

No. 141, Original

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IN THE  
SUPREME COURT OF THE UNITED STATES

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STATE OF TEXAS,

*Plaintiff,*

v.

STATE OF NEW MEXICO AND  
STATE OF COLORADO,

*Defendants.*

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**OFFICE OF THE SPECIAL MASTER**

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**THE STATE OF TEXAS'S SUPPLEMENTAL DISCLOSURE OF  
REBUTTAL EXPERT WITNESS INFORMATION AS TO  
REBUTTAL EXPERT REPORT OF LAND IQ, LLC**

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May 21, 2020

TO ALL PARTIES AND THEIR ATTORNEYS OF RECORD:

Pursuant to Rule 26(a)(2)(B) of the Federal Rules of Civil Procedure, and the Case Management Plan executed by the Honorable Michael J. Melloy, Special Master, on September 6, 2018, and amendments thereto, Plaintiff, State of Texas (Texas) hereby supplements information regarding three (3) rebuttal expert witnesses disclosed in the Land IQ, LLC's Rebuttal Report (hereinafter "Rebuttal Report") filed with Special Master Melloy and served on all parties and *amici* on December 30, 2019. This information was inadvertently omitted from the December 30, 2019 filing.

1. Mica Heilmann:

- a. Ms. Heilmann's CV is attached hereto as Appendix A, and by this reference incorporated as Appendix A to the Rebuttal Report. It reflects her qualifications as an expert in the portions of the Rebuttal Report with which she was involved.
- b. Ms. Heilmann's publications are included in her CV.
- c. Ms. Heilmann has not testified in the last four years.
- d. Ms. Heilmann's compensation is unrelated to the outcome of this case. She is compensated at the hourly rate of: \$205/hr for standard services, and \$500/hr for legal support, and expert deposition/trial testimony.

2. Stephanie Tillman:

- a. Ms. Tillman's CV is attached hereto as Appendix A, and by this reference incorporated as Appendix A to the Rebuttal Report. It reflects her qualifications as an expert in the portions of the Rebuttal Report with which she was involved.
- b. Ms. Tillman's publications are included in her CV.
- c. Ms. Tillman has not testified in the last four years.
- d. Ms. Tillman's compensation is unrelated to the outcome of this case. She is compensated at the hourly rate of: \$175/hr for standard services, and \$400/hr for legal support, and expert deposition/trial testimony.

3. Travis Brooks:

- a. Mr. Brooks CV is attached hereto as Appendix A, and by this reference incorporated as Appendix A to the Rebuttal Report. It reflects his qualifications as an expert in the portions of the Rebuttal Report with which she was involved.
- b. Mr. Brooks's publications are included in her CV.
- c. Mr. Brooks has not testified in the last four years.
- d. Mr. Brooks's compensation is unrelated to the outcome of this case. She is compensated at the hourly rate of: \$150/hr for standard services, and \$300/hr for legal support, and expert deposition/trial testimony.

Texas further continues to reserve its right to rely upon and use the testimony of any and all expert witnesses identified by all parties to this action and to present rebuttal testimony to any such witness through those listed here or other expert witnesses. Texas also reserves the right to amend or supplement this disclosure pursuant to Federal Rules of Civil Procedure 26(a)(2) and 26(e).

Dated: May 21, 2020

Respectfully submitted,

s/ Stuart L. Somach

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*\*Counsel of Record*

**Appendix A: Curriculum Vitae**  
(Attachment to the Expert Rebuttal Report of Land IQ)



**Mica H. Heilmann, CPSS, CPESC**  
**Principal Scientist, Owner**

## **Education**

B.S., Soil Science, California Polytechnic State University, San Luis Obispo, 2000  
Minors: Water Science and Viticulture

Fellow, California Agricultural Leadership Foundation Program, 2009

## **Professional Registrations/Affiliations**

- Certified Professional Soil Scientist (CPSS #30230)
- Board Member, Placer County Resource Conservation District

## **Distinguishing Qualifications**

Expert/Specialist in the following areas:

- Agricultural systems and crop production
- Remote (satellite/aerial) land evaluation
- Land use and soil evaluation and classification
- Irrigation and drainage management and systems
- Water resource evaluation, planning and conservation
- Agroclimatology and consumptive use analysis/modelling
- Nutrient and salinity management in soil and water systems
- Soil, plant and water interactions
- Land application of wastewaters and solid wastes
- Large-scale land stabilization and sediment control
- Environmental regulatory policy
- Project management and stakeholder coordination extent

## **Relevant Experience**

Ms. Heilmann is a Principal Scientist and founding partner with Land IQ. She specializes in large-scale land surface mapping and land and water resource evaluation and management. Ms. Heilmann is a technical lead of the team that developed Land IQ's remote land use mapping capabilities over the last 11 years, integrating agronomic knowledge with remote sensing and geospatial analytical techniques. She has over 19 years of experience providing scientific expertise on large-scale land classification, agricultural systems, native vegetation systems, water resource management, irrigation management and agroclimatology and soil-plant-water interactions. An experienced project manager, Mica works closely with clients and stakeholders in evaluating land systems and applying that knowledge in decision making and business systems. Mica leverages a wide range of science and technology advancements to provide innovative, practical, and sustainable solutions for clients. She holds a B.S. in Soil Science with minors in Viticulture and Water Science-Irrigation from California Polytechnic State University, San Luis Obispo, in addition to her certification as a Certified Professional Soil Scientist (CPSS).

## **Representative Project Experience**



**Mica H. Heilmann, CPSS, CPESC**  
**Principal Scientist, Owner**

- **Technical Project Manager – Statewide Remotely Sensed Crop Mapping – California Department of Water Resources.** Statewide spatial mapping of all agricultural crops, managed wetlands and urban areas in the state of California.
- **Assistant Project Manager – CA Statewide Tree Crop Mapping - The Almond Board of California, California Walnut Board, California Pistachio Research Board, California Dried Plum Board.** This work was performed under four separate contract for a cooperative of four tree crop commodity organizations and the CDFA. Developed and implemented detailed mapping techniques to map almonds, walnuts, pistachios and prunes for the entire state. Work involved detailed ground truth data collection, advanced remote sensing analytical processes informed by agronomic crop production factors, comprehensive QA/QC and independent validation. Results comprised over 1.7 M acres across the state and represent the most current, accurate and comprehensive mapping for these crops ever complete. All individual commodity organizations are applying resultant data to inform their decision processes and management efforts.
- **Project Manager - Sacramento-San Joaquin Delta Comprehensive Land Use Mapping, California Department of Water Resources, Sacramento, CA.** Performed comprehensive remote sensing land use classification for the Sacramento-San Joaquin Delta for 2015, 2016, and 2017. Classification included agricultural crops, native areas, open water, urban areas, farmsteads and semi-agricultural areas, and floating vegetation. The detailed legend for agricultural crops was aligned with DWR standard legend and provided additional detail in both permanent and annual crop categories. This work was informed by and validated against independent, in-season ground truth data collected throughout the delta. Both supervised and unsupervised classification techniques were used to digital image resources including Landsat (30 m) and Pleiades (2 m) satellite imagery. Results were over 96% accurate and will be used to inform both remote sensing and empirical evapotranspiration models. Change analysis and mapping updates are to be performed for 2016.
- **Project Manager – Statewide Groundwater Regarded Suitability analysis for Almonds and walnuts. Almond Board of California and California Walnut Board, Central Valley, CA.** Generated comprehensive suitability index for groundwater recharge potential through the central valley based on environmental factors including soils, topography and groundwater depth. This effort incorporated data resources including the UC Davis Soil and Groundwater Banking Index (SAGBI), DWR groundwater depth information, USGS Central Valley Hydrologic Model (CVHM) well log information, as well as valley-wide hydrologic conditions. This valley-wide index was merged with Land IQ's 2014 almond and walnut mapping to determine suitability levels of orchards for in-field ground water recharge. This work was a joint effort between ABC, Land IQ, UC Davis, and Sustainable Conservation
- **Technical Lead and Project Manager – Remote sensing Crop Mapping and Consumptive Use Analysis Supporting Crop Land Fallowing Program; Arizona Department of Water Resources, Yuma Arizona.**
- **Project Manager and Technical Reviewer - Rice mapping, multiple clients, California.** Develop annual, in-season rice acreage mapping for the state of California.
- **Project Manager - Historic Agricultural Water Use Analysis, Confidential Client, Southwestern CA.** Performed detailed evaluation of agricultural practices, cropping patterns, irrigation efficiency and other agricultural production factors contributing to consumptive water use in the Owens Valley retrospectively from the start of the 1900s to present. Developed performed USBR Sereis 510 land suitability classification to support and inform analytical efforts. Evaluated historical aerial image resources and cropping data to generate crop pattern assumptions. Performed root zone water



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balance modelling and developed comprehensive history of agricultural water use under a range of actual and hypothetical scenarios.

- **Assistant Project Manager - Cold Water Rice Yield Loss Assessment; Western Canal, Biggs-West Gridley and Richvale Irrigation Districts; Butte County, California.** Project Manager for an assessment of the cold water impacts on rice production in Butte County. Utilized advanced remote sensing approaches for assessing impacts of cold water releases from Oroville Dam on rice yields and the relationship to market rice values and revenues for growers in three irrigation districts. Collaboratively developed a program for tracking and quantifying yield losses.
- **Technical Lead – Development of Almond Root Zone Studies for the San Joaquin River Restoration Program; US Bureau of Reclamation, San Joaquin Valley.** Assessed impacts of irrigation practices on almond root zone characteristics.
- **Agricultural Scientist - Sacramento-San Joaquin Delta Bouldin Island Evapotranspiration Analysis – Semitropic Water Storage District, Bouldin Island, CA.** Evaluated reduction in ET from the land surface as a result of fallowing efforts in support of potential water transfer action in the Sacramento-San Joaquin delta. Supported site placement and installation of surface renewal monitoring instrumentation for real time data collection at three sites in the Delta. Assisted in calculation of actual ET and relating to remotely sensed ET models to generate comprehensive spatial ET for the island. Results provided an approach to defining the water savings that could be used in water transfer agreements.
- **Senior Scientist – Remotely Sensed Native Vegetative Cover Analysis – Los Angeles Department of Water and Power, Owens Lake, CA.** Supported remotely sensed vegetative cover analysis across the Owens Lake playa vegetated dust control facilities and native vegetated areas. Assisted with collection and application of ground truth information to support remotely sensed vegetation mapping. Assisted in selection and procurement of appropriate satellite image resources for vegetation analysis.
- **Soil Classification & Irrigability for Water Rights Negotiation; Blackfeet Reservation; Bureau of Indian Affairs; Glacier County, Montana.** Performed several large scale resource evaluations in support of water rights determinations for the 1.5 million acre Blackfeet Indian Reservation. Surveyed and classified soils on more than 10,000 acres of land across diverse reservation terrain and evaluated land suitability for irrigated and non irrigated agriculture. Incorporated ground survey, GIS and aerial photography and satellite image assessments. Performed reservation-wide stock water pond characterizations and planning for drainage restriction evaluations.
- **Project Manager - Surface Condition Survey; Owens Lake Dust Mitigation Program; Los Angeles Department of Water and Power; Owens Valley, California.** Developed and conducted a unique desert playa surface survey, including periodic monitoring for documentation of temporally dynamic surface characteristics. Developed custom survey methodologies and integrated advanced satellite image analysis, GIS, and ground survey to track changes in surface erodibility where conventional soil survey was not feasible. This extensive soil and surface characterization covered more than more than 20,000 acres of emissive Owens Dry Lake Playa. Developed a parallel surface condition monitoring program to define temporal ranges of characteristics for seasonally changing erodible Playa surfaces. Evaluated surface sand flux and air quality data to track erosion activity Playa-wide. Used collected data to develop surface salt crust input parameters for wind erosion modeling using the Wind Erosion Prediction System (WEPS) model. Collaborated with model developers for the unique use of this model, originally developed for agricultural application, in a saline playa environment.



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- **Project Lead - Soil Classification; Los Angeles Department of Water and Power; Owens Valley, California.** Managed and lead order 1 and order 2 soil surveys on over 8,000 acres of the 100 square mile arid Owens (dry) Lake playa. Surveys supported Phase 4 and 5 dust control site suitability evaluation, dust control measure selection, and dust control design criteria development. Survey incorporated GIS and remote sensing analysis for increased survey efficiency. Customized survey for collection of design-specific information including limiting soil parameters such as bearing capacity, extreme chemical conditions, open soil fissures, hardpan, and shallow groundwater. Identified and verified these and other extreme soil physical and chemical characteristics in surveyed lakebed soils.
- **Project Manager/Technical Lead - Water Management Tools Development; Owens Lake Dust Mitigation Program; Los Angeles Department of Water and Power; Owens Valley, California.** Worked closely with operational and programming staff to develop customized water management tools meant to be integrated with and to inform site supervisory control (SCADA) systems for over 40 square miles of dust control facilities. These tools automatically upload to GIS climatic and site information to calculate site-specific evaporation and water level information and integrate these factors and system parameters into a flexible operational tool that allows operators to forecast pond filling and dry down times and to prepare and optimize multiple water management scenarios. Coordinated with remote sensing and GIS staff to develop a customized digital terrain model that integrated public data and LADWP design information to prepare more accurate pond facility volume information.
- **Project Manager - Operational Water Conservation and Regulatory Negotiation; Owens Lake Dust Mitigation Program; Los Angeles Department of Water and Power; Owens Valley, California.** Lead scientist for pilot test and implementation of refined irrigation schedules for managed vegetation dust control areas, resulting in successful sustenance of vegetation while emulating natural hydrologic conditions and reducing irrigation water requirements and operational efforts. Also coordinated with air quality regulatory staff and shallow flooding operational staff to identify water conservation opportunities within existing facilities and compliance targets and mutually agreeable and feasible paths forward for implementation. Negotiations resulted in the first in-operation-season opportunities for client to refine facilities, allowing for more reasonable, faster implementation schedules, improved equipment access, and a greater potential for near-term water conservation.
- **Technical Lead - Salinity Management and Managed Vegetation Erosion Control: Owens Lake Dust Mitigation Program; Los Angeles Department of Water and Power; Owens Valley, California.** Lead soil scientist for design and implementation of native vegetative dust control for the Owens Lake Dust Mitigation Project located on a saline, arid playa in southeastern California. Conducted design evaluations for irrigation, drainage, and complex salinity management systems. Established over 2,200 acres of native vegetation erosion control in a hyper saline environment. Managed soil reclamation monitoring including pre-planting assessment of reclamation success and planting scheduling. Conducted site research for soil reclamation and vegetative establishment techniques and requirements. Assisted with complex drain water management and recycling design to manage fragile saline soil structure. Developed and continue to implement ongoing operational soil, vegetation and irrigation monitoring program, and provide continued support to operations staff on site management, water use efficiency, and refinement. Conducted field soil assessments in native wetlands as well as potential mitigation sites and assisted with location and development of mitigation wetlands based on soil chemical and physical attributes in playa soils.
- **Project Manager/Technical Lead - Water Management Tools Development; Owens Lake Dust Mitigation Program; Los Angeles Department of Water and Power; Owens Valley, California.**





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Worked closely with operational and programming staff to develop customized water management tools meant to be integrated with and to inform site supervisory control (SCADA) systems for over 40 square miles of dust control facilities. These tools automatically upload to GIS climatic and site information to calculate site-specific evaporation and water level information and integrate these factors and system parameters into a flexible operational tool that allows operators to forecast pond filling and dry down times and to prepare and optimize multiple water management scenarios. Coordinated with remote sensing and GIS staff to develop a customized digital terrain model that integrated public data and LADWP design information to prepare more accurate pond facility volume information.

- **Agricultural Scientist - Water Resource Plan; Oakdale Irrigation District; Oakdale, California.** Performed land use evaluations, grower interviews, on-farm assessments and public data reviews to prepare a comprehensive District water resources plan. Implemented an efficient stakeholder process to gather plan input data and share information on plan objectives, acting as liaison between growers, landowners and project staff. Scheduled and held over 35 individual field meetings with growers and/or land owners, acting as the primary contact for on-farm utilities issues in the field. Communicated design issues to growers and helped to coordinate requirements of design with specific grower needs and concerns. Evaluated crop rotations and irrigation systems and management for water use and water demand characterization. Utilized a customized GIS application to develop a detailed database of grower information, on-farm utilities, and other design criteria, allowing for efficient and accurate data collection and distribution.
- **Project Manager/Technical Lead - Arid Land Stabilization: Owens Lake Dust Mitigation Program; Los Angeles Department of Water and Power (LADWP); Owens Valley, California.**

***Regulatory Support and Mediated Settlement Technical Expert:***

- Technical expert involved in mediated regulatory negotiations between LADWP and its Owens Lake regulator. Presented technical findings at numerous meetings with client, attorneys, and key technical staff. Assisting in development and drafting of 2006 settlement agreement terms and 2008 State Implementation Plan.
- Developed a detailed 2-volume technical record and administrative record supporting LADWP's response to a 2005 regulatory determination mandating actions on over 9 square miles of land area. Performed intense evaluation and documentation of complex Owens Lake scientific soil-water and surface processes, several client and regulatory workshops, and presentations.

***New Erosion Control Technologies:***

- Worked cooperatively with regulatory agencies, operations personnel and air quality scientists to develop and evaluate existing wind erosion control technologies and to develop improved or new technologies for future use in saline playa environments. Developed numerous monitoring and research strategies for improving dust mitigation technology and evaluation methods.
- Developed detailed soils stabilizer testing for playa and road surfaces. Performed detailed evaluation of soil stabilization products, product selection, study design and implementation. Evaluated product performance using Portable In-Situ Wind Erosion Laboratory (PiSWERL) and surface characterization techniques.
- Developed configurations and implementation specifications for broad application of primary tillage as an interim, waterless dust control measure on 3.5 square miles of playa. Conducted SWEEP modeling for technology implementation. Developed construction parameters and



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provided support to construction management personnel. Assisted with development of study parameters to test effectiveness of tillage techniques and configurations and communicated with regulatory personnel about potential development of this new measure as a BACM.

- **Grower Liaison/Technical Lead - Grower Relations and On-farm Utilities Lead; Design Team Member; Pajaro Valley Water Management Agency Coastal Distribution System; Watsonville, California.** Lead grower communication program for conceptual design refinement and location of on-farm utilities and design components. Communicated effectively with growers, landowners, and client. Scheduled and held over 35 individual field meetings with growers and or land owners, acting as the primary contact for on-farm utilities issues in the field. Utilized a customized GIS data collection system to develop a detailed database of grower information, and to collect and manage design refinement data.
- **Soil and Agricultural Scientist - Irrigation System Design and Site Suitability, Groundwater Treatment Land Application System; Pacific Gas and Electric Company; Hinkley, California.** Evaluated soil suitability, conducted infiltration testing, and established design criteria for subsurface and surface drip irrigation systems to support groundwater land treatment system suitability and design. Performed detailed site suitability assessment for system implementation. Project involved chromium-contaminated groundwater treatment through pumping and land applying to agricultural land via drip irrigation.

## **Previous Experience**

Before co-founding Land IQ in, Ms. Heilmann spent seven years with CH2M HILL (now Jacobs Engineering) as a consulting soil scientist and also served as the firm's Regional Agricultural Services Technology Leader, representing and coordinating over 30 agricultural and water resources professionals within nine western states.

## **Select Publications**

Kimmelshue, J., M. Heilmann, Z. Wang, S. Mulder, C. Stall, M. Twietmeyer, G. Ludwig, R. Klein, C. Eidsath, G. Obenauf. 2016. California Statewide Crop Mapping for Resource Management and Regulatory Compliance. Manuscript in Development. To be submitted to California Agriculture.

Ludwig, G., D. Hunter, J. Kimmelshue, M. Heilmann, Z. Wang, S. Mulder, C. Stall, M. Twietmeyer. 2016. Development of a Statewide Spatial/Mapping Database for Almonds, Walnuts, and Pistachios – Final Report. California Department of Food and Agriculture/United States Department of Agriculture – Specialty Crop Block Grant Program. USDA Project No. 26235.

Kimmelshue, J., M. Heilmann, Z. Wang, S. Mulder, M Twietmeyer, R. Spell, C. Stall. 2015. Statewide Tree Crop Mapping of Dried Plums. California Dried Plum Board – Research Reports 2015. <http://ucanr.edu/repository/fileaccess.cfm?article=160095&p=BSKEQB&CFID=164917629&CFTOKEN=87232494> .

Kimmelshue, J., M. Heilmann, Z. Wang, S. Mulder, M Twietmeyer, R. Spell, C. Stall. 2015. Statewide Walnut Tree Crop Mapping and Age Determination. California Walnut Board Research Committee – Annual Research Report.

Kimmelshue, J., Z. Wang, M. Heilmann, S. Mulder, C. Stall, R. Spell, G. Ludwig, R. Klein, D. Balint. 2015. Development of a Statewide Spatial Database for Walnuts, Almonds, and Pistachios. Almond Board of



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California Final Research Report. 14-STEWCR0P4-Kimmelshue. Almond Board of California 2014.2015 Annual Research Report. <http://www.almonds.com/growers/resources/research-database> .

Kimmelshue, J., M. Heilmann, Z. Wang, S. Mulder, M Twietmeyer, R. Spell, C. Stall. 2015. Statewide Pistachio Tree Crop Mapping and Age Determination. California Pistachio Research Board – Annual Research Report.

Heilmann, Mica, J. Dickey, J. Smesrud, R. Coles, and R. Harasick. 2006. Managing Salinity to Implement Vegetative Dust Control on the Saline Owens Lake Playa. 2006. International Conference on the Future of Agriculture: Science, Stewardship, and Sustainability, Sacramento, CA, August 7-9, 2006.

Heilmann, Mica, B. Inman, J. Kimmelshue, B. Schmid, J. Dickey, R. Coles, and R. Harasick. 2006. Classification of the Owens Dry Lake Playa Surface Using Satellite Imagery and Unique Surface Characterization Methods. World Congress of Soil Science: Frontiers in Soil Science, Philadelphia, PA, July 9-16, 2006.

### **Select Presentations and Posters**

Kimmelshue, J., M. Heilmann, Z. Wang, S. Mulder, M. Twietmeyer, C. Stall. 2016. Statewide spatial mapping of almonds, walnuts, pistachios, and dried plums in California – results, interpretations, and applications. Featured Scientific Seminar. Invited for Presentation to the International Nut and Dried Fruit Council (INC) XXXV World Nut and Dried Fruit Congress. May 31, 2016. San Diego, CA.

Kimmelshue, J., M. Heilmann, Z. Wang. 2016. Results of Statewide Spatial Almond Mapping and Applications: Acreage, Age Determination, Recharge Suitability, Crop Change. Board of Directors for the Almond Board of California. April 12, 2016. Modesto, CA.

Heilmann, M., J. Kimmelshue. 2016. 2015 Delta Land Use Mapping. In conjunction with Comparative Study of Methods for Measuring Consumptive Use of Water in the Delta. Office of the Delta Watermaster, State Water Resources Control Board. March 17, 2016. Sacramento, CA.

Kimmelshue, J., M. Heilmann, Z. Wang, S. Mulder, M. Twietmeyer, C Stall. 2016. Remote Sensed Evapotranspiration Estimates and Crop Mapping within the Sacramento/San Joaquin Delta and Beyond. University of California, Division of Agriculture and Natural Resources – UC Davis Evapotranspiration Remote Sensing Workshop. February 10, 2016. Davis, CA.

Kimmelshue, J., M. Heilmann, Z. Wang, S. Mulder, M. Twietmeyer, C. Stall. 2016. Results of Statewide Spatial Tree Crop Mapping and Applications: Acreage, Age Determination, Recharge Suitability, and Crop Change. American Society of Agronomy – California Chapter Annual Meetings. February 2, 2016. Visalia, CA.

Heilmann, M., J. Kimmelshue, M. Twietmeyer. 2015. Groundwater Recharge Suitability – Statewide Almond Production. The Almond Conference. December 5, 2015. Sacramento, CA.

Kimmelshue, J., M. Heilmann, Z. Wang, S. Mulder. 2015. Statewide Dried Plum Mapping – Final Results. California Dried Plum Research Committee. December 16, 2015. Sacramento, CA.

Kimmelshue, J., M. Heilmann, M. Twietmeyer. 2015. Almond Groundwater Recharge Suitability. BOD Reputation Management & Agriculture Issues Management (AIM) Taskforce. November 2, 2015. Modesto, CA

Heilmann, M., J. Kimmelshue, Z. Wang, S. Mulder, C. Stall, M. Twietmeyer. 2015. Walnut Mapping and Groundwater Recharge Suitability. Walnut Board of California. December 1, 2015. Folsom, CA.



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Kimmelshue, J., M. Heilmann. 2015. Crop Mapping Progress Overview and Update. California Department of Water Resources. October 30, 2015. Sacramento, CA.

Heilmann, M., J. Kimmelshue, Z. Wang. 2015. Remotely Sensed Land Use Applications in Agricultural Systems. United States Congress on Irrigation and Drainage Technical Meetings. June 4, 2015. Reno, NV.

Kimmelshue, J., M. Heilmann, S. Mulder, C. Stall, Z. Wang. 2014. Preliminary Conclusions of Statewide Crop Mapping of Almonds. The Almond Conference. December 10, 2014. Sacramento, CA.

Kimmelshue, J., M. Heilmann. 2014. Results of Remote Sensing for Crop Identification – Citrus. Citrus Research Board and California Citrus Mutual. November 17, 2014. Visalia, CA

Kimmelshue, J., S. Mulder, M. Heilmann, S. Tillman. 2014. An Introduction to Scientific Approaches for Implementation of Future Regulations – A Spatial Approach. California Citrus Showcase. March 6, 2014. Visalia, CA.

Kimmelshue, J., M. Heilmann, Z. Wang. 2014. Results of Remote Sensing of Tree Crops. California Pistachio Research Board. January 30, 2014. Fresno, CA.

## **Education**

M.S., Soil Science, University of Saskatchewan, 2001

B.S., Agriculture (Environmental Science), University of Saskatchewan, 1998

B. Music Performance – Brandon University, 1993

## **Professional Registrations & Experience**

- Certified Professional Soil Scientist (CPSS) – American Registry of Certified Professionals in Agronomy, Crops and Soils
- Certified Professional Agronomist (CPAg) – American Registry of Certified Professionals in Agronomy, Crops and Soils
- Certified Crop Adviser (CCA) - American Registry of Certified Professionals in Agronomy, Crops and Soils
- Fellow, California Agricultural Leadership Program, 2012

## **Distinguishing Qualifications**

Expert/Specialist in the following areas:

- Interpreting scientific literature on soil fertility; crop nutrient management and environmental quality in agricultural systems; global, national and regional information on crop, soil and water resource interactions
- Managing projects with multi-disciplinary analysts and data types including GIS, remote sensing, grower opinions, and historical and current soil, water, and crop quality constituents
- Managing nutrients for crop production and environmental quality; soil inputs for salinity and sodicity management
- Providing regulatory support and communication between members of the agricultural industry and regulatory agencies
- Evaluating industrial co-products, soil and cropping systems for beneficial agricultural use; impacts of water quality and irrigation management on soil and crop quality
- Designing and implementing field-scale studies and nutrient, salinity and sodicity monitoring programs; regulatory compliance programs for land application of industrial wastewater
- Reclaiming sodic/saline soils
- Writing technical grant applications

## **Relevant Experience**

Ms. Tillman has worked in the consulting and agri-business industries for 18 years in Central Canada and the Western US. Her work has focused on various aspects of agronomy and soil quality management in agricultural systems. She has experience in nutrient, water and crop management for production and regulatory management. Ms. Tillman also works with clients and growers to understand and comply with regulations related to beneficial agricultural use and land treatment of industrial wastewater. She has experience in managing and reclaiming saline and sodic soils, and has extensive experience working with growers and grower representatives on various projects such as nutrient and water management, fertilizer co-product development, regulatory compliance, and beneficial reuse irrigation projects. Ms. Tillman has managed numerous projects with multi-disciplinary analysts, data types and deliverables suited to a wide array of client needs.

## **Representative Project Experience**

### **Regulatory Compliance and Support**

- **Eastern Municipal Water District, Perris, CA.** Managed technical team that developed best management practices grower manual and method for evaluating best management practice performance in newly formed water quality coalition that delivers recycled water to local farms; currently overseeing development of web-based management tool to collect, manage, analyze and report on site and best management practice usage data from coalition farms; collaborating with client, growers, and Regional Water Quality Control Board to comply with Conditional Waiver of Agricultural Discharge.
- **Colusa-Glenn Subwatershed Program, Glenn, CA.** Developed and delivered presentations at Colusa Farm Show and CGSP-sponsored grower continuing education credit meetings; content included Irrigated Lands Regulatory Program data summary results and management practices to impeded nitrogen leaching.
- **Sacramento Rendering Company, Sacramento, CA.** Conducted soil monitoring; explored various management, cropping and phytoremediation options; and developed strategy with consulting engineers to ensure regulatory compliance (for soil and water quality) and allow for expanded operations on 80-acre land application site.
- **Sacramento Valley Water Quality Coalition, Sacramento, CA.** Currently provide regulatory compliance support through managing a multi-disciplinary team of grower representatives, spatial analysts, agronomists and statisticians to aggregate, manage, analyze and report on regional nitrogen management data for a coalition of 8,600 growers that encompasses 1.1 million acres in Northern California.
- **Estimating Groundwater Loading of Nitrogen Under Agricultural Crops/Regulatory Support, Kern River Water Quality Coalition, Bakersfield, CA.** Researched and documented crop-specific, soil-specific, and management factors that cause N contamination to vary under agricultural fields to determine inputs for N leaching risk model for nearly 525,000 acres. Currently provide regulatory and technical support for the Irrigated Lands Regulatory Program and Central Valley Salinity Alternatives for Long-term Sustainability.
- **Upper Santa Clara River Chloride TMDL Collaborative Process; County Sanitation Districts of Los Angeles County.** Conducted extensive literature review and evaluation on chloride and salt tolerance of salt sensitive crops. Developed scoring system to rank literature on quality, applicability, and scope relevance to study area. Developed extended study alternatives including sand tank studies, field studies, and outdoor containers for avocado, strawberry, and nursery crops.
- **Waste Discharge Requirements Permitting; Wilbur Packing Company; Yuba City, California.** Managed monitoring program to ensure regulatory compliance. Colusa Industrial Properties owns and operates a fruit packing facility and several orchards. Project management responsibilities included scope, budget, and schedule development and tracking; client service, project team management, and coordinating technical document submittals to the Regional Water Quality Control Board on behalf of the client.
- **Land Treatment System Monitoring; Colusa Industrial Properties; Colusa, California.** Managed a monitoring program to ensure regulatory compliance. Colusa Industrial Properties owns and operates a land treatment system for disposal of industrial wastewater. Project management responsibilities included scope, budget, and schedule development and tracking; field soil sampling; writing technical and annual summary reports; tracking hydraulic and nutrient loading on the site; and coordinating project staff and document submittals to the Regional Water Quality Control Board on behalf of the client.
- **Jacksonville Brewery Land Application Site; Anheuser-Busch; Jacksonville, Florida.** Responsible for assisting Anheuser-Busch with regulatory compliance activities associated with land application of process water. This site is regulated by the Florida Department of Environmental Protection (DEP) for nitrate contamination in

groundwater. Involvement included developing a nitrogen balance tool by summarizing and manipulating historical and present-day data to identify alternatives for compliance with DEP regulations.

### **Beneficial Reuse**

- **Agricultural Reuse Pilot Study and Marketing Program; Chevron-Richmond; Richmond, California.** Chevron Environmental Management Company requires a means to dispose of its industrial process water. Responsibilities included designing and conducting a pilot field study to evaluate agricultural reuse and developing a marketing program with local state agency staff and academic community experts for growers to use Chevron's industrial process water as fertilizer.
- **Water and Soil Quality Monitoring and Crop Water Use Estimating; Resolution Copper Mining; Superior, AZ.** Assisted in determining and developing monitoring protocol for irrigation district using blended, treated mine discharge water to irrigate approximately 5,000 acres of cotton and alfalfa. Developed estimates for water quantity and quality appropriate for applicable crops.
- **Jacksonville Brewery Land Application Site; Anheuser-Busch; Jacksonville, Florida.** Responsible for assisting Anheuser-Busch with regulatory compliance activities associated with land application of process water. This site is regulated by the Florida Department of Environmental Protection (DEP) for nitrate contamination in groundwater. Involvement included developing a nitrogen balance tool by summarizing and manipulating historical and present-day data to identify alternatives for compliance with DEP regulations.
- **Land Treatment System Monitoring; Colusa Industrial Properties; Colusa, California.** Managed a monitoring program to ensure regulatory compliance. Colusa Industrial Properties owns and operates a land treatment system for disposal of industrial wastewater. Project management responsibilities included scope, budget, and schedule development and tracking; field soil sampling; writing technical and annual summary reports; tracking hydraulic and nutrient loading on the site; and coordinating project staff and document submittals to the Regional Water Quality Control Board on behalf of the client.

### **Nutrient, Water and Vegetation Monitoring and Management in Agricultural Systems**

- **Sacramento Rendering Company, Sacramento, CA.** Currently manage and conduct soil monitoring; explore various management, cropping and phytoremediation options; and developed a strategy with consulting engineers to ensure regulatory compliance (for soil and water quality) and allow for expanded operations on 80-acre land application site.
- **Regulatory Support, Estimating Groundwater Loading of Nitrogen Under Agricultural Crops; Kern River Water Quality Coalition, Bakersfield, CA.** Researched and documented crop-specific, soil-specific, and management factors across the nearly 525,000 acres within the coalition that cause N contamination to vary under agricultural fields for purpose of developing alternative regulatory approach to Irrigated Lands Regulatory Program.
- **Rangeland and Riparian Managements Plans; Deer Creek Watershed Conservancy; Cottonwood, California.** Conducted all mapping (GPS), landowner interviews, stocking rate assessments, and developed management practice implementation plans and monitoring plans for 20,000 acres on five ranches in Deer Creek Watershed. Mapping and planning included management units, fences, invasive weeds, water developments, and cultural and historical resources.
- **Cottonwood Creek Watershed Management Strategy and Plan; Cottonwood Creek Watershed Group; California.** Conducted public meetings on strategic resource areas including groundwater and surface water quality, erosion and flooding, aquatic habitat, rangeland and timber, and terrestrial and riparian habitat. Worked collaboratively with Technical Review Team and stakeholders to develop strategic areas including fuel

reduction and vegetation management, inventory and mapping, outreach and education, management plan development, and monitoring and modeling.

- **Santa Maria Basin Return Flow Modeling Under Agricultural Lands, Santa Barbara County, California.** Modified existing water balance in order to model return flow under irrigated crops, non-irrigated agricultural lands, and native vegetation. Researched and developed key model inputs such as rooting zones and consumptive water use for native vegetation and irrigated and non-irrigated crops.
- **Estimating Yield Loss from Cold Water in Rice; California Department of Water Resources, Oroville, CA (ongoing).** Currently manage project team, manage technical documentation and communications, oversee project and budget time management, collaborate with state agency officials, irrigation district managers, and cooperating rice growers to monitor over 100,000 acres of rice.
- **Technical Support, San Joaquin River Restoration Seepage Management Plan, Los Banos, CA.** Reviewed crop rooting depths, salinity tolerances, and soil monitoring in seepage management plan; developed guidance based on current science for almond root depth and capillary fringe in riparian soils to support long-term effort to restore flows to the San Joaquin River while reducing or avoiding adverse water supply impacts such as seepage to several hundred acres of agricultural fields riparian to the river from restoration flows.
- **Estimating Agricultural Water Use of Agriculture in the Owens Valley; Los Angeles Department of Water and Power.** Conducted review of agricultural production trends in California and in other similar Basin and Range agricultural valleys during the 20<sup>th</sup> Century. Assisted in developing a scenario for water use in the presence of a Bureau of Reclamation water project.
- **Land Treatment System Monitoring; Colusa Industrial Properties; Colusa, California.** Managed a monitoring program to ensure regulatory compliance. Colusa Industrial Properties owns and operates a land treatment system for disposal of industrial wastewater. Project management responsibilities included scope, budget, and schedule development and tracking; field soil sampling; writing technical and annual summary reports; tracking hydraulic and nutrient loading on the site; and coordinating project staff and document submittals to the Regional Water Quality Control Board on behalf of the client.

### **Erosion Control and Land Stabilization**

- **Facility Runoff Control Plans; Colorado Department of Transportation (CDOT).** Conducted site visits and assisted in writing Facility Runoff Control Plans for CDOT maintenance yards in and around Denver. Assisted in developing Best Management Practices to reduce erosion and pollutants in storm water discharges.
- **Product Selection and Study Design for Soil Binder Study on Owens Lake; Los Angeles Department of Water and Power, Owens Valley, CA (ongoing).** Conducted review and selection of dust palliatives and suppressants for investigation on the Owens Lake bed; assisted in study design; collaborated with vendors and technical support team.
- **Dust Control in Almond Production; Almond Board of California, Various sites, CA.** Managed project team, designed field experiment, developed sampling and analysis plan, collaborated with participating growers and UC Davis experts, conducted literature review, and oversaw project budget, staff time management and all project operations. Study encompassed three sites in the Central Valley to represent the Sacramento Valley and San Joaquin Valley Regions.
- **Soil Sampling and Analysis; Owens Lake Dust Mitigation Program; Los Angeles Department of Water and Power (LADWP).** Coordinating soil sampling and analysis in conjunction with court-ordered dust mitigation program. Owens Dry Lake is the nation's largest single source of dust emissions. LADWP must mitigate the emissions with dust control measures that include shallow flooding and establishing managed vegetation. Compliance must be accomplished under extremely saline conditions. Tasks included developing sampling



plans, performing soil sampling and interpreting data for soil reclamation, and developing soil profile descriptions.

- **Stormwater Monitoring, Multiple Statewide Projects, California Department of Transportation.** Contributor to various Caltrans erosion control and stormwater management projects, including the Caltrans Statewide Vegetative Erosion Control Review and Caltrans Non-Vegetative Alternative Soil Stabilizers project. Tasks included stormwater sampling, non-vegetative erosion control methods study plan documentation, and assisting in the design of stormwater collection methods.

### **Salinity Management and Reclamation in Agricultural Soils**

- **Bureau of Reclamation, Lower Colorado River Basin and Metropolitan Water District Regions.** Updated agricultural sector input data for Salinity Economic Impact Model, which estimates damages to agricultural crops from saline irrigation water; conducted literature review to determine crop salinity thresholds; reviewed and updated impact functions (formulas used to estimate yield loss from saline water of a specific salinity); oversaw technical staff that developed crop acreage and value estimates.
- **Reclaiming Sodic Soil; Petroglyph Energy; Walsenburg, CO.** Collaborated to develop soil reclamation treatment and monitoring program for dairy farm. Soil had become sodic from irrigation with coal bed methane discharge. Worked with landowner, client, and state industry commission to determine and coordinate field operations.
- **Technical Support, State Water Contractors, Sacramento, CA.** Provided guidance for non-profit association of 27 public water agencies, collectively serving 26 million residents, 750,000 acres of farmland and businesses throughout California on state of science for leaching fractions in delta soils, and specifically for soils of the Southern California Delta.

### **Carbon Credit Evaluation in Agricultural Systems**

- **Modeling Carbon Flux of Almond Pruning Practices; Almond Board of California; Modesto, CA.** Conducted literature review of carbon and nitrogen dynamics of almond management practices. Conducted survey of university extension agents, industry experts, and growers and compiled information for greenhouse gas model. Collaborated with remote sensing and GIS specialists to conduct almond crop mapping in California.
- **Determining Carbon Credits; Barksdale Airforce Base, Barksdale, Louisiana.** Assisted with technical aspects of using remote sensing and management information for modeling greenhouse gas flux from large area of land. Researched economic and technical mechanisms used in the carbon trading industry. Provided deliverable that summarized data analysis and current state of carbon market.

### **Project Management and Data Compilation/Interpretation in Multi-disciplinary Teams and Datasets**

- **Butte County In-lieu Recharge Evaluation, Butte County, Oroville, CA.** Collected, interpreted and summarized information from scientific literature, extension publications, local extension experts, local agricultural industry experts, and growers on factors that influence grower use of surface water vs. groundwater for economic evaluation that will inform Butte County's groundwater management plan to comply with the Sustainable Groundwater Management Act.
- **Agua Caliente Water Rights Adjudication, Native American Rights Fund, Coachella Valley** Collected, interpreted and summarized information from scientific literature, extension publications, local extension experts, and local agricultural industry experts about potential crop suitability for a region of the Coachella Valley, CA, including climate, soil, windbreak, and topographical requirements, and market potential to inform water rights adjudication.

- **Historical Agricultural and Riparian Land and Water Use Analysis, Confidential Client, Texas and New Mexico.** Collected, interpreted and summarized information from scientific literature, extension publications, local planning documents, and regional and national surveys on historical urban water use to inform water rights adjudication.
- **Evaluation of Crop Water Use Estimates Using Crop Coefficients, Confidential Client, Texas and New Mexico.** Reviewed historical and current yields in relation to standard crop coefficients used to estimate crop water use in pecan, cotton and alfalfa; developed recommendations for modifying crop water use estimates on current crop yields using various crop water use estimation approaches.
- **Evaluation of Crop Water Use Estimates Using Crop Coefficients, Friant Water Authority, place???** Reviewed historical and current yields in relation to standard crop coefficients used to estimate crop water use in major forage (alfalfa, corn) and tree (almond, walnut, pistachio) crops; developed recommendations for modifying crop water use estimates on current crop yields using various crop water use estimation approaches.
- **Sustainable Water Management Strategy for Specialty Crop Expansion in the Sacramento Valley, Sacramento Area Council of Governments, Sacramento, CA.** Currently managing technical team of consultants and sub-consultants to develop and provide inputs for Rural Urban Connections Strategy economic model. Technical work includes characterization of regional groundwater dynamics and surface water delivery systems; using spatial crop data and a groundwater suitability index to determine specific cropped fields suitable for groundwater recharge; conducting outreach and compiling feedback from water providers and growers in the six-county SACOG region to determine; and developing per acre metrics and scenarios for model runs to achieve feasible results.
- **Estimating Yield Loss from Cold Water in Rice; Western Canal Water District, Oroville, CA.** Developed protocol for monitoring rice yield with GPS-equipped harvesters for over 100,000 acres. Coordinated communication between water districts, landowners, and technical experts for data analysis. Assisted with various technical aspects of applying remote sensing technology to yield determination on large scale. Currently manage technical team to conduct annual yield loss estimation analysis; collect market data (USDA loan rate; cash market; pool prices; quality data, costs, and rebates from local rice dryers) to calculate annual initial and adjusted rice price according to formula stipulated in legal agreement between irrigation districts and California Department of Water Resources.
- **Almond Board of California, Modesto, CA.** Interpreted and summarized results from analyses using various spatial data including crop mapping, surface features such as water resources, environmental data and jurisdictional boundaries in the California Central Valley.
- **Zenith Insurance** – Used spatial crop data and public information in water management plans to assess water supply risk associated with dependence on surface and groundwater supplies, storage, and accessibility of conveyance structures within water provider districts in the California Central Valley.

## **Previous Experience**

Prior to her employment at Land IQ, Ms. Tillman worked as a soil and agricultural scientist at CH2M HILL for 6 years. Preceding her work in consulting, Ms. Tillman worked in the agri-sales, development and research industry across three Canadian provinces for Simplot Canada and Rhone-Poulenc. International experience includes volunteering at a project in Mali, West Africa, which encouraged agricultural and economic diversification to transition farms from peanut to cotton production.

**Travis Brooks, Ph.D. Candidate**  
**Associate Ecologist**

## **Education**

Ph.D. Candidate (Advanced to Candidacy 2010), Ecology and Evolutionary Biology, University of California, Los Angeles

B.S., Environmental Studies (Emphasis in Biology), Minor in Architecture, University of Southern California, 1999

## **Distinguishing Qualifications**

Expert/Specialist in the following areas:

- Restoration ecology
- Biological monitoring
- Environmental compliance
- Plant physiology
- California ecosystems
- Environmental science
- Physical geography
- Landscape-scale habitat management
- Vegetation/habitat suitability mapping
- CRAM wetland assessments
- Geographic Information System (GIS) analysis and modeling

## **Relevant Experience**

Mr. Brooks is an Associate Ecologist for Land IQ. He has eighteen years of experience in ecology of native plant communities, habitat restoration, and environmental compliance. He has managed staff in the development of resource management plans as well as habitat restoration plans. He has developed restoration and enhancement plans, planting plans and specifications for mitigation projects in coordination with regulatory agencies. He is experienced with managing mitigation sites for transportation, energy and construction-related projects and has developed restoration and enhancement plans and planting plans and specifications for coastal sage scrub, riparian, and wetland habitats for mitigation projects in Ventura, Los Angeles, Orange and San Diego Counties in California.

Mr. Brooks is experienced in providing Geographic Information System (GIS) analysis, statistical evaluations and modeling in support of land management projects. He studies geo-edaphic factors influencing the distribution of water-limited systems, including coastal sage scrub, native grasslands, and non-native grasses/forbs in southern California. He has also developed methods for vegetation/habitat suitability mapping to assist land managers in developing site-specific conservation, restoration and monitoring programs, and natural resources policy.

Mr. Brooks is experienced with surveys for sensitive, threatened, and endangered avian species including the California gnatcatcher and coastal cactus wren. He has also contributed to several public education programs conducted for clients.



**Travis Brooks (Ph.D. Candidate)**  
**Associate Ecologist**

## **Representative Project Experience**

- **Project Manager/Biologist - Natural Communities Coalition (NCC), Natural Communities Coalition Habitat Restoration Plan Update; Orange County, California.** Responsible for developing an updated Master Habitat Restoration Plan in collaboration and coordination with NCC and land managers within the Coastal and Central Nature Reserve of Orange County. The 37,000-acre project area provides habitat for a wide array of native plants and animals. The plan development includes conducting various land manager workshops to arrive at consensus for restoration prioritization, as well as analysis of past successes and challenges of restoration efforts. The plan will include the development of vegetation type distribution models and the application of these models to develop priority maps for restoration and an approach for landscape-scale habitat restoration.
- **Project Manager – Conservation Biology Institute (CBI), San Diego Association of Governments (SANDAG) South County Grasslands Project; San Diego County, California.** Mr. Brooks was responsible for the design and oversight of implementation of the Grasslands Restoration Phase 2 Project with partners CBI, The Nature Conservancy (TNC) and the South County Land Owners, including USFWS, CDFW, Sweetwater Reservoir Authority, BLM and the City of San Diego. Design of the project includes a landscape-level restoration experiment within a 14-acre site to evaluate the most cost-effective methods of restoring habitat for native grasslands, forblands, Quino Checkerspot butterfly and Otay tarplant. Implementation oversight and data analysis continued through 2017, and beyond as the results of the experiment are scaled up to restore and enhance habitat in South County. Mr. Brooks is currently developing preliminary Best Management Practices (BMPs) for landscape scale management of invasive grasses in coastal sage scrub and grassland communities that will benefit grassland and forbland restoration throughout western San Diego.
- **Biologist - Transportation Corridor Agencies (TCA), Habitat Restoration Plan for the Strawberry Farms 15-Acre Parcel; Irvine, California.** The HRP provides for the restoration of 13.3 acres of coastal sage scrub, including areas of cactus scrub and native perennial grassland for a 15-acre parcel within the City of Irvine Quail Hill Preserve. The habitats to be restored will provide habitat for several target species of the Orange County Central and Coastal Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP), including the California gnatcatcher, and coastal cactus wren. Mr. Brooks is the ecologist responsible for conducting rare plant surveys, mapping, and developing the HRP. Currently he is responsible for overseeing the implementation of the HRP, including sensitive bird surveys, and coordinating with the restoration contractor (Nakae & Associates) for maintenance of the restoration, and the City for access notifications.
- **Biologist - Transportation Corridor Agencies (TCA), Saddle Creek South Land Management, Orange County Transportation Authority (OCTA) Measure M (M2) Environmental Program; Orange County, California.** This project is part of the environmental program under the Orange County Transportation Authority's (OCTA) Measure M (M2) tax measure for mitigating thirteen Renewed M2 freeway improvement projects. Land IQ staff provided land management recommendations for the TCA, the interim land manager of the 83.65-acre Saddle Creek South parcel which is located directly adjacent to the TCA's Live Oak Plaza Conservation Area in Trabuco Canyon. Mr. Brooks was responsible for mapping and assessing the property, overseeing maintenance by the restoration contractor, and providing management recommendations. He created an accurate GIS-based property boundary file and updated vegetation map that can be used for future maps, management

**Travis Brooks (Ph.D. Candidate)**  
**Associate Ecologist**

activities, and reporting. He also developed management recommendations in the annual progress report for access road, trail, and fencing maintenance, signage, security patrols, fuel modification, invasive weed control, vegetation monitoring, sensitive plant and bird surveys, and wildlife monitoring.

- **Biologist - Transportation Corridor Agencies (TCA), Upper Chiquita Canyon Conservation Easement Area, Restoration and Management; Rancho Santa Margarita, Orange County, California.** Mr. Brooks was responsible for analysis of research test plots, digitizing field data using ArcGIS, data collection within the 1,186-acre site, and preparation of reports including the update to the Resource Management Plan (RMP) for submission to resource agencies. He assists the permitted biologist in conducting presence/absence surveys for the California gnatcatcher and coastal cactus wren within the Conservation Easement. In addition, he was recently involved in developing an interactive, web-based restoration management tool using GIS and web-functionality to enable the client to better manage biological resources and restoration activities in the Conservation Easement.
- **Biologist - Transportation Corridor Agencies (TCA), State Route-241 Southbound Widening Project Habitat Mitigation and Monitoring Plan (HMMP); Orange County, California.** Biologist responsible for conducting field surveys and writing the HMMP for proposed mitigation for coastal sage scrub and cactus scrub habitat that will be disturbed by construction activities associated with widening a section of the SR-241 toll road. Field surveys included vegetation, soil and landscape features related to development of a restoration plan. Production of the report included GIS analysis, cartography, fire history and climatic record summaries, development of the restoration plan, creation of the performance standards and methods for performance monitoring.
- **Biologist – Transportation Corridor Agencies (TCA), Crystal Cove State Park Restoration Plan; Orange County, California.** As field biologist, assisted with monitoring potential restoration sites for coastal sage scrub and oak communities. Field assessment consisted of mapping, collecting relevant vegetation, soil, and landscape position data, and evaluating the field data to best possible restoration areas for coastal sage scrub habitat within the potential restoration area.
- **Project Ecologist - San Diego Gas and Electric (SDG&E), Lakeside Ranch Mitigation Property Coastal Sage Scrub Restoration and Enhancement Plan; Lakeside, California.** This habitat mitigation and monitoring plan is a 55-acre site in San Diego County. The plan includes restoration and enhancement of Diegan coastal sage scrub (CSS) habitat, as part of the mitigation for impacts from the Sunrise Powerlink Project, including sensitive vegetation and the federally-listed threatened coastal California gnatcatcher. Mr. Brooks was the ecologist responsible for assessing and mapping the site, and developing the plan for restoration and enhancement of coastal sage scrub habitat and restoration of riparian woodland mid-canopy and understory. He managed the implementation of the restoration plan, including sensitive bird surveys, coordinating the restoration contractor, monitoring and reporting on the installation and progress of the mitigation site.
- **Biologist - Natural Communities Coalition (NCC), Cactus Wren Habitat Linkage Restoration Plan Coastal Reserve; Orange County, California.** Mr. Brooks was the biologist responsible for describing existing conditions, identifying restoration sites, and participated in developing a restoration plan to increase the suitable habitat for coastal cactus wren at 5 sites in the Laguna Coast Wilderness Park. He was also responsible for monitoring implementation and performance to evaluate the progress of the restoration towards the ultimate goals of the project. Cactus wren habitat has been lost to

**Travis Brooks (Ph.D. Candidate)**  
**Associate Ecologist**

fires in the Coastal Reserve and Central Reserve, therefore NCC and the resource agencies desire to increase suitable habitat and dispersal corridors.

- **Ecologist - Natural Communities Coalition (NCC), Environmental Enhancement and Mitigation Program (EEMP) Cactus Wren Habitat Linkage Enhancement and Restoration Project; Orange County, California** Project ecologist responsible for selecting ecologically appropriate areas for restoration and enhancement of 7.39 acres of cactus scrub for cactus wren habitat and dispersal along an existing wildlife corridor. The selection of areas required the use of Global Positioning System (GPS) to map existing biological resources, Geographic Information System (GIS) analysis and review of published literature regarding habitat utilized by cactus wren.
- **Project Manager - The Nature Conservancy (TNC), Los Angeles River Habitat Restoration Feasibility Study; City of Los Angeles, Los Angeles County, California.** Responsible for project management, data analysis and development of habitat restoration strategies and objectives for the study area which is the reach between Los Feliz Blvd. Bridge and the Taylor Yard Parcels. The Los Angeles River is currently the subject of planning efforts to revitalize the use of the channel right-of-way and adjacent areas to benefit the economy, regional park space, water conservation and native habitat. Provided feedback to the project team, including the Los Angeles Natural History Museum, University of Southern California, Connective Issue and WRC Consulting Services during the development of goals, objectives and strategies to improve the value of native habitat in the study area that complement concurrent planning efforts. The Habitat Restoration Feasibility Study was completed in 2016.
- **Biologist - Hearststone, Jurisdictional Habitat Mitigation Restoration and Monitoring Plan - Heritage Valley Parks; Fillmore, County of Ventura, California.** Responsible for monitoring and mapping the progress of the giant reed (*Arundo donax*) removal program for the 249-acre Heritage Valley Park Project within the floodplain of the Santa Clara River. Techniques used for mapping and tracking the progress of the giant reed removal program include remote sensing and GPS technologies.
- **Biologist - The Nature Conservancy (TNC), Hanson-Villanueva Property Restoration Plan; Ventura County, California.** Responsible for coordinating the results of field surveys for the initial constraints analysis for the Habitat Restoration, Enhancement, and Creation Plan (Plan) for TNC's Hanson-Villanueva Property. He assembled the information in a format that facilitated understanding the physical and biological characteristics of each identified management unit within the site. The 344-acre project area is part of the lower watershed of the Santa Clara River that historically provided habitat for a wide array of native plants and animals. An integrative study was performed and the resulting Plan provides management strategies and defines specifications for habitat restoration, enhancement and creation actions (including giant reed [*Arundo donax*] removal) within each of the identified management units to improve the overall quality of habitat within the floodplain and the larger watershed. TNC is currently implementing the plan.
- **Biologist - Puente Hills Habitat Preservation Authority (PHHPA), East Colima Coastal Sage Scrub Mitigation Plan and Ridgewood/Brea Power Coastal Sage Scrub Mitigation Plan Implementation; Whittier, California.** The restoration of coastal sage scrub habitat (CSS) within two sites in the Puente Hills Preserve is currently being implemented. The East Colima Mitigation Area was installed in January 2010 and consists of 15.5 acres of CSS restoration and 0.3 acres of enhancement of

**Travis Brooks (Ph.D. Candidate)**  
**Associate Ecologist**

existing CSS. The Ridgewood/Brea Power Mitigation Area was installed in February 2011 and consists of 0.5 acres of CSS restoration on degraded slopes once dominated by exotic species. Mr. Brooks assisted with horticultural monitoring of the CSS habitat, data collection, and preparation of annual performance monitoring reports for submission to resource agencies. The projects were completed in 2015 and 2016 respectively, and both received concurrence from the California Department of Fish and Wildlife.

- **Project Manager - Los Angeles Conservation Corps, Weed Management Plan for Debs Park; Los Angeles County, California.** Responsible for coordinating the weed mapping surveys and development of a Weed Management Plan for Debs Park in Los Angeles County. The project involved baseline weed mapping of approximately 80 acres of open space in the park to delineate and focus immediate weed control efforts to be identified in the invasive plant management plan. The plan will also include a weed map update protocol, specifications for control of specific invasive species, and guidelines on the timing and prioritization of weed management to control and adaptively manage weed populations in the future.
- **Biologist - WRC Consulting, Inc., Santa Ana River Mainstem Project, Reach 9 Phase 2B, Perennial Stream Habitat Plan; Orange County, California.** Responsible for working with the engineers at WRC to design a planting plan and specifications for installation of riparian and wetland habitat at the Santa Ana River and Green River Golf Course area off SR-91. The restoration of willow woodland riparian, willow scrub, and native emergent vegetation is required to compensate for the redesign of the river channel and to serve as mitigation for other projects by the City.
- **Biologist - WRC Consulting, Inc., Wagon Wheel Creek Habitat Restoration for Orange County Parks; Mission Viejo, Orange County, California.** Biologist responsible for assessing impact of historic flows in the creek and corresponding erosion. Wagon Wheel Creek is one of two seasonal creeks that flow through the 544-acre Thomas F. Riley Wilderness Park in Orange County. Developed recommendations on ecologically-appropriate revegetation methods and palettes to reduce the potential for erosion in conjunction with engineering solutions designed by WRC Consultants for the Final Conceptual Creek Restoration Plan for Wagon Wheel Creek.
- **Biologist – U.S. Fish and Wildlife Service, Dennett Dam Removal Basis of Design; Modesto, California.** Responsible for assessing the current extent of riparian vegetation communities and developing recommendations to mitigate impacts to vegetation from dam removal and to improve salmonid habitat along the impacted reach of the river. Worked with river geomorphologists and hydrologists to describe the historic extent of the flood plain using historical aerials and GIS analysis.

## **Previous Experience**

Prior to working for Land IQ (Formerly NewFields), Mr. Brooks was a biologist at Earthworks Restoration, where he served as a biologist for several restoration projects in southern California; and, learned the ecological principles and techniques for habitat restoration from Dr. Margot Griswold. During that time, Mr. Brooks attended UCLA in the Department of Ecology and Evolutionary Biology, where he advanced to PhD candidacy in 2010. While at UCLA, Mr. Brooks served as a Teaching Associate, including four years as a mentor for undergraduate students of the Institute for Environmental Studies and Sustainability during their Senior Practicum Research Projects. Previously, Mr. Brooks conducted air quality inspections and audits as an Inspector for the South Coast AQMD for a number of industries,



**Travis Brooks (Ph.D. Candidate)**  
**Associate Ecologist**

including helping to develop a portable combustion emissions analysis program for boilers and generators in the South Coast Basin.

Restoration Ecologist, NewFields, LLC. – April 2009 to August 2013

Earthworks Construction and Design/EARTHWORKS Restoration, Inc. Biologist. 2002 to April 2009.

University of California Los Angeles (UCLA). Teaching Associate. Winter Quarter 2007 to 2014.

South Coast Air Quality Management District (AQMD). Air Quality Inspector II. 2001 to 2006.

Cerritos Community College. Instructor. Fall Semester 2004 and Summer Term 2005.

Geoscience Diversity Enhancement Program (GDEP). Project Leader. Summer 2004.

Los Angeles Unified School District. Teacher. 2000 – 2001.

Natural Resource Specialist Internship, Palos Verdes Peninsula Land Conservancy. Summer



No. 141, Original

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IN THE  
SUPREME COURT OF THE UNITED STATES

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STATE OF TEXAS,

*Plaintiff,*

v.

STATE OF NEW MEXICO AND  
STATE OF COLORADO,

*Defendants.*

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**OFFICE OF THE SPECIAL MASTER**

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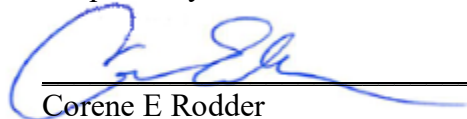
**CERTIFICATE OF SERVICE**

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This is to certify that on this 21st day of May 2020, I caused a true and correct copy of **THE STATE OF TEXAS'S SUPPLEMENTAL DISCLOSURE OF REBUTTAL EXPERT WITNESS INFORMATION AS TO REBUTTAL EXPERT REPORT OF LAND IQ, LLC** to be served upon all parties and *amici curiae*, by and through the attorneys of record and/or designated representatives for each party and *amicus curiae* in this original action. As permitted by order of the Special Master, and agreement among the parties, service was effected by electronic mail to those individuals listed on the attached service list, which reflects all updates and revisions through the current date.

Respectfully submitted,

Dated: May 21, 2020

  
Corene E Rodder

**SERVICE LIST FOR ALL PARTIES AND AMICI CURIAE**

**PARTIES**  
 (Service via Electronic Mail)

**PARTIES<sup>1</sup>**

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