1,228	3,732
3,719	9	792	1,944	3,733
3,720	10	946	2,813	3,734
3,721	11	1,128	3,850	3,735
3,722	12	1,311	5,069	3,736
3,723	13	1,494	6,472	3,737
3,724	14	1,677	8,057	3,738
3,725	15	1,859	9,825	3,739
3,726	16	2,032	11,770	3,740
3,727	17	2,205	13,889	3,741

" and by compacted volume, "B," in the waters of
ary, 1897, to June, 1904, inclusive—Continued.

1902.		1903.		1904.	
A.	B.	A.	B.	A.	B.
0.50	0.59	1.70	2.00	1.00	1.10
.50	.59	1.69	1.99	.50	
.30	.35	2.38	2.80		
2.17	2.55	2.06	2.42		
2.06	2.42	.90	1.06		
2.46	2.89	.52	.61		
		.29	.34		
4.94	5.81	1.40	1.65		
4.94	5.81	1.40	1.65		
.50	.59	1.40	1.65		
.50	.59	.50	.59		
.50	.59	1.00	1.18		

N FROM SURFACE OF RESERVOIR.

ow, showing evaporation at Fort Bliss, near
nd 1890, were published in Twelfth Annual
eological Survey, part 2, page 235, and in
ort, part 3, page 411.

n from surface of proposed reservoir at El Paso.

Month	In inches.	Decimals of a foot.
.....	2.0	0.17
.....	2.0	.17
.....	7.0	.58
.....	7.3	.61
.....	10.8	.90
.....	11.2	.94
.....	9.6	.80
.....	11.4	.95
.....	9.2	.77
.....	6.8	.56
.....	4.6	.38
.....	2.9	.24
.....	84.8	7.07

in the following discussion it is assumed that the tables on pages
402 are applicable alike to the El Paso reservoir and to the Ele-
phant Butte reservoir, and they will be used in both cases for finding
volume of mud deposited and the loss of water by evaporation.
The other data entering into these calculations will be the "inflow of
water for each month" and the capacity and surface area of the res-
ervoir at all levels of water. It is evident that these items will be
different for different reservoirs and localities, and therefore they
will be considered separately for each reservoir.

PROPOSED INTERNATIONAL RESERVOIR AT EL PASO.

The proposed El Paso dam would be constructed at "The Pass," 4
miles above El Paso, and would be of a height sufficient to give a
depth of 63.5 feet of water just above the dam. When full, the area
of water surface would be 25,565 acres. With the water standing 43.5
feet deep just above the dam its surface would cover only 12,428 acres,
and its contents would be only one-third of the capacity of the full
reservoir. Thirteen thousand acres of land covered by the full reser-
voir would be submerged to a depth of less than 20 feet. The follow-
ing table of capacities and areas is made by Mr. W. W. Follett from
his own surveys and contour maps of the basin:

Capacities and surface areas of proposed El Paso reservoir at different elevations.

[By W. W. Follett.]

Elevation above sea level (Southern Pacific Rwy. datum).	Depth of wa- ter in feet.	Area of water sur- face in acres.	Capacity in acre-feet.	Elevation above sea level (Southern Pacific Rwy. datum).	Depth of wa- ter in feet.	Area of water sur- face in acres.	Capacity in acre-feet.
<i>Feet.</i>				<i>Feet.</i>			
3,710	0	0	0	3,728	18	2,378	16,180
3,715	5	180	0	3,729	19	2,551	18,645
3,716	6	333	256	3,730	20	2,725	21,283
3,717	7	486	666	3,731	21	2,968	24,129
3,718	8	639	1,228	3,732	22	3,211	27,219
3,719	9	792	1,944	3,733	23	3,455	30,552
3,720	10	946	2,813	3,734	24	3,699	34,129
3,721	11	1,128	3,850	3,735	25	3,943	37,950
3,722	12	1,311	5,069	3,736	26	4,264	42,053
3,723	13	1,494	6,472	3,737	27	4,585	46,478
3,724	14	1,677	8,057	3,738	28	4,906	51,223
3,725	15	1,859	9,825	3,739	29	5,227	56,290
3,726	16	2,032	11,770	3,740	30	5,548	61,677
3,727	17	2,205	13,889	3,741	31	6,099	67,501

Capacities and surface areas of proposed El Paso reservoir at different elevations—Cont'd.

[By W. W. Follett.]

Elevation above sea level (Southern Pacific Rwy. datum).	Depth of water in feet.	Area of water surface in acres.	Capacity in acre-feet.	Elevation above sea level (Southern Pacific Rwy. datum).	Depth of water in feet.	Area of water surface in acres.	Capacity in acre-feet.
<i>Feet.</i>				<i>Feet.</i>			
3,742	32	6,650	73,876	3,759	49	14,639	259,279
3,743	33	7,201	80,801	3,760	50	15,013	274,105
3,744	34	7,752	88,278	3,761	51	15,675	289,449
3,745	35	8,304	96,306	3,762	52	16,337	305,455
3,746	36	8,794	104,855	3,763	53	16,999	322,123
3,747	37	9,285	113,894	3,764	54	17,661	339,453
3,748	38	9,776	123,425	3,765	55	18,324	357,445
3,749	39	10,267	133,446	3,766	56	19,125	376,170
3,750	40	10,758	143,959	3,767	57	19,926	395,695
3,751	41	11,235	154,955	3,768	58	20,727	416,022
3,752	42	11,712	166,429	3,769	59	21,528	437,149
3,753	43	12,189	178,379	3,770	60	22,328	459,077
3,754	44	12,667	190,807	3,771	61	23,253	481,868
3,755	45	13,145	203,713	3,772	62	24,178	505,583
3,756	46	13,518	217,044	3,773	63	25,103	530,224
3,757	47	13,891	230,749	3,773½	63½	25,565	542,891
3,758	48	14,265	244,827				

Monthly discharge, in acre-feet, of the Rio Grande at El Paso, Tex.

Month.	1897.*	1898.	1899.	1900.	1901.	1902.	1903.	1904.
January.....	3,100	30,129	12,912	8,110	278	8,291	615	
February.....	10,080	33,655	11,330	5,680	4,503	5,772	1,280	
March.....	9,920	20,044	7,071	460	3,669	635	22,602	
April.....	128,400	97,944	8,807	300	0	7,904	49,469	
May.....	511,101	140,192	10,330	41,810	158,102	526	203,623	
June.....	362,697	111,570	0	93,100	77,038	307	586,909	
July.....	81,739	196,269	19,553	70	12,576	20	158,202	
August.....	8,132	31,256	430	0	60,655	14,499	4,334	
September.....	41,950	2,262	0	16,433	21,005	9,313	1,031	
October.....	108,099	160	123	0	5,336	1,428	2,033	
November.....	60,322	119	179	0	12,813	298	208	
December.....	40,205	5,718	2,828	738	7,993	1,775	2,440	
The year..	1,374,745	669,296	73,503	169,751	363,968	50,768	1,032,844	

* Previous estimates revised.

NEW MEXICO: PLANS FOR RIO

WATER USED FOR IRRIGATION

It has been found that 180,000 acre-feet of irrigation water that can be at El Paso. A proper distribution of the region will be as follows:

Water used for irrigation in

January	-----
February	-----
March	-----
April	-----
May	-----
June	-----
July	-----
August	-----
September	-----
October	-----
November	-----
December	-----

The year.....

SERVICE OF RESERVOIR

Proper conclusions can now be formed performed by the proposed reservoir, : length of time required for it to fill with capacity will be less than that necessary means of cleaning out this mud is resorted from entering the reservoir by means of : expedients will be considered later in this discussion and comparison of the two : the mud which settles in the reservoir, : the reservoir becomes inefficient by reason of the method of calculation used in conclusion follows:

- 1) The "inflow" is taken from table
- 2) The "silt deposited in month" is "inflow" by the percentage in column B

- 3) "Water available" equals the "inflow" plus the "water in reservoir" at beginning of month
- 4) "Silt in reservoir" is the total at beginning of month

"Loss by evaporation" is figured from "water available" and "silt in reservoir" at beginning of month; then, by finding this amount in

PORT OF RECLAMATION SERVICE.

WATER USED FOR IRRIGATION.

posed El Paso reservoir at different elevations—Cont'd.

[By W. W. Follett.]

Capacity in acre-feet.	Elevation above sea level (Southern Pacific Rwy. datum).	Depth of wa- ter in feet.	Area of water sur- face in acres.	Capacity in acre-feet.
	<i>Feet.</i>			
73,876	3,759	49	14,639	259,279
80,801	3,760	50	15,013	274,105
88,278	3,761	51	15,675	289,449
96,306	3,762	52	16,337	305,455
104,855	3,763	53	16,999	322,123
113,894	3,764	54	17,661	339,453
123,425	3,765	55	18,324	357,445
133,446	3,766	56	19,125	376,170
143,959	3,767	57	19,926	395,695
154,955	3,768	58	20,727	416,022
166,429	3,769	59	21,528	437,149
178,379	3,770	60	22,328	459,077
190,807	3,771	61	23,253	481,868
203,713	3,772	62	24,178	505,583
217,044	3,773	63	25,103	530,224
230,749	3,773½	63½	25,565	542,891
244,827				

acre-feet, of the Rio Grande at El Paso, Tex.

1899.	1900.	1901.	1902.	1903.	1904.
12,912	8,110	278	8,291	615	
11,830	5,680	4,503	5,772	1,289	
7,071	460	3,669	635	22,602	
8,807	300	0	7,904	49,468	
10,330	44,810	158,102	526	203,623	
0	93,100	77,038	307	586,909	
19,533	70	12,576	20	153,202	
430	0	60,655	14,499	4,334	
0	16,483	21,005	9,813	1,061	
123	0	5,336	1,428	2,033	
119	0	12,813	298	298	
2,828	738	7,993	1,775	2,410	
73,503	169,751	363,968	60,768	1,032,844	

previous estimates revised.

It has been found that 180,000 acre-feet per year will be the largest amount of irrigation water that can be realized from this reservoir at El Paso. A proper distribution of this amount of water for this region will be as follows:

Water used for irrigation in each month.

	Acre-feet.
January	0
February	3,600
March	16,200
April	36,000
May	36,000
June	36,000
July	25,200
August	12,600
September	9,000
October	3,600
November	1,800
December	0
The year	180,000

SERVICE OF RESERVOIR.

Proper conclusions can now be formed as to the service that can be performed by the proposed reservoir, and estimates made of the length of time required for it to fill with mud to the point where its capacity will be less than that necessary for storage unless some means of cleaning out this mud is resorted to or the mud is prevented from entering the reservoir by means of settling basins above. Such expedients will be considered later in this paper, but for the purposes of discussion and comparison of the two reservoirs it will be assumed that the mud which settles in the reservoir remains there, at least until the reservoir becomes inefficient by reason of its accumulation.

The method of calculation used in computing the service tables is as follows:

- (1) The "inflow" is taken from table on page 404.
- (2) The "silt deposited in month" is found by multiplying the "inflow" by the percentage in column B of the table on pages 401-402.
- (3) "Water available" equals the "inflow" minus the "silt deposited" plus the "water in reservoir" at end of preceding month.
- (4) "Silt in reservoir" is the total accumulation at end of each month.
- (5) "Loss by evaporation" is figured by first adding together the "water available" and "silt in reservoir" to get the total contents of reservoir; then, by finding this amount in the last column of table on

pages 403-404, taking the corresponding water surface in acres from the same table, and multiplying by the evaporation in "decimals of a foot" in the last column of the table on page 402 for the given month. (See (1) below.)

(6) "Water used for irrigation" is from table on page 405.

(7) "Water in reservoir at end of month" equals "water available" minus "loss by evaporation" minus "use for irrigation" in month.

(8) "Deficiency" is the deficiency in amount necessary for irrigation.

(9) To find the "overflow," subtract "silt in reservoir" from total capacity of reservoir. This gives the water capacity of the reservoir at end of given month. If the water left over after subtracting "evaporation" and "irrigation" from "water available" exceeds this amount, the excess is the "overflow."

It is to be noted: (1) That the "loss by evaporation" can not exceed the "water available." (See October and November, 1902.) It is also limited by the surface area of the reservoir during months in which there is an overflow.

(2) That the water "used for irrigation" is limited by the quantity available. This quantity subtracted from the water required for irrigation gives the "deficiency." (See October and November, 1902, and February, 1903.)

(3) That the water capacity of the reservoir limits the amount of "water in reservoir at end of month." (See months having an "overflow.")

Estimated data concerning the proposed international reservoir on the Rio Grande at Paso, from January, 1897, to June, 1904, inclusive.

Date.	Inflow.	Silt deposited in month.	Water available.	Silt in reservoir.	Lost by evaporation.	Used for irrigation.	Water in reservoir at end of month.	Deficiency.	Overflow.
	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-ft.	Acre-ft.
1897.									
January.....	3,100	87	3,013	87	110	0	2,903	0	
February.....	10,080	284	12,699	371	357	3,600	8,742	0	
March.....	9,920	280	13,382	651	1,856	15,200	326	0	
April.....	128,400	3,107	125,619	3,758	6,100	35,000	33,519	0	
May.....	511,101	4,855	589,765	8,613	23,400	36,000	530,365	0	
June.....	362,697	2,212	890,850	10,325	24,440	36,000	532,066	0	
July.....	81,739	500	613,305	11,325	20,800	25,200	531,566	0	
August.....	8,182	383	539,315	11,708	24,700	12,600	502,015	0	
September.....	41,956	2,689	541,276	14,397	20,020	9,000	512,256	0	
October.....	108,099	4,767	615,588	19,164	14,560	3,600	523,727	0	
November.....	69,322	1,678	591,371	20,842	9,880	1,800	522,049	0	
December.....	40,205	426	561,828	21,268	6,240	0	521,623	0	
Total for year.....	1,374,745	21,268			152,463	180,000			

"This table contains slight inaccuracies, but they do not affect results."

NEW MEXICO: PLANS I

Estimated data concerning the proposed international reservoir on the Rio Grande at Paso, from January, 1897, to June, 1904, inclusive.

Date.	Inflow.	Silt deposited in month.	Water available.	Deficiency.
	Acre-feet.	Acre-feet.	Acre-feet.	Acre-ft.
1898.				
January.....	30,129	319	651,433	
February.....	33,655	357	554,602	
March.....	20,044	212	540,779	
April.....	97,944	274	607,169	
May.....	140,192	1,654	658,999	
June.....	111,570	1,317	629,060	
July.....	196,269	2,316	711,443	
August.....	31,236	369	546,041	
September.....	2,262	27	510,976	
October.....	160	0	482,678	
November.....	119	0	465,433	
December.....	5,718	67	460,078	
Total for year.....	669,298	6,912		
1899.				
January.....	12,912	137	467,213	
February.....	11,330	120	474,377	
March.....	7,071	117	473,634	
April.....	8,807	207	452,114	
May.....	10,330	170	412,122	
June.....	0	0	356,592	
July.....	19,553	1,126	320,689	
August.....	430	3	281,516	
September.....	0	0	253,241	
October.....	123	0	232,506	
November.....	119	0	220,793	
December.....	2,828	30	216,319	
Total for year.....	73,503	1,910		
1900.				
January.....	8,110	88	220,911	
February.....	5,680	60	224,066	
March.....	460	3	218,450	
April.....	300	1	194,226	
May.....	44,810	856	193,823	
June.....	93,100	1,099	237,494	
July.....	70	0	187,558	
August.....	0	0	151,478	
September.....	16,483	958	142,718	
October.....	0	0	124,478	
November.....	0	0	114,522	
December.....	738	9	109,309	
Total for year.....	169,751	3,072		
1901.				
January.....	278	3	107,016	
February.....	4,503	76	109,641	
March.....	3,669	60	107,831	
April.....	0	0	85,454	

corresponding water surface in acres from applying by the evaporation in "decimals" in of the table on page 402 for the given

irrigation" is from table on page 405. "ir at end of month" equals "water available" minus "use for irrigation"

the deficiency in amount necessary for irrigation

overflow," subtract "silt in reservoir" from "ir at end of month." This gives the water capacity of the reservoir at end of month. If the water left over after subtracting "irrigation" from "water available" exceeds the "overflow."

That the "loss by evaporation" can not be "irrigation" (See October and November, 1902) surface area of the reservoir during month of low.

"irrigation" is limited by the quantity subtracted from the water required "deficiency." (See October and November, 1902)

capacity of the reservoir limits the amount of "irrigation" at end of month." (See months having a

proposed international reservoir on the Rio Grande at El Paso, from January, 1897, to June, 1904, inclusive.

Water available.	Silt in reservoir.	Lost by evaporation.	Used for irrigation.	Water in reservoir at end of month.	Deficiency.	Overflow.
acre-feet.	acre-feet.	acre-feet.	acre-feet.	acre-feet.	acre-ft.	acre-ft.
3,013	87	110	0	2,903	0	0
12,699	371	357	3,600	8,742	0	0
18,382	651	1,856	16,200	328	0	0
125,619	3,758	6,100	35,000	83,519	0	0
569,765	8,613	23,400	36,000	530,765	0	0
890,850	10,825	24,440	36,000	832,066	0	298,850
613,305	11,325	20,800	25,200	581,566	0	35,805
539,315	11,708	24,700	12,600	502,015	0	0
541,276	14,397	20,020	9,000	512,256	0	0
513,588	19,164	14,560	3,600	523,727	0	75,808
591,371	20,842	9,880	1,800	522,049	0	57,371
561,828	21,268	6,240	0	521,023	0	33,828
		132,463	130,000			498,828

slight inaccuracies, but they do not affect results.

Estimated data concerning the proposed international reservoir on the Rio Grande at El Paso, from January, 1897, to June, 1904, inclusive—Continued.

Date.	Inflow.	Silt deposited in month.	Water available.	Silt in reservoir.	Lost by evaporation.	Used for irrigation.	Water in reservoir at end of month.	Deficiency.	Overflow.
	acre-feet.	acre-feet.	acre-feet.	acre-feet.	acre-feet.	acre-feet.	acre-feet.	acre-ft.	acre-ft.
1898.									
January	30,129	319	551,433	21,587	4,420	0	521,304	0	25,709
February	33,655	357	554,602	21,944	4,420	3,600	520,947	0	25,855
March	20,044	212	540,779	22,156	15,080	16,200	509,499	0	0
April	97,944	274	607,169	22,430	15,860	36,000	520,461	0	34,848
May	140,192	1,654	658,999	24,084	23,400	36,000	518,807	0	80,792
June	111,570	1,317	629,060	25,401	24,440	36,000	517,490	0	51,130
July	196,269	2,316	711,443	27,717	20,800	25,200	515,174	0	150,269
August	31,236	369	546,041	28,086	24,700	12,600	508,741	0	0
September	2,262	27	510,976	28,113	19,558	9,000	482,418	0	0
October	160	0	482,578	28,113	13,664	3,600	465,314	0	0
November	119	0	465,433	28,113	9,206	1,800	454,427	0	0
December	5,718	67	460,078	28,180	5,640	0	454,428	0	0
Total for year	669,298	6,912			181,188	180,000			368,383
1899.									
January	12,912	137	467,213	28,317	4,046	0	463,167	0	0
February	11,530	120	474,377	28,437	4,097	3,600	466,680	0	0
March	7,071	117	473,684	28,554	13,920	16,200	443,514	0	0
April	8,507	207	492,114	28,761	14,152	36,000	401,962	0	0
May	10,330	170	412,122	28,931	19,530	36,000	355,592	0	0
June	0	0	356,592	28,931	18,330	36,000	302,262	0	0
July	19,553	1,126	320,689	30,057	14,400	25,200	287,089	0	0
August	430	3	281,516	30,060	15,675	12,000	253,211	0	0
September	0	0	253,241	30,060	11,858	9,000	232,383	0	0
October	123	0	232,506	30,060	8,232	3,600	220,674	0	0
November	119	0	220,793	30,060	5,472	1,800	213,521	0	0
December	2,828	30	216,319	30,090	3,422	0	212,887	0	0
Total for year	73,503	1,910			133,144	180,000		0	0
1900.									
January	8,110	86	220,911	30,176	2,465	0	218,446	0	0
February	5,680	60	224,066	30,236	2,473	3,600	217,993	0	0
March	460	3	218,450	30,239	8,323	16,200	193,927	0	0
April	300	1	194,226	30,240	8,357	36,000	149,869	0	0
May	44,810	856	193,823	31,096	12,330	36,000	145,493	0	0
June	93,100	1,099	237,494	32,193	14,000	36,000	187,488	0	0
July	70	0	187,558	32,195	10,880	25,200	151,478	0	0
August	0	0	151,478	32,195	11,085	12,600	127,103	0	0
September	18,483	958	142,718	33,153	9,240	9,000	124,478	0	0
October	0	0	124,478	33,153	6,356	3,600	114,522	0	0
November	0	0	114,522	33,153	4,142	1,800	108,580	0	0
December	738	9	109,309	33,162	2,568	0	106,741	0	0
Total for year	169,751	3,072			92,825	180,000		0	0
1901.									
January	278	3	107,016	33,165	1,802	0	105,214	0	0
February	4,303	76	109,641	33,241	1,819	3,600	104,222	0	0
March	3,669	60	107,831	33,301	6,177	16,200	85,454	0	0
April	0	0	85,454	33,301	5,736	36,000	43,659	0	0

408 THIRD ANNUAL REPORT OF RECLAMATION SERVICE.

Estimated data concerning the proposed international reservoir on the Rio Grande at El Paso, from January, 1897, to June, 1904, inclusive—Continued.

Date.	Inflow.	Silt deposited in month.	Water available.	Silt in reservoir.	Lost by evaporation.	Used for irrigation.	Water in reservoir at end of month.	Deficiency.	Overflow.
1901.	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-ft.</i>	<i>Acre-ft.</i>
May	158,102	3,020	198,741	36,321	12,600	36,000	150,141	0	0
June	77,038	909	226,270	37,230	13,818	36,000	176,452	0	0
July	12,576	731	188,287	37,961	10,960	25,200	152,137	0	0
August	60,655	3,524	209,268	41,185	13,680	12,000	182,988	0	0
September	21,005	1,220	202,773	42,705	11,011	9,000	182,762	0	0
October	5,336	310	187,788	43,015	7,784	3,600	176,404	0	0
November	12,813	215	189,002	43,230	5,301	1,800	181,901	0	0
December	7,993	47	189,847	43,277	3,348	0	186,499	0	0
Total for year	363,968	10,115			94,095	180,000		0	0
1902.									
January	8,291	49	194,741	43,326	2,397	0	192,344	0	0
February	5,772	34	198,082	43,360	2,414	3,600	192,068	0	0
March	685	2	192,701	43,362	8,149	16,200	168,352	0	0
April	7,004	202	176,054	43,564	8,296	36,000	181,758	0	0
May	526	13	132,271	43,577	10,890	36,000	85,381	0	0
June	307	9	85,679	43,586	9,400	36,000	40,279	0	0
July	20	0	40,299	43,586	5,920	25,200	9,179	0	0
August	14,499	842	22,836	44,428	5,785	12,600	4,451	0	0
September	9,313	541	13,223	44,969	4,158	9,000	65	0	0
October	1,428	8	1,485	44,977	0	1,485	0	2,115	0
November	298	2	296	44,979	0	296	0	1,504	0
December	1,775	10	1,765	44,989	1,104	0	661	0	0
Total for year	50,768	1,712			58,513	176,381		3,619	0
1903.									
January	615	12	1,264	45,001	777	0	487	0	0
February	1,289	26	1,750	45,027	0	1,750	0	1,850	0
March	21,802	633	21,969	45,660	3,550	16,200	2,219	0	0
April	49,468	1,197	50,490	46,857	5,100	36,000	9,390	0	0
May	203,623	2,156	210,855	49,015	13,185	36,000	161,670	0	0
June	580,909	3,580	744,999	52,595	24,440	36,000	490,296	0	194,112
July	198,202	588	647,960	53,133	20,800	25,200	489,758	0	0
August	4,334	72	494,020	53,205	24,700	12,600	456,720	0	0
September	1,031	17	457,734	53,222	18,788	9,000	429,946	0	0
October	2,033	34	431,945	53,256	13,104	3,600	415,241	0	0
November	298	2	415,537	53,258	8,722	1,800	405,015	0	0
December	2,440	29	407,426	53,287	5,369	0	402,057	0	0
Total for year	1,032,844	8,298			138,535	178,150		1,850	304
1904.									
January	972	11	403,018	53,286	3,774	0	399,244	0	0
February	367	2	399,629	53,300	3,740	3,600	392,289	0	0
March	0	0	392,289	53,300	12,644	16,200	365,445	0	0
April	0	0	362,445	53,300	12,657	36,000	314,788	0	0
May	0	0	314,788	53,300	16,920	36,000	261,868	0	0
June	0	0	261,868	53,300	15,698	36,000	210,170	0	0

^a Deficiency equals amount required for irrigation less amount used for irrigation.

NEW MEXICO: PLANS FOR RIO

Summary of data concerning the proposed international reservoir from January, 1897, to June, 1904.

Year.	Inflow from river.	Silt deposited.	Loss by evaporation.
	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>
1897	1,374,745	21,268	15
1898	669,298	6,912	18
1899	73,506	1,910	13
1900	109,751	3,073	9
1901	363,948	10,115	9
1902 ^a	50,768	1,712	5
1903 ^b	1,032,844	8,298	13
1904 (half year)	1,359	13	6
Total for 7½ years	2,736,236	53,300	91
Average per year	498,165	7,107	12
Percentage of inflow		1.43	

^a Empty in October and November.

The above table for proposed El Paso r
(1) That the accumulated mud in the r
and a half years would be 53,300 acre-fe
7,107 acre-feet per year. At the end of
amount to 325,735 acre-feet, or 60 per cen
the reservoir, leaving only 217,000 acre-fe
reservoir, unless some means of getting r
The mud in the reservoir would have a n
and its surface would cover an area of
side and 13½ miles long. The entire w
ould have a maximum depth of 17½ feet,
res.

(2) The tabulated statement shows the
water is wasted through the overflow, be
made high enough to hold it. Even if th
other side were of such a nature that a sa
spillway 63.5 feet above the river bed, t
such that the spillway could not reasonabl
(3) A supply of 180,000 acre-feet per y
but although it is shown that only 176
in 1902 and 178,150 acre-feet in 19
amounts to 36 per cent of the inflow in 189
1899, and nearly 30 per cent of the inflow

posed international reservoir on the Rio Grande at El Paso, 1897, to June, 1904, inclusive—Continued.

acre-feet.	Silt in reservoir.	Lost by evaporation.	Used for irrigation.	Water in reservoir at end of month.	Deficiency.	Overflow.
acre-feet.	acre-feet.	acre-feet.	acre-feet.	acre-feet.	acre-feet.	acre-feet.
8,741	36,321	12,600	36,000	150,141	0	0
6,270	37,230	13,818	36,000	176,452	0	0
4,297	37,961	10,900	25,200	152,187	0	0
9,268	41,485	13,680	12,600	182,988	0	0
2,773	42,705	11,911	9,000	182,762	0	0
7,788	43,015	7,784	3,600	176,404	0	0
9,002	43,230	5,801	1,800	181,901	0	0
9,847	43,277	3,348	0	186,499	0	0
		94,095	180,000		0	0
4,741	43,326	2,397	0	192,344	0	0
8,082	43,360	2,414	3,600	192,068	0	0
2,701	43,362	8,149	16,200	168,352	0	0
0,054	43,564	8,296	36,000	131,758	0	0
2,271	43,577	10,890	36,000	85,381	0	0
5,679	43,586	9,400	36,000	40,279	0	0
0,299	43,586	5,920	25,200	9,179	0	0
2,836	44,428	5,785	12,600	4,451	0	0
3,223	44,909	4,138	9,000	65	0	0
1,485	44,977	0	1,485	0	2,115	0
296	44,979	0	296	0	1,504	0
1,765	44,989	1,104	0	661	0	0
		58,513	176,381		3,619	0
1,204	45,001	777	0	487	0	0
1,750	45,027	0	1,750	0	1,850	0
11,969	45,660	3,550	16,200	2,219	0	0
10,430	46,857	5,100	36,000	9,390	0	0
0,855	49,015	13,185	36,000	161,670	0	0
14,999	52,595	24,440	36,000	490,296	0	194,200
17,960	53,133	20,800	25,200	489,758	0	112,200
14,020	53,205	24,700	12,600	456,720	0	0
17,734	53,222	18,788	9,000	429,946	0	0
11,945	53,256	13,104	3,600	415,241	0	0
15,587	53,258	8,722	1,800	405,015	0	0
17,426	53,267	5,869	0	402,057	0	0
		138,585	178,150		1,850	306,460
13,018	53,298	3,774	0	399,244	0	0
19,629	53,300	3,740	3,600	392,289	0	0
12,289	53,300	12,644	16,200	363,445	0	0
13,445	53,300	12,657	36,000	314,788	0	0
14,786	53,300	16,920	36,000	261,968	0	0
11,868	53,300	15,698	36,000	210,170	0	0

required for irrigation less amount used for irrigation.

Summary of data concerning the proposed international reservoir on Rio Grande at El Paso, from January, 1897, to June, 1904.

Year.	Inflow from river.	Silt deposited.	Lost by evaporation.	Used for irrigation.	Lost by overflow.	Water in reservoir at end of year.
	Acres-feet.	Acres-feet.	Acres-feet.	Acres-feet.	Acres-feet.	Acres-feet.
1897	1,374,745	21,268	152,463	180,000	499,391	521,023
1898	639,298	6,912	181,188	180,000	338,383	454,438
1899	73,503	1,910	183,114	180,000		212,887
1900	169,751	3,073	93,825	180,000		106,741
1901	383,968	10,115	94,095	180,000		186,499
1902 ^a	50,768	1,712	58,513	176,381		661
1903 ^b	1,032,844	8,298	138,535	178,150	306,465	402,057
1904 (half year)	1,359	13	65,433	127,800		210,170
Total for 7½ years	3,736,236	53,300	917,196	1,382,331	1,174,239	
Average per year	498,165	7,107	122,293	180,000	156,565	
Percentage of inflow		1.43	24.55	37.00	32.00	5.02

^a Empty in October and November.

^b Empty in February.

The above table for proposed El Paso reservoir shows:

(1) That the accumulated mud in the reservoir at the end of seven and a half years would be 53,300 acre-feet, deposited at the rate of 7,107 acre-feet per year. At the end of forty-six years this would amount to 325,735 acre-feet, or 60 per cent of the entire capacity of the reservoir, leaving only 217,000 acre-feet of water capacity in the reservoir, unless some means of getting rid of this mud is devised. The mud in the reservoir would have a maximum depth of 46 feet, and its surface would cover an area of valley land about 3 miles wide and 13½ miles long. The entire water space above this mud would have a maximum depth of 17½ feet, covering an area of 25,000 acres.

(2) The tabulated statement shows that a very large amount of water is wasted through the overflow, because the dam can not be made high enough to hold it. Even if the material of the hills on either side were of such a nature that a safe dam could be built, with a spillway 63.5 feet above the river bed, the height of these hills is such that the spillway could not reasonably be at a greater elevation.

(3) A supply of 180,000 acre-feet per year is estimated for irrigation, but although it is shown that only 176,381 acre-feet will be available in 1902 and 178,150 acre-feet in 1903, the waste by overflow amounts to 36 per cent of the inflow in 1897, 55 per cent of the inflow in 1899, and nearly 30 per cent of the inflow in 1903.

During the seven and a half years the water that flows into the reservoir is disposed of as follows:

Disposition of water at proposed international reservoir on Rio Grande at El Paso.

	Per cent.
Loss by sediment.....	1.43
Loss by evaporation.....	24.55
Loss by overflow.....	32.00
Total loss.....	57.98
Water used for irrigation.....	37.00
Water in reservoir at end of 7½ years.....	5.02
Total.....	100.00

PROPOSED RESERVOIR NEAR ENGLE, N. MEX.

The Engle dam would be constructed in a narrow gorge of the river below the site that was proposed for the dam of the old Elephant Butte Company. According to surveys of the Reclamation Service, the proposed reservoir would have a depth of 160 feet just above the dam, and a storage capacity of 1,500,000 acre-feet. Recent additional surveys made by J. L. Rhead, under the direction of B. M. Hall, show that it will be practicable to build a dam at this point 230 feet above the river bed, but there is a natural gap in the hill to the west, several miles above the dam, that has an elevation of only 4,383 feet above sea level. A spillway can be made at this point at an elevation of 4,385 feet, limiting the water depth to 175 feet. If the water is 175 feet deep, the reservoir would have a capacity of 2,000,000 acre-feet, as shown in the following table, which is based on topographic surveys of the Reclamation Service up to an elevation of 4,370 feet. Areas and capacities from 160 to 175 feet of depth are calculated by percentage of increase. This reservoir will be deep and narrow, and sediment could be cleaned out of it more easily than if it were wide and shallow. The methods of calculation for service in this reservoir are the same as those for the El Paso reservoir.

Area of surface and capacity of

Elevation in feet above sea level (Santa Fe Rwy. datum).	Depth of water in feet.	Surface water in acre-feet.
4,210	0	0.
4,215	5	41.
4,220	10	130.
4,225	15	219.
4,230	20	365.
4,235	25	511.
4,240	30	843.
4,245	35	1,175.
4,250	40	1,781.
4,255	45	2,388.
4,260	50	3,145.
4,265	55	3,908.
4,270	60	4,664.
4,275	65	5,426.
4,280	70	6,175.
4,285	75	6,924.
4,290	80	7,630.
4,295	85	8,335.
4,300	90	8,977.
4,305	95	9,620.
4,310	100	10,550.
4,315	105	11,480.
4,320	110	12,553.
4,325	115	13,626.
4,330	120	14,811.
4,335	125	15,996.
4,340	130	17,618.
4,345	135	19,241.
4,350	140	21,370.
4,355	145	23,499.
4,360	150	25,516.
4,365	155	27,534.
4,370	160	29,553.
4,375	165	30,447.
4,380	170	35,600.
4,385	175	38,400.

^a Estimated.

half years the water that flows into the reservoirs follows:

Proposed international reservoir on Rio Grande at El Paso.

	Per cent.
.....	1.43
.....	24.55
.....	32.00
.....	57.98
.....	37.00
7½ years	5.02
.....	100.00

RESERVOIR NEAR ENGLE, N. MEX.

It would be constructed in a narrow gorge of the river at a point that was proposed for the dam of the old river. According to surveys of the Reclamation Service, the reservoir would have a depth of 160 feet just above the dam, and a storage capacity of 1,500,000 acre-feet. Recent surveys by J. L. Rhead, under the direction of the Reclamation Service, show that it will be practicable to build a dam at this point in the river bed, but there is a natural gap in the river bed above the dam, that has an elevation of 4,210 feet. A spillway can be made at this point in the river bed, limiting the water depth to 175 feet. If the reservoir is deep, the reservoir would have a capacity of 1,500,000 acre-feet. The following table, which is based on the Reclamation Service up to an elevation of 4,210 feet, shows the capacities from 160 to 175 feet of depth are calculated. This reservoir will be deep and could be cleaned out of it more easily than the El Paso reservoir. The methods of calculation for service are the same as those for the El Paso reservoir.

Area of surface and capacity of Engle reservoir.

Elevation in feet above sea level (Santa Fe Rwy. datum).	Depth of water in feet.	Surface of water in acres.	Capacity to contain in acre-feet.
4,210	0	0.0	0
4,215	5	41.5	110
4,220	10	130.5	415
4,225	15	219.5	1,290
4,230	20	365.0	2,610
4,235	25	511.0	4,825
4,240	30	843.0	7,720
4,245	35	1,175.0	12,765
4,250	40	1,781.0	19,470
4,255	45	2,388.0	29,890
4,260	50	3,145.0	43,350
4,265	55	3,908.0	58,470
4,270	60	4,684.0	82,375
4,275	65	5,426.0	107,600
4,280	70	6,175.0	136,635
4,285	75	6,924.0	169,385
4,290	80	7,630.0	205,880
4,295	85	8,335.0	245,795
4,300	90	8,977.0	289,235
4,305	95	9,620.0	335,730
4,310	100	10,550.0	385,435
4,315	105	11,480.0	440,510
4,320	110	12,553.0	500,240
4,325	115	13,626.0	565,685
4,330	120	14,811.0	636,500
4,335	125	15,996.0	713,515
4,340	130	17,618.0	796,465
4,345	135	19,241.0	888,615
4,350	140	21,370.0	988,875
4,355	145	23,499.0	1,101,045
4,360	150	25,516.0	1,223,065
4,365	155	27,534.0	1,355,690
4,370	160	29,553.0	1,500,000
4,375	165	30,447.0	" 1,650,000
4,380	170	35,600.0	" 1,815,000
4,385	175	38,400.0	" 2,000,000

"Estimated.

412 THIRD ANNUAL REPORT OF RECLAMATION SERVICE.

Monthly discharge, in acre-feet, of Rio Grande at San Marcial (above Elephant Butte).

Month.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.
January	19,553	57,675	27,854	40,582	20,967	22,731	17,197	16,840
February	24,325	59,425	24,603	35,099	25,168	17,435	21,927	18,902
March	40,767	62,164	27,546	33,203	15,114	7,954	46,790	6,060
April	212,548	271,458	54,089	6,248	23,683	40,106	100,007	0
May	755,196	165,832	35,048	123,590	256,126	26,787	318,367	0
June	366,426	126,268	952	159,888	96,178	6,407	630,476	0
July	65,977	167,062	28,407	0	59,286	0	77,841	0
August	6,149	13,835	6,365	0	65,334	49,210	3,064	0
September	114,188	4,641	2,916	73,190	37,607	13,949	1,438	0
October	281,677	1,230	676	0	17,018	823	545	0
November	175,715	11,722	9,521	2,440	20,053	4,641	5,534	0
December	152,736	23,365	21,828	10,084	19,240	11,286	18,883	0
The year	2,215,257	964,677	239,835	484,324	656,274	230,729	1,272,069	0

Water used for irrigation below Eagle.

	Acre-feet.
January	0
February	13,000
March	54,000
April	119,000
May	119,000
June	119,000
July	83,000
August	42,000
September	31,000
October	13,000
November	7,000
December	0
The year	600,000

Estimated data concerning the proposed reservoir on the Rio Grande near Eagle, N. Mex.

Year.	Inflow.	Silt deposited in month.	Water available.	Silt in reservoir.	Lost by evaporation.	Used for irrigation.	Water in reservoir at end of month.	Efficiency.	Overflow.
1897.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.
January	19,553	551	19,002	551	304	0	18,698	0	0
February	24,325	686	42,337	1,237	537	13,000	28,800	0	0
March	40,767	1,150	68,417	2,387	2,320	54,000	12,097	0	0
April	212,548	5,144	219,501	7,531	4,820	119,000	95,681	0	0
May	755,196	7,174	813,703	14,705	16,650	119,000	705,053	0	0
June	366,426	2,235	1,372,244	16,940	21,800	119,000	931,444	0	0
July	65,977	402	897,017	17,342	17,960	83,000	896,659	0	0
August	6,149	290	902,518	17,632	18,800	42,000	841,718	0	0
September	114,188	7,519	948,587	24,951	15,700	31,000	901,587	0	0
October	281,677	12,422	1,171,142	37,373	14,164	13,000	1,143,978	0	0
November	175,715	4,252	1,315,441	47,625	10,487	7,000	1,297,954	0	0
December	152,736	1,619	1,449,071	43,244	7,080	0	1,441,991	0	0
Total for year	2,215,257	43,244			130,022	600,000			

NEW MEXICO: PLANS FOR RIO

Estimated data concerning the proposed reservoir on the
Continued.

Year.	Inflows.	Silt deposited in month.	Water available.	Silt in reservoir.	Lost by evaporation.
1898.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.
January	57,675	611	1,499,056	43,555	5,06
February	59,425	680	1,552,785	44,485	5,10
March	92,164	659	1,596,190	45,144	17,28
April	271,458	7,601	1,788,762	52,745	21,96
May	165,832	1,957	1,811,577	54,702	32,76
June	126,268	1,490	1,784,695	56,192	33,84
July	167,062	1,971	1,796,945	58,163	28,92
August	13,835	163	1,698,698	53,326	31,49
September	4,641	55	1,629,794	58,381	24,10
October	1,230	0	1,575,924	58,381	16,97
November	11,722	0	1,557,676	58,381	11,47
December	23,365	276	1,562,295	58,657	7,25
Total for year	964,677	15,413			236,21
1899.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.
January	27,854	295	1,582,604	58,952	5,16
February	24,603	261	1,601,778	59,213	5,23
March	27,546	455	1,610,636	59,668	18,02
April	54,089	1,271	1,592,433	60,939	18,61
May	35,048	578	1,488,292	61,517	26,86
June	952	0	1,343,379	61,517	26,51
July	28,407	1,636	1,224,033	63,153	21,09
August	6,365	38	1,126,891	63,191	23,73
September	2,916	0	1,064,079	63,191	18,42
October	676	0	1,015,327	63,191	12,91
November	9,521	0	998,934	63,191	8,64
December	21,828	231	1,004,886	63,422	5,48
Total for year	239,835	4,765			190,71
1900.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.
January	40,582	430	1,069,592	63,852	1,00
February	35,099	372	1,070,277	64,224	4,00
March	33,203	196	1,086,194	64,420	14,10
April	6,248	22	1,021,314	64,412	14,18
May	123,590	2,261	1,012,461	66,703	20,76
June	159,888	1,857	1,030,099	68,590	22,04
July	0	0	889,656	68,590	16,57
August	0	0	790,080	68,590	17,77
September	73,190	4,252	799,244	72,842	14,70
October	0	0	753,537	72,842	10,15
November	2,440	0	732,819	72,842	6,78
December	10,084	119	729,016	72,961	4,25
Total for year	484,324	9,539			149,41
1901.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.	Acre-feet.
January	20,967	247	745,488	73,208	3,06
February	25,168	424	767,463	73,632	8,12
March	15,114	249	766,205	73,881	10,66
April	23,683	0	725,228	73,881	10,77

Estimated data concerning the proposed reservoir on the Rio Grande, near Engle, N. Mex.—
Continued.

Year.	Inflows.	Silt deposited in month.	Water available.	Silt in reservoir.	Lost by evaporation.	Used for irrigation.	Water in reservoir at end of month.	Deficiency.	Overflow.
	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>
1898.	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>	<i>Acres-feet.</i>
January	57,675	611	1,499,935	43,855	5,065	0	1,498,990	0	0
February	59,425	630	1,562,785	44,485	5,100	13,000	1,584,685	0	0
March	62,164	659	1,596,190	45,114	17,285	54,000	1,524,905	0	0
April	271,458	7,601	1,788,762	52,745	21,960	119,000	1,647,802	0	0
May	165,832	1,957	1,811,677	54,732	32,780	119,000	1,659,917	0	0
June	126,268	1,490	1,784,695	56,132	33,840	119,000	1,631,855	0	0
July	167,062	1,971	1,796,946	58,163	28,920	88,000	1,686,026	0	0
August	13,835	163	1,698,698	58,326	31,490	42,000	1,625,208	0	0
September	4,641	55	1,629,794	58,381	24,100	31,000	1,571,694	0	0
October	1,230	0	1,575,924	58,391	16,970	13,000	1,545,954	0	0
November	11,722	0	1,557,674	58,391	11,470	7,000	1,539,206	0	0
December	23,365	276	1,562,295	58,657	7,250	0	1,555,045	0	0
Total for year	964,677	15,413			236,210	600,000		0	0

Acre-feet 0

	0
	13,000
	54,000
	119,000
	118,000
	119,000
	83,000
	42,000
	31,000
	13,000
	7,000
	0
	600,000

1899.									
January	27,854	295	1,582,604	58,952	3,168	0	1,577,436	0	0
February	24,603	261	1,601,778	59,213	5,233	13,000	1,583,545	0	0
March	27,546	455	1,610,636	59,668	18,021	54,000	1,538,615	0	0
April	54,089	1,271	1,591,433	60,939	18,671	119,000	1,453,822	0	0
May	35,048	578	1,488,292	61,517	26,805	119,000	1,342,427	0	0
June	932	0	1,343,379	61,517	26,517	119,000	1,197,862	0	0
July	28,407	1,636	1,224,633	63,153	21,096	83,000	1,120,537	0	0
August	5,395	38	1,126,894	63,191	23,731	42,000	1,061,163	0	0
September	2,916	0	1,064,079	63,191	18,428	31,000	1,014,651	0	0
October	676	0	1,015,327	63,191	12,914	13,000	989,413	0	0
November	9,521	0	998,934	63,191	8,645	7,000	983,289	0	0
December	21,828	231	1,004,886	63,422	5,486	0	999,400	0	0
Total for year	234,835	4,765			190,715	600,000		0	0

Order.	Silt in reservoir.	Lost by evaporation.	Used for irrigation.	Water in reservoir at end of month.	Deficiency.	Overflow.
Ac.	Acree-feet.	Acree-feet.	Acree-feet.	Acree-feet.	Acree-feet.	Acree-feet.
302	551	304	0	18,698	0	0
337	1,237	537	13,000	28,800	0	0
417	2,387	2,320	51,000	12,097	0	0
501	7,531	4,820	119,000	95,881	0	0
703	14,705	16,650	119,000	708,353	0	0
244	16,940	21,800	119,000	931,444	0	0
017	17,342	17,360	83,000	896,659	0	0
518	17,632	18,800	42,000	841,718	0	0
587	24,951	13,700	31,000	901,887	0	0
142	37,373	14,164	13,000	1,143,975	0	0
441	41,625	10,487	7,000	1,297,934	0	0
071	43,244	7,080	0	1,441,991	0	0
		130,022	600,000			

Estimated data concerning the proposed reservoir on the Rio Grande near Engle, N. Mex.—
Continued.

Year.	Inflow.	Silt deposited in month.	Water available.	Silt in reservoir.	Lost by evaporation.	Used for irrigation.	Water in reservoir at end of month.	Deficiency.	Overflow.
1901.	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Acre-feet.</i>
May	256,126	4,892	846,689	78,773	18,018	119,000	709,671	0	0
June	96,178	1,135	804,714	79,908	18,010	119,000	667,704	0	0
July	59,286	3,445	723,545	83,353	11,240	83,000	626,305	0	0
August	65,534	3,808	688,031	87,161	16,340	42,000	629,691	0	0
September	37,607	2,185	665,113	89,346	12,936	31,000	621,177	0	0
October	17,018	582	637,208	90,355	9,111	13,000	615,095	0	0
November	20,053	337	634,811	90,672	6,167	7,000	621,644	0	0
December	19,240	114	640,770	90,786	3,924	0	636,846	0	0
Total for year	656,274	17,825			126,369	600,000		0	0
1902.									
January	22,731	134	659,443	90,920	2,842	0	656,601	0	0
February	17,438	103	673,933	91,023	2,890	13,000	658,043	0	0
March	7,554	28	665,969	91,051	9,773	54,000	602,196	0	0
April	40,100	1,023	641,279	92,074	9,992	119,000	512,287	0	0
May	26,787	648	538,426	92,722	13,248	119,000	406,178	0	0
June	6,407	185	412,400	92,907	11,882	119,000	281,518	0	0
July	0	0	251,518	92,907	8,280	83,000	190,238	0	0
August	49,210	2,859	236,589	95,766	9,101	42,000	185,488	0	0
September	13,349	776	198,061	95,542	6,963	31,000	160,093	0	0
October	823	5	190,911	96,547	4,765	13,000	143,145	0	0
November	4,341	27	147,759	96,574	3,154	7,000	137,606	0	0
December	11,286	67	148,824	96,641	2,900	0	146,824	0	0
Total for year	200,729	5,855			81,896	600,000		0	0
1903.									
January	17,197	344	103,677	96,985	1,453	0	162,224	0	0
February	21,927	436	193,715	97,427	1,504	13,000	169,211	0	0
March	46,790	1,310	214,691	98,781	5,400	54,000	155,291	0	0
April	100,007	2,420	252,878	101,151	6,076	119,000	127,802	0	0
May	318,867	3,375	442,794	104,526	11,988	119,000	311,806	0	0
June	660,476	4,029	908,253	108,535	21,648	119,000	827,605	0	0
July	77,841	265	905,181	108,820	17,472	83,000	804,709	0	0
August	5,064	51	807,722	108,871	18,848	42,000	746,874	0	0
September	1,438	24	748,268	108,895	14,384	31,000	702,901	0	0
October	545	9	703,440	108,904	10,024	13,000	680,416	0	0
November	5,534	33	685,917	108,937	6,688	7,000	672,229	0	0
December	18,883	223	690,889	109,160	4,243	0	686,646	0	0
Total for year	1,272,069	12,519			119,728	600,000		0	0
1904.									
January	16,840	199	713,287	109,359	3,041	0	700,246	0	0
February	18,902	111	719,037	109,470	3,090	13,000	702,947	0	0
March	6,090	36	708,971	109,506	16,441	54,000	644,530	0	0
April	0	0	644,530	109,506	10,241	119,000	515,289	0	0
May	0	0	515,289	109,506	13,119	119,000	383,170	0	0
June	0	0	383,170	109,506	11,672	119,000	252,498	0	0

Summary of data concerning the reservoir.

Year.	Inflow from river.	Silt deposited.
	<i>Acre-feet.</i>	<i>Acre-feet.</i>
1897	2,215,257	43,244
1898	964,677	15,413
1899	289,835	4,765
1900	484,324	9,539
1901	656,274	17,825
1902	200,729	5,855
1903	1,272,069	12,519
1904 (half year)	41,802	246
Total for 7½ years	6,074,967	109,506
Average per year	809,997	14,601
Percentage of inflow		1.8

Putting the last line of the summary in that during this seven and a half years the reservoir would have been disposed of.

Disposition of water at proposed reservoir.

Loss by sediment	
Loss by evaporation	
Loss by overflow	
Total loss	
Water used for irrigation	
Water in reservoir at end of 7½ years	
Total	

The foregoing tables for the proposed reservoir show:

(1) That the accumulation of mud in seven and a half years would be 109,506 acre-feet. It will therefore take 14,600 acre-feet per year. It will therefore take 1,200,000 acre-feet of water to accumulate 1,200,000 acre-feet of mud in the reservoir capacity, leaving a water capacity of 800,000 acre-feet, unless some means are used. This mud in the reservoir would raise its surface, as estimated from the table, 16 inches, its surface dimensions being 16 and 30 miles long. The entire water would have a maximum depth of 25 feet, and have an area of 38,000 acres.

oposed reservoir on the Rio Grande near Engle, N. Mex.—
Continued.

Water available.	Silt in reser- voir.	Lost by evapora- tion.	Used for irriga- tion.	Water in reservoir at end of month.	Defi- ciency.	Over- flow.
acre-feet.	acre-feet.	acre-feet.	acre-feet.	acre-feet.	acre- feet.	acre- feet.
846,689	78,773	18,018	119,000	709,671	0	0
804,714	79,908	18,010	119,000	667,704	0	0
723,545	83,358	14,240	83,000	626,305	0	0
688,031	87,161	16,340	42,000	629,691	0	0
665,113	89,346	12,936	31,000	621,177	0	0
637,206	90,239	9,111	13,000	615,095	0	0
644,811	90,672	6,167	7,000	621,644	0	0
640,770	90,786	3,924	0	636,846	0	0
		126,369	600,000		0	0
659,448	90,920	2,842	0	656,601	0	0
673,933	91,023	2,890	13,000	658,043	0	0
665,969	91,051	9,773	54,000	602,196	0	0
641,279	92,074	9,992	119,000	512,287	0	0
538,426	92,722	13,248	119,000	406,178	0	0
412,400	92,907	11,882	119,000	281,518	0	0
281,518	92,907	8,280	83,000	190,238	0	0
236,589	95,766	9,101	42,000	185,488	0	0
196,061	96,542	6,968	31,000	160,093	0	0
160,911	96,547	4,766	13,000	143,145	0	0
147,759	96,574	3,154	7,000	137,605	0	0
148,824	96,641	2,000	0	146,824	0	0
		84,896	600,000		0	0
163,677	96,965	1,453	0	162,224	0	0
183,715	97,421	1,504	13,000	169,211	0	0
214,691	98,731	5,400	54,000	156,291	0	0
252,878	101,151	6,976	119,000	127,802	0	0
442,794	104,526	11,988	119,000	311,806	0	0
968,233	108,555	21,648	119,000	827,605	0	0
906,181	108,820	17,472	88,000	804,709	0	0
807,722	108,871	18,848	42,000	746,874	0	0
748,288	108,895	14,384	31,000	702,904	0	0
703,440	108,904	10,024	13,000	680,416	0	0
685,917	108,937	6,688	7,000	672,229	0	0
690,889	109,160	4,243	0	686,646	0	0
		119,728	600,000		0	0
703,287	109,359	3,041	0	700,246	0	0
719,037	109,470	3,090	13,000	702,947	0	0
708,971	109,506	10,441	54,000	644,530	0	0
644,530	109,506	10,241	119,000	515,289	0	0
515,289	109,506	13,149	119,000	383,140	0	0
383,140	109,506	11,672	119,000	252,468	0	0

Summary of data concerning the reservoir near Engle, N. Mex.

Year.	Inflow from river.	Silt depos- ited.	Lost by evapora- tion.	Used for irrigation.	Lost by over- flow.	Water in reservoir at end of year.
	acre-feet.	acre-feet.	acre-feet.	acre-feet.	acre- feet.	acre-feet.
1907	2,215,257	43,244	130,022	600,000	0	1,441,991
1908	984,677	15,413	226,210	900,000	0	1,565,045
1909	239,835	4,765	190,715	600,000	0	999,400
1910	484,324	9,539	149,419	600,000	0	724,766
1911	656,274	17,825	126,369	600,000	0	636,846
1912	200,729	5,855	84,896	600,000	0	146,824
1913	1,272,069	12,519	119,728	600,000	0	666,646
1914 (half year)	41,802	346	51,653	424,000	0	252,449
Total for 7½ years	6,074,967	109,506	1,089,072	4,624,000	0	
Average per year	809,997	14,601	145,200	600,000	0	
Percentage of inflow		1.8	18.0	76.2	0	4.0

Putting the last line of the summary in a different form it is found that during this seven and a half years the water that flowed into the reservoir would have been disposed of as follows:

	Per cent.
Loss by sediment	1.8
Loss by evaporation	18.0
Loss by overflow	0.0
Total loss	19.8
Water used for irrigation	76.2
Water in reservoir at end of 7½ years	4.0
Total	100.0

The foregoing tables for the proposed reservoir near Engle, N. Mex., show:

(1) That the accumulation of mud in the reservoir at the end of seven and a half years would be 109,506 acre-feet, which is at the rate of 14,600 acre-feet per year. It will therefore require eighty-two years to accumulate 1,200,000 acre-feet of mud, and fill up 60 per cent of the reservoir capacity, leaving a water capacity at that time of only 800,000 acre-feet, unless some means of getting rid of the mud is devised. This mud in the reservoir would have a depth of 150 feet, and its surface, as estimated from the table on page 411, would cover 5,516 acres, its surface dimensions being approximately 1½ miles wide and 30 miles long. The entire water space above this mud would have a maximum depth of 25 feet, and when full its surface would have an area of 38,000 acres.

(2) The tabulated statement shows that the reservoir will furnish continuously 600,000 acre-feet for irrigation without any deficiency and without any overflow.

(3) The largest amount of water there would have been in the reservoir at any time was in July, 1898, when there was 1,685,026 acre-feet of water; 168 feet being the maximum depth of water, including the mud. Hence, no water would have been lost by overflow with a 170-foot dam, or rather with a dam having a spillway for 170 feet depth of water, which spillway would be at elevation 4,380 feet, or 3 feet below the level of the lowest point of the gap selected for a spillway.

(4) The lowest quantity of water in the reservoir would have been 127,802 acre-feet at the end of April, 1903, and the depth in reservoir at that time 83 feet. The amount of water in the reservoir, June, 1904, at end of estimate, would have been 252,449 acre-feet.

COMPARISON OF THE TWO PROPOSED RESERVOIRS.

	El Paso.	Engle.
	<i>Acre-feet.</i>	<i>Acre-feet.</i>
Storage capacity.....	542,891	2,600,000
Yearly supply for irrigation (ordinary years).....	180,000	600,000
Supply for irrigation in dryest year.....	176,381	600,000
Average annual loss by overflow.....	156,565	None.
Average annual loss by evaporation.....	122,293	145,200
Combined annual loss from evaporation and overflow.....	278,858	145,200

A given quantity of water stored in El Paso reservoir will have nearly twice the evaporation surface as the same quantity stored in Engle reservoir.

The El Paso reservoir would be filled with silt to 60 per cent of its capacity in forty-six years, as compared with eighty-two years for the Engle reservoir. After the reservoir had been filled to 60 per cent of its capacity there would still remain storage for 217,000 acre-feet in the El Paso reservoir and for 800,000 acre-feet in the Engle reservoir.

The efficiency of the two reservoirs can be seen at a glance from the following table, showing the percentage in each of the water supply lost by evaporation and overflow, and the percentage available for irrigation:

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Record for seven and one-half

Loss by sediment.....	
Loss by evaporation.....	
Loss by overflow.....	
Total loss.....	
Water used for irrigation.....	
Water in reservoir at end of seven and one-half year.....	

The possibility of sluicing out part of and the corresponding effect upon each of considered.

In order to be able to sluice mud from must be empty and the sluice water must be above the reservoir itself. Hence advance a natural flood in the river, or there must be above on the river or one of its tributaries. Without going into the question of the question for this work, it will be assumed that it of ground sluicing used in hydraulic mining constructed at the bottom of the dam to prevent. A high-level canal along the hillside above the number of hydraulic giants undercutting the increase the work that can be done by a gate for the present only the chance of ground of water, without resort to pressure no tanks, will be considered, and it will be comparison, that a single channel, having bottom and side slopes of 4 to 1, can thus remove mud from the upper end to the lower referring to the foregoing statement it will reservoir will accumulate sufficient mud per cent of its entire capacity, and the next feet in the river channel just above the dam with a decreasing depth for a distance of channel through this mud along the width of 50 feet at the bottom and will remove 230,000,000 cubic feet of mud, with

Record for seven and one-half years.

ment shows that the reservoir will furnish 1,000 acre-feet for irrigation without any deficiency.

of water there would have been in the reservoir in July, 1898, when there was 1,385,026 acre-feet being the maximum depth of water, and no water would have been lost by overflow, rather with a dam having a spillway for which spillway would be at elevation 4,380 feet above the lowest point of the gap selected.

of water in the reservoir would have been 1,000 acre-feet in April, 1903, and the depth in reservoir would have been 252,449 acre-feet.

THE TWO PROPOSED RESERVOIRS.

	El Paso.	Engle.
	Acre-feet.	Acre-feet.
.....	542,891	2,000,000
.....	180,000	600,000
.....	176,381	600,000
.....	156,565	None
.....	122,293	145,200
.....	278,853	145,200

er stored in El Paso reservoir will have on surface as the same quantity stored in

ould be filled with silt to 60 per cent of its capacity as compared with eighty-two years for the El Paso reservoir had been filled to 60 per cent of its capacity still remain storage for 217,000 acre-feet and for 800,000 acre-feet in the Engle

reservoirs can be seen at a glance from the following table the percentage in each of the water supply, overflow, and the percentage available for

	Percentage of inflow.	
	El Paso reservoir.	Engle reservoir.
Loss by sediment.....	1.43	1.8
Loss by evaporation.....	24.55	18.0
Loss by overflow.....	32.00	0
Total loss.....	57.98	19.8
Water used for irrigation.....	37.00	76.2
Water in reservoir at end of seven and one-half years.....	5.02	4.0
	100.00	100.0

The possibility of sluicing out part of the mud that accumulates and the corresponding effect upon each of the reservoirs may now be considered.

In order to be able to sluice mud from a reservoir the reservoir must be empty and the sluice water must come from some source other than the reservoir itself. Hence advantage must be taken of a natural flood in the river, or there must be an auxiliary storage dam above on the river or one of its tributaries for supplying sluice water. Without going into the question of the quantity of water necessary for this work, it will be assumed that it can be done by the method of ground sluicing used in hydraulic mining, a large tunnel being constructed at the bottom of the dam to provide the necessary outlet. A high-level canal along the hillside above the reservoir and a number of hydraulic giants undercutting the banks would materially increase the work that can be done by a given quantity of water, but for the present only the chance of ground sluicing with a large flow of water, without resort to pressure nozzles for undercutting the banks, will be considered, and it will be assumed, for purposes of comparison, that a single channel, having a width of 50 feet at the bottom and side slopes of 4 to 1, can thus be maintained through the mud from the upper end to the lower end of the reservoir. By referring to the foregoing statement it will be seen that the El Paso reservoir will accumulate sufficient mud in forty-six years to fill 60 per cent of its entire capacity, and the mud will have a depth of 46 feet in the river channel just above the dam and will extend upstream with a decreasing depth for a distance of about 13½ miles. Sluicing a channel through this mud along the center of the valley, with a width of 50 feet at the bottom and with side slopes 4 to 1, will remove 280,000,000 cubic feet of mud, which amounts to 6,428 acre-

feet. But the rate of mud accumulation in this reservoir is 7,107 acre-feet per year. Hence the proposed sluicing would take out less than one year's accumulation.

It has also been shown that the Engle reservoir will accumulate sufficient mud in eighty-two years to fill 60 per cent of its entire capacity and that the mud just above the dam will be 150 feet deep and will extend upstream with decreasing depth for a distance of at least 30 miles. Sluicing through this deposit a channel with a bottom width of 50 feet and side slopes 4 to 1 will remove 5,353,920,000 cubic feet of mud, which is equivalent to 120,613 acre-feet. As the mud accumulates in this reservoir at the rate of 14,580 acre-feet per year, the proposed sluicing would remove the accumulations of eight and a fourth years.

This mud-sluicing discussion is not given to show the practical limits to which cleaning out by sluicing can be carried, nor is it here claimed that even the supposed channel can be maintained by sluicing; but the discussion applies the same hypothetical conditions to both reservoirs and shows that the same process applied to both will produce very different results. It takes out less than one year's accumulations of mud from the El Paso reservoir, while it removes more than eight years' accumulations from the Engle reservoir. This difference is due to the fact that in the former the mud is a wide, shallow deposit and in the latter it is a deep, narrow deposit. The same advantage will hold good for the Engle reservoir, no matter what process of sluicing may be applied or what the difficulties of sluicing the material may be, provided the material is the same in both reservoirs. The same process will take out nine-tenths of a year's accumulations in the El Paso reservoir and eight and one-fourth years' accumulations in the Engle reservoir. Sluicing is therefore nine times as efficient in the latter as the former. As the depth of mud in the latter is practically three times as great as in the former, the efficiency of sluicing appears to vary directly as the squares of the depths. This conforms to general principles and is a natural result of the investigations.

CONCLUSION.

The foregoing study has been confined to a comparison of the service that can be performed by the two proposed reservoirs. The question of cost has not been considered, but will be investigated later, yet it is safe to say that the El Paso reservoir would cost a great deal more in proportion to its efficiency than the Engle reservoir. The cost of the high dam of the Engle reservoir would be largely offset by the following conditions at the El Paso site:

(1) The greater depth to bed rock, and the fact that the bed rock is a broken limestone formation dipping downstream.

(2) The many thousand acres of rich, high lands to be submerged by water and mud by into marsh lands above the head of the reservoir.

(3) The removal of the railroad tracks flooded.

(4) The flooding of the quarry and the rearing plants in the basin.

The El Paso reservoir would waste more overflow each year than it would furnish produce in the immediate vicinity of El Paso of mud flats and marshes on land that would be valuable for agricultural and other purposes. Water for irrigating the great Mesilla Valley, as truly tributary to El Paso as El Paso, would waste enough water by evaporation 83,000 acres.

On the other hand, the Engle reservoir overflow and a minimum amount by evaporation will furnish enough water for irrigation to give a flow to the old Mexican canal equal from it years ago for irrigation, and have El Paso and Texas to participate in the benefits.

The Engle dam has the final advantage and is subject to the reclamation act. The plan that legislation by Congress can allow Mexico to participate. But the extent and manner of this plan must be arranged and decided by Congress of State. All that the Reclamation Service can make plans and estimates for work in the future that will not conflict with any action that may be taken and by the Secretary of State for restoring the Mesilla Valley has laid claim in Texas and Mexico to the appropriation and continuous use.

RIO GRANDE PROJECT

GENERAL CONDITIONS.

The foregoing discussions have brought out the conditions of the Rio Grande that can not be neglected in storing its flood waters and irrigating its valley. The Rio Grande is essentially a torrential or storm-water river, so irregular in their occurrence that the average annual flow is less than one-tenth of the total of this water is much needed for irrigation.

d accumulation in this reservoir is 7,107 the proposed sluicing would take out less on.

that the Engle reservoir will accumulate years to fill 60 per cent of its entire capacity above the dam will be 150 feet deep and a decreasing depth for a distance of at through this deposit a channel with a and side slopes 4 to 1 will remove mud, which is equivalent to 120,613 acres in this reservoir at the rate of 14,580 posed sluicing would remove the accumulation in years.

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It takes out less than one year's accumulation from the Engle reservoir, while it removes more than from the El Paso reservoir. This difference the former the mud is a wide, shallow deep, narrow deposit. The same advantage Engle reservoir, no matter what process of what the difficulties of sluicing the material is the same in both reservoirs. The nine-tenths of a year's accumulations in eight and one-fourth years' accumulations sluicing is therefore nine times as efficient er. As the depth of mud in the latter is as great as in the former, the efficiency of directly as the squares of the depths, principles and is a natural result of the

CONCLUSION.

been confined to a comparison of the service the two proposed reservoirs. The question is not settled, but will be investigated later, yet it is also reservoir would cost a great deal more money than the Engle reservoir. The cost of the Engle reservoir would be largely offset by the El Paso site:

to bed rock, and the fact that the bed rock is dipping downstream.

(2) The many thousand acres of rich, high-priced, Mesilla Valley lands to be submerged by water and mud by the reservoir or converted into marsh lands above the head of the reservoir.

(3) The removal of the railroad tracks occupying the land to be flooded.

(4) The flooding of the quarry and the removal of the manufacturing plants in the basin.

The El Paso reservoir would waste more water by evaporation and overflow each year than it would furnish for irrigation. It would produce in the immediate vicinity of El Paso many thousands of acres of mud flats and marshes on land that would otherwise be exceedingly valuable for agricultural and other purposes. It would furnish no water for irrigating the great Mesilla Valley in New Mexico, a region as truly tributary to El Paso as El Paso Valley itself, although it would waste enough water by evaporation and overflow to irrigate 83,000 acres.

On the other hand, the Engle reservoir will waste no water by overflow and a minimum amount by evaporation, and at the same time will furnish enough water for irrigation to supply Mesilla Valley, give a flow to the old Mexican canal equal to that which was used from it years ago for irrigation, and have enough left over to allow Texas to participate in the benefits.

The Engle dam has the final advantage of being in New Mexico and subject to the reclamation act. The project can be so planned that legislation by Congress can allow Mexico and Texas to participate. But the extent and manner of this participation is a matter that must be arranged and decided by Congress and the Department of State. All that the Reclamation Service can do at present is to make plans and estimates for work in the Territory of New Mexico that will not conflict with any action that may be taken by Congress and by the Secretary of State for restoring water to which El Paso Valley has laid claim in Texas and Mexico by virtue of ancient prior appropriation and continuous use.

RIO GRANDE PROJECT

GENERAL CONDITIONS.

The foregoing discussions have brought out certain facts concerning the Rio Grande that can not be neglected in making a general plan for storing its flood waters and irrigating its rich valleys. The Rio Grande is essentially a torrential or storm-water stream, subject to great floods, so irregular in their occurrence that the total flow in some years is less than one-tenth of the total flow in other years. As all of this water is much needed for irrigation a reservoir that will

waste a large amount of it by overflow or by unnecessary evaporation is not to be considered. The quantity of water required might be stored in a series of reservoirs along the river, having a combined capacity sufficient for impounding all the flood water; but the cost per acre of land irrigated would be too great. The depth from the present river bed to bed rock is from 65 to 90 feet at nearly all of the available reservoir sites. As all the dams, whether large or small, must be founded on bed rock, a series of small dams will cost more than one large dam forming a reservoir with a storage capacity equal to that of all the others. But aside from the increased cost of storage by means of a number of small reservoirs, there is another condition that absolutely prohibits their use. The Rio Grande is a very muddy river. It carries in suspension a percentage of silt that varies from year to year, and from month to month, but that is sufficient to have made a mud deposit in the last seven and one-half years equivalent to 1.8 per cent of the total volume of water that has come down the river.

Any reservoir constructed on the river will stop all the silt that comes down the river in suspension. A small reservoir will accumulate as many acre-feet of mud per year as a large one, until it is filled with mud. With a series of small reservoirs the upper one would fill with mud in a short time, and any mud that might be sluiced out of it would simply be transferred to the next one below, and so on. It has also been shown that any process of mud sluicing that can be resorted to is much more efficient in a large, deep reservoir than in a smaller, shallow one.

It therefore appears that the best solution of the mud question, as well as the storage question, is the construction of one big reservoir of great depth, with a capacity to store all the water and equalize the irregular flow over a number of years, and with surplus capacity for mud storage, until posterity can take advantage of its great depth to sluice it out economically.

A general map of the proposed Rio Grande project is shown on Pl. XLVII.

ENGLE DAM.

So far as known the only site for such a dam and reservoir on the river is the site selected by the reclamation engineers below Elephant Butte, near Engle, N. Mex. If the plans are carried out successfully at this site, the reservoir will not only meet all of the demands for irrigation below it, but will protect the valley below from the disastrous floods to which it is now subject.

IRRIGABLE LANDS.

The following is a statement of the irrigable lands of Rio Grande Valley in the United States immediately below the proposed dam:

NEW MEXICO: PLANS FOR RIO GR.

Irrigable lands surveyed in New Mexico and Texas dam.

Below Engle dam to United States dam site No. 39:	
East side of river, survey by Reclamation Service	
West side of river, survey by Reclamation Service	
Below dam site No. 39 to Rincon:	
East side of river, land-office maps	-----
West side of river, land-office maps	-----
Below Rincon to Penasco Rock:	
East side of river, land-office map	-----
West side of river, land-office map	-----
Below Penasco Rock to Texas State line:	
East side of river, Reclamation Service	-----
West side of river, Reclamation Service	-----
Below Texas State line to El Paso, Tex.:	
In Mesilla Valley, Reclamation Service	-----
Below El Paso, Tex., on east side of the Rio Grande	-----
Total	-----

SPECIFICATIONS FOR DAM.

The Engle dam, as projected by this survey, is on a 6° curve, the upstream edge of crest on a radius of 955 feet. The dimensions are as follows:

Height from bed-rock foundation to top of crest 255 feet.

Height from river bed (sand) to top of crest 190 feet.

Thickness at bottom, 180 feet.

Thickness at crest from outside to outside 10 feet.

Length of crest, 1,150 feet. Length of dam 1,200 feet.

From upstream edge parapet wall of crest to downstream edge parapet wall of crest gives upstream batter 1 inch to the foot; gives downstream batter 1 inch to the foot.

Downstream edge of crest 3 feet 6 inches above the downstream batter with a 100-foot radius.

Roadway 5 feet below crest between parapet walls 4 feet wide.

Height of spillway, 10 feet below roadway between parapet walls.

Depth of water from river bed to spillway 10 feet.

Strains calculated for possible high water level on foundation, with weight of masonry 141 pounds per square foot, specific gravity of 2.25.

Spillway to be at a gap on west side of river at dam site. This spillway will be 175 feet above river bed at dam site, and will have a length of 100 feet.

t by overflow or by unnecessary evaporation. The quantity of water required might be reservoirs along the river, having a combined ponding all the flood water; but the cost would be too great. The depth from the rock is from 65 to 90 feet at nearly all of the

As all the dams, whether large or small, rock, a series of small dams will cost more than a reservoir with a storage capacity equal. But aside from the increased cost of storage in small reservoirs, there is another condition for their use. The Rio Grande is a very muddy stream, a percentage of silt that varies from one month to month, but that is sufficient to have in the last seven and one-half years equivalent to a volume of water that has come down the

sed on the river will stop all the silt that in suspension. A small reservoir will accumulate mud per year as a large one, until it is filled. Instead of small reservoirs the upper one would be me, and any mud that might be sluiced out transferred to the next one below, and so on, at any process of mud sluicing that can be efficient in a large, deep reservoir than in a

it the best solution of the mud question, as shown, is the construction of one big reservoir with capacity to store all the water and equalize the number of years, and with surplus capacity the fertility can take advantage of its great depth fully.

proposed Rio Grande project is shown on

ENGLE DAM.

ly site for such a dam and reservoir on the west side of the reclamation engineers below Elephant Rock. If the plans are carried out successfully they will not only meet all of the demands for irrigation but will protect the valley below from the disastrous now subject.

IRRIGABLE LANDS.

ment of the irrigable lands of Rio Grande is shown immediately below the proposed dam:

Irrigable lands surveyed in New Mexico and Texas below the proposed Engle dam.

	Acres.
Below Engle dam to United States dam site No. 39:	
East side of river, survey by Reclamation Service	2,949
West side of river, survey by Reclamation Service	6,913
Below dam site No. 39 to Rincon:	
East side of river, land-office maps	6,400
West side of river, land-office maps	15,240
Below Rincon to Penasco Rock:	
East side of river, land-office map	5,230
West side of river, land-office map	3,560
Below Penasco Rock to Texas State line:	
East side of river, Reclamation Service	52,879
West side of river, Reclamation Service	25,152
Below Texas State line to El Paso, Tex.:	
In Mesilla Valley, Reclamation Service	22,227
Below El Paso, Tex., on east side of the Rio Grande, to town of Rio Grande	71,800
Total	208,400

SPECIFICATIONS FOR DAM.

The Engle dam, as projected by this survey, will be arched upstream and on a 6° curve, the upstream edge of the crest having a radius of 955 feet. The dimensions are as follows:

Height from bed-rock foundation to top of parapet walls on crest, 255 feet.

Height from river bed (sand) to top of parapet walls on crest, 190 feet.

Thickness at bottom, 180 feet.

Thickness at crest from outside to outside of parapet walls, 20 feet.

Length of crest, 1,150 feet. Length of dam at river level, 400 feet.

From upstream edge parapet wall of crest a triangular section gives upstream batter 1 inch to the foot; downstream batter, 7½ inches to the foot.

Downstream edge of crest 3 feet 6 inches vertical and curved to meet the downstream batter with a 100-foot radius.

Roadway 5 feet below crest between parapet walls on each side and 14 feet wide.

Height of spillway, 10 feet below roadway of crest and 15 feet below top of parapet wall.

Depth of water from river bed to spillway, 175 feet.

Strains calculated for possible high water at crest 255 feet above foundation, with weight of masonry 141 pounds per cubic foot, or a specific gravity of 2.25.

Spillway to be at a gap on west side of valley several miles above the dam. This spillway will be 175 feet above the level of the present river bed at dam site, and will have a length of 800 feet.

The reservoir will be about 40 miles in length, and will have a storage capacity of 2,000,000 acre-feet to the level of spillway. It will furnish about 600,000 acre-feet per annum for irrigation, and will irrigate 180,000 acres of land.

If no means of keeping the mud cleared out is provided, it is estimated that the silt deposits in the reservoir will decrease its capacity 60 per cent in eighty-two years, but a proper sluice tunnel and gates will make it possible to take advantage of conditions and opportunities for getting rid of mud by sluicing. The necessary conditions are an empty reservoir and a flow of water through the reservoir bed, either from a natural flood in the river or from an auxiliary reservoir above provided for the purpose.

All that is necessary at present is to construct an ample opening at the river level with gates that can be operated when the reservoir is empty.

The openings for everyday use will consist of a sufficient number of cast-iron pipes with proper gates on them.

Some of the large cast-iron service pipes will have their inlets in the vicinity of the large sluice gate, so that this large gate will not be covered with mud.

Another set of pipes will come through the rock bluff at the opposite end of the dam and will lead to water wheels, if it is found to be profitable to produce power in this way.

As bed rock is about 65 feet below the present river bed, it will be necessary to excavate about 65 feet of sand and gravel to get the dam on bed rock.

Although the river was practically dry for three months in 1900 and for five months in 1904, it will be necessary to provide a flume or other waterway that will carry the whole river and keep it out of this excavation; also strong cofferdams and a large pumping plant. The sand must be excavated by pumping, or by an elevator dredge, or by cableway excavators. By a system of driven wells all around the inside of the cofferdam it is probable that the sides of the excavation can be kept dry enough to maintain a slope of 3 to 1 in an open cut, but in this estimate a slope of 4 to 1 is assumed.

Schedule of quantities for dam.

44,400 cubic yards soft rock and earth excavation along hill slopes.
335,000 cubic yards sand excavation.
Cofferdams above and below, 400 feet each.
Flume or waterway for river, 800 feet long.
5,000 cubic yards bed-rock excavation for dam anchorages.
114,000 cubic yards of cyclopean concrete below river bed.
296,000 cubic yards cyclopean concrete above river bed.
Tunnel and sluice gates and outlets.
Paving for spillway.
Earth excavation for spillway, 120,000 cubic yards.
Foundation for spillway.
Soft rock excavation for spillway.
Concrete masonry for spillway, 2,000 cubic yards.

No railroads and but little good land w
reservoir.

DIVERSION DAM AND CAN

Plans and specifications have been prepared at Penasco Rock, near Selden station on the 18 miles above Las Cruces, N. Mex.; and that point to the head of the present Las has generally been considered the proper one as the large solid rock protruding from the about 50 feet into the river offered a safe anchorage for canal gates, notwithstanding the river bed opposite this point of rock is bed rock. But Survey plans and estimates are more than counterbalanced by its unfavorable conditions are as follows:

(1) The Santa Fe Railroad occupies the be available for a canal in the first 2,600 feet therefore be necessary either to move the the hill at a great expense or to build the constructing a high embankment and protect against the scour of the river.

(2) The elevation gained by starting the can not be maintained except at great expense kept up at a regular grade the water would be necessary to cover the agricultural land.

(3) The high, soft river bluff for one-half Las Cruces canal is undermining and encroaching such an extent that there is not room for the and the railroad, and the ground is entirely above the railroad. It will therefore be necessary to do this the river can be turned off along the west side of the valley channel at least a mile west of its present the way.

The above practical considerations have at Penasco Rock is 4 or 5 miles farther up river for a diversion, and that, aside from this expense cheaper to make a diversion dam lower the no rock bluff, as the difficulties encountered 600 feet of canal more than counterbalanced the rock abutment.

t 40 miles in length, and will have a storage-feet to the level of spillway. It will feet per annum for irrigation, and will

the mud cleared out is provided, it is estimated in the reservoir will decrease its capacity, but a proper sluice tunnel and gates advantage of conditions and opportunity sluicing. The necessary conditions are flow of water through the reservoir bed, in the river or from an auxiliary reservoir use.

present is to construct an ample opening at that can be operated when the reservoir is

use will consist of a sufficient number of gates on them.

in service pipes will have their inlets in the gate, so that this large gate will not be

come through the rock bluff at the opposite lead to water wheels, if it is found to be in this way.

et below the present river bed, it will be 15 feet of sand and gravel to get the dam

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By a system of driven wells all around it is probable that the sides of the excavation to maintain a slope of 3 to 1 in an opening of 4 to 1 is assumed.

of quantities for dam.

earth excavation along hill slopes.

tion.

0 feet each.

00 feet long.

ation for dam anchorages.

concrete below river bed.

concrete above river bed.

lets.

120,000 cubic yards.

y.

2,000 cubic yards.

No railroads and but little good land will be submerged by this reservoir.

DIVERSION DAM AND CANAL.

Plans and specifications have been prepared for a diversion dam at Penasco Rock, near Selden station on the Santa Fe Railroad, about 18 miles above Las Cruces, N. Mex.; and for 7 miles of canal from that point to the head of the present Las Cruces canal. This spot has generally been considered the proper one for this diversion dam, as the large solid rock protruding from the left bank and extending about 50 feet into the river offered a safe abutment for a dam and anchorage for canal gates, notwithstanding the fact that borings in the river bed opposite this point of rock show a depth of 70 feet to bed rock. But Survey plans and estimates show that its advantages are more than counterbalanced by its unfavorable location. Some of the unfavorable conditions are as follows:

(1) The Santa Fe Railroad occupies the only ground that would be available for a canal in the first 2,600 feet below the rock. It will therefore be necessary either to move the railroad farther back into the hill at a great expense or to build the canal in the river bed by constructing a high embankment and protecting the embankment against the scour of the river.

(2) The elevation gained by starting the canal at Penasco Rock can not be maintained except at great expense, and if it could be kept up at a regular grade the water would be on a higher level than is necessary to cover the agricultural lands.

(3) The high, soft river bluff for one-half mile above the mouth of Las Cruces canal is undermining and encroaching on the railroad to such an extent that there is not room for a canal between the river and the railroad, and the ground is entirely too high for a canal above the railroad. It will therefore be necessary to drop nearly to the river level and use the present river bed for a canal at this point. In order to do this the river can be turned across the big bend by a cut-off along the west side of the valley. This will put the river channel at least a mile west of its present location and get it out of the way.

The above practical considerations have developed the fact that Penasco Rock is 4 or 5 miles farther up river than is necessary to go for a diversion, and that, aside from this extra length of canal, it will be cheaper to make a diversion dam lower down the river, where there is no rock bluff, as the difficulties encountered in building the first 2,600 feet of canal more than counterbalance the advantages of the rock abutment.

NEW DIVERSION POINT.

The above considerations have led to the selection of a new diversion point on the river, opposite the residence of Mr. Summerford, at Leasburg station, on the Santa Fe Railroad, about 5 miles below Penasco Rock. At this new site the river is on the west side of the valley, against the foothills. The site is about 2 miles above the proposed cut-off, across the big bend. The cut-off will cause the river channel to lower at least 5 feet at the site, and will make the banks comparatively high.

Here can be constructed a diversion dam similar in every way to the proposed Penasco Rock diversion dam, except that a concrete pier will take the place of the natural rock. The canal will also have a similar head weir and head-gates. From the Leasburg diversion dam (as this site will be called for distinction) 2 miles of canal will reach the point where it is proposed to use one-half mile of the present narrow river bed above the mouth of the Las Cruces canal.

Following is a schedule of the work for the Leasburg diversion dam, sluice gates, canal inlet, and $2\frac{1}{2}$ miles of canal leading to head of the Las Cruces canal:

Structures of Leasburg diversion and conduit to Las Cruces canal.

500-foot concrete weir dam, with pier, embankment, and sluice gates.
Pier at left bank.
Inlet to canal.
Head-gates in canal.
Concrete in head-gates, wing walls, and floor.
2 miles of full-size canal, with 146,000 cubic yards of earth excavation.
River cut-off at Big Bend, 24,000 cubic yards earth excavation.
Embankment across river above cut-off, 10,000 cubic yards.
Wire fencing for river control.
Right of way.
Sluice gates in embankment above mouth of Las Cruces canal.
Arroyo control, drop, lower embankment, etc.
Watchman's house.

The above schedule includes a canal large enough for 1,000 second-feet. A present capacity of 500 second-feet will be sufficient for furnishing water from the river to existing canals in the valley while the Engle storage dam is in construction.

REPORT OF BOARD OF CONSULTING ENGINEERS.

The board of consulting engineers reported on this project as follows:

The considerations which prompted the investigations for a high dam near Engle as superior to the international dam project have been signally justified by the results, which may be summarized as follows:

1. The proposed Engle reservoir has a capacity of 2,000,000 acre-feet, as

NEW MEXICO: PLANS FOR RIO GR

against about 540,000 acre-feet that can be provided by the international reservoir at El Paso.

2. The former will furnish for irrigation 800,000 acre-feet annually, while the latter will furnish only 180,000 acre-feet.

3. The former will lose no water by overflow, while the latter will lose a very large percentage by overflow.

4. With a given amount of water the Engle reservoir will store one-half the surface for evaporation that will be required by the international reservoir.

5. It will probably require eighty-two years to fill the international reservoir with mud, while the latter reservoir will lose 10 per cent of its capacity in forty-six years.

6. The Engle reservoir is deep and narrow, while the international reservoir is wide and shallow, and in consequence it is found that mud will be nine times as efficient in the former.

7. The Engle reservoir will store the entire flow of the river with a minimum evaporation, and will prevent the valley occupied by the Santa Fe Railroad and the International reservoir will waste the water by evaporation, producing a maximum of evaporation, regaining 25,000 acres of good land near El Paso, and 15,000 more above it, and produce insanitary conditions.

8. The International dam proposes to destroy about 50,000 acres of land immediately north of El Paso in order to irrigate El Paso, while the Engle reservoir proposes to irrigate that the other would destroy, also to irrigate 50,000 acres in addition, to irrigate 90,000 acres above in New Mexico, all of which is tributary to El Paso.

A study of the water supply of the Rio Grande regulated by the proposed dam below Elephant Butte shows that 100,000 feet of water could have been drawn from the reservoir, emptying the reservoir. This is a basis for estimating the value of the water.

At the rate of $\frac{3}{4}$ foot in depth for irrigation it would irrigate 100,000 acres. The surveys show irrigable land about as follows:

Above Penasco Rock.....
Penasco Rock to Texas line.....
In Texas above El Paso.....
In El Paso Valley below El Paso.....

According to the above figures the Engle dam will irrigate 100,000 acres of land in New Mexico and 20,000 acres in Texas, a total of 120,000 acres of land above El Paso, and a surplus of water which could be emptied into the river for use below. The cost of the project, including the reservoir and the canal above El Paso, is estimated at \$7,200,000, or \$120 per acre. This is below the value of irrigated land in this valley, and it is announced the project desirable at this price. This will require about 300,000 barrels of cement. The people in Las Cruces were informed of the project at a public meeting, at which a resolution was passed in favor of the project and requesting the board of consulting engineers to enable lands in Texas to benefit by the project.

W DIVERSION POINT.

have led to the selection of a new diversion site the residence of Mr. Summerford, at Santa Fe Railroad, about 5 miles below where the river is on the west side of the bend. The site is about 2 miles above the proposed bend. The cut-off will cause the river to flow at the site, and will make the banks

a diversion dam similar in every way to a diversion dam, except that a concrete pier is used instead of natural rock. The canal will also have a pair of gates. From the Leasburg diversion (called for distinction) 2 miles of canal will be proposed to use one-half mile of the river above the mouth of the Las Cruces canal. The work for the Leasburg diversion is about 1½ miles of canal leading to head of

diversion and conduit to Las Cruces canal.

a pier, embankment, and sluice gates.

dike, and floor.

146,000 cubic yards of earth excavation.

100,000 cubic yards earth excavation.

cut-off, 10,000 cubic yards.

above mouth of Las Cruces canal.

embankment, etc.

des a canal large enough for 1,000 second-feet of 500 second-feet will be sufficient for further to existing canals in the valley while in construction.

BOARD OF CONSULTING ENGINEERS.

engineers reported on this project as follows:

Completed the investigations for a high dam near international dam project have been signally justified and summarized as follows:
The reservoir has a capacity of 2,000,000 acre-feet, as

against about 540,000 acre-feet that can be provided by the proposed international reservoir at El Paso.

2. The former will furnish for irrigation 600,000 acre-feet of water per annum, while the latter will furnish only 180,000 acre-feet.

3. The former will lose no water by overflow, while the latter will waste a very large percentage by overflow.

4. With a given amount of water the Engle reservoir will present only about one-half the surface for evaporation that will be presented by the international reservoir.

5. It will probably require eighty-two years to fill 60 per cent of the former reservoir with mud, while the latter reservoir will be filled with mud to 60 per cent of its capacity in forty-six years.

6. The Engle reservoir is deep and narrow, while the International reservoir is wide and shallow, and in consequence it is found that any process of sluicing out mud will be nine times as efficient in the former as in the latter.

7. The Engle reservoir will store the entire flow of the river without waste and with a minimum evaporation, and will prevent disastrous floods along the valley occupied by the Santa Fe Railroad and by several important towns, while the International reservoir will waste the water by overflow, present conditions producing a maximum of evaporation, regulate no floods above El Paso, cover 25,000 acres of good land near El Paso, and make marsh land of probably 15,000 more above it, and produce insanitary conditions at El Paso.

8. The International dam proposes to destroy about 40,000 acres of good land immediately north of El Paso in order to irrigate about 55,000 acres below El Paso, while the Engle reservoir proposes to irrigate the 40,000 acres of land that the other would destroy, also to irrigate 50,000 acres below El Paso, and, in addition, to irrigate 90,000 acres above in New Mexico, a total of 180,000 acres, all of which is tributary to El Paso.

A study of the water supply of the Rio Grande as measured at San Marcial, regulated by the proposed dam below Elephant Butte, shows that 600,000 acre-feet of water could have been drawn from the reservoir each year without ever emptying the reservoir. This is a basis for estimating the future duty.

At the rate of 3½ feet in depth for irrigation the water would serve 180,000 acres. The surveys show irrigable land about as follows:

	Acres.
Above Penasco Rock.....	40,000
Penasco Rock to Texas line.....	70,000
In Texas above El Paso.....	20,000
In El Paso Valley below El Paso.....	50,000

According to the above figures the Engle dam would furnish water to 110,000 acres of land in New Mexico and 20,000 acres in Texas, or a total of 130,000 acres of land above El Paso, and a surplus of water sufficient for 50,000 acres, which could be emptied into the river for use below El Paso.

The cost of the project, including the reservoir and all diversion works and canals above El Paso, is estimated at \$7,200,000, or \$40 per acre on 180,000 acres. This is below the value of irrigated land in this valley, and those best informed pronounce the project desirable at this price. The main item of cost is the dam, and this will require about 300,000 barrels of cement.

The people in Las Cruces were informed of the result of the investigations at a public meeting, at which a resolution was unanimously adopted declaring in favor of the project and requesting the board to recommend legislation by Congress to enable lands in Texas to benefit by the reservoir and contribute to its cost.

The land to be irrigated is nearly all private land.

Prominent citizens of the valley assert that there is little doubt that practically all the owners of land in the valley will readily comply with the provisions of the law by which they may receive the benefits of the reclamation act, and the board concurs in this opinion. An organization to take in hand the subject of securing pledges of land to the cost of the project has been recommended, and it is not feasible to begin construction until these are secured, but the prospects are sufficiently good to justify a recommendation that legislation be asked that will authorize the irrigation of lands in Texas in connection with the project.

THE ROSWELL ARTESIAN BASIN, NEW MEXICO.^a

Flowing wells were first obtained in the Roswell artesian basin about ten years ago, and for a number of years development was confined chiefly to the immediate vicinity of Roswell. During the last two years, however, a number of strong flows have been obtained near Artesia, a small town about 40 miles south of Roswell, and at present this part of the basin is experiencing the greatest development. There are now over 40 well machines at work in the region, many of which are of the most improved type. It requires from one to two months to complete an average well, so that from the above figures an approximate estimate can be obtained of the rate at which development in well boring is going on throughout this district.

The Roswell artesian basin is 60 miles long and has an average width of about 10 miles. It has an area of between 600 and 700 square miles, the greater part of which lies along the west side of Pecos River in southeastern New Mexico. Owing to the rapidity with which wells have been drilled throughout this region it is difficult to give a complete list of the flowing wells, but records have already been obtained of over 200, and it is probable that the total number exceeds 300. More than half of this number are found in the extreme north end of the basin at Roswell and the North Spring River Valley. The flow of these wells varies from a few gallons to 1,800 gallons a minute, depending principally on the locality. At Roswell the flow of an average well has been variously estimated at from 500 to 700 gallons, while near Artesia the highest flow recorded exceeds 1,700 gallons. The water is used chiefly for irrigation and domestic purposes. In a few cases it is unfit for domestic purposes on account of the presence of sulphur. The water from Formwaltz well, northwest of Hagerman, is said to have medicinal properties, although no chemical analysis was obtained. Considerable interest has always been shown in the composition of the Roswell artesian waters, and a few years ago extended analyses were made by Prof. E. M. Skeats, of El Paso, Tex. Unfortunately the material is not available at the present time. Generally where wells are utilized for irrigating pur-

^a From report by C. A. Fisher.

poses the water is taken from the well rarely stored in small reservoirs. In a few cases wells have been constructed along the side of the river to increase the flow. On the margin of the South Spring River, several shallow wells have been drilled to materially increase the flow of this stream.

CHARACTER AND AGE OF

The rocks of the district comprise limestone and gypsum, which are believed to be of Permian age. The deposits are extensive sheets of sand, silt, and clay of the Quaternary period, deposited in successive layers along the river and the high limestone slopes to the west. In the present discussion, the Permian is divided into three groups—the upper group, the middle group, and the Recent deposits in the Roswell basin. The upper group, which comprises the rugged slopes to the west, consists of alternating layers of gypsum and limestone, gypsum generally predominates. Near the base of the limestone bed is encountered. This group is about 300 feet, the beds ranging from fine-grained sandy series consists chiefly of red sandstone, which are porous and incoherent, while the limestone is massive. In Artesia the entire series has a maximum thickness of about 100 feet, but to the north is much thinner, especially where it scarcely exceeds 100 feet. The Recent deposits reach a very great thickness in some places, but only the uppermost member, a porous, sandy limestone, is considered.

WATER HORIZONS

There are several distinct artesian horizons in the Permian series. The strongest is the massive limestone, which is rather thin bedded. This limestone varies in thickness from 10 to 100 feet. The uppermost member of the massive limestone is the Permian. Above this horizon several small horizons are encountered throughout the overlying red sandstone.

SOURCE OF SUPPLY

The water-bearing formations outcrop along the west side of the basin, where they receive their water from the Pecos River.

WATERS OF THE RIO GRANDE AND ITS TRIBUTARIES.

LETTER

FROM

THE SECRETARY OF THE INTERIOR.

TRANSMITTING,

BY DIRECTION OF THE PRESIDENT, ORDERS AND REGULATIONS
OF THE INTERIOR DEPARTMENT TOUCHING USE, APPROPRIA-
TION, OR DISPOSITION FOR IRRIGATION OF THE WATERS OF
THE RIO GRANDE AND ITS TRIBUTARIES IN COLORADO AND
NEW MEXICO.

APRIL 29, 1911.—Referred to the Committee on Irrigation of Arid Lands and
ordered to be printed.

DEPARTMENT OF THE INTERIOR,
Washington, April 27, 1911.

SIR: By direction of the President, and responsive to House reso-
lution 944, Sixty-first Congress, third session, I have the honor to
submit herewith copies of orders and regulations in the Interior
Department and its bureaus touching the use, appropriation, or dis-
position for irrigation of the waters of the Rio Grande and its trib-
utaries in Colorado and New Mexico, the Rio Grande reclamation
project, together with a list of applications for rights of way, in-
volving the waters of the Rio Grande and its tributaries, initiated
or acted upon by this department since the passage of the reclama-
tion act.

Very respectfully,

WALTER L. FISHER,
Secretary.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

DEPARTMENT OF THE INTERIOR,
UNITED STATES RECLAMATION SERVICE,
Washington, D. C., April 22, 1911.

The SECRETARY OF THE INTERIOR.

SIR: In accordance with instructions of March 6, there are trans-
mitted herewith certain data relating to the water of the Rio Grande.
This material has been brought together in accordance with the reso-

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U.S. Exhibit 7

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lution of the House of Representatives of March 2, 1911, which in substance directs that they be furnished, if not incompatible with public interests:

A. Copies of all Executive or department orders and regulations in the possession of the Interior Department and its bureaus touching upon the use, appropriation, application, or disposition for irrigation of the waters of the Rio Grande and its tributaries in Colorado and New Mexico.

B. The Engle reclamation project and lands to be reclaimed thereunder.

C. The negotiations with the Republic of Mexico concerning said waters.

D. Together with a list or statement of all private irrigation or reservoir projects initiated or attempted to be initiated from the waters of said river and its tributaries in Colorado and New Mexico, above said Engle project, or acted upon by said department since the passage of the reclamation act and the disposition of the same.

Upon the receipt of these instructions request was made that the bureaus concerned bring together the desired facts, and correspondence was also initiated with other departments in cases where the files of this department were incomplete on the subject. As a result of this investigation and correspondence, the accompanying papers included in Exhibits A, B, C, and D are presented.

Very respectfully,

F. H. NEWELL, *Director.*

EXHIBITS.

EXHIBIT A.—COPIES OF EXECUTIVE OR DEPARTMENT ORDERS, ETC.

The following copies have been furnished by the Commissioner of the General Land Office:

1. December 5, 1896, order of Secretary Francis.
 2. December 18, 1896, reply of Commissioner Lamoreaux.
 3. January 13, 1897, modification by Secretary Francis.
 4. May 25, 1898, statement from Secretary Hitchcock transmitting complaint by Goudy.
 5. July 10, 1898, instructions from Acting Secretary Ryan.
 6. September 27, 1898, further instructions by Acting Secretary Ryan.
 7. April 22, 1907, recommendations from Director Newell, approved by Secretary Garfield.
 8. November 12, 1907, decision by Secretary Garfield.
 9. November 21, 1907, approval of certain selections by Secretary Ballinger.
- The above apparently includes copies of all executive or department orders and regulations touching the use, appropriation, application, or disposition for irrigation of the waters of the river, excepting those directly relating to the Engle Reservoir given below.
- In this connection also is given correspondence with the Department of Agriculture with reference to certain data relating to the flow of the Rio Grande, which were apparently obtained during the years 1896 and 1897, and subsequent years, by the use of public funds, but which have never been available for use by the public in general or by State or Federal officials:
10. March 14, 1911, Secretary Fisher to Department of Agriculture.
 11. March 18, 1911, Secretary Wilson to Department of the Interior.

DEPARTMENT OF THE INTERIOR,
Washington, December 5, 1896.

THE COMMISSIONER OF THE GENERAL LAND OFFICE.

SIR: Your office is hereby directed to suspend action on any and all applications for right of way through public lands for the purpose of irrigation by using the waters of the Rio Grande River or any of its tributaries in the State of Colorado or in the Territory of New Mexico until further instructed by this department.

Very respectfully,

D. R. FRANCIS, *Secretary.*

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AUG 4 1905

Have we others?

none catn 827'05

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OFFICIAL PROCEEDINGS

EL PASO, TEXAS.

Nov. 15-18,

1904.

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THE OFFICIAL PROCEEDINGS
OF THE
TWELFTH
NATIONAL IRRIGATION CONGRESS

HELD AT
El Paso, Texas, Nov. 15-16-17-18, 1904

COMPILED AND EDITED

BY

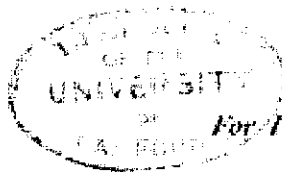
GUY ELLIOTT MITCHELL,
Chairman Press Bureau

BY ORDER

THE EXECUTIVE COMMITTEE

A. W. GIFFORD,
Secretary

CHARLES B. BOOTHE,
Chairman



For Index see end of Volume.

PUBLISHED BY
CLARKE & COURTS, GALVESTON, TEXAS
1905

General Session, Friday Afternoon, November 18, 1904.

The meeting was called at 2:00 o'clock by President Pardee.

Mr. Prince—Mr. President, I have an exceedingly gratifying, as well as important duty to perform. Most gratifying because it announces what I think is the most practical act in the history of this Congress, and the most gratifying of any duty which anyone has had to perform at this great gathering here in El Paso. I ask permission to make a very brief preliminary statement.

For a number of years there has existed a diversity of opinion—no, I rather may say a bitterness of action—between those living in the Rio Grande valley with regard to the irrigation improvements which seem necessary in order to utilize the water of that river. It was a three-cornered controversy—on the north, those living in the Territory of New Mexico; to the south and east of the river, those living in the State of Texas, and on the west of the river our brothers in the Republic of Mexico. Each had its own ideas, and each was sufficiently tenacious and sufficiently powerful to prevent action on the part of the other. Each, I am sorry to say, as time went by, became more and more antagonistic to the other, so that it seemed as if harmony of action was almost among the impossibilities. But a miracle has come; that which seemed to be impossible is not only possible, but is an assured and accomplished fact. Harmony and unity of action have succeeded in the place where before was contention and bitterness. There have been frequent assurances during the course of the existence of this Congress, among all of those from all parts of the Rio Grande valley, north and central and south, and this has resulted in the adoption of a resolution which has been very aptly called "a most happy solution of a vexed question." This agreement was so perfect, that yesterday afternoon, at a meeting in this room, a resolution was adopted unanimously, by all who were present, asking that some course of action should prevail, and that the officers of the Reclamation Service should go on and do the great work which they had found it was possible to do. And since that time, in another conference, this statement, with an addendum explanatory to some extent, has been signed. I hold here the original; it has been signed by five representing New Mexico, five representing Texas and five representing the Republic of Mexico. The resolution which was adopted yesterday read: "That we heartily approve the valuable work of the Reclamation Service under the Department of the Interior of Washington, whose officers of the Rio Grande have been in New Mexico and elsewhere, and we heartily endorse and approve the proposal of building the Elephant Butte dam as a happy solution of a vexed question that has embarrassed the parties interested, providing that an equitable distribution of the waters of the Rio Grande with due regard to the rights of New Mexico, Texas and Mexico."

"EL PASO, TEXAS, NOV. 18, 1904.

"The undersigned Mexican delegates to the Irrigation Congress, have had no time to make a comparison of the two projects to store the waters of the Rio Grande, the International dam project and the Elephant Butte dam

Chairman—The gentleman from New Mexico has moved the previous question, which was seconded in various directions. Shall the previous question now be put?

Mr. Prince—I wish to ask whether the question on which the previous question is asked is simply to strike out this one or three sections applying to the desert act and timber act?

Chairman—Shall the previous question be put? If there be no objection, the Secretary will call the roll of States. All those who vote aye on the question now before the house will vote to strike out from the report of the Committee this recommendation for the repeal of these three certain things. Those who vote no will vote to keep in the report of the Committee its recommendation for the repeal of those three certain things.

Roll call by States.

Chairman—The noes have it—63 ayes and 205 noes.

Mr. Finkel—I desire to move an amendment to that portion of the resolutions regarding a loan of the Government; I wish to put in the words "non-interest bearing" before the word "loan." I do not think we should incur any interest-bearing debt. Congress may not understand this, hence these words regarding interest should be put in. Motion seconded; carried.

Mr. Prince—I move as an amendment a substitute for the three sections with regard to the acts that have just been voted upon, the following:

"Whereas, The Timber and Stone Act, the Desert Land Law and the commutation clause of the Homestead Act have in some instances in their administration been found to result in speculation and monopoly;

"*Resolved*, That we request the Congress of the United States to make such modifications in said laws as will save the remaining public lands for actual settlers who will found homes and live upon said lands."

Congress, by its action a very few months ago, has shown, Mr. President, that it desires to take some action on the subject. It has refused to strike out the action that was proposed by the committee, which shows distinctly that it does desire some action. I submit the action which was taken last year which was very prudent and careful and judicious, and I think it is not desirable that this Congress, in the passage of any of its resolutions, should continually change its views and its standing on certain questions from year to year. It is a great deal better to re-affirm what we have done, once it is shown to be absolutely right. This was passed last year after a very long and searching discussion in which the best minds of the Congress of the United States expressed themselves. They are not here, these gentlemen, this year because they thought this matter was settled at once and forever by this Congress. Senator Teller is not here. Mr. Mondell is not here—not here because they thought this matter had been settled. That is the reason they are not here. In the first place let us re-affirm what we did then, which is in opposition to everything that is wrong in these acts and in favor of everything that is right.

Mr. Clark—I want to refer to the action of the Congress at Ogden last year. A great many members here present were there and recollect that the contention went on and a discussion was had which was, in many points,

(5)

PAST AND PRESENT PLANS FOR IRRIGATION OF THE RIO GRANDE VALLEY.

B. M. HALL, Supervising Engineer U. S. Reclamation Service.

The Rio Grande rises in the State of Colorado, and flows south through the entire length of the Territory of New Mexico to the north boundary of Texas, near the town of Anthony. From this point "The Pass," about four miles above El Paso, Texas, it forms the boundary between New Mexico and Texas. At "The Pass" it becomes the boundary line between the United States and Mexico, and continues as such for about 1300 miles to the Gulf of Mexico.

So far as its history is known it has always been a torrential or storm-water stream, subject at times to great floods, and at other times to periods of minimum flow when its bed was dry, or carried an insignificant amount of water along certain parts of its course.

Above El Paso it has a length of about 900 miles, and a drainage area of about 38,000 square miles. In this section its ordinary flow, or what is known as its permanent water, comes almost entirely from a comparatively small area in Colorado and upper New Mexico, where there is a heavy snowfall in the mountains.

The country through which it flows is very fertile, but the rainfall is so meager and so erratic that it is an arid desert, and no crops can be raised without artificial irrigation.

EARLY IRRIGATION IN RIO GRANDE VALLEY.

Before the middle of the sixteenth century the Spaniards entered the valley of the Rio Grande in New Mexico, and there found the Pueblo Indians living in towns, cultivating the land, and bringing water onto it by irrigating ditches, many of which are still in use to this day. A Spanish colony was established at Chamita, New Mexico, in 1598, and at Santa Fe in 1605. The latter colony existed until 1680, when they were driven out by the Pueblo Indians. Spanish supremacy was again established in 1692. From that time to near the middle of the nineteenth century the Rio Grande Valley in New Mexico was under the dominion of Spain and Mexico, and was settled up by Spaniards and Mexicans, who irrigated and cultivated the lands. In the excellent report made by Mr. W. W. Follett in 1896 to the International Boundary Commission, he says: "While quite a large native population has come into the Rio Grande drainage in New Mexico since the construction of railroads in 1880, it is confined principally to the towns, and to-day fully 90 per cent of the irrigating in this section is done by Mexicans and Indians." In the same report Mr. Follett says: "The El Paso Valley was occupied by Spaniards over three hundred years ago. In the year 1600 El Paso del Norte (now called Juarez) was an important town, and records are in existence over two hundred and eighty years old which refer to the Acequia Madre of El Paso del Norte as being in use." In speaking of his investigations in El Paso Valley, Mr. Follett says: "From all I could learn, I should judge that in former years some 40,000 acres of land were tilled in this valley, more than half of which was on the Mexican side of the river."

SCARCITY OF WATER.

During recent years there has been a great scarcity of water in the Rio Grande, in New Mexico and in the El Paso Valley of Texas and Mexico. The deficiency of flow at El Paso brought about a complaint from the Republic of Mexico. The question by a protocol, dated May 6, 1896, was referred to the International Boundary Commission for a full investigation and a report upon the following points:

1—The amount of water of the Rio Grande taken by irrigation canals in the United States of America.

2—The average amount of water in said river, year by year, before the construction of said irrigation canals, and since said construction.

3—The best and most feasible mode of so regulating the use of the waters of said river as to secure to each country concerned, and to its inhabitants, their legal and equitable rights and interests in said waters.

On November 25, 1896, this Commission, composed of Col. Anson Mills for the United States, and Señor Don F. Javier Osorno for the Republic of Mexico, having before them the full and complete report of Mr. W. W. Follett, United States Engineer for the Commission, reported as follows:

1—The increase in the acreage irrigated from the Rio Grande in the State of Colorado from the year 1880 to the year 1896 was 197,000 acres. The increase of acreage irrigated in New Mexico during the same years was 3000 acres, making a total of 200,000 acres.

2—The flow of the river at El Paso has been decreased about 200,000 acre feet of water per annum by the taking of water for irrigation by canals constructed in the United States of America; the great mass of these waters consisting of flood waters utterly unavailable for irrigation without large reservoirs.

3—As "the best and most feasible mode of regulating the use of water, and securing to each country and its inhabitants their legal and equitable rights in said waters," the Commission recommended that the United States government should buy all necessary land, pay all damages, and construct at its own expense an international dam at "The Pass," about four miles above El Paso; submerge 25,565 acres of good land in the United States with water; extend the Mexican boundary upstream to the dam site, giving Mexico 98 acres additional territory in order that one end of the dam may be on Mexican soil; deed one-half of the dam, the reservoir and the water supply to the Republic of Mexico, and in some way prevent the construction of any large reservoirs on the Rio Grande in the Territory of New Mexico.

The Commission estimated the cost of this project at \$2,317,113.36.

As above mentioned, Mr. Follett estimates that about 40,000 acres of land had prior rights under the old canals in El Paso Valley, and was deprived of irrigation by the act of American citizens on the head waters; and that something more than one half of this 40,000 acres lay on the Mexican side of the river. As the restoring of these ancient water rights is the primary object of the proposed expenditure of \$2,317,113.36, the cost of the project would be \$57.92 per acre. However, it will be shown further along in this paper that the proposed reservoir could be made to irrigate 55,000 acres

in El Paso Valley, which would put the cost per acre at \$42.12, provided the estimate of the Commission is a correct one. There is every reason for believing this estimate too low, but aside from the monetary cost per acre for the land to be irrigated, there is another item of cost to be considered. The reservoir would cover 25,565 acres of good valley land with mud and water, and would cause marshes to form in the low flat valley at the head of the lake amounting to perhaps 15,000 acres additional, making a total destruction of about 40,000 acres of land in Mesilla Valley, which is just as near to El Paso, and just as valuable as any of the land that would be irrigated.

WOULD HAVE LEFT NEW MEXICO OUT.

While the published report of the Commission and its engineers plainly sets forth the fact that increased irrigation in Colorado caused shortage of water in Mexico, Texas and New Mexico, their recommendations not only leave New Mexico out of all the benefits to be derived from a project inaugurated for the purpose of making up this shortage, but give part of her territory to Mexico; cover up another part of it by the proposed reservoir, and distinctly ask that the government shall prevent the construction of any other large reservoir on the Rio Grande in the territory of New Mexico. The only reasonable explanation of these extraordinary recommendations lies in the probable fact that the Commission had no alternative plan for consideration, and thought that the plan recommended was the only possible plan that could be adopted for restoring the water to which Mexico laid claim by virtue of ancient prior use. Indeed they were confronted at the time with the prospect of an Elephant Butte dam in New Mexico, not under government management, but to be constructed, owned and operated by a stock company of private capitalists, whose plans contemplated the construction of a comparatively low dam, without sufficient storage capacity for irrigating a large area above and having a surplus for Mexico. At that time the United States government had no Reclamation Service. Now that conditions have completely changed, and there is an alternative plan which claims to be able to accomplish just as much for Mexico, and a great deal more for the United States, it becomes necessary to compare these two plans, and choose between them.

The alternative plan, suggested by the U. S. Reclamation Service, is to build a storage dam opposite Engle, New Mexico, across the Rio Grande at a point about a quarter of a mile below the site selected by the old Elephant Butte Company, and a third of a mile below the Elephant Butte, which is a conical mountain peak rising abruptly from the river bank to a height of about 500 feet. At this site it is proposed to build a dam that will form a reservoir 175 feet deep at its lower end, and 40 miles long, with a storage capacity of two million acre feet, that will impound enough water to furnish 600,000 acre feet per annum, and irrigate one hundred and eighty thousand acres of land, distributed as follows:

110,000 acres in New Mexico.

20,000 acres in Texas above El Paso.

50,000 acres in El Paso Valley below El Paso.

(11)

HEARINGS UPON THE BILL H. R. 17030.

COMMITTEE ON FOREIGN AFFAIRS.

HOUSE OF REPRESENTATIVES,

Washington, D. C., January 24, 1907.

The committee met this day at 11.40 o'clock a. m., Hon. Robert R. Holt, chairman, presiding.

There appeared before the committee and were granted hearings on the subject-matter of the bill, Hon. William R. Smith, Representative from Texas; Hon. Bernard S. Reley, Delegate from New Mexico; and Mr. F. H. Newell, of the Geological Survey, chief engineer of the Reclamation Service.

Mr. BURLESON. Mr. Chairman, preliminary to the hearings of these gentlemen, I would like to ask permission of the committee that the gentlemen who may be heard may have the privilege of extending their remarks in the hearings and adding thereto any matter that they may see fit to add.

The CHAIRMAN. You desire this to be printed?

Mr. BURLESON. Yes, sir.

The CHAIRMAN. That will require an order; but the committee has the privilege, and it will be done.

STATEMENT OF HON. WILLIAM R. SMITH, REPRESENTATIVE FROM TEXAS.

Mr. SMITH. Mr. Chairman and gentlemen of the committee, if I may be heard now, I want to state that this is a bill that pertains to a matter that has been pending before this committee for several years, and I assume that every member of the committee is more or less familiar with the facts pertaining to the old bill, on which you had a great many hearings, as I understand.

The old bill provided for the construction of an international dam at or near El Paso, Tex., for the storage of the floodwaters of the Rio Grande River for irrigation purposes, and providing for the equitable distribution of the water so stored between Texas and New Mexico. In the valley below El Paso the water going to Mexico was to be contributed in settlement of certain claims brought by the Mexican Government against our Government for damages, by reason of Mexican citizens being deprived of water for irrigation purposes which they had been in the habit of using for many years, the water having been taken out in New Mexico and Colorado by American citizens, this fact being shown by the report of the U. S. Boundary Commission, headed by Gen. Anson Mills, and recognized by the State Department of this Government, as is shown by the reports of various negotiations between the two Governments, contained in Senate Document No. 229 of the Fifty-fifth Congress, second session.

STATEMENT OF MR. F. H. NEWELL, OF THE GEOLOGICAL SURVEY,

Chief Engineer of the Reclamation Service.

Mr. NEWELL. Mr. Chairman and gentlemen, this matter is one that I have had under study for sixteen years. In 1898 I began as assistant hydraulic engineer of the former Irrigation Survey, the measurement of the Rio Grande and the examination of the whole river, without reference to State boundaries. The present Reclamation Service now has the accumulated records of the river flow extending over fifteen years of surveys for reservoir sites, and other substantial engineering data on which to base an opinion as to which is the best method of handling that river.

In summing up the whole matter, as was done before the Irrigation Congress at El Paso in November, 1904, it appears, considering the river as a whole, from Colorado to Texas, that the best reservoir site, the most economical to be constructed, is that near Eagle, N. Mex. This is nearly identical with the old Elephant Butte site. The building of the Eagle reservoir would practically obliterate the Elephant Butte proposition.

It is possible to build at that site a large reservoir holding the entire flood flow of the river. By constructing this reservoir under the terms of the reclamation-service act of June 17, 1902, it will be possible to store all the flood waters in the Rio Grande, discharge them back into the river as needed, and divert them in the Mesilla Valley and upon the irrigated lands above and below El Paso, on both sides of the river.

Mr. PRATT. What do you estimate would be the expense of that dam?

Mr. NEWELL. The expense of that dam and of the distributing system is estimated at a little over \$7,200,000.

Mr. PRATT. How much land would you flood with the dam?

Mr. NEWELL. A little less than 40,000 acres, of which there is practically no agricultural land, as the flooded area is in a narrow valley.

Mr. BRIDGES. That has an advantage on this site over the other site, because the other site did flood quite an area of good land.

Mr. NEWELL. This bill proposes that some of the funds necessary for building the irrigation system shall come from future appropriation to be made by Congress, in order to reimburse the reclamation fund, on account of the land having ancient prior rights. It is proposed to furnish such lands with water free. The purpose of the last clause of this bill is to ascertain the extent of the ancient rights that have been destroyed in Mexico and Texas, and the cost of obtaining water for the lands claiming such rights.

Mr. PRATT. You would not estimate the value of these ancient rights at \$35 an acre, would you?

Mr. NEWELL. It would cost on an average of \$35 to \$40 per acre to provide a permanent supply for these lands.

Mr. LAMAR. As I understand, the Government does not concede that we are responsible for the failure of the water there?

Mr. NEWELL. It is understood that there is no legal obligation; as to the equity, that is another question.

Mr. PRATT. You say a certain portion of the total cost is contemplated to be set aside out of the reclamation fund?

Mr. NEWELL. Yes, sir.

PROJECT HISTORY

Rio Grande Project - Texas - New Mexico

From Inception to December 31, 1912, including
complete History of Construction of Leasburg Unit.

(Exclusive of Storage Unit)

now rapidly changing. Owing to the increased facilities for irrigation afforded by the work of the Reclamation Service, and the assurance of further and greater future benefits, American farmers are now rapidly supplanting the Mexicans, farming with more modern methods, and largely extending the irrigated area.

The Rio Grande was one of the first streams to be investigated by the Geological Survey, and no stream in the West has a more complete record of discharge than this river above El Paso. Since 1888 gaging has been taken at Del Norte, Embudo, Rio Grande, San Marcial and El Paso.

Various projects have from time to time been investigated and reported upon for the storage and utilization of the flood waters of this river. In 1889 and 1890 the Geological Survey located and surveyed a number of reservoir sites on the Rio Grande, one of which, "No. 38," is situated within the present reservoir site, the proposed dam being located at a point fourteen miles north of Elephant Butte. Another, "No. 39", was to be formed by a dam located eleven miles south of the Town of Las Palomas. In 1896 surveys were made for the so-called International dam and reservoir, a short distance above El Paso.

The Reclamation Service began investigations on the Rio Grande on March 1, 1903, with special attention to a dam

site between No. 38 and No. 39, above mentioned. Here the river flows through a narrow canyon of sandstone. About a half mile above this site is an ancient volcano rising from the east bank to a height of about five hundred feet above the river, and known as Elephant Butte, from the fancied resemblance to an elephant's head. From this butte the dam takes its name.

During the summer of 1903 a topographic survey of the river and valley was made from damsite No. 38 to damsite No. 39, and on the 26th of October borings at the proposed damsite near Elephant Butte were begun to determine the depth and character of bedrock. These borings were continued during the following winter, and showed bedrock of sandstone at depths varying from fifty to sixty-five feet below the surface.

In August, 1903, a topographic survey was begun at Selden and extended down the river, covering the irrigable area in the Mesilla Valley to El Paso. In 1904 these surveys were extended to cover the El Paso Valley for a distance of about forty miles down the river from El Paso. Borings were also made at the site of a proposed diversion dam at Penasco Rock near Fort Selden.

As a result of the surveys and investigations in 1903 and 1904 at the Elephant Butte site it was then tentatively

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decided upon as being superior to any other on the river as a site for the storage of water for irrigation of Mesilla and El Paso Valleys. Physical and natural conditions determined this site as offering more favorable and less objectionable features than any other which had been proposed by either the Government or by private interests. The reservoir has a much larger capacity than any other on the river, and is ample to store the floods of wet years, and to hold them to reinforce the supply in times of extreme drought. It is the only proposed reservoir with a capacity large enough to utilize the entire flow of the drainage basin. It is situated sufficiently low in the basin to intercept practically all the waters, and yet is sufficiently high to command enough land to consume all the available water supply. It does not submerge any large area of valley lands, nor any railroads.

The capacity of the reservoir as first planned was 2,000,000 acre-feet, but this was later increased to 2,600,000 acre-feet by raising the height of the dam and elevation of the spillway. The extremely large capacity is intended mainly for the solution of the sediment problem, which is the most difficult and serious obstacle to the utilization of the flood waters of the Rio Grande.

The height of the dam, and consequently the capacity of the reservoir, is limited by a low gap in the hills one and one-fourth miles northwest of the damsite. At first it was planned to build a spillway in this gap, but on investigation, it was found that instead of being in rock, as was supposed, the gap is in deep beds of gravel and sand. A fault in the geological structure passes near the gap and cuts off the sandstone strata, which appeared on the surface to be continuous. The final plans include an embankment or earth dam at this point, with a maximum height of about thirty feet.

The situation of the Town of San Marcial and the Abilene, Topeka & Santa Fe Railroad at the upper end of the reservoir also limit the practical height of the dam.

In 1905 two water users' associations were organized on this project; the Elephant Butte Water Users' Association of New Mexico, with headquarters at Las Cruces, and the El Paso Valley Water Users' Association of Texas, with headquarters at El Paso.

During the spring and early summer of 1905 surveys were made for a diversion dam near Leasburg at a point about $2\frac{1}{2}$ miles south of old Fort Selden. It was at this time that the Leasburg Project took its name, from the proposed

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diversion dam being near Leasburg station on the Santa Fe Railroad. The next year, however, the Santa Fe made a change in its alignment between Selden and Leasburg, abandoning its old grade at and below Penasco Rock, which had prevented the Reclamation Service from making use of the rock for a diversion site. As a result of this change of the railroad the Penasco Rock was finally adopted as the diversion site. The railroad company's reason for changing their track was that they had found it impractical to maintain their grade against the encroachments of the river at a point a mile below Fort Selden. Their change of track was made in 1906 and the same year, further surveys and plans were made with Penasco Rock as the diversion point, the contract was let and construction of the Leasburg Project begun. As the Leasburg Project is an integral part of the Rio Grande Project, its history up to this point is inseparable from that of the general project. From this point on, however, its history will be given separately.

In order to make the Rio Grande Project feasible, Congress extended the provisions of the Reclamation Act to the State of Texas by an act approved June 12, 1906, and a treaty between the United States and Mexico was entered into on May 21, 1906, in which the United States agreed to furnish a certain

portion of the regulated flow of the Rio Grande to supply the Mexican canal at Juarez.

Article 1 of the treaty is as follows:

"After the completion of the proposed storage dam near Engle, New Mexico, and the distributing system auxiliary thereto, and as soon as water shall be available in said system for the purpose, the United States shall deliver to Mexico a total of 60,000 acre-feet of water annually, in the bed of the Rio Grande at the point where the head works of the Acequia Madre, known as the old Mexican Canal, now exist above the City of Juarez, Mexico."

In return, the Mexican Government waives all other claims to water in the Rio Grande above the town of Fort Quitman, Texas, and all claims for past damages from shortage of water.

Under the Reclamation Act, the cost of a project is to be repaid to the Government by the water users under it, but in this case it became evident that the American water users should not be taxed for that portion of the cost of the project due to the obligations of the United States in the above treaty, of supplying water to Mexico. Accordingly in 1907, Congress appropriated \$1,000,000 to be expended under the direction of the Secretary of the Interior towards the construction of the Elephant Butte Dam, forming the Engle Reservoir.

The cost of the project, including the reservoir and

all diversions and canals above El Paso, was originally estimated at \$7,200,000. Since that estimate was made, the cost of labor and materials has advanced, and important additions have been made to the plans, so that the estimated cost must be considerably raised.

Above Elephant Butte the Rio Grande has a length of about 775 miles, and a drainage area of about 30,000 square miles.

The estimated average annual run-off at the damsite is 800,000 acre-feet; the capacity of the reservoir as planned, 2,600,000 acre-feet; area of reservoir 40,000 acres or $62\frac{1}{2}$ square miles; maximum depth of water 193 feet; average depth, $62\frac{1}{2}$ feet; length of reservoir, 40 miles. The fall of the river from San Marcial to El Paso is nearly uniform at $4\frac{1}{2}$ feet per mile. The dam as planned is to have a maximum height of 300 feet; length on top, 1,200 feet. It is to be built of rubble concrete, with a gravity section, and will contain approximately 500,000 cubic yards of masonry, requiring, together with other necessary concrete structures, at least 400,000 barrels of Portland cement. Sand and gravel excavation in the river bed is estimated at 350,000 cubic yards, and a large amount of loose and solid rock excavation on the hillsides.

The damsite is twelve miles from Engle, the nearest station on the Santa Fe Railroad. The cost of hauling lumber by teams over the road is \$4.25 per M feet, and other freight, \$2.45 per ton. From these figures it was estimated that the saving in the cost of hauling cement alone would pay for the construction of a branch railroad to the damsite. The saving on the cost of hauling equipment, lumber and other freight, together with the general facilitation of the work makes the construction of a temporary branch railroad a very profitable expenditure.

In December, 1907, a party was put into the field at the reservoir site to extend the topographic surveys with the view to planning for a higher dam, also to dig test pits and explore the geological structure at the Dam site. These surveys and investigations were continued throughout the following year. In March, 1908, another party began the location of a standard gage branch railroad to the damsite. This location survey was completed in May, but was partly revised in December, 1908, to reduce the maximum curvature. As finally located, the junction with the Santa Fe Railroad is at a point about half way between Engle and Gutter. Its general course is west and the length of the branch to the damsite is ten and one-half miles. The maximum curvature is

twelve degrees, the maximum grade going west, against loaded trains, is 1.6%. That going east, against empty trains, is 3.7%, compensated for curvature. Lighter grades down to about 2.5% maximum, could have been had, but only by an increase in construction cost much greater than the estimated saving in operation cost for five years. For seven miles from the junction the grading work is very light. The remaining three and one-half miles at the west end is heavy rock work. There are two trestle bridges on the line; one over Ash Canyon, 80 feet high and 448 feet long, and one over Spring Canyon, 60 feet high and 400 feet long.

During 1908 a number of wagon roads were graded about the camp near the damsite, and a new road built from the camp to Engle. Between August, 1908, and May, 1909, a concrete water tank with a capacity of 300,000 gallons was constructed on a hill near the damsite, to supply the camp and other construction work. About one and one-half miles of 4-inch main pipe was laid connecting the tank with the site for a well and extending through the camp grounds.

In November, 1908, grading for the railroad was begun at the west end and extended eastward, covering the terminal yards and the first mile of track. The work was all being done by force account. On February 18, 1909, an agreement was entered into with the Atchison, Topeka & Santa Fe

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Railway Company, by the terms of which the United States is to locate, grade and construct a roadbed and necessary bridges, ditches and culverts for a standard gage spur track extending from the proposed site of the dam at Elephant Butte, to a point on the Rio Grande Division of said Company, between the stations of Engle and Cutter. The Company is to furnish track materials, lay and maintain the track, and operate the line under specific conditions. Freight and passenger rates under this contract are made very favorable to the Reclamation Service. By the first of May, 1909, 80% of the excavation for the railroad grade had been done. At this time orders were given to stop all construction work on account of the failure of negotiations which had been pending for the purchase of the lands needed for the damsite, reservoir and railroad right of way.

The damsite and most of the lands required for reservoir and railroad right of way, are in the Armeriaris Grant No. 55. A part of the reservoir lands are in Armeriaris Grant No. 54. These grants are the property of the Victoria Land & Cattle Company, having headquarters at Bakersfield, Cal. Armeriaris Grant No. 55 was granted to Pedro Armeriaris in 1819, by Facundo Melgares, the Civil and Military Governor of New Mexico under the Spanish Crown. Grant No. 54 was granted to the same party in the same manner the following

year. These grants were confirmed by Act of Congress dated June 21, 1860. They were surveyed in 1872, and patented in 1878. The total area required by the Reclamation Service for the Rio Grande Project in these grants is about 33,640 acres. When this had become an approved project, work was begun in 1907 on the examination of land office and court records relating to land titles in the Eagle reservoir site. In 1908 a number of small tracts were purchased in the reservoir site from individual owners but it was not until late in that year that the surveys had been completed to such an extent to make it possible to definitely describe the boundaries of the land wanted of the Victorio Land & Cattle Company. It had been informally understood for some time previous with the agents of the Company that when the Government was ready to definitely describe the lands wanted there would be no difficulty in agreeing on a purchase price. When the time had arrived, however, it was found impossible to agree on a price, the amount offered and that asked being at wide variance. The Company asked \$600,000, while the offer made by the officers of the Reclamation Service was \$65,000. This situation developed in the spring of 1909 and led to the order above referred to, stopping preliminary work on May 1st. Under authority conferred upon the Secretary of the Interior by Section 7 of the Reclamation Act, condemnation proceedings

were commenced to acquire the lands in question. In preparing the data for the suit it became necessary to describe a number of small tracts owned by a number of individuals, situated within, and entirely enclosed by the lands to be condemned. These persons were squatters who had lived on their lands for many years, and had acquired title to them by adverse possession. Their title to their several tracts had been confirmed by a decree in the Third Judicial Court of the Territory of New Mexico, dated June 27, 1908. It was thought that the descriptions of these numerous tracts given in the court decree would be sufficient for the purpose of filing the condemnation suit, but on July 12, 1909, it was decided that they were not adequate, and surveys were immediately begun to obtain accurate descriptions. There were 186 of these tracts, comprising in all 2297 acres of bottom lands, a small part being in cultivation. The boundaries of nearly all of these tracts were very irregular. These surveys were begun in July and finished September 30th. Descriptions and maps were finished in October and the condemnation suit was filed November 5, 1909. The hearing of the case was had December 14th, on which date commissioners were appointed by the court to view and appraise the lands and fix the amount of damages to be paid. On January 11, 1910, the commissioners met at Engle and proceeded over the

lands, and set a date, February 10, 1910, which later was postponed to February 21, 1910, for the hearing of witnesses at Socorro, New Mexico. This brings the history of the case up to the present writing. (February 1, 1910).

Up to the present time there has been no allotment from the Reclamation fund, for construction purposes on the Rio Grande Project, outside of the Leesburg Project. The allotments have been small and intended for survey purposes only. What construction work was done at Elephant Butte was paid out of the special appropriation of \$1,000,000, above mentioned.

A diversion at El Paso, and a canal system for El Paso Valley being part of the Rio Grande Project, surveys have been started looking to the design of these irrigation works. In December, 1908 a party was started at El Paso to make a detailed topographic survey of the Valley. The survey of 1904 had been of a preliminary nature, and the map made at that time on too small a scale on which to design a distributing system. This second survey is to produce a map which the works will be designed from and built as funds become available. The survey was continued during 1909 and at the present time the party has reached a point thirty miles below El Paso.

UNITED STATES
RECLAMATION SERVICE
RIO GRANDE PROJECT - NEW MEXICO-TEXAS

PROJECT HISTORY 1915

CHAPTER NO. 6OPERATION AND MAINTENANCEBYOro McDermith, Superintendent of Irrigation

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Irrigation Season: Previous to 1915, irrigation was practiced intermittently, water being used for irrigation purposes, whenever there was a supply available in the Rio Grande. While there was no definite limits to the irrigation season, it was generally assumed and so reported that the irrigation season extended from February 1st to October 25th. During the year 1915, however, storage water was available and irrigation water was delivered from February 1st to December 24th. The water deliveries made after the month of October being made at the request of the Water Users' Associations. Therefore during the year 1915, the irrigation season practically covered a period of ten months.

Reservoir Conditions: Up to January 4th, 1915, no water had been stored in the Eagle reservoir. On that date water commenced to be stored, the Elephant

Butte Dam having reached such a stage of the construction work that the gates could be closed and a certain amount impounded. It was necessary however, during the entire season to waste a considerable amount of water down the bed of the Rio Grande to prevent the water level of the reservoir from reaching the unfinished work. As the construction work progressed, it was possible to store more water and the contents of the reservoir steadily increased until August, when the heavy drafts of storage water for irrigation decreased the amount stored. This condition continued until December when a gain of 5989 acre-feet was recorded. The normal flow of the Rio Grande was insufficient at times for irrigation requirements and reservoir water was delivered on the following dates: July 4th to 22nd, inclusive, July 24th, July 31st, August 2nd to 31st, inclusive, September 1st to 26th, inclusive, September 30th, October 1st to 18th, inclusive, and December 1st to 6th inclusive. The following table shows the amount in the reservoir at the beginning of each month, the amount released and the amount stored each month, all in acre-feet. It will be noticed that at the first of

1916 there is 362,226 acre-feet in the reservoir.

Month	Elevation: 1st of month	Acre-feet: 1st of month	Acre-feet: outflow during mon	Acre-feet: stored during mon
1915				
January	4214.00	0	23,001	9,190
February	4237.50	9,190	27,310	8,168
March	4249.95	17,358	4,547	43,222
April	4264.50	60,590	72,792	201,316
May	4296.70	261,896	197,457	189,903
June	4316.10	451,799	238,986	44,313
July	4320.06	496,112	116,423	19,261
August	4321.56	515,373	115,085	
September	4315.22	441,974	78,099	
October	4309.09	375,165	21,186	
November	4307.39	359,220	14,127	
December	4307.29	358,287	24,156	3,939
1916				
January	4307.71	362,226		

423,174

Land Irrigated: From the canals operated by the Reclamation Service, there was irrigated a total of 33,876 acres, 19,307 acres under the Leasburg Canal and 14,569 acres under the Franklin Canal. The irrigable acreage under these canals as constructed is approximately 43,000 acres. In addition to the land irrigated from Government operated canals, approximately 27,000 acres of land under independent community ditches, received storage water at various times. The community ditches using this storage

water are all in the New Mexico portion of the project and comprise the following communities: Arrey, Garfield, Hatch, Pecos, San Miguel, Santo Tomas, La Mesa, Chamberino, Three Saints and La Union.

Methods: The methods of water delivery have differed greatly under the two Government operated canals. Under the Leasburg Canal, water was delivered to three communities, the Dona Ana, the Las Cruces and the Mesilla valley. Water deliveries from the Leasburg were made on demand of the community desiring water and no attempt was made to rotate under this canal. Under the Franklin Canal, water was delivered on individual application, a number of the water users drawing directly from the canal. Others lying under community ditches received water from the canal at the point of diversion of the community ditch and conveyed the water through their community ditch to the land. Water deliveries were rotated as much as possible in the different canal sections. Owing to the fact that the Reclamation Service does not control the lateral system and the laterals as constructed by the water users' are both inefficient and small, it has been impossible to adopt a perma-

nent plan of rotation.

Duty of Water: The duty of water on the Rio Grande Project is extremely low. This is especially true of lands irrigated in the New Mexico portion of the project. The causes of this condition are varied, the principal ones being the old, antiquated system of irrigation, the inefficient and poorly constructed farm ditches and laterals, the tendency of the individual water user to over irrigate, lack of cultivation and character of soil.

The system of irrigation is the same as was practiced in the valley over 100 years ago by the Indians and Mexicans and is extremely primitive. As practiced, this system is to take the water whenever it is running in the ditch, without regard to the rights of others or the necessity of irrigation and run it over the land as long as possible. The ditches are generally too small to carry an efficient head and are cleaned when it is impossible to get water through them by Mexicans with shovels without regard to maintaining the grade of the ditch. Structures in lateral ditches are crude to the utmost degree and in smaller ditches no structures are used

as a general rule. The irrigating is done almost entirely by Mexican labor and almost all crops are over irrigated. Cultivation is practiced but very little and in most cases not at all. The character of the soil is generally a silt loam with a considerable amount of sand and absorbs freely, especially since the construction of the Elephant Butte Dam and the consequent loosening of light silt in the irrigation water.

The duty of water under the Leasburg Canal for 1915 was 7.0 acre-feet per acre, measured at the point of diversion from the canal. Under the Franklin Canal a higher duty was obtained and amounted to 4.45 acre feet per acre in 1915, measured at the point of diversion from the canal.

Losses: While the loss from evaporation in the reservoir is high due to the small per cent of humidity and high winds, the principal reservoir losses were caused by seepage. This is to be expected as the reservoir bed was submerged for the first time and the material submerged was generally sandy silt and extremely porous. The evaporation at Elephant Butte was estimated at 7.58 feet per year

and the estimation was made from the most reliable data obtainable and is believed to be conservative.

Losses in canals are mostly chargeable to leaky headgates and checks. Some water wasted at different points was not measured and is shown as a loss in canal. Very little loss occurred in canals from seepage, this on account of the age of the canals and the fact that for several years the canals reported have carried extremely silty water which has plastered the sides and prevented percolation.

Rio Grande Project

MONTHLY WATER STORAGE
Anglo Reservoir

Year 1915

Mon.	QUANTITIES IN ACRE- FEET										IN FEET	
	Inflow			Outflow			Losses				Total out:	Storage:
	Delivered:	Rain	Total	Irriga-	tion	Evap.	Seepage	Acres	Loss	per	flow and	end of
	..	..	..	use	..	..	..	..	..	..	losses	month
Jan.	33,243:	153:	33,396:	23,001:	23,001:	84:	1,121:	590:	1.80:		24,206:	9,190:
Feb.	38,013:	1,222:	39,235:	27,310:			575:	3,182:	1,675:	1.80:	31,067:	17,368:
Mar.	53,163:	3,480:	56,643:	4,547:			1,520:	7,354:	3,850:	1.91:	13,421:	60,580:
Apr.	271,487:	14,400:	285,887:	72,792:			4,740:	17,639:	8,900:	1.92:	94,571:	261,896:
May	393,774:	0:	393,774:	197,457:			6,414:	---	11,220:	--:	203,871:	451,799:
June	309,493:	0:	309,493:	238,986:			10,860:	15,334:	11,895:	1.29:	265,180:	496,112:
July	119,871:	46,000:	165,871:	116,428:			11,580:	18,602:	12,250:	1.52:	146,610:	515,373:
Aug.	46,175:	21,810:	67,985:	115,085:			10,730:	37,029:	11,080:	3.34:	162,844:	441,974:
Sept.	17,911:	24,140:	42,051:	78,099:			6,990:	59,819:	10,100:	5.92:	144,908:	375,165:
Oct.	13,001:	0:	13,081:	21,185:			5,498:	2,342:	9,890:	2.37:	29,026:	359,220:
Nov.	22,681:	0:	22,681:	14,127:			4,927:	4,560:	9,860:	4.63:	23,614:	358,287:
Dec.	35,405:	4,745:	40,150:	24,155:			2,162:	6,893:	9,910:	.90:	36,211:	352,226:
Total	1,354,297:	115,950:	1,470,247:	933,174:			67,080:	175,275:			2,14:	1,175,529:
or												
Means												

Maximum Storage during Year - 518,583 A.F. Max. Gate Height - 4321.81 Date - July 30th

* Considerable water wasted through gates to protect construction.

** Estimated.

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DEPARTMENT OF THE INTERIOR
UNITED STATES RECLAMATION SERVICE

MONTHLY WATER DIVERSIONS

From Rio Grande River
Project Rio Grande Years 1911-1915

QUANTITIES IN ACRE-FEET

MONTH	YEAR				
	19 11 °	19 12 °	1913	1914	19 15
January.....	5,469			4,730	1,218
February.....	17,506	13,975	9,506	13,266	5,426
March.....	16,421	20,315	24,563	16,394	5,748
April.....	19,377	17,223	26,432	28,324	33,684
May.....	16,949	19,898	33,103	32,931	36,665
June.....	15,551	19,410	32,411	29,740	44,352
July.....	15,374	20,559	7,023	17,413	41,525
August.....	17,092	10,352	1,396	28,529	33,546
September.....	16,169	3,220	1,000	15,718	24,570
October.....	12,780	1,947	9,176	10,611	10,546
November.....					3,491
December.....					15,917
Total.....	152,686	124,999	144,610	197,646	256,286
Acreage irrigated.....	17,825	19,262	27,723	22,442	33,976
Per acre irrigated.....					

Remarks: " For Leasburg Canal only.

1913-1914-1915. For both Leasburg and Franklin Canals.

NOTE: A considerable portion of the water diverted was for scouring and silting purposes and such water was not used for irrigation.

WATERS OF THE RIO GRANDE AND ITS TRIBUTARIES.

LETTER

FROM

THE SECRETARY OF THE INTERIOR.

TRANSMITTING,

BY DIRECTION OF THE PRESIDENT, ORDERS AND REGULATIONS OF THE INTERIOR DEPARTMENT TOUCHING USE, APPROPRIATION, OR DISPOSITION FOR IRRIGATION OF THE WATERS OF THE RIO GRANDE AND ITS TRIBUTARIES IN COLORADO AND NEW MEXICO.

APRIL 29, 1911.—Referred to the Committee on Irrigation of Arid Lands and ordered to be printed.

DEPARTMENT OF THE INTERIOR,
Washington, April 27, 1911.

SIR: By direction of the President, and responsive to House resolution 944, Sixty-first Congress, third session, I have the honor to submit herewith copies of orders and regulations in the Interior Department and its bureaus touching the use, appropriation, or disposition for irrigation of the waters of the Rio Grande and its tributaries in Colorado and New Mexico, the Rio Grande reclamation project, together with a list of applications for rights of way, involving the waters of the Rio Grande and its tributaries, initiated or acted upon by this department since the passage of the reclamation act.

Very respectfully,

WALTER L. FISHER,
Secretary.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

DEPARTMENT OF THE INTERIOR,
UNITED STATES RECLAMATION SERVICE,
Washington, D. C., April 22, 1911.

The SECRETARY OF THE INTERIOR.

SIR: In accordance with instructions of March 6, there are transmitted herewith certain data relating to the water of the Rio Grande. This material has been brought together in accordance with the reso-

lution of the House of Representatives of March 2, 1911, which in substance directs that they be furnished, if not incompatible with public interests:

A. Copies of all Executive or department orders and regulations in the possession of the Interior Department and its bureaus touching upon the use, appropriation, application, or disposition for irrigation of the waters of the Rio Grande and its tributaries in Colorado and New Mexico.

B. The Engle reclamation project and lands to be reclaimed thereunder.

C. The negotiations with the Republic of Mexico concerning said waters.

D. Together with a list or statement of all private irrigation or reservoir projects initiated or attempted to be initiated from the waters of said river and its tributaries in Colorado and New Mexico, above said Engle project, or acted upon by said department since the passage of the reclamation act and the disposition of the same.

Upon the receipt of these instructions request was made that the bureaus concerned bring together the desired facts, and correspondence was also initiated with other departments in cases where the files of this department were incomplete on the subject. As a result of this investigation and correspondence, the accompanying papers included in Exhibits A, B, C, and D are presented.

Very respectfully,

F. H. NEWELL, *Director.*

EXHIBITS.

EXHIBIT A.—COPIES OF EXECUTIVE OR DEPARTMENT ORDERS, ETC.

The following copies have been furnished by the Commissioner of the General Land Office:

1. December 5, 1896, order of Secretary Francis.
2. December 18, 1896, reply of Commissioner Lamoreaux.
3. January 13, 1897, modification by Secretary Francis.
4. May 25, 1906, statement from Secretary Hitchcock transmitting complaint by Goudy.
5. July 10, 1906, instructions from Acting Secretary Ryan.
6. September 27, 1906, further instructions by Acting Secretary Ryan.
7. April 22, 1907, recommendations from Director Newell, approved by Secretary Garfield.
8. November 12, 1907, decision by Secretary Garfield.
9. November 21, 1907, approval of certain selections by Secretary Ballinger.

The above apparently includes copies of all executive or department orders and regulations touching the use, appropriation, application, or disposition for irrigation of the waters of the river, excepting those directly relating to the Engle Reservoir given below.

In this connection also is given correspondence with the Department of Agriculture with reference to certain data relating to the flow of the Rio Grande, which were apparently obtained during the years 1896 and 1897, and subsequent years, by the use of public funds, but which have never been available for use by the public in general or by State or Federal officials:

10. March 14, 1911, Secretary Fisher to Department of Agriculture.
11. March 18, 1911, Secretary Wilson to Department of the Interior.

DEPARTMENT OF THE INTERIOR,
Washington, December 5, 1896.

THE COMMISSIONER OF THE GENERAL LAND OFFICE.

SIR: Your office is hereby directed to suspend action on any and all applications for right of way through public lands for the purpose of irrigation by using the waters of the Rio Grande River or any of its tributaries in the State of Colorado or in the Territory of New Mexico until further instructed by this department.

Very respectfully,

D. R. FRANCIS, *Secretary.*

WATERS OF THE RIO GRANDE AND ITS TRIBUTARIES.

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DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,
Washington, D. C., December 18, 1896.

The SECRETARY OF THE INTERIOR.

SIR: This office is in receipt of departmental order of December 5, 1896, directing the suspension of action "on any and all applications for right of way through public lands for the purpose of irrigation by using the waters of the Rio Grande River or any of its tributaries in the State of Colorado or in the Territory of New Mexico" until further instructions. In connection therewith I would call attention to the application of the Pecos Irrigation & Improvement Co., submitted to the department by this office on November 12, 1896; and those of the Mesilla Valley Land & Irrigation Co. and the Rio Grande Dam & Irrigation Co., submitted together August 15, 1896.

These applications are all that are pending before the department on recommendation of approval by this office and which come within the operation of said order.

Very respectfully,

S. W. LAMOREUX, *Commissioner.*

DEPARTMENT OF THE INTERIOR,
Washington, January 13, 1897.

The COMMISSIONER OF THE GENERAL LAND OFFICE.

SIR: By departmental letter of December 5, 1896, you were directed to suspend action on all applications for right of way for irrigation purposes by the use of the waters of the Rio Grande or any of its tributaries in Colorado or New Mexico till further instructed.

I now hereby modify the above order by limiting its application, so far as the tributaries of the Rio Grande are involved, to those tributaries which empty into that river above the point where it becomes the boundary between the United States and Mexico.

Very respectfully,

D. R. FRANCIS, *Secretary.*

DEPARTMENT OF THE INTERIOR,
Washington, May 25, 1906.

The COMMISSIONER OF THE GENERAL LAND OFFICE.

SIR: In a letter of January 25, 1906, to the department, Mr. F. C. Goudy, president of the Rio Grande Reservoir & Ditch Co., made complaint that the proposed construction of a reservoir by the company in Colorado for reclamation purposes and the procuring of a right of way therefor is being prevented by the Government.

In a report of February 26, 1906, on this letter the Director of the Geological Survey recommended that—

"If there be no objection on the part of the State Department, at whose instance the order of December 5, 1896, was made, the same be modified to permit the approval of rights of way for irrigation purposes on the tributaries of the Rio Grande which were initiated by actual field surveys based upon notices of appropriation of water filed under the laws of Colorado prior to March 1, 1903."

The Acting Secretary of State, in a letter of March 7, 1906, to the department, stated that—

"The Department of State approves the recommendation of the Director of the Geological Survey modifying the order of suspension in accordance with the request of the Rio Grande Reservoir & Ditch Co."

In a letter of the 22d instant to the department the Acting Secretary of State has extended the approval covered by the letter of March 7, supra—
"so as to include all companies or applicants whose rights of way for irrigation purposes on the tributaries of the Rio Grande * * * were initiated by actual field surveys based upon notices of appropriation of water filed under the laws of Colorado prior to March 1, 1903."

In view of the foregoing the departmental order of December 5, 1896, directing you to suspend action on all applications for right of way through the public lands for purposes of irrigation by using the waters of the Rio Grande or any of its tributaries in Colorado or New Mexico, and the order of January

13, 1897, modifying the original order so far as the tributaries of the Rio Grande are concerned by limiting its application to tributaries emptying into the Rio Grande above the point where it becomes the boundary between the United States and Mexico, are hereby modified so as to exclude from their operation all applications for right of way covered by the approval in the letter of the 22d instant from the Acting Secretary of State, quoted above.

The letter of Mr. Goudy is transmitted herewith.

Very respectfully,

E. A. HITCHCOCK, *Secretary.*

DEPARTMENT OF THE INTERIOR,
Washington, July 10, 1906.

The COMMISSIONER OF THE GENERAL LAND OFFICE.

SIR: In departmental letter of May 25, 1906, to you, departmental orders of December 5, 1896, and January 13, 1897, were modified so as to exclude from their operation all applications for rights of way through the public lands for purposes of irrigation by using the waters of the Rio Grande or any of its tributaries in Colorado and New Mexico initiated by actual field surveys based on notices of appropriation of water filed under the laws of Colorado prior to March 1, 1903, such modification being favored by the Acting Secretary of State in a letter of May 22, 1906, to the department.

In view of this modification of the orders mentioned you are directed that in acting on this class of applications, now on file or that may be filed hereafter in your office, to submit them to the Director of the Geological Survey to ascertain whether they will conflict with the obligations of the United States, under the treaty with Mexico, recently ratified, or with the Rio Grande or any other project of the Reclamation Service, and to transmit the reports of the director, with the applications when they are submitted for departmental action.

Very respectfully,

THOS. RYAN, *Acting Secretary.*

DEPARTMENT OF THE INTERIOR,
Washington, September 27, 1906.

The COMMISSIONER OF THE GENERAL LAND OFFICE.

SIR: In a letter of the 24th instant to the department the Acting Secretary of State has stated, with respect to applications for right of way through public lands for purposes of irrigation by using the waters of the Rio Grande or any of its tributaries in Colorado and New Mexico, that the Department of State perceives no reason for the further suspension of action on any application of such character.

He has stated further that the intent of the original departmental order of suspension dated December 5, 1896, was to conserve the interests of the Mexican Government in the waters of the Rio Grande pending an agreement between the United States and Mexico on the question, and that such an agreement has been reached and is embodied in the treaty signed May 21 last, by which the United States obligates itself to deliver to the Mexican Government 60,000 acre-feet of water annually.

He has accordingly recommended that the order of December 5, 1896, and all modifying orders be rescinded, thus removing, so far as the Department of State is concerned, all restrictions on the consideration of applications involving any enterprise of a character which, on investigation by the Reclamation Service, is found to be not prejudicial to the treaty interests of Mexico.

In view of this recommendation the departmental order of December 5, 1896, and the several modifying orders are hereby revoked, and it is hereby directed that before any applications involving the use of the waters mentioned in Colorado and New Mexico are submitted for final departmental action by you they be first submitted to the Director of the Geological Survey to ascertain whether favorable action thereon would interfere with any project of the Reclamation Service or with the obligations of the United States under the treaty of May 21, 1900, with Mexico.

Very respectfully,

THOS. RYAN, *Acting Secretary.*

DEPARTMENT OF THE INTERIOR,
UNITED STATES RECLAMATION SERVICE,
Washington, D. C., April 22, 1907.

The SECRETARY OF THE INTERIOR.

SIR: The situation on the Rio Grande requires careful consideration and determination of policy by the Secretary. Briefly stated, the conditions are these:

The United States has entered into a treaty with Mexico, proclaimed by the President on January 16, 1907, by which it is agreed that the United States shall deliver to Mexico 60,000 acre-feet of water at the head of the Mexican canal near El Paso. In order to carry out this part of the treaty, Congress has appropriated, by act approved March 4, 1907, the sum of \$1,000,000 toward the construction of a dam on the Rio Grande, this being assumed to furnish water for 25,000 acres at \$40 per acre. The total estimated cost of this project, including the dam, will be \$7,200,000, of which amount \$200,000 has been set aside and is now being used in the construction of subsidiary works, notably a diversion dam above Las Cruces, N. Mex. The remaining amount, \$6,000,000, must be obtained from the reclamation fund.

It is estimated that for this expenditure of \$7,200,000 it will be possible to irrigate 180,000 acres at \$40 per acre. Deducting the 25,000 acres in Mexico, this leaves 155,000 acres in New Mexico and Texas to refund the \$6,200,000. By storing all the water of the Rio Grande, including storm floods, this acreage can be supplied. If the flow of the stream is notably diminished, the area to be served will be correspondingly reduced and the cost per acre increased. This increase of cost will probably be at the expense of the lands in the United States, as Congress has already made the appropriation for the building charge to comply with the terms of the treaty.

The headwaters of this river are in the State of Colorado, surrounding the San Luis Valley. For several years after December 5, 1890, the Department of the Interior refused to grant rights of way for reservoirs or canals on these headwaters because of the effect on the international problem below. The departmental order was first modified May 25, 1900, to permit approval in cases where the applicants made a showing of priority over the United States. After the Senate had advised the ratification of the treaty, on July 10, 1903, these orders of the department were revoked, and the Reclamation Service was required to pass upon each case as to conflict with the treaty of the Rio Grande project. Most of the older cases have been reported on favorably by the Reclamation Service. In some of the cases, especially the later ones, the conditions involved some doubt as to the advisability of approval, and the questions of policy to be considered by the department were reported to the General Land Office for submission to the department when the cases were presented for your consideration.

Recently a few exceptions have been made as to small reservoirs located high in the mountains, where it appeared that the construction of works would not interfere notably with the supply of water which could be had in the lower reservoir. In view of the fact, however, that the treaty above mentioned has been concluded and an appropriation has been made by Congress for constructing the works in part, it appears probable that any considerable extension of the reservoir system at the headwaters may interfere with the plans of the Government.

Wide publicity has been given to the fact that the department has in a few cases permitted the location of small reservoirs on the headwaters of the Rio Grande. As a result a considerable number of applications are being made for other reservoir sites. If it were practicable to lay down a general rule by which the smaller of these sites could be approved the results would probably be beneficial, but a practical difficulty arises in the possibility of defining the limits between the large and small projects. It is unquestionably true that if all of the large projects on the headwaters of the river which are planned by private parties could be actually constructed the water supply for the Government reservoir would be to a large extent cut off. It is important, therefore, to have a general rule which can be applied to all cases.

RECOMMENDATIONS.

I therefore recommend that the department lay down the general policy that until the development of irrigation on the upper Rio Grande, in the State of Colorado and the Territory of New Mexico, shall furnish sufficient data to determine the effect of the storage and diversion of water in that vicinity upon the

water supply for the Eagle Reservoir of the Rio Grande project, no further rights of way be approved which involve the storage or diversion of the waters of the upper Rio Grande and its tributaries, except applications of two kinds: First, those in connection with which there is a showing that the rights of the parties were initiated prior to the beginning of active operations by the Reclamation Service for the Rio Grande project, namely, March 1, 1903; second, applications which involve the diversion or storage of not exceeding 1,000 acre-feet of water per annum.

When it becomes possible to determine the effect of the approved applications upon the water available for storage for the Rio Grande project, it may be possible to allow the use of rights of way to a greater extent than is now proposed.

Very respectfully,

F. H. NEWELL, *Director*.

Approved:

J. R. GARFIELD, *Secretary*.

APRIL 25, 1907.

DEPARTMENT OF THE INTERIOR,
UNITED STATES RECLAMATION SERVICE,
Washington, D. C., April 27, 1907.

The COMMISSIONER OF THE GENERAL LAND OFFICE.

SIR: Inclosed herewith you will find copy of a letter dated April 22, 1907, addressed to the honorable the Secretary of the Interior, and approved by him under date of April 25, relative to the situation on the Rio Grande.

This is transmitted for your consideration in connection with applications for rights of way in that vicinity.

Very respectfully,

F. H. NEWELL, *Director*.

DEPARTMENT OF THE INTERIOR,
Washington, November 12, 1907.

The COMMISSIONER OF THE GENERAL LAND OFFICE.

SIR: The department has again before it for consideration the application of A. V. Tabor for right of way, filed under the act of March 3, 1891 (26 Stat., 1005), on account of what is known as Rio Grande Reservoir, covering land in sec. 31, T. 41 N., R. 4 W., Del Norte land district Colorado.

This application was the subject of report by the Director of the Geological Survey under date of December 29, 1906, wherein it was said that—

"The matter was referred to the supervising engineer in charge of the operations of the Reclamation Service affecting the drainage of the Rio Grande, who reports that while the water of the reservoir applied for appropriating a part of the flood waters of the river would interfere with the Rio Grande project, the interference would be so slight as not to materially affect the project or the obligations of the United States under its treaty with Mexico. There is no objection, therefore, on the part of this office to the approval of the application."

In departmental decision of January 12 last, not reported, which was upon Tabor's appeal from your office decision of June 13, 1904, rejecting his application, this report from the Director of the Geological Survey was referred to, and, after disposing of other matters incidental to the application, the entire matter was returned without final action for the further consideration of your office in the light of the report of the Director of the Geological Survey and other matters disposed of in said departmental decision.

The application is again transmitted with your office letter of the 6th instant wherein attention is called to certain memorandum, prepared by the Reclamation Service, which received departmental approval April 25, 1907, which memorandum recommended the establishment of a general policy until the development of irrigation on the upper Rio Grande in the State of Colorado and the Territory of New Mexico shall furnish sufficient data to determine the effect of the storage and diversion of the waters in that vicinity upon the water supply of the Eagle Reservoir of the Rio Grande project, and that no further rights of way be approved which involve the storage or diversion of the upper Rio Grande and its tributaries, except applications of two kinds: First, those in connection with which there is a showing that the rights of the parties were initiated prior to the beginning of active operations by the Reclamation

Water Appropriations.
Rio Grande Project.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY, RECLAMATION
SERVICE.

Carlsbad, New Mexico, Jan. 23, 1906.

Mr. David L. White,
Territorial Irrigation Engineer,
Santa Fe, New Mexico.

Dear Sir:-

The United States Reclamation Service, acting under authority of an act of Congress known as the Reclamation Act, approved June 17, 1902 (32 Stat., 588), proposes to construct within the Territory of New Mexico certain irrigation works in connection with the so-called Rio Grande project. The operation of the works in question contemplates the diversion of water from the Rio Grande River.

Section 22 of Chapter 102 of the laws enacted in 1905 by the 26th Legislative Assembly of the Territory of New Mexico- an act entitled, "An Act Creating the Office of Territorial Irrigation Engineer, to Promote Irrigation Development and Conserve the Waters of New Mexico for the Irrigation of Lands and for other Purposes," approved March 16, 1905 - reads as follows:

"Whenever the proper officers of the United States authorized by law to construct irrigation works, shall notify the territorial irrigation engineer that the United States intends to utilize certain specified waters, the waters so described, and unappropriated at the date of such notice, shall not be subject to further appropriations under the laws of New Mexico, and no adverse claims to the use of such waters, initiated subsequent to the date of such notice, shall be recognized under the laws of the territory, except as to such amount of the water described in such notice as may be formally re-leased in writing by an officer of the United States thereunto duly authorized."

In pursuance of the above statute of the Territory you are hereby notified that the United States intends to utilize the following described waters, to wit:-

A volume of water equivalent to 730,000 acre-feet per year requiring a maximum diversion or storage of 2,000,000 miner's inches

said water to be diverted or stored from the Rio Grande River at a point described as follows:

Storage dam about 9 miles west of Engle, New Mexico, with capacity for 2,000,000 acre-feet, and diversion dams below in Palomas Rincon, Mesilla and El Paso Valleys in New Mexico and Texas.

It is, therefore, requested that the waters above described be withheld from further appropriation and that the rights and interests of the United States in the premises be otherwise protected as contemplated by the statute above cited.

Very truly yours,

(Signed) B. M. Hall -
Supervising Engineer.

Supplemental notice of the intention of the United States to use the waters of the Rio Grande for irrigation purposes on the Rio Grande Project.

Phoenix, Arizona, April, 1908

Mr. Vernon L. Sullivan,
Territorial Engineer,
Santa Fe, New Mexico.

Dear Sir:-

Claiming and reserving all rights under our former notice of January 23, 1906, addressed to David L. White, Territorial Irrigation Engineer of New Mexico, which said notice advised him of the intention of the United States to use the waters of the Rio Grande for the purpose of irrigation, and is now filed in your office, I do now hereby give you the following notice in addition to said former notice and supplemental thereto.

The United States acting under authority of an Act of Congress, known as the Reclamation Act, approved June 17, 1902, (32Stat., 388), proposes to construct within the Territory of New Mexico certain irrigation works in connection with the so-called Rio Grande Project. The operation of the works in question contemplates the diversion of the water of the Rio Grande River.

Section 40 of Chapter 49 of the laws enacted in 1907 by the 37th Legislative Assembly of the Territory of New Mexico, an Act entitled, "An Act to conserve and regulate the use and distribution of the waters of New Mexico; to create the office of Territorial Engineer; to create a Board of Water Commissioners, and for other purposes", approved March 19, 1907, reads as follows:

Whenever the proper officers of the United States authorized by law to construct works for the utilization of waters within the Territory, shall notify the Territorial Engineer that the United States intends to utilize certain specified waters, the waters so described and unappropriated, and not covered by applications or affidavits duly filed or permits as required by law, at the date of such notice, shall not be subject to a further appropriation under the laws of the Territory for a period of three years from the date of

said notice, within which time the proper officers of the United States shall file plans for the proposed work in the office of the Territorial Engineer for his information, and no adverse claim to the use of the water required in connection with such plans, initiated subsequent to the date of such notice, shall be recognized under the laws of the Territory, except as to such amount of water described in such notice as may be formally released in writing by an officer of the United States thereunto duly authorized; Provided, that in case of failure to file plans of the proposed work within three years, as herein required, the waters specified in the notice given by the United States to the Territorial Engineer shall become public water, subject to general appropriations.

In pursuance of the above statute of the Territory you are hereby notified that the United States intends to utilize the following described waters, to-wit:

All the unappropriated water of the Rio Grande and its tributaries, said water to be diverted or stored from the Rio Grande River at a point described as follows:

Storage dam about nine miles west of Engle, New Mexico, with capacity for two million (2,000,000) acre feet, and diversion dams below ⁱⁿ Palomas, Rincon, Mesilla and El Paso Valleys in New Mexico and Texas.

It is therefore requested that the waters above described be withheld from further appropriation and that the rights and interests of the United States in the premises be otherwise protected as contemplated by the statute above cited.

Very truly yours,

(Signed) Louis C. Hill,

Supervising Engineer.

Affidavit of Filiberto Cortez

I, Filiberto Cortez, being first duly sworn hereby declare as follows:

1. I have been employed by the Rio Grande Project office of the Bureau of Reclamation (BOR) since 1974 in various capacities related to civil and hydraulic engineering. Presently I am the Field Division Manager with the El Paso Field Division of the Bureau of Reclamation (formally the Rio Grande Project office).

2. I have been chief of the Engineering and Contracts Branch of the Rio Grande Project reviewing requests for construction on Reclamation lands by other agencies and providing engineering services for the Rio Grande Project in New Mexico and Texas for design and construction of hydraulic facilities.

3. I have been chief of the water operations Branch of the Rio Grande Project responsible for the management of water stored in Elephant Butte and Caballo Reservoirs and for operations of Caballo water releases in order to make the required water deliveries to EBID, EPCWID#1 and Mexico. In this capacity I was also responsible for the water charges and records of the water deliveries to EBID and EPCWID.

4. I have served as a hydraulic engineer in the Water and Land Division of the Rio Grande Project responsible for the management of water stored in Elephant Butte and Caballo Reservoirs, coordinating Rio Grande Compact waters releases in Abiquiu and Cochiti Reservoirs with Reclamations Albuquerque, New Mexico office and the Albuquerque office of the Corp of Engineers.

5. As hydraulic engineer in the Water and Land Division of the Rio Grande Project, I also coordinated flood control operations with Reclamation and other agency offices in the Rio Grande Basin.

6. The Rio Grande Reclamation Project consists of two storage dams and reservoirs, Elephant Butte and Caballo which are owned by the federal government. Elephant Butte includes a power generating plant which is also owned by the federal government. Caballo serves as regulating reservoir as well as providing conservation storage and flood control.

7. There are four diversion dams in the Rio Grande Project owned by the federal government that provide full irrigation service to 155,000 water-right acres in the Elephant Butte Irrigation District (EBID) (88,000 acres), Dona Ana County, New Mexico and the El Paso County Water Improvement District No. 1 (EPCWID) (67,000 acres), El Paso County, Texas. An additional diversion dam diverts water to Mexico into the Acequia Madre canal system.

8. The Project also provides supplemental water to 20,014 acres in Hudspeth County Conservation and Reclamation District No. 1 (HCCRD) in Hudspeth

County, Texas.

9. Diversions to EBID and EPCWID are made and measured at the headgates by district personnel, under contract with the United States. District personnel are also responsible for water deliveries to district water users. Diversions to Mexico are made and measured by International Boundary and Water Commission personnel.

10. The Elephant Butte dam, reservoir, and power plant are operated and maintained by personnel located at the BOR Elephant Butte Field Office located just downstream of the Elephant Butte Dam.

11. Caballo Dam is an earth-fill structure 96 feet high and 4,590 feet long constructed between 1936 and 1938 on the Rio Grande approximately 25 miles downstream from Elephant Butte Dam. Caballo Reservoir has a maximum capacity of 331,500 AF (1981 survey) at an elevation of 4182.00 feet (USBR datum). This storage capacity includes a flood control space of 100,000 AF which is controlled by the International Boundary and Water Commission. Water discharged from the Elephant Butte power plant during power generation is regulated at Caballo Dam for irrigation use.

12. Caballo Reservoir and Dam is operated and maintained by the BOR Elephant Butte Field Office. The river channel between Elephant Butte Dam and Caballo Reservoir and the river channel downstream of Caballo Dam to U.S. Interstate Highway 25 bridge is also maintained by the BOR Elephant Butte Field Office.

13. The remainder of the bed and banks of Rio Grande through the Rio Grande Project and downstream to the Gulf of Mexico is maintained by the International Boundary and Water Commission.

14. Water releases from Elephant Butte and Caballo Reservoirs are coordinated by the water Operations Section of BOR. El Paso Field Office to meet irrigation requirements for the EPCWID#1, EBID and the Republic of Mexico..

15. Percha Diversion Dam, which was completed in 1939, is on the Rio Grande, approximately 2 miles downstream of Caballo Dam. This facility is operated and maintained under contract with the United States by the Elephant Butte Irrigation District.

16. Percha Diversion Dam diverts water into the Percha Private Lateral and the Arrey Canal. The Arrey Canal system carries irrigation water to approximately 16,260 acres in Rincon Valley, New Mexico. The dam has concrete ogee weir 350-feet long with embankment wings and a spillway with an overflow weir and two 20-foot wide by a-foot high radial sluice gates. The Arrey Canal Head works are located at the west abutment and contain eight slide gates, each 4.3 X 3.75 feet. It has historically diverted up to 414 cubic feet per second (cfs).

17. Leasburg Diversion Dam is on the Rio Grande, approximately 62 miles north of El Paso, Texas, at the head of Mesilla Valley, New Mexico. This structure diverts water into the Leasburg Canal system which has historically diverted up to 837 cfs, which carries irrigation

water to approximately 31,600 acres of the Upper Mesilla Valley, in New Mexico. The dam is concrete ogee weir-600 feet long with embankment wings and three 5-foot wide by 8-foot high sluice gates. This facility is operated and maintained under contract with the United States by the Elephant Butte Irrigation District.

18. Mesilla Diversion Dam is located in New Mexico on the Rio Grande, approximately 40 miles north of El Paso, Texas. This structure diverts water into the East Side Canal system which has historically diverted up to 347 cfs, the Westside Canal system which has historically diverted up to 784 cfs, the Del Rio Lateral which has historically diverted up to 60 cfs and also to the California Extension Lateral which has a design capacity of 25 cfs which combined carry irrigation water to approximately 53,959 acres of Lower Mesilla Valley in New Mexico and Texas.

19. The Rio Grande Project was constructed as an interstate and international system and it serves all the area within the Project boundaries and delivers water to Mexico pursuant to the 1906 Convention with Mexico.


20. The Rio Grande Project is operated to use all the water available in the Rio Grande system within the Project boundaries. All the water in the bed and banks of the Rio Grande is utilized to meet project irrigation, municipal and industrial requirements. Water from drain return flows, from irrigation system waste ways, from arroyos, from sewage treatment effluent, from river bank storage and from any other tributary water source which flows into the Rio Grande are used as part of the Project water supply.

21. River losses are offset by repeatedly reusing irrigation and drainage return flows throughout the system. The allocation and delivery of Project water to EBID and EPCWID is based upon the amount of irrigable acreage in each district.

21. Table I which is attached to this statement is, to the best of my knowledge and belief, a table showing historic releases, diversions, and the diversion ratio, based on the Project historical record as maintained in the El Paso Field Division of the Bureau of Reclamation.

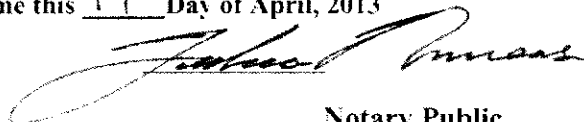
I, Filiberto Cortez, declare under penalty of perjury that the foregoing is true and correct.

Executed this 19 day of April, 2013


Filiberto Cortez

Subscribed and sworn to me this 19 Day of April, 2013

My Commission Expires


Notary Public



U.S. Exhibit 14

Table 1. Historic Releases and Diversions, 1908-1945, measured As Acre-Feet

YEAR	Release from Project Reservoir Storage	Mexico Diversions	Rincon and Mesilla Diversions	El Paso Valley Diversions	Total Project Diversions	Diversion Ratio
1908					107855	
1909					158628	
1910					95865	
1911					155145	
1912					127077	
1913					109956	
1914					233032	
1915					240789	
1916					523950	
1917					459979	
1918	696054	60,000			646477	0.929
1919	674237	60,000			178641	0.265
1920	881272	60,000	474484	102956	637440	0.723
1921	979908	60,000	617593	97361	774954	0.791
1922	999175	60,000	710241	132196	902437	0.903
1923	844461	60,000	756344	157390	973734	1.153
1924	1002127	60,000	853348	171481	1054828	1.057
1925	817408	60,000	779330	148760	988090	1.209
1926	761607	60,000	688356	128051	876407	1.151
1927	880961	60,000	705936	138298	904234	1.026
1928	835061	60,000	743520	340342	1143862	1.370
1929	701819	60,000	656015	305887	1021902	1.456
1930	793353	60,000	656032	292308	1008340	1.271
1931	750760	60,000	643155	274134	977289	1.302
1932	831741	60,000	652384	268135	980519	1.179
1933	826126	60,000	639120	275378	974498	1.180
1934	803646	60,000	624678	300073	984751	1.225
1935	636387	60,000	404616	246272	710888	1.117
1936	747055	60,000	557057	329858	946915	1.268
1937	758474	60,000	538444	350663	949107	1.251
1938	780334	28,358	567572	416821	1012751	1.298
1939	789059	60,562	627922	425101	1113585	1.411
1940	731890	58,240	580941	410202	1049383	1.434
1941	704258	55,327	467500	416742	939569	1.334
1942	1325521	60,000	677768	175114	1054401	0.796
1943	911923	59,194	741288	358777	1243182	1.364
1944	866234	61,396	615977	466142	1143515	1.320
1945	882202	60,039	651729	432220	1143988	1.297

1946	763749	60,129	603210	375667	1039006	1.360
1947	724923	58,006	556260	337572	951838	1.313
1948	741174	60,699	554792	341114	956605	1.291
1949	712235	60,268	569948	370001	1000217	1.404
1950	719338	60,605	562605	346151	969361	1.348
1951	469455	33,100	332817	197831	563748	1.201
1952	543979	49,900	354321	211767	615988	1.132
1953	528620	37,800	358722	200257	596779	1.129
1954	244155	10,100	204817	70594	285511	1.169
1955	219156	8,200	159253	57913	225366	1.028
1956	246139	7,900	170364	55488	233752	0.950
1957	397092	23,300	315667	113207	452174	1.139
1958	737127	60,100	507567	311541	879208	1.193
1959	687409	60,100	494560	330851	885511	1.288
1960	705161	60,300	502004	348217	910521	1.291
1961	561695	48,600	421526	269503	739629	1.317
1962	651940	60,100	467950	338265	866315	1.329
1963	517169	39,700	432807	244759	717266	1.387
1964	206081	6,700	204362	70492	281554	1.366
1965	505606	36,700	289126	177466	503292	0.995
1966	610330	49,600	407635	265463	722698	1.184
1967	456585	29,800	381222	231820	642842	1.408
1968	505673	39,700	469307	204809	713816	1.412
1969	667658	59,900	534244	311945	906089	1.357
1970	661118	60,100	525287	318891	904278	1.368
1971	498375	34,800	407301	238909	681010	1.366
1972	260902	16,100	246921	132966	395987	1.518
1973	617462	60,000	425621	263267	748888	1.213
1974	640852	60,100	476608	322324	859032	1.340
1975	580607	60,100	452757	309102	821959	1.416
1976	679684	60,200	525709	345423	931332	1.370
1977	417495	24,800	278458	202439	505697	1.211
1978	356169	14,900	184906	148707	348513	0.979
1979	568687	60,000	377413	254224	691637	1.216
1980	658694	60,000	475351	318250	853601	1.296
1981	608163	60,000	422174	261441	743615	1.223
1982	643169	60,000	456758	272925	789683	1.228
1983	648380	60,000	463514	262925	786439	1.213
1984	653151	60,000	443111	275159	778270	1.192
1985	677397	60,000	470775	282054	812829	1.200
1986	1148188	60,000	1111111	811141	1111001	1.111
1987	1578009	60,000	1111111	111141	1111111	1.111
1988	838011	60,000	536261	357784	954045	1.138

1989	736865	60,000	533150	327131	920281	1.249
1990	680106	60,000	457103	285035	802138	1.179
1991	625956	60,000	439556	283141	782697	1.250
1992	734981	60,000	513798	315575	889373	1.210
1993	823244	60,000	555907	360332	976239	1.186
1994	852283	60,000	612496	34147	1037979	1.167
1995	1046145	60,000	617606	471261	1100158	1.004
1996	774335	60,000	567491	314315	941806	1.216
1997	798621	60,000	573125	303642	936767	1.173
1998	808661	60,000	572797	289379	922176	1.140
1999	735467	60,000	502967	285161	848128	1.153
2000	751373	60,000	533125	250370	843495	1.123
2001	786549	60,000	554341	311210	925551	1.177
2002	801147	60,325	527467	309450	897242	1.120
2003	364528	13,590	205434	126460	345484	0.948
2004	399519	13,922	184564	137778	336264	0.842
2005	676031	58091	411986	178988	649065	0.960
2006	434228	27112	257268	135325	419705	0.967
2007	636730	51245	346877	211793	609915	0.958
2008	675479	56048	377323	212499	645870	0.956
2009	693289	58688	358860	250006	667554	0.963
2010	659679	56883	331928	223546	612357	0.928
2011	396444	25650	54468	262677	342795	0.865
AVG.	688884	51863	490724	275445	802390	1.176

Source: Reclamation data. Red years are years with flood releases. Highlighted area is latest drought period.
2011 diversions reflect allocation charged.

CHIEF OF POLICE

2003 OCT 03 07 10 45
THE DISTRICT COURT OF
ALABAMA

EL PASO COUNTY, TEXAS

327TH JUDICIAL DISTRICT

- 327TH JUDICIAL DISTRICT**

5. The Commission filed its Final Determination with this Court, in accordance with TEX. WATER CODE ANN. § 11.317 (Vernon 2000), and requested that the Court set deadlines for filing of exceptions and hearing dates.

6. On August 9, 2006, the Court set deadlines for filing exceptions for 4:00 pm on September 15, 2006, and hearing dates for exceptions for 10:00 am on October 30, 2006, in accordance with TEX. WATER CODE ANN. § 11.317 (Vernon 2000). A hearing on the merits was also set for 10:00 am on October 30, 2006.

7. All claimants of water rights in the Upper Rio Grande Segment of the Rio Grande Basin above Fort Quitman who appeared before the Commission were notified by the Commission of the filing of the Commission's Final Determination with this Court in compliance with TEX. WATER CODE ANN. § 11.317 (Vernon 2000).

8. All claimants of water rights in the Upper Rio Grande Segment of the Rio Grande Basin above Fort Quitman who appeared before the Commission were duly notified by the Commission of the Court's setting a September 15, 2006 deadline for filing exceptions to the Commission's Final Determination and of the October 30, 2006 hearing dates.

9. Clerical errors in the final determination of the City of El Paso's claim have been identified, to wit: references to "paragraph 1" in paragraphs 5.a. and 5.b. under Conclusions of Law, on pages 13-14 of the Commission's Final Determination, should refer to "Conclusions of Law, paragraph 2." The City of El Paso has requested that these references be corrected. The Commission agrees that this is a clerical error which should be

corrected. The Court finds that the references in Conclusions of Law Nos. 5.a. and 5.b. are clerical errors which should be changed.

10. No Exceptions have been filed.

IT IS THEREFORE ORDERED, ADJUDGED AND DECREED:

1. The Final Determination of water rights in the Rio Grande Segment of the Basin (SOAH Docket No. 582-96-0144, TCEQ Docket No. 1996-0209-WR), issued April 13, 2006, and filed with this Court on August 7, 2006, a copy of which is attached hereto as Exhibit A and incorporated herein for all purposes, is affirmed by this Court, except that references to "under paragraph 1 above" in paragraphs 5.a. and 5.b. under the Conclusions of Law, on pages 13--14 of the Commission's Final Determination, which relate to the Claim of the City of El Paso, should be, and they are each hereby MODIFIED to read "under Conclusions of Law, paragraph 2 above."
 2. The Commission is authorized to take such further action as is required by the Texas Water Rights Adjudication Act, TEX. WATER CODE ANN. § 11.301 et seq. to implement this Final Judgment.
 3. Costs of court are assessed against the Texas Commission on Environmental Quality.
- SIGNED this 30th day of October, 2006.



HONORABLE LINDA CHEW
Judge Presiding
327th Judicial District Court
El Paso County, Texas.

Exhibit A

**Final Determination
Adjudication of Water Rights in the
Upper Rio Grande Above Fort Quitman**

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY



AN ORDER adopting the Final Determination in the Adjudication of all Claims of Water Rights in the Upper Rio Grande (Above Fort Quitman, Texas) Segment of the Rio Grande Basin; SOAH Docket No. 582-96-0144; TCEQ Docket No. 1996-0209-WR.

On 01/11/06, the Texas Commission on Environmental Quality (Commission) considered the Adjudication of All Claims of Water Rights in the Upper Rio Grande (Above Fort Quitman, Texas) Segment of the Rio Grande Basin.

On 08/17/05, the Commission issued an Order adopting a Preliminary Determination in the Adjudication of All Claims of Water Rights in the Upper Rio Grande (Above Fort Quitman, Texas) Segment of the Rio Grande Basin. A copy of the Order adopting the Preliminary Determination was mailed to all parties on 08/19/05. Notice of the Preliminary Determination and the Opportunity to file a Contest was mailed to all claimants on the Upper Rio Grande (Above Fort Quitman, Texas) Segment of the Rio Grande Basin on August 30, 2005. Notice of the Preliminary Determination and the opportunity to file a Contest was published in the *El Paso Times* on August 31, 2005 and September 7, 2005. No contests were filed.

After Considering the ALJ's Proposal for Decision and the evidence and arguments presented, the Texas Commission on Environmental Quality adopts the following Final

Determination of All Claims of Water Rights in the Upper Rio Grande (Above Fort Quitman, Texas) Segment of the Rio Grande Basin, incorporating appropriate Findings of Fact and Conclusions of Law:

FINAL DETERMINATION

The Texas Commission on Environmental Quality hereby makes its Final Determination of claims of water rights in the Upper Rio Grande (above Fort Quitman, Texas) and contributing Texas tributaries. This action is taken pursuant to The Texas Water Rights Adjudication Act, § 11.301 *et seq.* of the Texas Water Code ("Code," TEX. WATER CODE ANN.) Jurisdiction was established in the initial public hearings in El Paso, Texas, on October 28 and December 11, 2003, and evidence was received then and at subsequent public hearings.

The Department of the Interior's Motion for Rehearing asserts that the McCarran Amendment does not waive sovereign immunity in this proceeding because property owners in the Rio Grande Project in Texas are not joined as parties in this adjudication proceeding. The Motion for Rehearing was considered on 04/12/06, and is granted in part to add this statement and denied in all other respects. In Texas mere beneficial use by individual property owners of waters alone gives the user no vested rights to them. *J.B. Bean v. United States*, 143 C. Ct. C. 363, 163 F.Supp. 838 (1958). Consequently, beneficial use of water alone does not give rise to a water right.

After considering all evidence and matters introduced during the proceeding, including an investigation report by Commission staff with a plat or maps required by law, and an administrative law judge's report and written statement of facts, the Commission makes the following findings of fact and conclusions of law.

A. Claim of El Paso County Water Improvement District No. 1 and United States:

DIVERSION POINTS NOS.: 0050, 0100, 0150, 0200, 0250, 0500, and 0600

TRACT NO.: 0050

OWNERSHIP: El Paso County Water Improvement District No. 1 and United States of America, Department of the Interior, Bureau of Reclamation

SECTION 11.307 CLAIM (El Paso County Water Improvement District No. 1): Under Permit No. 5433 and Certified Filing No. 123, to divert and use 376,000 acre-feet of water per year from the Rio Grande for irrigation, municipal, industrial, mining, and recreational use; any measurable surface water based effluent, groundwater based effluent, or groundwater discharged into the Rio Grande for which the District has entered into legal contracts with the United States of America pursuant to the Reclamation Act (38 Stat. 388, 43 U.S.C. 371, *et seq.*); and an average of 1,899 acre-feet of water averaged over any five-year period from tributary inflows of the Rio Grande between the Texas/New Mexico state line and Riverside Dam. The priority date is January 1, 1918, for water and return flows under Permit No. 5433 and July 6, 1889, under Certified Filing No. 123. The place of use is for a maximum of 69,010 acres of land within the District's boundaries and the District has the right to sell any of this water surplus to the District's needs for any of the authorized purposes of use in El Paso and Hudspeth Counties.

SECTION 11.307 CLAIM (United States of America, Department of the Interior, Bureau of Reclamation): Under Permit No. 5433 and Certified Filing No. 123, to impound 2,246,510 acre-feet of water in Elephant Butte Reservoir and Caballo Reservoir in New Mexico, and to divert and use 315,548 (67/155 of 730,000 acre-feet) acre feet of water per year from water released from Elephant Butte Reservoir and Caballo Reservoir to the Rio Grande for irrigation, municipal, industrial, mining, and recreational use (under Permit No. 5433) and 70,000 acre-feet per year for irrigation, municipal, industrial and recreation (under Certified Filing No. 123). The priority date is July 6, 1889, for Certified Filing No. 123 and January 23, 1906, for water stored in New Mexico and delivered via contracts to the El Paso County Water Improvement District No. 1 under Permit 5433.

FINDINGS OF FACT:

1. Section 8 of the Reclamation Act of 1902 (now 43 U.S.C. §§ 372 and 383) provides in part: "Nothing in this Act shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this act, shall proceed in conformity with such laws, and nothing herein shall in any way affect any right of any State or of the Federal Government or of any landowner, appropriator, or user of water in, to, or from any interstate stream or the waters thereof."

2. Claimant El Paso County Water Improvement District No. 1 ("Claimant District") is a political subdivision of the State of Texas organized and existing under Article XVI, § 59 of the Texas Constitution. Claimant District is authorized to enter into contract or other obligations with the United States under Chapter 55 of the Code.
3. Claimant United States of America ("Claimant United States") is acting by and through the Department of the Interior, Bureau of Reclamation, with respect to recognition of water rights relating to the Rio Grande Reclamation Project.
4. The Rio Grande Project in New Mexico and Texas was constructed by Claimant United States under the Rio Grande Reclamation Project Act of February 25, 1905, 33 Stat 814.
5. The State of Texas authorized the Secretary of the Interior to conduct any activities in the State of Texas necessary to perform his duties under the federal reclamation act, as amended (43 U.S.C. § 371 *et seq.*).
6. The Rio Grande Reclamation Project provides water to land classified as irrigable within the Elephant Butte Irrigation District in New Mexico and the Claimant District in Texas. Claimant District includes 69,010 acres within its boundaries that are classified by the United States and Claimant District as irrigable.
7. Claimant United States acquired lands, canals, and water rights in Texas for the construction of the Rio Grande Reclamation Project. These acquisitions included, without limitation, the Franklin Canal and the lands and water rights identified in the Loomis affidavits filed July 6, 1889, and August 10, 1889, and later embodied in Certified Filing No. 123, and beneficial use after July 6, 1889, was continuous. Said project was constructed by the United States, using Reclamation funds.
8. In 1939, the United States, Colorado, New Mexico and Texas entered into the Rio Grande Compact (53 Stat. 785; Code § 41.009) to "remove all causes of present and future controversy among" those states with respect to the use of the waters of the Rio Grande above Fort Quitman, Texas.
9. Claimant United States stores water in two reservoirs, Elephant Butte and Caballo, located in New Mexico and constructed by and owned by Claimant United States, for use throughout the Rio Grande Reclamation Project and in Mexico. Claimant United States claims a right under Certified Filing No. 123 to impound 2,638,860 acre-feet of water in these reservoirs. Claimant United States diverts water through a series of diversion dams on the Rio Grande in New Mexico and Texas.
10. In 1906, the United States entered into the Convention with Mexico for the Rio Grande providing for the equitable distribution of water of the Rio Grande for

irrigation purposes (34 Stat. 2953). The Convention also provides in part that the delivery of 60,000 acre-feet per year to Mexico shall be assured by the United States, but in the event of extraordinary drought or serious accident to the irrigation system in the United States, available water shall be distributed through the year in the same proportions as the irrigation water supply furnished to lands in the United States.

11. Water for Claimant District is presently diverted by Claimant United States at the Mesilla Diversion Dam in New Mexico and the American Diversion Dam in Texas. Water has historically been diverted at the Riverside Diversion Dam, but this diversion dam is not currently functional.
12. Approximately 2.3 miles downstream from the American Diversion Dam is the International Diversion Dam, which is used to deliver 60,000 acre-feet of water per year to Mexico under the 1906 Convention between the United States and the Republic of Mexico. The International Diversion dam was constructed by and is owned by Claimant United States.
13. Claimant United States entered into a contract dated December 29, 1917, with Claimant District and the El Paso Valley Water Users' Association for construction of drainage works for the distribution and delivery of water for irrigation purposes. Claimant United States entered into a contract dated January 17, 1920, with Claimant District and the El Paso Valley Water Users' Association for the repayment of construction and operation and maintenance charges. Thereafter, the El Paso Valley Water Users' Association was dissolved. Pursuant to a Memorandum of Agreement dated August 27, 1920, El Paso County Water Improvement District No. 1 and El Paso County Conservation and Reclamation District No. 2 agreed to consolidate, and subsequently consolidated as El Paso County Water Improvement District No. 1.
14. Pursuant to said contracts and amendments thereto and later contracts between Claimant United States and Claimant District, Claimant United States delivers to Claimant District water from the Rio Grande Reclamation Project. Claimant District has reimbursed Claimant United States for construction costs, as required by contract. Claimant United States in 1996 conveyed to Claimant District certain facilities and rights-of-way within the District's boundaries but reserved ownership of the American Canal, the American Canal Extension, and the American, International, and Riverside diversion dams. The American Diversion Dam and Riverside Diversion Dam and the American Canal and American Canal Extension are used by the United States to divert and convey all water diverted and acquired from the Rio Grande by Claimant United States and Claimant District in accordance with Findings of Fact Nos. 17, 18, and 19.

15. The Secretary of the Interior of the United States is authorized to conduct any activities in Texas necessary to perform duties under the federal reclamation act, as amended (43 U.S.C. § 371 *et seq.*), and to conduct any activities in the State of Texas, as authorized by the State of Texas, necessary to perform duties under the federal reclamation act. In accordance with its contractual obligations, Claimant District reimburses Claimant United States annually for certain costs incurred by Claimant United States for operations and maintenance of said Project.
16. In 1991, Claimant District applied for a permit from the Texas Natural Resource Conservation Commission (predecessor to the Texas Commission on Environmental Quality) and the Commission recognized that Claimant District had water rights under the law of the State of Texas to that portion of the facilities and water of the Rio Grande Reclamation Project and the Rio Grande and its tributaries that have been reserved for or appropriated by or for the benefit of Claimant District and its predecessors and beneficial users.
17. Claimant District is the owner of Permit No. 5433, which in part authorizes the diversion and use of 376,000 acre-feet of water per annum from the following:
 - a. All rights that Claimant District acquired or perfected pursuant to Certified Filing No. 123;
 - b. 67/155 of all water stored in Project Storage (as defined in the Rio Grande Compact) and legally available for release to Elephant Butte Irrigation District and El Paso County Water Improvement District No. 1, plus any additional share of Project Water obtained through allocation, purchase and/or operation rules, "Project Water" being defined as all water legally dedicated to the Rio Grande Project; any waters entering Texas in the bed of the Rio Grande from New Mexico, including, but not limited to, return flows from New Mexico's use and groundwater discharged into the Rio Grande; and any measurable return flows from the District entering the Rio Grande in Texas above Riverside Dam.
18. Claimant District is also authorized by Permit No. 5433 to divert and use from the Rio Grande any measurable surface-water based effluent, groundwater based effluent, or groundwater discharged into the Rio Grande by Claimant District or any other entity with whom Claimant District has entered into a legal contract for such water.
19. Claimant District is also authorized by Permit No. 5433 to divert and use from the Rio Grande an average of 1,899 acre feet of water per annum, when averaged over any

five-year period, from tributary inflows of the Rio Grande between the Texas/New Mexico state line and the Riverside Dam.

20. Claimant District is authorized by Permit No. 5433 to divert water under Findings of Fact Nos. 17 and 18 from the Mesilla Diversion Dam, the American Diversion Dam, and the Riverside Diversion Dam at a combined maximum diversion rate of 1,355 cubic feet per second.
21. Claimant District is authorized by Permit No. 5433 to divert water under Finding of Fact No. 19 from American Diversion Dam and Riverside Diversion Dam at a combined maximum rate of 10 cubic feet per second.
22. Claimant District is authorized by Permit No. 5433 a time priority of 1914 for use of the water described in Finding of Fact No. 17. Claimant District is authorized by Permit No. 5433 a time priority of 1918 for use of the water described in Finding of Fact 19.
23. Claimants use the bed and banks of the Rio Grande to transport the water acquired by Claimant United States and Claimant District in accordance with Findings of Fact Nos. 17, 18, and 19 above, and to operate and maintain the diversion dams and works.
24. Permit No. 5433 was granted by the Texas Natural Resource Conservation Commission on September 8, 1993, and issued by said Commission on October 7, 1993.
25. Claimant United States has diverted from the Rio Grande and Claimant District has beneficially used 376,000 acre-feet during 2002, out of the water described in Finding of Fact No. 17.
26. Claimant United States has diverted from the Rio Grande and Claimant District has beneficially used 234,022 acre-feet during 1995, out of the water described in Finding of Fact No. 18.
27. Claimant United States has diverted from the Rio Grande and Claimant District has beneficially used 1,899 acre-feet during 2002, out of the water described in Finding of Fact No. 19 above.
28. Claimant District is authorized to use all of the water authorized in Permit No. 5433 for municipal, industrial, mining, or recreational purposes, and/or for irrigation of a maximum of 69,010 acres of land within the District's boundaries, and/or to sell any

of this water surplus to the District's needs for any of the authorized purposes of use in El Paso and Hudspeth Counties.

29. Permit No. 5433 contained the following three special conditions:

- a. This permit does not supersede any legal requirement for the protection of environmental water needs pursuant to international treaty, interstate compact or other applicable law to which permittee is subject irrespective hereof. Nothing in this condition is intended to grant to the State of Texas any authority additional to that provided by law or waive any right of the permittee.
- b. This permit is granted without prejudice to the claims and rights, if any, of the United States in or to the waters and facilities of the Rio Grande Project.
- c. This permit is not intended to in any way compromise or diminish the volume of water which the United States is obligated to provide to Mexico on an annual basis pursuant to the terms of the Convention of May 21, 1906, between the United States and Mexico; nor does the permit grant to the District, for any use whatsoever, any waters to which Mexico is entitled pursuant to the above-referenced 1906 Convention.

CONCLUSIONS OF LAW:

1. The Texas Commission on Environmental Quality has the authority and responsibility pursuant to the Water Rights Adjudication Act of 1967 (Code § 11.301, *et seq.*) to adjudicate all water right claims filed under that Act.
2. Claimant United States is recognized a right under Certified Filing No. 123 to impound 2,638,860 acre-feet of water in Elephant Butte Reservoir and Caballo Reservoir in New Mexico.
3. Claimant United States and Claimant District are authorized to divert and Claimant District is authorized to use an aggregate amount of water from the Rio Grande not in excess of 376,000 acre-feet per year from the following sources:
 - a. All rights which Certificate Holders acquired or perfected pursuant to Certified Filing No. 123;
 - b. 67/155 of all water stored in Project Storage (as defined in the Rio Grande Compact) and legally available for release to the Elephant Butte Irrigation

District and Claimant District, plus any additional share of Project Water obtained by Certificate Holders, or either of them, through allocation, purchase and/or operation rules, "Project Water" being defined as all water legally dedicated to the Rio Grande Reclamation Project; and

- c. Any waters entering Texas in the bed of the Rio Grande from New Mexico, including, but not limited to, return flows from New Mexico's use and groundwater discharged into the Rio Grande.
4. In addition to the water diverted pursuant to Conclusion of Law No. 3, Claimants are authorized to divert from the Rio Grande up to 234,022 acre-feet per year of measurable surface-water based effluent, groundwater based effluent or groundwater discharged into the Rio Grande by Claimant District or any other entity with whom Claimant District has entered into legal contract for such water. "Effluent" as used in this Certificate of Adjudication means any and all water that reaches the bed of the Rio Grande from agricultural drains, sewage treatment plants, or storm water runoff.
5. In addition to the water diverted pursuant to Conclusions of Law Nos. 3 and 4, Claimants are authorized to divert from the Rio Grande an average of 1,899 acre-feet of water per annum, when averaged over any five-year period, from tributary inflows of the Rio Grande between the Texas/New Mexico state line and the Riverside Diversion Dam.
6. Claimant United States and Claimant District are recognized a right to use the bed and banks of the Rio Grande to transport the water which is the subject of this Preliminary Determination, and to operate and maintain diversion dams and works.
7. Claimants are authorized to divert all or any part of the water authorized for diversion in Conclusions of Law Nos. 3 and 4, at a combined maximum diversion rate of 1,355 cubic feet per second, at the following diversion points:
 - a. Mesilla Diversion Dam located on the Rio Grande in New Mexico;
 - b. American Diversion Dam located on the Rio Grande at the point where Texas, Mexico, and New Mexico meet; and
 - c. Riverside Diversion Dam located on the Rio Grande approximately 13.5 miles downstream of the American Diversion Dam;
8. Claimants are authorized to divert the water authorized for diversion in Conclusion

of Law No. 5 from the American Diversion Dam and the Riverside Diversion Dam at a combined maximum rate of 10 cubic feet per second.

9. Claimant District is recognized a right to use all of the water authorized in Permit No. 5433 for municipal, industrial, mining, or recreational purposes and/or irrigation of a maximum of 69,010 acres of land within the District's boundaries and/or to sell any of such water surplus to the District's needs for any of the authorized purposes of use in El Paso and Hudspeth Counties.
10. The following Special Conditions should be included in the Certificate of Adjudication:
 - a. This Certificate of Adjudication does not supersede any legal requirement for the protection of environmental water needs pursuant to international treaty, interstate compact, or other applicable law to which Certificate Holders are subject irrespective hereof. Nothing in this condition is intended to grant to the State of Texas any authority additional to that provided by law or to waive any right of Certificate Holders.
 - b. This Certificate of Adjudication is not intended to in any way compromise or diminish the volume of water that the United States is obligated to provide to Mexico on an annual basis pursuant to the terms of the Convention of May 21, 1906, between the United States and Mexico; nor does the Certificate grant to the District, for any use whatsoever, any waters to which Mexico is entitled pursuant to the above referenced 1906 Convention.
 - c. Nothing in this certificate is intended to modify any authority of the State of Texas or the United States of America provided by law, now or in the future.
11. The time priority for use of the water included in Conclusions of Law Nos. 3 and 4, is July 6, 1889. The time priority for use of the water included in Conclusion No. 5 is January 1, 1918.

B. Claim of Jobe Concrete, Inc.:

DIVERSION POINTS NOS.: 0400 and 0450

TRACT NO.: None

OWNERSHIP: Jobe Concrete, Inc.

SECTION 11.303 CLAIM: By predecessor in interest, as a riparian owner appropriator, and/or a claimant of rights under the Irrigation Acts of 1889 and 1895 for which no filings were made by claimant. The claim encompassed one reservoir with a capacity of 137 acre-feet and diversion of 178 acre-feet of water per annum from the Rio Grande for industrial use (in the manufacture of Portland cement), with a priority date of 1910.

SECTION 11.307 CLAIM: By predecessor in interest, affirming the basis of the prior § 11.303 claim, for 178 acre-feet of water per annum from the Rio Grande for industrial use.

FINDINGS OF FACT:

1. Claimant owns land on which flows from a small watershed adjacent to the Rio Grande are impounded by a small reservoir called Cement Lake. The flows originate in seeps and springs upstream of the impoundment and create a discernible watercourse there.
2. Claimant's land, noted in Finding of Fact No. 1, was patented out of the State of Texas between 1840 and 1895.
3. The Cement Lake reservoir was built by 1910 and used from that year onward for industrial processes.
4. During the years from 1943 through 1967, water from the unnamed watercourse impounded in Cement Lake was used at the site, in the amount of 178-acre feet per annum, for the manufacturing of cement (i.e., for cooling large machinery at the facility).

CONCLUSIONS OF LAW:

1. The Texas Commission on Environmental Quality has the authority and responsibility pursuant to the Water Rights Adjudication Act of 1967 (Code § 11.301, *et seq.*) to adjudicate all water right claims filed under that Act.
2. Claimant is recognized a right to divert 178 acre-feet of water per annum for industrial purposes from the flows of an unnamed tributary of the Rio Grande that are impounded in Cement Lake, with a priority date of 1910.

C. Claim of City of El Paso:

DIVERSION POINTS NOS.: 0500, 0550, 0600, and 0650

TRACT NO.: None

OWNERSHIP: City of El Paso, by and through its Public Service Board

SECTION 11.307 CLAIM: Under Permit No. 1535, as amended, to divert and use 11,000 acre-feet of water per year for municipal and domestic purposes from the Rio Grande, with a priority date of November 1, 1948. The diversion point is at the American Diversion Dam or the Riverside Diversion Dam and the water is conveyed through the American Canal, the Franklin Canal, and/or the American Canal Extension.

FINDINGS OF FACT:

1. Claimant was authorized by Permit No. 1535, issued on May 10, 1950, to divert, appropriate, and use 27,000 acre-feet per annum of the unappropriated or unused storm, flood, and return waters of the Rio Grande for municipal and domestic purposes, and to impound 16,000 acre-feet of that water per annum in an off-channel storage reservoir having a capacity of 3,000 acre-feet.
2. Permit No. 1535 was amended on September 10, 1963, by changing the location of the storage reservoir and by adding a new point of diversion.
3. Permit No. 1535A was amended on August 25, 1969, by deleting the requirement to construct a 3,000 acre-foot capacity off-channel reservoir, and by reducing the right to divert and use water to 11,000 acre-feet per year by direct diversion of return and flood waters, without the use of storage, for municipal purposes.
4. Permit No. 1535B was amended on September 8, 1993, by adding the authorization for diversion at the Riverside Diversion Dam, identifying the City's existing water treatment plants, and allowing for the use of the American Canal Extension.
5. The priority date of Claimant's rights under Permit No. 1535, as amended, is November 1, 1948.
6. After Claimant applied for Permit No. 1535, it entered into a Stipulation and Agreement dated December 1, 1949, with the El Paso County Water Improvement District No. 1 and the Hudspeth County Conservation and Reclamation District No. 1 ("the Districts"), the United States and others, which Stipulation and Agreement incorporates a Contract between the City of El Paso and the El Paso County Water Improvement District No. 1 dated August 10, 1949, and set forth the terms and conditions of withdrawal of the United States' and the Districts' protests of the City of El Paso's permit application, and established that the United States shall determine when federal Rio Grande Reclamation Project water is in excess of the requirements of the Districts and is available to the City under its permit.

7. Claimant established that it has beneficially used a maximum of 6,403 acre-feet (in 1981) of the water authorized in Permit No. 1535, as amended, for the authorized purposes.
8. The reasons Claimant failed to use the total amount of water authorized in Permit No. 1535, as amended, for the authorized purposes were that that total amount of water was not determined by the United States to be available to Claimant or was not available to Claimant at a time when Claimant could beneficially use it.
9. Claimant demonstrated an intention to divert and use 11,000 acre-feet per year of the unappropriated storm, flood, and return waters of the Rio Grande, without the use of storage, for domestic and municipal purposes by showing anticipated future need and the possibility of modified water treatment operations that would allow use of low quality water.

CONCLUSIONS OF LAW:

1. The Texas Commission on Environmental Quality has the authority and responsibility pursuant to the Water Rights Adjudication Act of 1967 (Code § 11.301, *et seq.*) to adjudicate all water right claims filed under that Act.
2. Claimant is recognized a right under Permit No. 1535, as amended, to divert, appropriate, and use not to exceed 11,000 acre-feet of water per year of the unappropriated storm, flood, and return waters of the Rio Grande, without the use of storage, for domestic and municipal purposes, with a priority date of November 1, 1948.
3. Claimant is authorized to divert the water authorized by Conclusion of Law No. 2 from the Rio Grande at the American Diversion Dam or the Riverside Diversion Dam and conveyed therefrom, depending on the point of diversion, through the American Canal, the Franklin Canal, and/or the American Canal Extension, to any of the City's water treatment plants, including the W. E. Robertson/Elwood J. Umbenhauer and Jonathan W. Rogers Water Treatment Plants, where it will be diverted from the canals to the plants. In addition, Claimant is authorized to divert this water directly from the Rio Grande to the water treatment plants through facilities provided, or to be provided, by or for the City of El Paso.
4. Claimant's Certificate of Adjudication should include the following Special Conditions:
 - a. Measurement of the water herein authorized to be appropriated by the City of El Paso, by and through its Public Service Board, is to be made at the point of diversion.
 - b. Nothing in this Certificate of Adjudication is intended to modify any authority of the State of Texas or the United States of America provided by law, now or in the future.
5. Claimant, the El Paso County Water Improvement District No. 1, the Hudspeth County Conservation and Reclamation District No. 1, the United States, and the Executive Director

of the Texas Commission on Environmental Quality have agreed to include the following additional Special Conditions in the certificate:

- a. Certificate Holder is authorized to divert water under paragraph 1 above, in accordance with the provisions in paragraphs 2 and 3 of the August 10, 1949 Contract between the City of El Paso and the El Paso County Water Improvement District No. 1.
- b. Determination of the quantity of water available under paragraph 1 above shall be made by the United States, Secretary of the Interior, or his or her designee in accordance with federal reclamation laws and the laws of the State of Texas.

D. Claim of Indian Cliffs Ranch, Inc.:

DIVERSION POINT NO.: 0700

TRACT NO.: None

OWNERSHIP: Indian Cliffs Ranch, Inc.

SECTION 11.307 CLAIM: Under Permit No. 3544, to impound without diversion 52 acre-feet of water for recreational purposes, in a single impoundment on San Felipe Arroyo, with a priority date of October 11 1977.

FINDINGS OF FACT:

1. Claimant was authorized by Permit No. 3544, issued on February 13, 1978, to impound without diversion 52 acre-feet of water for recreational purposes, in a single impoundment on San Felipe Arroyo.
2. Site investigation by Commission staff revealed that the reservoir is actually not located on San Felipe Arroyo, but on an unnamed tributary of San Felipe Arroyo, and staff recommended that the Certificate of Adjudication issued to Indian Cliffs should reflect that fact.
3. Claimant has impounded water for recreational use, as authorized, during each of the 10 years prior to 2004. The annual amount of water impounded during the period has varied, however, with a maximum impoundment of 28 acre-feet.

4. Claimant could and intends to make beneficial use of the impoundment's entire authorized volume for recreational purposes, in the event that local rainfall produces enough runoff to fill the impoundment.

CONCLUSIONS OF LAW:

1. The Texas Commission on Environmental Quality has the authority and responsibility pursuant to the Water Rights Adjudication Act of 1967 (Code § 11.301, *et seq.*) to adjudicate all water right claims filed under that Act.
2. Claimant is recognized a right under Permit No. 3544 to impound without diversion 52 acre-feet of water for recreational purposes, in a single impoundment on an unnamed tributary of San Felipe Arroyo, with a priority date of October 11, 1977.

E. Claim of Hudspeth County Conservation and Reclamation District No. 1 and United States:

DIVERSION POINTS NOS.: 0850 and 0900

TRACT NO.: 0300

OWNERSHIP: Hudspeth County Conservation and Reclamation District No. 1 and United States of America, Department of Interior, Bureau of Reclamation

SECTION 11.307 CLAIM (Hudspeth County Conservation and Reclamation District No. 1): Under Permit No. 236A to divert and use 27,000 acre-feet of water per year from the Rio Grande for irrigation use, at a priority date of November 22, 1917. The place of use is 9,000 acres of land within the District's boundaries for any of the authorized purpose of use.

SECTION 11.307 CLAIM (United States of America): Under Permit No. 236A (subsequent to contract No. 116r-3471 between the United States and Hudspeth County Conservation and Reclamation District No. 1), Certified Filing No. 123, and Reclamation Law.

FINDINGS OF FACT:

1. In 1905, the United States enacted the Rio Grande Reclamation Project Act of February 25, 1905, 33 Stat. 814, authorizing the construction of storage facilities on the Rio Grande in the Territory of New Mexico for storage of water of the Rio Grande for irrigation of lands in New Mexico and Texas for the Rio Grande Project.

2. In 1905, the State of Texas enacted House Bill 588, 29th Legislature, Chapter 101 (now § 11.052 of the Texas Water Code), which authorized the Secretary of the Interior to make all necessary examinations and surveys for, and to locate and construct reclamation works for irrigation purposes within the State of Texas, and to perform any and all acts necessary to carry into effect the provisions of the Reclamation Act of 1902 (38 Stat. 388, now 43 U.S.C. § 371, *et seq.*) as to such lands, subject to all the provisions, limitations, charges, terms, and conditions of the Reclamation Act.
3. Section 8 of the Reclamation Act of 1902 (now 43 U.S.C. §§ 372 and 383) provides in part: "Nothing in this Act shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this act, shall proceed in conformity with such laws, and nothing herein shall in any way affect any right of any State or of the Federal Government or of any landowner, appropriator, or user of water in, to, or from any interstate stream or the waters thereof."
4. Claimant Hudspeth County Conservation and Reclamation District No. 1 ("Claimant District") is a political subdivision of the State of Texas, organized and existing under Article XVI, Section 59 of the Texas Constitution, and is subject to Chapter 55 of the Code and other provisions thereof. Claimant District is authorized by statute to enter into contracts or other obligations with the United States (Code § 55.185). By statute, Claimant District is required to "... distribute and apportion all water acquired by the district under a contract with the United States in accordance with Acts of Congress, rules and regulations of the Secretary of the Interior, and provisions of the contract" (Code § 55.364). Claimant District includes 18,618 acres within its boundaries that are classified by the United States and Claimant District as irrigable.
5. Claimant United States of America ("Claimant United States") is acting by and through the Department of the Interior, Bureau of Reclamation, with respect to recognition of water rights relating to the Rio Grande Reclamation Project.
6. In 1911, the United States enacted a statute dated February 21, 1911 (36 Stat. 925, 43 U.S.C. §§ 523-525, the "Warren Act") to authorize the United States to contract for impounding, storing, and carriage of water and to cooperate in the construction and uses of reservoirs and canals under reclamation projects, and for other purposes. Claimant District entered into a contract with the United States dated December 1, 1924, as amended in 1951, (the "Warren Act Contract"), which provides for the use of Rio Grande Reclamation Project water by Claimant District.
7. In 1911, the State of Texas adopted what is now Code § 11.005, which provides as

follows "This chapter applies to the construction, maintenance, and operation of irrigation works constructed in this state under the federal reclamation act, as amended (43 U.S.C. Sec. 371 et seq.), to the extent that this chapter is not inconsistent with the federal act or the regulations made under that act by the secretary of the interior."

8. In 1939, the United States, Colorado, New Mexico and Texas entered into the Rio Grande Compact (53 Stat. 785; Code § 41.009) to "remove all causes of present and future controversy among" those states with respect to the use of the waters of the Rio Grande above Fort Quitman, Texas.
9. Claimant United States releases stored water from Elephant Butte and Caballo reservoirs to supply water to the Elephant Butte Irrigation District in New Mexico and the El Paso County Water Improvement District No. 1 in Texas. The first two diversion dams downstream of Caballo Dam (Percha Diversion Dam and Leasburg Diversion Dam) are used by the United States to deliver water to land in New Mexico. Mesilla Diversion Dam is located in New Mexico but is used to divert water to both the Elephant Butte Irrigation District and the El Paso County Water Improvement District No. 1. American Diversion Dam is the next diversion dam downstream on the Rio Grande. The United States diverts from the Rio Grande into the American Canal at the American Diversion Dam water for the El Paso County Water Improvement District No. 1 (some of which is subsequently used by Claimant District No. 1 pursuant to its Warren Act Contract).
10. The Rio Grande Reclamation Project provides water to land classified as irrigable within the Elephant Butte Irrigation District in New Mexico and the El Paso County Water Improvement District No. 1 in Texas, upstream of Claimant District.
11. On December 1, 1949, the United States, the City of El Paso, the El Paso County Water Improvement District No. 1, Claimant District, and others entered into a "Stipulation and Agreement" regarding Application No. 1584 made by the City of El Paso to the Board of Water Engineers, State of Texas, for permit to appropriate water from the Rio Grande, and attached to and made a part of such Stipulation and Agreement was a contract between the City of El Paso and the El Paso County Water Improvement District No. 1 dated August 10, 1949. Such Stipulation and Agreement set forth the terms and conditions regarding the withdrawal of protests of Application No. 1584 by Claimant United States, Claimant District, and others, and established that the United States shall determine when federal Rio Grande Reclamation Project water is in excess of the requirements of the El Paso County Water Improvement District No. 1 and Claimant District and is available to the City of El Paso.

12. Claimant District holds Permit No. 236 from the State of Texas as amended by Texas Permit No. 236A. Such permit authorizes Claimant District to divert water from the Rio Grande at a grade control structure located at latitude 31.413 degrees north, 106.096 degrees west in El Paso County, Texas, and at a grade control structure located at latitude 31.318 degrees north and longitude 105.936 degrees west in Hudspeth County, Texas. The priority date of Claimant District's rights under Permit No. 236A is November 22, 1917.
13. Claimant District has beneficially used on 9,000 acres of irrigable land within such district 27,000 acre-feet of water during one or more years from 1918 through 2004 and has diverted such water at a maximum rate of 400 cubic feet per second at a grade control structure located at latitude 31.413 degrees north, 106.096 degrees west in El Paso County, Texas and at a grade control structure located at latitude 31.318 degrees north and longitude 105.936 degrees west in Hudspeth County, Texas.
14. In 2001, Claimant United States has delivered and Claimant District has beneficially used 151,892 acre-feet of water available to Claimant District at the terminus of the Tornillo Drain, Hudspeth Feeder Canal, and Tornillo Canal under the Warren Act Contract and in accordance with the Stipulation and Agreement.
15. Claimants have used the bed and banks of the Rio Grande to transport the water that is the subject of their Claims and have operated and maintained diversion structures and works in the Rio Grande as necessary to divert such water described under Findings of Fact Nos. 13 and 14.
16. Claimant District has beneficially used water, described under Findings of Fact Nos. 13 and 14, diverted from the Rio Grande for agricultural, industrial, mining, and recreational purposes, and/or for irrigation of a maximum of 18,618 acres of irrigable land within the Claimant District's boundaries.

CONCLUSIONS OF LAW:

1. The Texas Commission on Environmental Quality has the authority and responsibility pursuant to the Water Rights Adjudication Act of 1967 (Code § 11.301, *et seq.*) to adjudicate all water right claims filed under that Act.
2. Claimants are recognized a right to divert an aggregate amount of water from the Rio Grande not in excess of 27,000 acre-feet per annum within 3,500 feet upstream of a grade control structure located at latitude 31.413 degrees north, 106.096 degrees west in El Paso County, Texas, and at a grade control structure located at latitude 31.318

degrees north and longitude 105.936 degrees west in Hudspeth County, Texas, to irrigate 9,000 acres of land within Claimant District's boundaries.

3. Claimant United States is authorized to deliver and Claimant District is authorized to use a maximum of 151,392 acre-feet per year of any water available to Claimant District at the terminus of the Tornillo Drain, Hudspeth Feeder Canal, and Tornillo Canal under the Warren Act Contract and in accordance with the Stipulation and Agreement.
4. Claimants are authorized to use the bed and banks of the Rio Grande to transport the water that is the subject of their Certificate of Adjudication and to operate and maintain diversion structures and works in the Rio Grande as necessary to divert such waters.
5. The maximum combined rate for water diverted from the Rio Grande authorized under Conclusion of Law No. 2 is 400 cubic feet per second.
6. Claimant District is authorized to use all of the water authorized herein for agricultural, industrial, mining, or recreational purposes, and/or for irrigation of a maximum of 18,618 acres of irrigable land within the District's boundaries.
7. Claimants' Certificate of Adjudication should include the following Special Conditions:
 - a. This Certificate of Adjudication does not supersede any legal requirement for the protection of environmental water needs pursuant to international treaty, interstate compact, or other applicable law to which Certificate Holders are subject irrespective hereof. Nothing in this condition is intended to grant to the State of Texas any authority additional to that provided by law or to waive any right of Certificate Holders.
 - b. This Certificate of Adjudication is not intended to in any way compromise or diminish the volume of water that the United States is obligated to provide to Mexico on an annual basis pursuant to the terms of the Convention of May 21, 1906, between the United States and Mexico; nor does the Certificate grant to the District, for any use whatsoever, any waters to which Mexico is entitled pursuant to the above referenced 1906 Convention.
 - c. All rights of the Certificate Holders under this Certificate of Adjudication shall be subject and inferior to all rights of the El Paso County Water Improvement

District No. 1 in and to all Rio Grande Reclamation Project facilities and water, and to all of the other rights of the El Paso County Water Improvement District No. 1, which are described or recognized in the El Paso County Water Improvement District No. 1's Certificate of Adjudication No. _____, subject to the provisions in paragraphs 2 and 3 of the August 10, 1949 Contract between the City of El Paso and the El Paso County Water Improvement District No. 1. However, this Certificate of Adjudication shall not be deemed to modify or affect the Stipulation and Agreement in any manner.

- d. Determination of the quantity of water available under _____ of this Certificate of Adjudication [i.e., under Conclusion of Law No. 3, above] shall be made by the United States of America, Secretary of the Interior, or this or her designee in accordance with federal reclamation laws and the laws of the State of Texas.
 - e. Nothing in this Certificate of Adjudication is intended to modify any authority of the State of Texas or the United States of America provided by law, now or in the future.
8. The time priority for use of the water included in Conclusion of Law No. 2 is November 22, 1917. Water use under Conclusion of Law No. 3 is a non-priority use.

F. Claim of Robert and Doloris Kimpel:

DIVERSION POINT: None

TRACT NO.: None

OWNERSHIP: Robert and Doloris Kimpel

SECTION 11.303 CLAIM: None

SECTION 11.307 CLAIMS On an unspecified basis, for agricultural and irrigation use upon three separate tracts of land, from unnamed tributaries of the Rio Grande and San Felipe Arroyo. The claims seek to authorize four small impoundments and the diversion of 656 acre feet of water per annum.

FINDINGS OF FACT:

1. Neither Claimants nor any of their predecessors in interest filed a statement of claim pertinent to Claimant's asserted rights under § 11.303 of the Water Rights Adjudication Act of 1967 (Code § 11.301, *et seq.*).
2. Claimants hold no permit issued by the State of Texas nor any other appropriative right pertaining to their claims asserted in this adjudication.
3. Claimants have demonstrated no use of water that pertains to their claims asserted in this adjudication during the years 1963 through 1970, inclusive.

CONCLUSIONS OF LAW:

1. The Texas Commission on Environmental Quality has the authority and responsibility pursuant to the Water Rights Adjudication Act of 1967 (Code § 11.301, *et seq.*) to adjudicate all water right claims filed under that Act.
2. Claimants should not be recognized any water right in this adjudication.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

1. The Commission, pursuant to § 11.315 of the Code, makes this Final Determination of all properly pending claims of surface water rights in the Adjudication of All Claims of Water Rights in the Upper Rio Grande (Above Fort Quitman, Texas) Segment of the Rio Grande Basin.
2. The chief clerk of the Texas Commission on Environmental Quality shall forward a copy of this Order and Final Determination to each person who filed a claim in this adjudication in accordance with § 11.307 of the Code and to other entities as prescribed in § 11.309 of the Code.
3. If any provision, sentence, clause or phrase of this Order is for any reason held to be

invalid, the invalidity of any portion shall not affect the validity of the remaining portions of the Order.

4. All other motions, requests for entry of specific Findings of Fact or Conclusions of Law, and any other requests for general or specific relief in this proceeding, if not expressly granted herein, are hereby denied for want of merit.

ISSUED: **APR 13 2006**

A handwritten signature in cursive script, reading "Kathleen H. White".

Kathleen Hartnett White, Chairman

No. 141, Original

**In the
SUPREME COURT OF THE UNITED STATES**

STATE OF TEXAS,

Plaintiff,

v.

**STATE OF NEW MEXICO and
STATE OF COLORADO,**

Defendants.

OFFICE OF THE SPECIAL MASTER

**UNITED STATES OF AMERICA'S RESPONSES TO
NEW MEXICO'S FIRST SET OF DISCOVERY REQUESTS**

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U.S. Department of Justice

Counsel for the United States

TX v. NM # 141

New Mexico Exhibit

NM_EX-612

RESPONSE TO INTERROGATORY No. 11:

The United States incorporates its previously served objection to Interrogatory 11. Notwithstanding that objection, the United States identifies the Operating Agreement, Operating Manual (2012), and Rio Grande Project order forms.

INTERROGATORY No. 12: Identify all persons with knowledge of facts that support Your contention that the “Project may have to release additional water from storage to offset [water extracted from the surface or the ground at places below Elephant Butte Reservoir] in order to maintain delivery of any given quantity of water to downstream users,” as set forth in the United States’ Complaint in Intervention in Paragraph 14.

RESPONSE TO INTERROGATORY No. 12:

The United States incorporates its previously served objection to Interrogatory No. 12. Notwithstanding these objections, the United States identifies Phil King, Al Blair, Tom Maddox, Peggy Barrol, Nabil Shafike, John D’Antonio, Filiberto Cortez, Ian Ferguson, Jean Moran, Greg Sullivan, Heidi Walsh, Bob Brandes, James Narvaez, Robert Rios, Bill Hutchinson, Dagmar Llewelyn, Michelle Estrada-Lopez, and Gerardo Melendez.

INTERROGATORY No. 13: Explain in detail what You consider to be a full annual allocation of water from the Project to New Mexico and Texas. *See* United States Bureau of Reclamation, *Rio Grande Project Water Supply Allocation Procedures*, Bates No. US0167011, at 4 (referencing “a full supply of 468,700 acre-feet to authorized irrigated lands in the U.S. and a full allocation to Mexico of 60,000 AF for a total of 528,700 AF,”

the “required release from project storage [as] 763,800 AF,” and “the Net Diversion at Headings (US and Mexico) for a release of 763,800 AF is 931,841 AF”).

RESPONSE TO INTERROGATORY No. 13:

The United States incorporates its previously served objection to Interrogatory No. 13. Notwithstanding that objection, the United States provides the following explanation by time period:

- A full annual allocation to the United States for delivery to Mexico is 60,000 acre-feet (“AF”) delivered in the bed of the Rio Grande at the heading of the Acequia Madre, per the Convention of 1906.
- Prior to 1950, Reclamation delivered water Project lands. No annual allocation was determined during this period. Reclamation delivered water to Project lands based on Project water orders up to a release of 790,000 AF or a maximum achievable release based on the current-year water supply.
- From 1950 to 1980, Reclamation delivered water to Project lands. A full annual allocation to Project lands was 3.024 AF/acre to each acre of authorized Project land under irrigation.
- In 1980, EBID and EPCWID took over operation and maintenance of Project canals, laterals, and drains. Between 1980 and 1990, Reclamation developed procedures for allocating water to each district at its respective diversion points. The procedure for determining district diversion allocations was updated and revised several times during this period in coordination and consultation with EBID, EPCWID, and US-IBWC. During this period, a full annual allocation to the U.S. canal headings ranged from

750,650 AF to 902,000 AF (392,111 AF to 478,039 AF to EBID; 298,539 AF to 363,961 AF to EPCWID). See the table of allocations provided in response to Interrogatory 14.

- From 1991 to 2007, Reclamation allocated water to EBID and EPCWID based on the D1 and D2 Curves. During this period, a full annual allocation to the U.S. canal headings was 871,841 AF (494,979 AF to EBID; 376,862 to EPCWID)
- From 2008 to present, Reclamation allocates water to EBID and EPCWID according to the Operating Agreement (2019 Allocation Spreadsheet). Under the Operating Agreement, the full annual diversion allocation to the U.S. canal headings is 898,056 AF (509,864 AF to EBID; 388,192 AF to EPCWID). EBID voluntarily foregoes a portion of its annual allocation to account for any decrease in Project delivery performance relative to the D2 Curve; EBID receives an increase in its annual allocation to reflect any increase in Project delivery performance relative to the D2 Curve.

INTERROGATORY No. 14: List all years in which You were able to make a full annual allocation of Project water to New Mexico and Texas as You define in your response to Interrogatory 13.

RESPONSE TO INTERROGATORY No. 14:

The United States incorporates its previously served objection to Interrogatory Nos. 13 and 14 and response to Interrogatory No. 13. Notwithstanding these objections, the United States provides the following table of allocations for the years 1951-2018:

Year	Final Allotment to Lands, af/a	Year	Final Allotment to Lands, af/a	Final Allotment to Canal Headings, af	Year	Final Allotment to Canal Headings, af	Year	Final Allotment to Canal Headings, af
1951	1.75	1970	3.00		1989	890,900	2008	831,694
1952	2.50	1971	1.75		1990	931,841	2009	898,814

Year	Final Allotment to Lands, af/a	Year	Final Allotment to Lands, af/a	Final Allotment to Canal Headings, af	Year	Final Allotment to Canal Headings, af	Year	Final Allotment to Canal Headings, af
1953	1.90	1972	0.80		1991	931,841	2010	813,828
1954	0.50	1973	3.00		1992	931,841	2011	344,918
1955	0.42	1974	3.00		1993	931,841	2012	269,704
1956	0.39	1975	3.00		1994	931,841	2013	104,096
1957	1.17	1976	3.00		1995	931,841	2014	207,762
1958	4.00	1977	1.25		1996	931,841	2015	359,256
1959	3.50	1978	0.75		1997	931,841	2016	449,293
1960	3.25	1979		790,000	1998	931,841	2017	709,120
1961	2.45	1980		790,000	1999	931,841	2018	437,834
1962	3.25	1981		750,650	2000	931,841		
1963	2.00	1982		790,000	2001	931,841		
1964	0.33	1983		790,000	2002	931,841		
1965	1.85	1984		902,000	2003	317,495		
1966	2.50	1985		902,000	2004	353,944		
1967	1.50	1986		902,000	2005	931,841		
1968	2.00	1987		902,000	2006	472,426		
1969	3.00	1988		902,000	2007	616,867		

INTERROGATORY No. 15: List all years in which You were unable to deliver to Mexico all water Mexico was entitled to receive under the Convention between the United States and Mexico for the Equitable Distribution of the Waters of the Rio Grande for Irrigation Purposes, May 21, 1906 (U.S.-Mex., 34 Stat. 2953).

RESPONSE TO INTERROGATORY No. 15:

The United States incorporates its previously served objection to Interrogatory No. 15 and further objects to the terms “unable to deliver” and “all water Mexico was entitled to receive” as vague and ambiguous in context. A full allocation to the United States for delivery to Mexico is 60,000 AF, but in times of extraordinary drought, Mexico’s annual allocation is reduced in proportion with the allocations to the districts. For purposes of illustration, between 2010 and 2018, there was only one year (2017) when Mexico was allocated a full 60,000 AF,

Respectfully submitted this 19th day of November, 2019.

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