EXHIBIT 2

TX v. NM # 141
New Mexico Exhibit
NM_EX-006

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 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 an Expert Report dated October 31, 2019 (NM-EX 100),[1] a Rebuttal Expert Report dated June 15, 2020 (NM-EX 101), a Supplemental Rebuttal Expert Report dated July 15, 2020 (NM-EX 102), a Supplemental Rebuttal Expert Report (2nd Edition) dated September 15, 2020 (NM-EX 103), and a Declaration dated November 4, 2020 (NM-EX 001) in this case.

3. My curriculum vitae and list of publications from the last 10 years can be found in my October 31, 2019 Expert Report at 106-111, NM-EX 100.

Background

[1] All exhibits designated ("NM-EX") in this Declaration are contained in the State of New Mexico's Exhibit Compendium filed with New Mexico's Partial Summary Judgment Motions on November 5, 2020, and additional exhibits in the State of New Mexico's Supplemental Exhibit Compendium dated December 22, 2020. Exhibits used by the United States and Texas in their motions for partial summary judgment are cited as in those briefs.

4. 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 Compact of 1938 as the "Compact." I refer to the area between Elephant Butte Dam, New Mexico, and the New Mexico state line, which contains the Rio Grande Project ("Project") as the "LRG." I refer to that portion of Texas below the Rio Grande gage at El Paso, and above the gage at Fort Quitman, that contains Project lands, as the El Paso valley.

5. I have been asked by Counsel for New Mexico to summarize technical data and findings related to the following topics:

- Groundwater pumping data in New Mexico and Texas within and in the vicinity of the Project;
- The impacts of groundwater pumping on the Project and on Project deliveries to Texas;
- The use and interception of Project Return flows;
- The distribution of Project Supply between New Mexico and Texas;
- The 2008 Operating Agreement and its effects; and
- New Mexico water administration in the LRG.

6. I have been informed by Counsel for New Mexico that I should focus my summary on these issues as they relate and respond to the Motions for Partial Summary Judgment filed by Texas and the United States on November 5, 2020.

The Project and Reclamation

7. The Project is operated by the U.S. Bureau of Reclamation ("Reclamation"). As relevant to this Declaration, the operations of the Project include the allocation and delivery of Project water stored in Elephant Butte and Caballo reservoirs to EBID, EPCWID and to Mexico. *See e.g.* NM-EX 529, Bureau of Reclamation Final Environmental Impact Statement (Sep. 30, 2016) ("FEIS") at 3-4.

Project Supply and Allocation

8. The Compact defines "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 …"; and "Usable Water" as "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." NM-EX 330, Compact, at Art. I (k), (*l*).[2]

9. Water for Project Storage derives from inflows from the Rio Grande watershed upstream of Elephant Butte, and local inflows of surface water. The Compact provides limits and constraints on upstream storage that are initiated when Project Storage. Reclamation releases Usable Water from Project Storage for delivery to Project beneficiaries and to Mexico as part of the operations of the Rio Grande Project. Releases are made in response to orders by the Districts, and in accordance with each year's schedule of deliveries to Mexico. NM-EX 529, FEIS at 3-5.

10. The term "Project Supply" refers to the Usable Water released from Caballo Dam, plus Project return flows and inflows occurring below Caballo Dam, that can be allocated and

[2] In later years the term "Usable Water" was amended to also exclude San Juan-Chama project water.

delivered to the beneficiaries of the Project, namely the citizens of New Mexico and Texas, and to Mexico. NM-EX 529, FEIS at 3-4; NM-EX 100, Barroll Rep. at 26-30. Not all of the water delivered into Elephant Butte can be delivered to Project Beneficiaries. Some of this water is lost to evaporation or seepage before it is delivered to Project beneficiaries. A small amount of the water released from Project storage is used by pre-Compact water rights such as those associated with the Bonita Lateral.

11. Project allocations are the amount of Project Supply each District (EBID and EPCWID) is entitled to order (take) each year from the Project, and the amount Mexico is entitled to receive by Treaty. *See e.g.*, NM-EX 529, FEIS at 4; NM-EX 307, *Convention between the United States and Mexico - Equitable Distribution of the Waters of the Rio Grande* (May 21, 1906). Project allocations are determined before the beginning of each irrigation season and updated as necessary throughout the season.

12. During each irrigation season (approximately March through October), each District may order surface water from the Project to be delivered at its canal headings as long as the District has not expended its allocation. Deliveries by Reclamation to the Districts are measured by gages and converted into what are known as "Charged Diversions" (or "Allocation Charges") which are then subtracted from each District's allocation account as the irrigation season progresses. *See e.g.*, NM-EX 510, 2008 Operating Agreement at 9-11; NM-EX 529, FEIS at 12, 18, 24, Appendix B.

13. ~~During the course of the irrigation season, Reclamation receives orders from the Districts, and adjusts the gates of Caballo Dam to control the release of water so that these orders are delivered to the Districts' canal headings. *See* NM-EX 531, Rio Grande Project Operations Manual, at 4-5 (2018) ("Operations Manual"). Reclamation sets the Caballo release rate~~

taking into account the losses and gains between Caballo Dam and the canal headings to which it is delivering water, so that regardless of what losses or gains may occur, the amount ordered will reach the canal heading for which the order is being made. NM-EX 531, Operations Manual at 4-8. If the delivery to EPCWID falls short of the order for any reason, there is a procedure by which water is released from EBID's works to temporarily mitigate the shortfall until adjustment of the Caballo release resolves the problem. NM-EX 529, FEIS at 4, 24; NM-EX 531, Operations Manual at 8. Historically, Reclamation has always been able to fulfill the orders made by the Districts. Stream depletions occurring upstream of EPCWID's canal headings do not prevent Reclamation from delivering the water that EPCWID has ordered. *See e.g.*, NM-EX 210, Dr. Ian M. Ferguson Dep., Vol. 2 (Feb, 20, 2020) (Ferguson Dep.) at 260:6-7 ("I'm not aware of any records that suggest EPCWID ordered water that it did not receive."); NM-EX 231, Robert Rios Dep. (Aug 26, 2020) at 56:21-24; NM-EX 230, Gary Esslinger Dep. Vol. 1 (August 17, 2020) at 121:18 – 122:3; NM-EX 228, Filiberto Cortez 30(b)(6) Dep. (August 20, 2020) at 20:22 – 22:15.

Irrigation Well Pumping in the LRG

14. Before the creation of the Project, farmers in the LRG used wells to supplement undependable surface water supplies, and other water users relied on wells for drinking water and other uses. NM-EX 342, Slichter 1905[3] at 31-35; NM-EX 336, Lee 1907[4] at 41-47. Once the Project began to supply surface water, the need for supplemental groundwater was reduced. By the 1940's, after decades of Project operation, "very few" of the early

[3] NM-EX 342, Charles S. Slichter, *Observations on the Ground Waters of Rio Grande Valley*, U.S. Geological Survey Water-Supply and Irrigation Paper No. 141, Washington, D.C.: Government Printing Office (1905) (Slichter 1905).

[4] NM-EX 336, Willis T. Lee, *Water Resources of the Rio Grande Valley in New Mexico* (Lee 1907).

irrigation wells remained in operation. NM-EX 343, Conover 1947[5] at 9; NM-EX 424, Conover 1954[6] at 9, 103-105, 107. Declarations[7] on file at the New Mexico Office of the State Engineer indicate that some irrigation wells were drilled during the 1920s and 1930s, which suggests that there were some active irrigation wells in New Mexico at the time the Compact was enacted.

15. The Rio Grande basin and the entire Southwest region was hit by a serious drought that began in 1946, accelerated in the winter of 1946-1947, and lasted through most of the 1950s. NM-EX 112, Jennifer Stevens, Ph.D. Expert Report (October 28, 2019) (Stevens Rep.) at 91. During the late 1940s Reclamation warned farmers of impending low-supply conditions (NM-EX 334, 1946-1950 Rio Grande Project Histories,[8] "Water Announcements,") and many farmers in both Districts began to drill irrigation wells. Reclamation recognized that groundwater pumping would be necessary to sustain the Project: in the 1950 RGP History Reclamation states: "Providing the present drought conditions continue, a study will have to be undertaken to determine means of irrigating the Rio Grande Project, with no available runoff from the upper watershed. At present, pumping from wells appears to be the most feasible for a short time." NM-EX 335, 1950 RGP Histories, "Future Work" at 43-44.

[5] NM-EX 343, C.S. Conover, *Preliminary Memorandum on Groundwater Supplies for Elephant Butte Irrigation District, New Mexico* (September 1947) (Conover 1947).

[6] NM-EX 424, 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, 1954) (Conover 1954).

[7] "Declarations" as used in New Mexico water administration are formal statements filed by groundwater rights claimants with the Office of the State Engineer.

[8] Rio Grande Project Histories, or "RGP Histories" were annual reports produced by Reclamation dealing with all aspects of Project operations.

16. ~~At that time, in the late 1940s, the connection between groundwater and surface water within the Project was understood and had been documented by USGS study. NM-EX 343, Conover 1947 at 1, 12-15~~.

17. ~~In 1951 there was insufficient Usable Water in Project Storage to supply the Project, and the final allotment to farmers was only 1.75 AF/A (as compared with a full-supply allotment of 3.024 AF/A). NM-EX 419, 1951 RGP Histories 1951, "Water Announcements." As the 1950s progressed, and water-short conditions continued and deepened, more irrigation wells were drilled within the Project, and groundwater became an integral part of the water supply to Project farmers in both Texas and in New Mexico. This is evidenced by the Water Announcements and Operations and Maintenance Reports contained in RGP Histories from 1951 – 1957. NM-EX 417, 1951-1957 RGP Histories, "Water Announcements"; NM-EX 420, 1951-1957 RGP Histories, "Operations and Maintenance." Starting in 1951, Reclamation encouraged farmers with good wells "to transfer a part of their unused allotment water to those who are in need of additional water." NM-EX 419, 1951 RGP Histories, "Water Announcement" (August). In 1954 Reclamation requested farmers with wells to use them "to the greatest extent possible" NM-EX 417, 1954 RGP Histories, "Water Announcement" (March).~~

18. ~~Reclamation staff worked with Project farmers during the 1950s to distribute pumped groundwater through Project conveyances. NM-EX 420, 1951 RGP Histories, "Operations and Maintenance."~~

19. ~~The use of groundwater pumped from farmers' wells in both New Mexico and in Texas allowed the Project to operate successfully during the drought years of the 1950s, and allowed Project farmers to produce crops of good yield despite extremely low surface water~~

~~supplies in a number of years. NM-EX 420, 1951-1957 RGP Histories, "Operation and Maintenance."~~

20. ~~The drought years of the 1950s, and later low-supply years in the 1960s were a difficult time for Project farmers as evidenced by a number of contracts for the Deferment of Construction Charges that are contained in Rio Grande Project Histories for this period. These Contracts refer to "severe losses in recent years as a result of unprecedented drought conditions." NM-EX 421, "Supplemental Contract[s] Providing for the Deferment of Construction Charges Payable in Calendar Year [X]." A similar contract is included in the 1964 Project Histories. *Id.*~~

21. ~~During the 1970s Reclamation worked with Districts on the development of District-owned irrigation supply wells. The 1978 Rio Grande Project Histories contains a contract related to the drilling of four District irrigation wells in EPCWID. NM-EX 422, 1978 RGP Histories, "License Agreement with El Paso County Water Improvement District No. 1 for Installation of 4 Water Wells." During the 1970s EBID drilled a number of District irrigation wells that were used briefly. NM-EX 415, Memorandum Opinion, *Mestas v. Elephant Butte Irrigation District*, CIV NO 78-138-B, D.N.M. (5/11/1979).~~

22. Irrigation well pumping in the LRG portions of New Mexico has been fully metered since 2008. Metering data from the period of record (2009 – 2019), combined with surface water delivery data, indicates that New Mexico farmers are applying an average of 4.0 AF of combined surface and groundwater to each irrigated acre. By comparison, EPCWID allots 4.0 AF per acre of surface water to its farmers in full-supply years, plus unknown amounts of groundwater. NM-EX 423, 2001 Rio Grande Project Third Party Implementing Contract Among the U.S., EPCIWD, and the City of El Paso at 49, 59.

23. ~~The cropping pattern in the Project has changed throughout the history of the Project. At the time the Compact was signed, cotton comprised about 50% of the crop mix in both EBID and EPCWID, and the full Project acreage (155,000 acres) was not yet in irrigation. By the 1950's the percentage of cotton had risen to approximately 80%. Forage crops including alfalfa and pasturage comprised the majority of the rest of the crop mix. At the time of the Compact, Reclamation cropping reports indicate that both Districts contained a few 10's of acres of pecan trees. Pecan acreage in both states expanded rapidly during the 1980s and thereafter. Currently, Pecan acreage comprises approximately 40% of irrigated acreage in the Project in both New Mexico and in Texas. Sullivan and Welsh, 2nd Ed. Original Rep. (7-15-2020) at 24 – 32; NM-EX 122, NM-EX 101, Barroll Reb. Rep. at 5~~.

24. ~~The total amount of irrigated acreage in New Mexico has decreased over recent decades, from a high of over 90,000 acres during the 1950s to approximately 75,000 acres today, as illustrated in Figure 1 of this Declaration. When the total amount of irrigation water applied in the LRG is averaged over the entire EBID authorized acreage of 90,640, the result is 3.4 AF per acre of assessed or authorized Project acreage. NM-EX 101, Barroll Reb. Rep. at Table 1 and Figure 10. This value is consistent with the irrigation demand per acre (3.5 AF per acre) used by Gunaji in his 1961 analysis[9] of water use during the 1950's drought, and the estimate of 3.3 AF per acre made by Conover in 1947, and so the total application of irrigation water in New Mexico has not increased since that time. NM-EX~~

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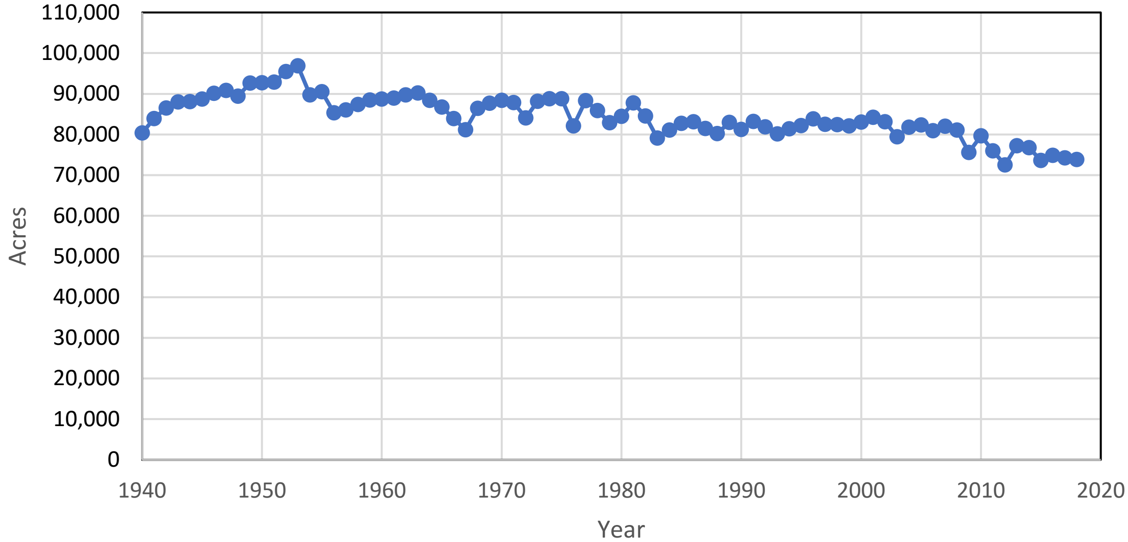
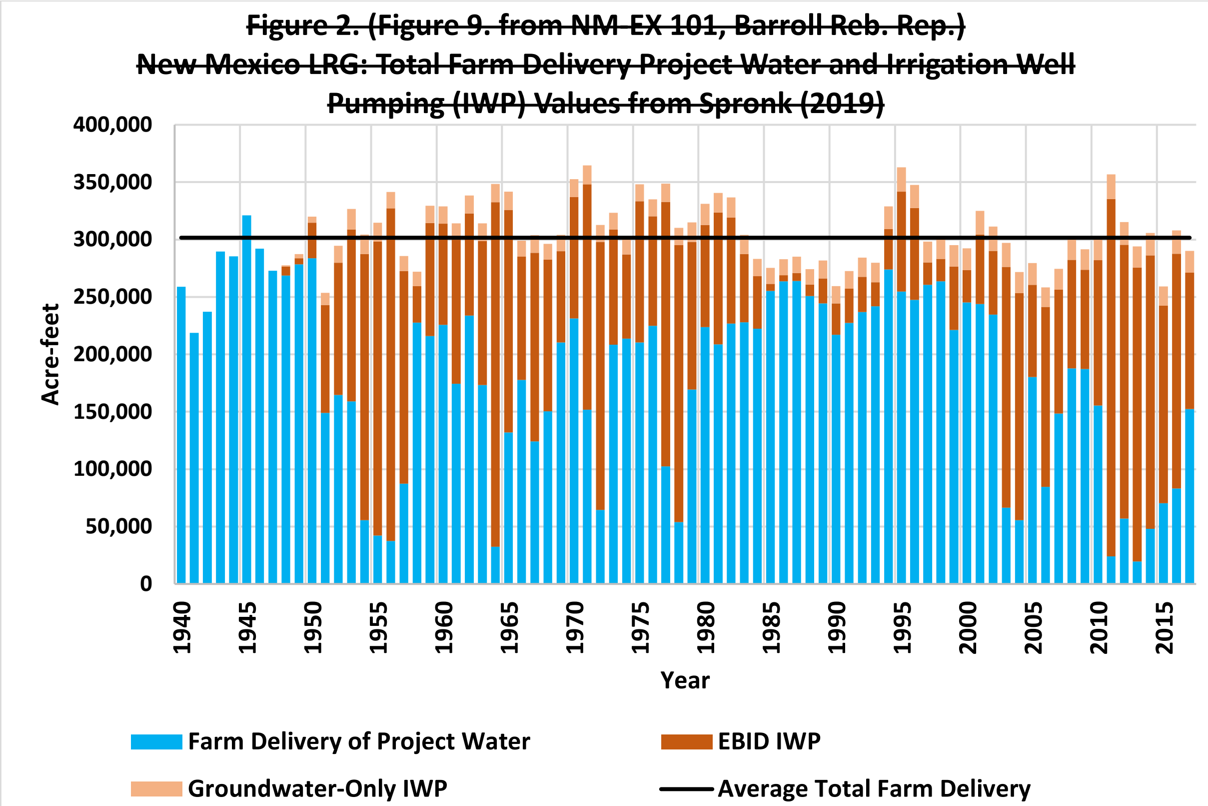
[9] ~~NM-EX 432, N. Gunaji, *Groundwater Conditions in the Elephant Butte Irrigation District* (1961) (Gunaji 1961).~~

~~432, Gunaji 1961 at 3, 19; NM-EX 343, Conover 1947 at 6.~~

~~Figure 1. (Figure 6. from NM-EX 101, Barroll Reb. Rep.)~~
~~Irrigated Acreage in New Mexico LRG~~



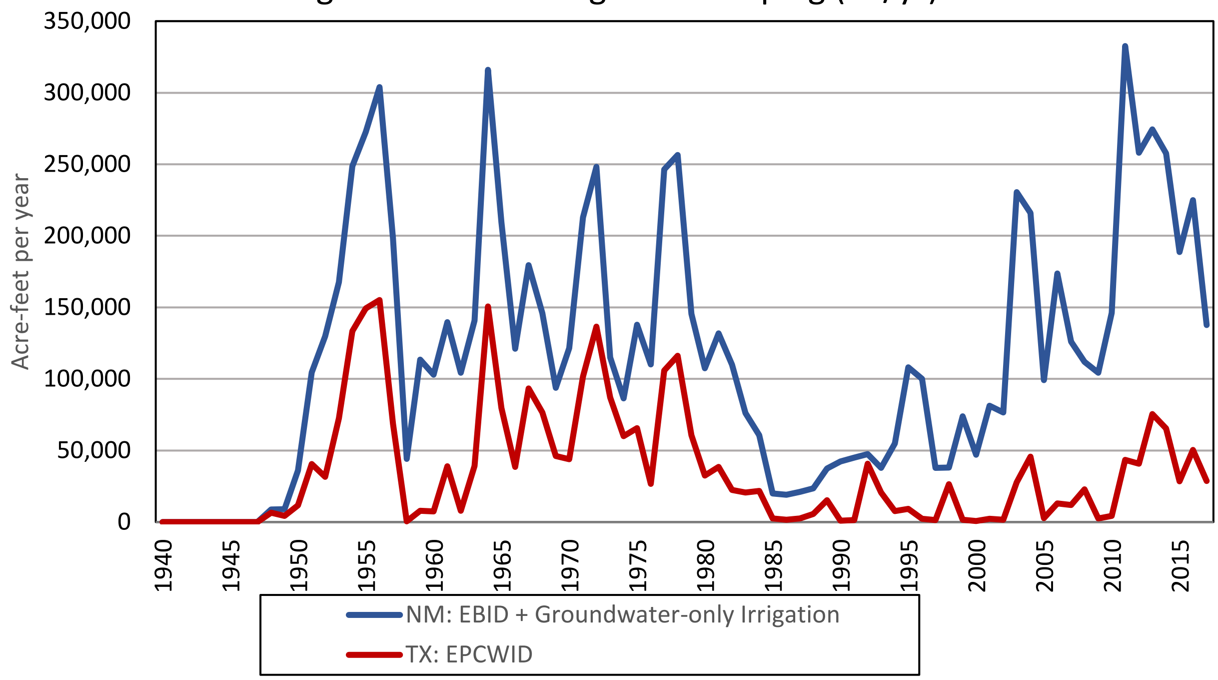
25. The available evidence suggests that the total application of irrigation water in New Mexico, including both surface water and groundwater sources, has not increased since the 1950s, as illustrated in Figure 2 of this Declaration. Data and analysis suggest that the depletions associated with irrigation within New Mexico have not increased since the 1950s. NM-EX 101, Barroll Reb. Rep. at Figures 9 and 10.



26. Current irrigation well pumping levels in New Mexico in recent years are consistent with the irrigation well pumping estimated during the 1950s' drought, as shown by Figure 3 of this Declaration, and comparison with historical estimates NM-EX 432, Gunaji 1961; NM-EX 100, Barroll Rep. at 19-20. Current levels of irrigation well pumping in New Mexico are in part due to drought conditions, but since 2006 are also due to the large reduction in EBID's surface water caused by the 2008 Operating Agreement. NM-EX 101, Barroll Reb. Rep. at 9 and §12; NM-EX 100, Barroll Rep. at § 8. In years in which the Project has a full supply available to it, the 2008 Operating Agreement has reduced EBID's allocation by more than one-third (1/3). NM-EX 100, Barroll Rep. at Figure 8.2. Analysis of recent well meter data shows that irrigation well pumping in the New Mexico part of the LRG is directly proportional to EBID's surface water shortage, so that the greater the reduction in EBID's allocation, the greater the total irrigation well pumping in the New Mexico. NM-EX 101,

Barroll Reb. Rep. at Figure 7. Despite the reduction in EBID's allocation caused by the 2008 Operating Agreement, irrigation well pumping in New Mexico in recent low-supply years are consistent with those from the drought of the 1950s, and as described above, the total amount of water applied to irrigated lands in New Mexico has not increased.

Figure 3. Annual Irrigation Pumping (AF/yr)



Source: Expert Report of Gregory K. Sullivan and Heidi M. Welsh (Second Edition) (July

27. ~~There is no evidence that Texas requires metering of irrigation wells, and no meter data is available for these wells. Furthermore, there is no evidence that Texas places any limits on how much these wells can pump. In addition to farm wells, EPCWID has drilled over 60 District water wells, which it has used to pump groundwater into EPCWID conveyances for use by Texas Project beneficiaries.[10]~~

[10] ~~NM-EX 532, Reyes, J. (EPCWID General Manager), *Water Conservation and Management Projects in El Paso County Water Improvement District* (PPT also at http://www.twdb.texas.gov/waterplanning/rwp/climate/doc/13-Reyes.pdf), Symposium: Far West Texas Climate Change, June 17, 2008.~~

28. ~~Throughout the history of the Project, and especially during periods of low surface water supply, farmers throughout the Project have relied on groundwater supplies, and are entitled to do so. NM-EX 107, Expert Report of Estevan Lopez (October 31, 2019) (Lopez Rep.) at 42. (P 7, 8). The Project operates in an arid climate, and there will continue to be years when surface water supplies are very low due to normal variations in climate, plus a potentially drier future due to climate change. The 1950s drought shows that in a prolonged, multi-year drought, the Project was able to successfully operate only because farmers pumped groundwater. During droughts today, it is likely farmers will go out of business if they are unable to pump groundwater as they have been able to do since the 1950s. Also, cities and towns in the Lower Rio Grande have grown over the decades in their reliance on groundwater supplies. Without the groundwater supplies towns and cities would be left without water for the citizens. Similarly, domestic wells throughout the Lower Rio Grande supply water to individual homes and these families do not have access to surface water supplies.~~

Non-Irrigation Well Pumping in the LRG

29. ~~Within New Mexico, the City of Las Cruces currently pumps approximately 15,000 AF/yr from wells in the Mesilla basin. NM-EX 013, Lee Wilson, Ph.D., Decl. at ¶ 6. Las Cruces has pumped groundwater since at least the early years of the 20th century, gradually increasing their diversions as the population of the city increased. *Id.* at ¶ 4. Las Cruces also pumps between approximately 4,000 AF/yr from wells in the Jornada del Muerto, an adjoining but hydrologically disconnected basin. *Id.* at ¶ 6. Return flow from both sources of water, in the form of treated effluent, returns to the Rio Grande below Las Cruces, and is available for diversion as part of Project Supply at Mesilla Dam. *Id.* at ¶ 6.~~ Diversion of

this water is accounted as Project Supply. Assorted other New Mexico municipal and commercial groundwater users pump an additional approximately 20,000 AF/yr in Rincon and Mesilla basins. Some percentage of this water also returns to the Rio Grande as treated effluent. NM-EX 116, Expert Report of Gilbert R. Barth, Ph.D. (3nd Edition September 15, 2020) (Barth Rep.) at 5-19.

30. In New Mexico, in the LRG, irrigation wells pumping comprises 80% to 90% of total groundwater pumping, and municipal and industrial pumping comprise the other 10 to 20%. In Texas, municipal groundwater pumping comprises far more than half of the total pumping, although a lack of meter data makes it difficult to ascertain the exact percentage.

31. Texas pumps groundwater for municipal and other non-irrigation purposes from its part of the Mesilla basin. The largest Texas diversions in the Mesilla basin are from the Canutillo well field, which pumps approximately 24,000 AF/yr based on data by the El Paso Water Utility, for El Paso municipal use. A portion of the water pumped from the Canutillo well field returns to the Rio Grande below the Rio Grande at El Paso (or Courchesne) gage. Diversion of this return flow is accounted as Project Supply. NM-EX 100, Barroll Rep. at 30.

32. Other than the Canutillo well field, there is no recent meter data is available for Texas groundwater pumping (either for irrigation or other non-irrigation uses) in the Mesilla Basin.

33. In the Hueco bolson, the City of El Paso in Texas and Ciudad Juarez in Mexico, have historically pumped large amounts of groundwater, creating a cone of depression more than 100 feet deep, as illustrated in NM-EX 117, LRG Wells and Goundwater Level Declines. The rate of pumping increased substantially since 1938, increasing from only a few

~~thousand AF/yr in 1938 up to a maximum of approximately 75,000 AF/yr around 1990. NM-EX 121, Charles P. Spalding and Daniel J. Morrissey Reb. Report (July 15, 2020) at Figure 5.4.~~

Impacts of Groundwater Pumping

34. When water is pumped from a stream-connected aquifer, that pumping eventually depletes water from the stream system but the ***timing*** of the depletion, the ***location*** where that depletion occurs, and the ***amount*** of depletion depends on a variety of hydrologic conditions, and the location and construction of the pumping wells. Stream depletions generally consist of reduction of gains to streams and to irrigation drains, and increases in the seepage loss from natural streams and irrigation conveyances.

35. The Rio Grande within the LRG and El Paso valley has historically had both gaining and losing reaches. During times of low Project Supply and high groundwater pumping, the losses from the Rio Grande are higher than in high-Project-supply years with low groundwater pumping. Groundwater pumping in both New Mexico and in the Texas Mesilla impact the gains and losses from the Rio Grande in the Mesilla Valley. Groundwater pumping in both Texas and Mexico impact the gains and losses from the Rio Grande in the El Paso Valley. NM-EX 122, Sullivan and Welsh, 2nd Ed. Original Rep. (7-15-2020) at 92-98; Spaulding and Morrissey, 2nd Ed. Original Rep. (7-15-2020) at Figure 9.3.

36. Stream depletion by groundwater pumping does not necessarily equate to impairment of other water rights, even in a fully appropriated stream system. The impact of stream depletion upon other water users depends on a number of factors, including hydrologic conditions and river operations. In the case of the Project, stream depletions that occur during years of adequate supply do not impact downstream deliveries. Instead, as a function

of normal operations of the Project, Reclamation adjusts releases from Caballo as necessary, taking into account the gains and losses occurring between Caballo dam and the points of delivery, to ensure that all the water that has been ordered is in fact delivered. NM-EX 100, Barroll Rep. at § 2.2 and Appx. B.

37. Groundwater pumping in both New Mexico and Texas (and Mexico as well) may cause stream depletions. ~~These stream depletions may cause Reclamation to release more water from Project Storage in order to deliver water to Project beneficiaries than otherwise. NM-EX 103, Barroll Suppl. Reb. Rep. (2nd Ed.) at 4; NM-EX 122, Sullivan and Welsh, 2nd Ed. Original Rep. (7-15-2020) at 92-93.~~

38. Prior to 2006, stream depletions occurring in Project full-supply years would have no effect on either the water allocated to the Districts or the water delivered to the Districts in those full-supply years. ~~Furthermore, if Project Supplies remained adequate until the next spill of the Project reservoirs, then the Project beneficiaries would not experience any later reduction in deliveries resulting from those stream depletions. NM-EX 103, Barroll Suppl. Reb. Rep. (2nd Ed.) at 3-9.~~

39. However, stream depletions that occurred in the years leading up to a shortage could reduce the Project allocations in the subsequent water-short years. The amount by which allocations are reduced would not be equal to the stream depletions. Stream depletions occurring outside of the Caballo release season would not reduce Project allocation or deliveries, which are accounted only during the Caballo release season. Stream depletions occurring during the irrigation season could result in extra releases from Project storage, reducing the Usable Water available in subsequent short-supply years. Prior to 2006, this would result in reduced allocations to both Districts in the subsequent low-supply years.

However, the reductions to Usable Water in storage that accumulated during the years leading up the shortage would also have reduced reservoir evaporation. ~~This difference in evaporation would lessen the change in allocation caused by those stream depletions. NM-EX 103, Barroll Suppl. Reb. Rep. (2nd Ed.) at 4; NM-EX 122, Sullivan and Welsh, 2nd Ed. Original Rep. (7-15-2020) at 71-72.~~

40. Texas claims damages from New Mexico pumping for the years 1985 – 2016. Of these years, 1985 - 2002 were full-supply years for the Project. Texas (EPCWID) was allocated a full supply in these year and was not entitled to any additional water in these years., In most of those years, EPCWID could have ordered more water than it did, if such water was in any way necessary. NM-EX 001, Barroll 1st Decl. at ¶¶ 24, 28-31. Normal Project operations ensured that Texas received the water it did order. NM-EX 100, Barroll Rep. at 8 – 13.

41. From 2006 to the present, since the advent of D3 Allocation, any impacts of groundwater pumping and stream depletion on the Project, regardless of their cause, now reduce EBID's Project Allocation and the supply of Project water available in New Mexico. Texas now receives far more than the 43% share of the Project Supply to which it is entitled. New Mexico's share of Project Supply has been reduced and increasing amounts of irrigation well pumping are now needed to supply its irrigated acreage in the LRG. NM-EX 100, Barroll Rep. at 31, Appx. A at A25; NM-EX 101, Barroll Reb. Rep. at 9-10, 43-47; NM-EX 103, Barroll Suppl. Reb. Rep. (2nd Ed.) at 14-19.

42. Pumping in the Hueco bolson by Texas and Mexico has lowered groundwater levels in some parts of the El Paso Valley by over 100 feet, as illustrated in NM-EX 117, LRG Wells and Groundwater Level Declines). This pumping has intercepted irrigation return flows, dried

up drains, and increased seepage losses from the Rio Grande, impacting the entire Project. In fact, these drawdowns may have disconnected the stream system from the aquifer in the El Paso area, maximizing the seepage losses in this area. NM-EX 101, Barroll Reb. Rep. at 18.

43. ~~New Mexico has long understood the impacts of groundwater pumping on surface water systems, and as related to New Mexico's Compact obligations. New Mexico declared the Rio Grande Underground Water Basin upstream of Elephant Butte reservoir in 1956, for the express purpose of protecting the flows of the Rio Grande. This would have the effect of protecting New Mexico's Compact deliveries to Elephant Butte reservoir.[11] *See* NM-EX 007, D'Antonio 2nd Decl. at ¶¶ 15, 17, 21.~~

44. Prior to 2006, groundwater levels in the Rincon and Mesilla valleys were relatively high and fluctuated from season to season due to the application of irrigation water from the Rio Grande on Project lands resulting in seepage of surface water into the groundwater system. Groundwater levels also fluctuated from year to year based on Project Supply levels: in low supply years groundwater levels declined, and in subsequent full-supply years groundwater levels recovered. Following the adoption of D3 Allocation in 2006 and the 2008 Operating Agreement, groundwater levels in the Rincon and Mesilla valleys have declined in years of low Project supply, but have not recovered in any substantive way in subsequent full-supply years. NM-EX 100, Barroll Rep. at 73 - 77.

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[11] ~~NM-EX 416, S. E. Reynolds & Philip B. Mutz, Water Deliveries under the Rio Grande Compact, 14 Nat. Resources J. 201 (1974). "There can be no doubt that the November 29, 1956 Order of the New Mexico State Engineer assuming jurisdiction over the drilling of wells and the appropriation of groundwater in the Rio Grande Basin above Elephant Butte Reservoir contributed to the liquidation of the New Mexico debit by preventing new ground water appropriations that would have diminished the flow of Rio Grande above Elephant Butte Reservoir and thus delayed the realization of credit status for New Mexico."~~

45. Over the past 50 years, groundwater levels in parts of the Hueco bolson and El Paso valley have declined by over 100 feet due to municipal groundwater pumping by the City of El Paso and Ciudad Juarez. There has been no recovery in these groundwater levels. *See* NM-EX 117, LRG Wells and Groundwater Levels Decline, which is a snapshot of the much larger interactive exhibit submitted in the full Gilbert Barth Rebuttal Expert Report (2nd Ed.).

Project Return Flow: Use and Interception

46. Project return flows form part of Project Supply. NM-EX 100, Barroll Rep. at 26-30; TX_MSJ_000132, Rio Grande Joint Investigation (RGJI) at 100.

47. Project return flows associated with irrigation largely return through drains and Project wasteways. The quantity of irrigation return flow varies from year to year, depending on supply conditions, with larger amounts of return flow occurring in years of higher Project Supply; meaning, the more surface water that is applied for irrigation purposes, the more return flow is created. The amounts of irrigation return flow also vary within a year, increasing as the irrigation season progresses and more water is applied to crops. NM-EX 100, Barroll Rep. at 26-29, NM-EX 122, Sullivan and Welsh, 2nd Ed. Original Rep. (7-15-2020) at 24 – 32; NM-EX 424, Conover 1954 at 45- 50.

48. The Rio Grande Joint Investigation Report ("RGJI") states that "total measured return flows, represented by the total of measured drain flows averaged for the years 1930 -1936, was 50 percent of the average of total net diversions in the same period." TX-MSJ-00022, RGJI at 13. This does not mean that return flows (drain flows) ***comprise*** 50% of Project net diversions[12] but rather that the amount of total annual drain flow, throughout the Project

[12] Net diversions exclude Project water rediverted as part of planned bypass operations.

and throughout the calendar year, is equal to approximately 50% of the amount of water diverted at Project headings. Some of these Project drain flows were not and could not be diverted by the Project, such as drain flows generated in the lowermost parts of EPWID below the Tornillo heading. In fact, drain flows comprised 17.2% of total Project diversions on average during the years 1930 – 1936 as shown in RGJI Table 90. TX_MSJ_000045, TX_MSJ_000132, RGJI at 13, 100. The percentages in RGJI Table 90 for the El Paso Valley are not representative of present conditions due to the re-plumbing of the Project diversion and conveyance system in the El Paso Valley that eliminated the river diversions at the Riverside Dam and the Hansen, Guadalupe, and Tornillo heading that served lands in EPCWID, as well as the cessation of use of irrigation return flows arising within the El Paso Valley portion of EPCWID. NM-EX 100, Barroll Rep. at 14-15 and Appx. C, at C4-C8).

49. Project return flows available for use within the Project were historically generated within the Rincon valley in New Mexico, the Mesilla valley in New Mexico and Texas, and within the El Paso valley above the Tornillo heading in Texas. NM-EX 100, Barroll Rep. at 26 – 29.

50. Historically, in addition to EPCWID's first diversion from the Rio Grande in the El Paso valley (located initially at the International Dam, and later at the American Dam), EPCWID also had several river diversion headings further downstream, including the Riverside, Tornillo, Hanson and Guadalupe canal headings. These additional headings diverted return flows generated in the upper part of the El Paso valley as well as municipal effluent generated by the City of El Paso, and any other Project waters available at these locations which might include water released from storage and return flows from the Rincon and Mesilla valleys. NM-EX-100, Barroll Rep. at 14, Appx. C at C8; NM-EX-101, Barroll Reb.

Rep. at 25. The data in Table 90 of the RGJI (TX_MSJ_000132, *see also* Figure 6 of Texas Motion for Partial Summary Judgment at TX_MSJ_000131 and 001579) reflects the diversion of return flows arising in the El Paso valley. This table reports that EPCWID diversions in the Upper El Paso Valley, at Franklin, were composed of 35.1% drain flow and seepage, whereas in the Lower El Paso Valley the water diverted by EPCWID at Tornillo canal were composed of 57.7% return flow. The difference in the percentage of "Drain flow and seepage" between the Franklin and Tornillo diversions is a result of return flows generated in the Upper El Paso being diverted into the Tornillo canal. The percentages of return flows shown throughout Table 90 of the RGJI reflect the return flows occurring during the 1930 – 1936 period, and show that at the time of the negotiation of the Compact, the return flows generated within the El Paso Valley were an integral part of Project Supply. The fact that the El Paso Valley return flows are no longer accounted as Project Supply is a significant change that has substantial impacts on New Mexico's allocation and delivery of Project water. TX_MSJ_000132, RGJI at 100; NM-EX 100, Barroll Rep. at Appx. C.; NM-EX 101, Barroll Reb. Rep. at 24 – 36; NM-EX 103 Barroll Suppl. Reb. Rep. (2nd Edition) at 21-30. EPCWID should make use of return flows generated within the El Paso Valley (whether from drains or from municipal wastewater discharges) and the use of this water should be properly accounted for.

51. The rectification of the Rio Grande in the El Paso valley in 1938[13] separated the Rio Grande from the Tornillo, Hanson and Guadalupe canal headings. Following the rectification of the Rio Grande and until approximately 1980, water was diverted from EPCWID drains in the El Paso Valley into the Tornillo canal for use by EPCWID farmers. Since approximately

[13] For an explanation of the rectification of the Rio Grande, see NM-EX 100, Barroll Rep., Appx. at C10 – C12.

1980, there is no evidence that EPCWID makes any use of drain flow or other irrigation return flow arising within the El Paso Valley. NM-EX 100, Barroll Rep. Appx. C, at C21-C28.

52. Groundwater pumping by both Texas and New Mexico intercepts return flows associated with Project irrigation and reduces the flow in Project drains.

53. ~~From 1950 through 2005, the Project allocated 57% of Project Supply to EBID (New Mexico) and 43% to EPCWID (Texas), without any explicit accounting for interception of Project return flows.~~

54. The City of El Paso diverts a considerable amount of Project Water for municipal purposes in the El Paso Valley. Much of this municipal use has replaced Project irrigation in Texas. NM-EX 423, Third Party Implementing Contract at 48 of 74. ~~Some of these municipal diversions for the City of El Paso take place as a result of contractual agreements allowing for the exchange of Project Supply for municipal effluent, that is then considered to be "District Supply" for EPCWID, and not "Project Supply." Some of the municipal diversions for the City of El Paso take place as a result of contractual agreements related to a Project accounting credit related to the American Canal Extension. NM-EX 423, Third Party Implementing Contract at 6-7 and 57-62 of 74~~

55. ~~Municipal effluent and return flows associated with the municipal use of Project Water in the El Paso Valley were originally accounted as part of Project Supply. NM-EX 100, Barroll Rep. at 30; NM-EX 425, Cortez 1999 Summary of June 25, 1999, Meeting to Discuss Water Accounting etc. These municipal Project return flows have now been intercepted by Texas, by diverting them directly into EPCWID conveyances, and this water is no longer accounted as Project Supply. NM-EX 100, Barroll Rep. at 30, 49-50; Barroll Reb. Rep. at 24-36. The~~

~~reduction in irrigation return flows in Texas, as well as the fact that Reclamation no longer charges EPCWID for the use of any such return flows, means that a greater portion of EPCWID's charged diversions consist of reservoir releases than occurred previously, which may increase EPCWID's draw on the reservoir, reducing the amount of water available for allocation to both New Mexico and Texas. The treatment of municipal effluent in the El Paso Valley stands in stark contrast to the treatment of municipal effluent in New Mexico. Municipal effluent from the City of Las Cruces is available for diversion at Mesilla Dam and at Project diversion heading farther downstream, and the diversion of that effluent is accounted as Project Supply.~~

Current Inequitable Distribution of Project Water (2006 to Present)

56. ~~From the early years of the Project through 1978, the Project was operated as one unit, and each acre of Project land was equally entitled to the same amount of Project Water. NM-EX 506, Affidavit of Filiberto Cortez (April 20, 2007) at 8; NM-EX 119, Expert Reb. Rep. of Dr. Ian Ferguson at 7. Since authorized Project acreage was distributed 88/155 (approximately 57%) in New Mexico and 67/155 (approximately 43%) in Texas, the entitlement to Project water during this time was 57% to New Mexico and 43% to Texas~~.

57. ~~From 1979 through 2005 Reclamation allocated water to the Districts for their delivery to individual Project beneficiaries, and explicitly allocated 57% of Project Supply to EBID and 43% to EPCWID. NM-EX 100, Barroll Rep. at 34-38; NM-EX 400, Reclamation Water Supply Allocation Procedures (WSAP) at 5-6. This distribution was consistent with the 1938 Downstream Contract. The allocation method employed during that time used the D1 and D2 Curves, which are Project performance relations based on data from 1951 through 1978, a time when farmers in both Districts, as well as the City of El Paso, pumped large~~

~~amounts of groundwater. When developing the D1 and D2 Curve, Reclamation made "[s]tatistical evaluations of operational records for the period 1951 through 1978," and "provided graphs, equations, and data" which Reclamation intended to use "to ensure that future allocations to Mexico and the allocations to the U.S. maintain the historical relationship between the delivery of water to U.S. farms and Mexico." NM-EX 400, WSAP at 9. Under the D1/D2 Allocation Method, Mexico's share of Project Supply was calculated using the D1 Curve. The total Project Supply was calculated using the D2 Curve, and Project Supply remaining beyond Mexico's share was split 57% to EBID and 43% to EPCWID. NM-EX 100, Barroll Rep. at 33-37, Appx. A at A13-A17.~~

58. Starting in 2006, the Project allocation method changed, and Reclamation substantially reduced allocations and deliveries to EBID, while increasing EPCWID's allocation of Project Water. NM-EX 100, Barroll Rep. at 8-10, 44, and Appx. A at A25-A30. The Project allocation method that was applied starting in 2006 is referred to as the D3 Allocation method. The D3 Allocation method reduces EBID's allocation by the total of all real or apparent discrepancies in Project performance relative to the 1951 - 1978 period. As a result, all increases in system losses that have occurred since the 1951 – 1978 period result in reductions to EBID's allocation. Similarly, all reductions in accounted deliveries that have occurred as a result of changes in Project accounting cause reductions to EBID's allocation. NM-EX 100, Barroll Rep. at 40 - 44. For example, the fact that municipal effluent from the City of El Paso in the El Paso valley is no longer accounted as Project Supply, even though this effluent now comprises the majority of Project return flow in that valley, results in a reduction to EBID's allocation. NM-EX 425, Cortez 1999 Summary of

June 25, 1999, Meeting to Discuss Water Accounting, NM-EX 100, Barroll Rep. at 30, 49-50 and Appx. D at D25 – D28; NM-EX 101, Barroll Reb. Rep. at 24-36.

59. New Mexico's analysis shows that changes in Project accounting are responsible for up to 74,000 AF of the apparent reduction in Project deliveries or Project performance since the 1951-1978 period. D3 Allocation reduces EBID's allocation for all reductions in Project performance compared with the 1951-1978 period. Therefore, up to 74,000 AF of reduction in EBID's allocation are not a result of groundwater pumping in New Mexico, but are caused by changes in Project accounting. NM-EX 100, Barroll Rep. at 60.

60. Also, starting in approximately 2006, Reclamation initiated individual "carryover accounts" for the Districts. Thereafter during the allocation process, the amounts in the Carryover account, plus extra water needed to ensure delivery of those accounts, has been deducted from Project Storage before the D3 Allocation for the next year is calculated. Because of the contemporaneous reduction in its allocation, EBID has not been able to take much advantage of Carryover. EPCWID has carried over large amounts of allocation in many years. The mechanics of how these Carryover accounts are implemented means that large amounts of EPCWID Carryover have reduced the water available for allocation to EBID. NM-EX 100, Barroll Rep. at 48-49 and Appx. D at D21-D23; NM-EX 101, Barroll Reb. Rep. at 21-24.

61. The 2008 Operating Agreement, under which Reclamation continues to operate the Project and allocate its supply, combines the D3 Allocation method and Carryover as described above. NM-EX 510, 2008 Operating Agreement.

62. For the years 2006 through 2019, EPCWID's percentage share of Project allocation, excluding Carryover, has averaged 56% of the total Districts' allocation, compared with

43% prior to 2006. If Project Supply had been divided 57:43 as it had been historically, EPCWID would have been allocated a total 693,408 AF less during 2006 - 2019, and EBID would have been allocated 693,408 AF more. NM-EX 101, Barroll Reb. Rep. at 44, Table 9. By reducing EBID's surface water allocation, the 2008 Operating Agreement forces EBID members to pump additional groundwater to order to supply their crops.

63. If EBID had been allocated and delivered its 57% share of Project Supply since 2006, EBID and the Project as a whole would have benefitted from an improvement in groundwater conditions in New Mexico that would have reduced stream losses and increased drain flows. This improvement in groundwater conditions would have increased Project delivery efficiency and thereby further increased EBID's allocation and delivery at little cost to EPCWID. NM-EX 103, Barroll Suppl. Reb. Rep. (2nd Ed.) at 18-19.

64. D3 Allocation and the 2008 Operating Agreement starve the upper part of the Project of water, causing reductions in total Project return flows and depleting the groundwater supply in the upper part of the Project. The net result is a reduction in Project delivery efficiency and a reduction in total Project Supply. NM-EX 103, Barroll Suppl. Rep. (2nd Ed.) at 14-20. To use the analogy proposed by Texas, the 2008 Operating Agreement itself "reduces the size of the pizza" that represents Project Supply, upon which the two District rely.

65. United States witnesses have testified and written that the purpose of the change in allocation associated with the 2008 Operating Agreement was to offset depletions caused by New Mexico groundwater pumping and depletions, and to protect the delivery of EPCWID's allocation from the effects of New Mexico pumping. *See, e.g.*, NM-EX 119, Ferguson Reb. Rep. at 5-6. The US did not perform any quantitative analysis of the impacts of New Mexico pumping at the time the 2008 Operating Agreement was adopted.

66. Prior to adoption of D3 Allocation in 2006 and the 2008 Operating Agreement, groundwater levels in New Mexico responded resiliently; that is, groundwater levels dropped by 5-10 feet during years of low supply and then recovered in subsequent full-supply years. This reactive behavior changed after 2006, and since that time groundwater levels in the Mesilla basin have declined during years of drought but have failed to recover in subsequent full-supply years due to the lack of surface water supply in the New Mexico portion of the Project as effected by D3 Allocation. As a result, the groundwater system in the Mesilla basin in New Mexico has changed from a sustainable system to a mined groundwater system. NM-EX 100, Barroll Rep. at 73-77.

67. ~~Now that less surface water is allocated to southern New Mexico, EBID farmers must pump more groundwater to supply their crops, which depletes New Mexico's groundwater reserves, and impacts Project performance and Project Supply. The operations of D3 Allocation then further reduce EBID's allocation in subsequent years, which exacerbates and perpetuates this unsustainable cycle. This cycle is illustrated in NM-EX 118, Effect of 2008 OA on New Mexico: A Vicious Cycle.~~

Quantitative Analysis of Project Allocation

68. Analysis by New Mexico's experts using the New Mexico Integrated Lower Rio Grande Model (ILRGM) calculates that the impact of New Mexico pumping on Texas is much smaller than the reallocation of Project water away from New Mexico under D3 Allocation and the 2008 Operating Agreement. NM-EX 103, Barroll Suppl. Reb. Rep. (2nd Ed.) at vi-vii, 9, 20.

69. Results from the New Mexico ILRGM show that if New Mexico had been allocated 57% percent of Project Supply from 2006 through 2017, the combined effects of that allocation

increase, and the resulting improved groundwater conditions and Project performance, would have resulted in New Mexico being allocated a total of 1,053,393 AF more than under D3 Allocation, or on average, 94,000 AF more per year from 2006 through 2017. In effect, the D3 Allocation and the 2008 Operating Agreement have reduced New Mexico surface water allocation by 88,000 AF/yr on average since 2006. NM-EX 103, Barroll Suppl. Reb. Rep. (2nd Ed.) at 15-16.

70. New Mexico's ILRGM calculates that if New Mexico had been allocated 57% of Project Supply, the resulting improved groundwater conditions and associated reduction in river seepage and increased drain flow would have resulted in a total increase in Project Supply deliveries of 863,730 AF in the years 2006 through 2017, or an average of 72,000 AF/year. NM-EX 103, Barroll Suppl. Reb. Rep. (2nd Ed.) at 18.

71. Reclamation's implementation of the D3 Allocation method and the 2008 Operating Agreement have reduced the delivery efficiency and performance of the Rio Grande Project as a whole. NM-EX 100, Barroll Rep. at 77-78; NM-EX 103, Barroll Suppl. Reb. Rep. (2nd Ed.) at 18-19.

72. ~~Reclamation's implementation of the D3 Allocation method and the 2008 Operating Agreement have harmed New Mexico by substantially reducing its surface water supply in the LRG, and negatively impacting the water balance of groundwater systems of the Rincon and Mesilla basins. NM-EX 100, Barroll Rep. at 71-77. EPCWID and Texas have benefitted by gaining a disproportionate share of surface water.~~

73. The United States is incorrect in stating at its USMF 65: "Between 2003 and 2005, when the Project allocations to the Districts were less than 50% of a normal allocation (equivalent to 1.37 af/ac in 2003, 1.01 af/ac in 2004, and 1.13 af/ac in 2005)." The United States

provides no basis for these allocation estimates ***except for my reports, and my reports do not contain these numbers.*** EBID set an allotment to individual constituents of 0.67 acre-feet per acre (AF/A) in both 2003 and 2004. NM-EX 100, Barroll Rep. at Appx. A, Table A.7 at A20.

74. The United States is incorrect in stating at USMF 65: "Had all groundwater pumping in New Mexico below Elephant Butte been "turned off" between 2003 and 2005, EBID and EPCWID could have received a full allocation from the Project." The United States has misinterpreted the result from the ILRGM and the text, figures and table from my own Supplemental Reports (NM-EX 102 and 103). No model run has been done that simulates the conditions described, and it is my opinion that such a model run would not show that result. In fact, the model runs New Mexico has performed show that even when all New Mexico LRG pumping is turned off from 1940 forward, there still would not have been a full supply of water to the Project in 2004. NM-EX 103, Barroll Suppl. Reb. Rep. (2nd Ed.) at 4-6.

New Mexico Water Administration in the LRG

75. ~~New Mexico considers the Rio Grande to be fully appropriated, and has considered this to be so since 1908. NM-EX 007, D'Antonio 2nd Decl. at ¶ 16. New Mexico does not permit new appropriation of the surface waters of the Lower Rio Grande, and enforces against illegal diversion of those waters. NM-EX 007, D'Antonio 2nd Decl. at ¶¶ 16, 24; NM-EX 010, Declaration of Ryan Serrano, Lower Rio Grande Water Master, at ¶¶ 22-27.~~

76. ~~Water rights associated with the Project comprise the largest surface water rights in the LRG. In addition to Project water rights, there are a few pre-Project surface water rights in the New Mexico part of the LRG, including water rights associated with the Bonita Lateral,~~

and a few pre-Project rights that obtain water directly from the Rio Grande. New Mexico water laws and regulation protect the senior water rights of the Rio Grande Project. NM-EX 007, D'Antonio 2nd Decl. at ¶ 1, 16, 17, 21-24, 34, 37, 38, 40, 43, 53; NM-EX 010, Serrano Decl. at ¶¶ 5-30.

77. New Mexico recognizes its responsibility to ensure that New Mexico's legal and regulatory framework allows Reclamation to deliver Project and Compact waters. New Mexico recognizes its responsibility to work in good faith with Reclamation to assist in the delivery of surface water by the Project, and address problems in Project operations that occur in New Mexico. NM-EX 007, D'Antonio 2nd Decl. at ¶¶ 38, 52, 54, 55, 57, 58, 59; NM-EX 002, D'Antonio 1st Decl. at ¶¶ 10, 11, 12; NM-EX 009, Schmidt-Petersen 2nd Decl. at ¶¶ 4-22.

78. As described in the Declaration of State Engineer John D'Antonio, New Mexico rigorously and consistently manages its water systems, including the groundwater use in the LRG. *See* NM-EX 007, D'Antonio 2nd Decl. at ¶¶ 1-59.) The OSE assures vigorous enforcements of its statutory obligations, rules, regulation, and State Engineer and court orders. *Id.*; NM-EX 010, Serrano Decl. at ¶¶ 4-34, 37.

79. Groundwater rights for irrigation in the LRG were fully developed prior to 1980, during drought periods during the 1950s, 1960s and 1970s, in cooperation with Reclamation as described above. During that time, it is likely that almost every acre of land in EBID was irrigated by groundwater.

80. As I have proved throughout my expert reports and declarations, New Mexico's analysis of the impacts of groundwater pumping, and the impacts of the change in Project Allocation that started in 2006 with D3 Allocation, demonstrates that impacts to Texas by groundwater

pumping in New Mexico are far exceeded by the amount of Project Supply allocated away from EBID to EPCWID since 2006. At present, Reclamation allocates far more water to EPCWID than its 43% share and all evidence is that EPCWID is allocated and receives more than sufficient Project Supply to satisfy its demands. Therefore, Texas cannot complain of any shortage caused by New Mexico groundwater pumping. Absent any claim by Texas that it is being shorted Project Supply there is no need for water right curtailment in New Mexico to provide Texas with additional supply.

81. As I have proved throughout my expert reports and declarations, groundwater levels in the Rincon and Mesilla basins have been negatively impacted since 2006 by the effects of drought and of New Mexico's reduced share of Project Supply caused by D3 Allocation and the 2008 Operating Agreement. New Mexico is developing mechanisms to address these groundwater issues, and is currently implementing a Pilot Project to reduce groundwater depletions in the LRG.

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

Executed on December 21, 2020

Margaret Barroll

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