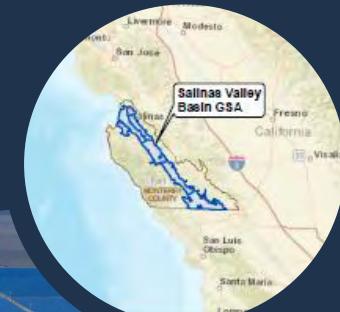




STATEMENT OF QUALIFICATIONS

Groundwater Sustainability Planning Services
For the Salinas Valley Basin Groundwater Sustainability Agency



Kennedy/Jenks Consultants

Prepared for Salinas Valley Basin Groundwater Sustainability Agency

Table of Contents

- 1-2 COVER LETTER AND FIRM INFORMATION**
Section Two
- 3-4 FIRM PROFILE**
Section Three
- 5-9 KEY PERSONNEL**
Section Four
- 10 FIRM QUALIFICATIONS**
Section Five
- 11-20 DETAILED LIST OF TASKS**
Section Six
- 21 SCHEDULE**
Section Seven
- 22 BILLING SCHEDULE**
Section Eight
- 23 CONDITIONS AND CONSTRAINTS**
Section Nine
- 24-28 CLIENT REFERENCES**
Section Ten
- 29 LEGAL PROCEEDINGS/ARBITRATIONS/COURT ACTIONS**
Section Eleven
- 30 CONFLICT OF INTEREST**
Section Twelve

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Santa Clara, CA 95054

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January 12, 2018

Mr. Gary Petersen
General Manager
Salinas Valley Basin Groundwater Sustainability Agency (GSA)
Mailing: PO Box 1350, Carmel Valley CA 93924

Dear Mr. Petersen:

Groundwater is of paramount importance to the economy and therefore, the fabric of the Salinas Valley. The preparation of a Groundwater Sustainability Plan (GSP) for the Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) will be a challenging but exciting endeavor as the GSP will lay the foundation for future groundwater, and economic, sustainability. Kennedy/Jenks Consultants together with Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), and independent consultants Martin Feeney, Matt Zidar, and Bob Abrams, brings expertise, experience, depth, familiarity and knowledge of the Salinas Valley and needs of the SVBGSA to efficiently deliver a compliant GSP.

Specifically, our team uniquely brings:

- **Prior working experiences** with you and your member agencies to quickly and comfortably support and augment you and your limited staff. We know how to work with you and key partners and understand the institutional and technical complexities of the GSP preparation. We have gained our experience through out preparation of the planning and other grant applications and storm water resource plan as well as AMEC's extensive groundwater and surface water modeling work.
- **Hands-on local work** to enhance understanding of regional benefits and cooperation amongst diverse stakeholders. Our prior and ongoing work with stakeholders common to your GSA provide in depth knowledge of the surface water and groundwater systems of the Salinas Valley Basin which will be the foundation for the water budgets necessary to set groundwater management criteria that benefit the region.
- **A time efficient approach** to prepare a compliant plan for the Salinas Valley Basin to meet the 2020 deadline. Our team will leverage our knowledge of the Salinas Valley Basin to prepare early GSP sections at the same time that institutional and cooperative agreements are being prepared. This parallel approach will allow the entirety of the GSP to be completed by 2020.
- **A deep bench of hydrogeologists, engineers, and water planners** who understand the complex water resources (e.g. groundwater, stormwater, recycled water, surface water, etc) in the region to develop and evaluate an Implementation Plan that is pragmatic and tailored to the GSA specific needs. Your Implementation Plan is likely to need more infrastructure. Identifying, developing, and optimizing that infrastructure conceptually will save you time and money. Moreover, this helps to complement the funding strategies that ultimately will be tied to the needs of the SVBGSA.
- **Proven funding successes** to maximize financial support of future implementation needs. Having supported you in the past on Prop 1 funding, we know how to structure projects and management actions to maximize funding success. Kennedy/Jenks' funding team has prepared

Kennedy/Jenks Consultants

applications for over \$451 million of grant funding for clients.

This SOQ represents a partnership between Kennedy/Jenks Consultants and Amec Foster Wheeler and we look forward to your favorable response to our Statement of Qualifications and building a successful working relationship. Please do not hesitate to contact me at 650-852-2817 or Sachititagaki@KennedyJenks.com, Pete Talbot at 415-243-2463 or PeteTalbot@KennedyJenks.com, or Les Chau at 415-370-8050 or les.chau@woodplc.com if you have questions.

Sincerely,



Sachiko Itagaki, PE
Project Manager
Kennedy/Jenks Consultants



Peter C. Talbot, P
Client Director
Kennedy/Jenks Consultants



Les Chau, BCES
Principal Hydrogeologist
Amec Foster Wheeler

SECTION 3 | FIRM PROFILE

QUALIFICATIONS AND EXPERIENCE

Meeting the water management needs of California communities has been the hallmark of Kennedy/Jenks Consultants (Kennedy/Jenks) practice. As a leader in California water and wastewater engineering for more than nine decades, Kennedy/Jenks has a proven track record of engineering and technical performance. Since our founding in 1919, we have pioneered new water system technologies and applications for blending reliability of proven existing technology with emerging advanced solutions.

Kennedy/Jenks is an award-winning, full-service, multidiscipline engineering and environmental sciences consulting firm that has earned a reputation for excellence and innovation in water planning, groundwater management and infrastructure design. We continue to provide excellent service to public agencies with combined resources of over 180 staff in our Sacramento, San Francisco, Santa Rosa and Santa Clara offices, and over 430 staff company-wide.



client, our expert knowledge of regional and regulatory issues, and our commitment to client service.

The Kennedy/Jenks team members brings the experience through our work with a broad suite of agencies and organizations in Monterey County as summarized below. These relationships will facilitate our quick start with the preparation of a compliant GSP.

AGENCY/ORGANIZATION	KENNEDY/JENKS STAFF	AMEC FOSTER WHEELER	BOB ABRAMS	MARTIN FEENEY	MATT ZIDAR
Salinas Valley Basin GSA	X				
Pure Water Monterey (Monterey Regional Water Pollution Control Agency)	X			X	
Monterey County Planning/Flood Control and Water Conservation District	X	X		X	X
Monterey County Water Resources Agency		X	X	X	X
Pajaro Valley Water Management Agency				X	X
Grower Shipper Association of Central California			X		
Salinas Valley Growers/Food Processors			X		

99

years in business

\$83M

Gross Revenue

31

Offices in 15 States

450

Employees

SUBCONSULTANTS

AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE, INC. (AMEC FOSTER WHEELER)

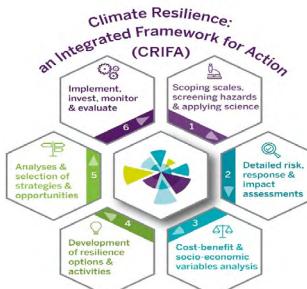
Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) is an environmental consulting, engineering and design, and project management company operating with more than 3,300 professionals in 90 locations across the US and more than 750 professionals in 12 California offices. We provide services to both public and private clients worldwide, serving the water, clean energy, federal, industrial, pharmaceutical, mining, oil & gas, and transportation sectors.

With an adept staff of water scientists and engineers, we deliver a full suite of water resources solutions. From developing innovative water supply sourcing solutions to flood risk planning, our professionals deliver economically, socially, and environmentally sustainable solutions aligned with our clients' project objectives. Their water resources specialists work on projects that range from statewide floodplain mapping and dam analysis/design to climate impact adaptation studies and groundwater resources management and computer modeling.



750
Professionals

12
California Offices



Their network of California-based groundwater specialists provides broad and diverse skill sets and perspectives to help solve water resource challenges faced by communities across the state. Their team of groundwater professionals offer decades of expertise developing and applying integrated basin-scale modeling tools to support development of long-term water resource management plans for water resource sustainability projects. They are experienced in the development and application of regional groundwater models, and linked groundwater – surface water models for alternatives evaluation in support of regional water planning studies. They offer decades of experience collaborating with diverse stakeholder groups as well as leading, facilitating, and moderating advisory committees, groups and interagency meetings in an effective, objective, and diplomatic manner.

The Amec Foster Wheeler team is familiar with the Salinas Valley Watershed Model (SVWM) / Salinas Valley Integrated Hydraulic Model (SVIHM) system and has a great working relationships with the Monterey County Water Resources Agency, County of Monterey Planning, the U.S. Geological Survey (USGS), and stakeholders.

The proposed team has experience working with local regulatory agencies and knowledge of local environmental issues that will benefit the GSA by expediting project work, involving stakeholders, maintaining quality, and strict adherence with SGMA Best Management Practices and compliance with GSA requirements.

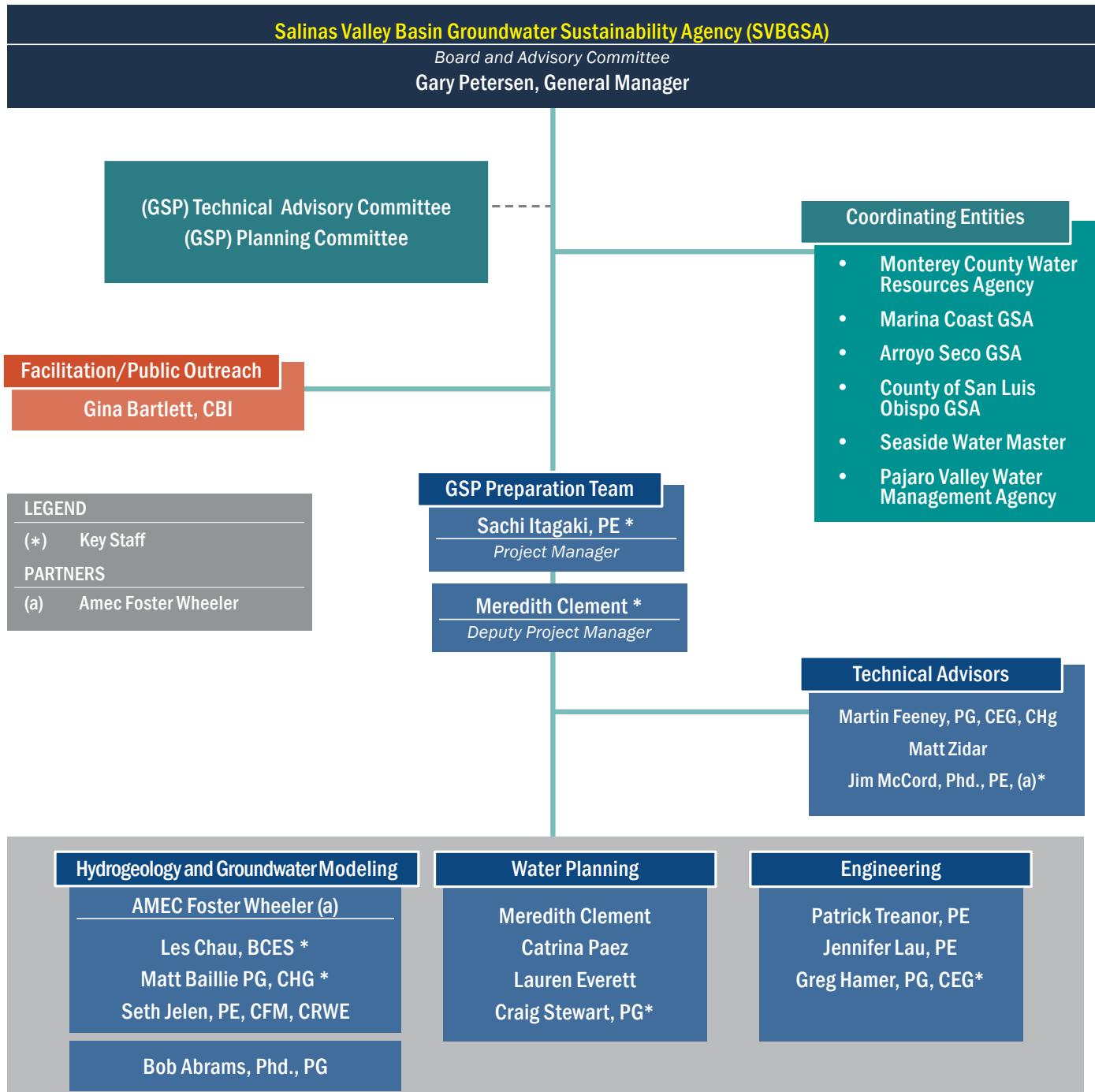
Amec Foster Wheeler has over five years of SGMA related experiences performing the in the following subject areas:

- Preparing comprehensive water supply and demand studies for any federal, state, city, or special districts involving an assessment of water supplies (surface and groundwater), water demands (agriculture, M&I, environmental) and providing population projections for future demands and water system infrastructure improvements.
- Leading/facilitating/moderating advisory committees, groups and interagency meetings in an effective, objective and diplomatic manner. Also working (participation) and providing technical support as part of an interagency (federal & local) technical term(s) in consensus-building, decision-making and discussions/negotiations.
- Prioritizing projects and completing resilience programs to reduce our clients' risks. We deliver services and value to our clients within a turn-key Resilient Infrastructure, Sustainable Communities (RISC™) project delivery framework. Our RISC™ services provide critical data inputs for the planning and analysis for resiliency, including micro-weather forecasting, coastal surge analysis, critical asset risk evaluation and multi-variable data analysis tools. Resilience options are compared using economic, social and environmental evaluation criteria that makes up a Climate Resilience: An Integrated Framework of Action as illustrated in Exhibit 2.1 to the left.

SECTION 4 | KEY PERSONNEL

...DELIVERED BY A BEST-IN-CLASS, LOCAL TEAM THAT HAS NO START-UP TIME...

Kennedy/Jenks will lead the team of largely local professionals and subconsultants - all of whom have pre-established relationships having worked on prior projects together to maximize efficient delivery and collaboration.



SACHI ITAGAKI, PE

PROJECT MANAGER

Sachi Itagaki has over 25 years of water resources and civil engineering experience, specifically in conducting integrated water resource planning and management programs including surface water and groundwater investigations; utility (water, recycled water, wastewater, and stormwater) infrastructure management, master planning, modeling, and design studies; water quality and hazardous waste investigations; and supporting the preparation of CEQA Compliance documents and obtaining project permits. She has worked extensively in groundwater management and investigation as well as the Integrated Regional Water Management Program (IRWMP) since its inception preparing both IRWM Plans and IRWM Planning and Implementation grant funding applications that have collectively resulted in approximately \$110 million of financial support for water resource planning and management programs as well as over \$451 million for groundwater investigations, recycled water and stormwater feasibility studies and construction of a range of water-related facilities including desalination, recycled water, ecosystem restoration, potable water infrastructure, and treatment. Sachi has also worked in Monterey County and the Salinas Valley area since 2006 on projects including a groundwater evaluation near the Carmel River, storm water Low impact development and storm water resource plan (SWRP) preparation as well as a successful \$10 million storm water implementation grant application. She has collaborated on several projects with Les Chau, Principal Hydrogeologist.

MEREDITH CLEMENT

DEPUTY PROJECT MANAGER

Meredith Clement has over 20 years of environmental consulting experience on a wide range of water planning projects throughout California. Meredith has special expertise with water planning projects, grant administration and writing, urban planning, and environmental compliance documentation, including the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). Meredith led the preparation of the Proposition 1 GSP Planning Grant application and has also managed several complex water planning efforts including a water rights change petition CEQA document.

LES CHAU, BCES

PRINCIPAL HYDROGEOLOGIST

Mr. Chau is a Principal Hydrogeologist with 26 years of consulting experience in groundwater resource studies, water quality compliance projects, and water infrastructure asset management. Mr. Chau was the Principal Investigator and Project Manager of the Salinas River Groundwater Basin Water Supply Investigation for the County of Monterey. The project started in 2014 is a five-year investigation of long term water supply, drought and climate change related risk assessments on water quality and supply. He leads a team of quantitative hydrogeologists, surface water hydrologist to participate in the Technical Advisory Committee and stakeholder discussions to manage; data collection, groundwater pumping (i.e. new state legislation and formation of GSA), climate change impacts on water quality and supply, and seawater intrusion mitigation.

From 2008 to 2013, Mr. Chau served as Project Manager for the San Francisco Public Utilities (SFPUC) South-Westside Groundwater Basin Storage and Recovery Project and the San Francisco Groundwater Project. He managed the multifaceted program as the Project Manager. He also served as project manager for the environmental impact studies for the project which was completed with public comments in 2013. The project concluded with the certification of the EIR in August 2014 and construction began early 2015.

MATT BAILLIE, PG, CHG

SENIOR HYDROGEOLOGIST

Mr. Baillie is a quantitative hydrogeologist with more than 10 years of experience in consulting, specializing in numerical modeling, with extensive expertise in the MODFLOW suite of programs. His past projects have involved all aspects of the water cycle, including groundwater-surface water interaction, groundwater flow, runoff generation, statistical analysis of precipitation patterns, and solute transport. His modeling experience ranges in scale from individual sites to entire alluvial basins. Additionally, Mr. Baillie is experienced in aquifer storage and recovery, seawater intrusion, climate change, nat-

SECTION 4 | KEY PERSONNEL

ural and environmental tracers (including stable isotopes and temperature), and aquifer test performance and analysis. Mr. Baillie has presented technical results of select projects in technical settings, such as the Groundwater Resources Association of California annual meeting. He has also assisted on field projects, including the installation and testing of monitoring wells and investigation of potential collector well sites

CRAIG STEWART, PG

PRINCIPAL HYDROGEOLOGIST

Mr. Stewart has more than 35 years of professional experience in the fields of hydrogeology, groundwater resources assessment and management, soil and groundwater quality assessment and remediation, and engineering geology. He has worked on projects involving groundwater basins, groundwater quality and resources evaluations, production water well design, groundwater recharge facilities, and surface water/groundwater interactions in diverse groundwater basins in coastal, inland, bedrock, and alluvial hydrogeologic environments. He has developed and refined basin water balances, characterized hydrogeologic conditions using a wide variety of drilling, sampling, and exploratory techniques in unconsolidated sediments and bedrock, conducted and analyzed data from a wide variety of hydraulic tests in boreholes and wells, and applied numerical models to simulate groundwater flow in a variety of hydrogeologic settings. Mr. Stewart has provided expert consultant services for matters involving water rights, subsidence, and soil and groundwater contamination.

JIM MCCORD, PE, PHD.

PRINCIPAL ENGINEER – HYDROGEOLOGY

Dr. McCord has more than 30 years of experience in hydrology, hydrogeology, and water resource investigations, with emphasis on characterization of groundwater and surface water systems, numerical modeling of hydrologic systems, river basin planning and management, water supply and availability analysis, vadose zone hydrology, contaminant hydrology, surface water and groundwater interaction, and water rights. He is a recognized expert in Vadose Zone Hydrology, teaching short courses for the Nuclear Regulatory Commission and the International Atomic Energy Authority on this topic. He has authored numerous consulting reports and technical peer-reviewed papers, and co-authored the textbook, Vadose Zone Processes (CRC Press, 1999). He served as an Adjunct Professor of Earth Science at New Mexico Technical University since 1991, as well as Adjunct Professor of Civil Engineering at the University of New Mexico and of Civil and Environmental Engineering at New Mexico Tech since 2007.

GREG HAMER, PG, CEG

SENIOR HYDROGEOLOGIST

Mr. Hamer has performed and managed water resources investigations and environmental studies for more than 35 years. His water resources expertise includes basin studies, conjunctive use evaluations, water quality studies, production well field analysis, litigation support for water rights issues, supply well rehabilitations, and geologic and hydrogeological studies. His environmental experience includes site characterizations and assessments, remediation of contaminated soil and groundwater, and regional screening and siting studies. Mr. Hamer has managed and performed groundwater investigations throughout Southern and Central California, including studies of both coastal and inland basins. He has performed hydrogeological and environmental evaluations of more than 20 groundwater basins in the eastern and northern Mojave Desert, and for basins in other parts of California. His work experience also includes development of detailed groundwater basin water balances for water supply.

SETH JELEN, PE, CFM, CWRE

PRINCIPAL ENGINEER-WATER RESOURCES

Mr. Jelen, PE, CFM, CWRE is a Principal Engineer with over 26 years of professional experience in the field of water resources science and engineering, modeling, software development, and GIS analysis. His first project was to calibrate an HSHP hydrologic model for the Napa River at St. Helena, California. His practice grown to surface water including flow (both runoff and water supply prediction), flooding (hydrology), flood elevation, flood mitigation, and floodplain mapping and management), and water quality (instream and pollutant load modeling). He is an expert in: continuous hydrologic modeling; hydraulic modeling in 1- and 2-dimensions and both steady and unsteady/dynamic states; water quality anal-

SECTION 4 | KEY PERSONNEL

ysis; transport of sediment and pollutants in streams and upland off urban surfaces; and in custom application development using C++, Visual Basic and other languages.

BOB ABRAMS, PHD., PG

WATER QUALITY AND HYDROGEOLOGY

Dr. Abrams is a California-licensed Professional Geologist and Certified Hydrogeologist specializing in quantitative analysis of groundwater and vadose zone systems. Dr. Abrams has extensive experience developing and implementing models and conducting data analysis to support sustainability and impact analyses, feasibility studies, water rights analysis, and water supply development. He has gained particular expertise in groundwater flow, artificial groundwater recharge, solute transport, and redox zone analyses. He has successfully addressed issues of water quality, groundwater sustainability, enhanced recharge and aquifer storage, and water supply development. His broad background includes projects for agricultural, food and beverage, municipal, petroleum, railroad, and chemical clients. His water quality work has addressed a wide range of issues including nitrates, pesticides, salinity, metals, petroleum hydrocarbons, and chlorinated solvents. Dr. Abrams has worked successfully as an independent contractor, for private consulting firms, as an adjunct professor for San Francisco State University, and for the USGS.

CATRINA PAEZ

WATER RESOURCE PLANNER

Catrina is a Water Resource Specialist with 8 years of experience in water resource-related research and planning, including IRWM Plans, Urban Water Management Plans, water supply assessments, and other planning documents. Catrina has also contributed to numerous successful grant applications, including for Proposition 84 Implementation and Planning grants, Proposition 1 Stormwater Grant Program, and USBR WaterSmart grants totaling close to \$90 million in authorized grant funding.

LAUREN EVERETT

WATER RESOURCE PLANNER

Lauren Everett has over 16 years of water supply and demand management planning, integrated water resource planning, grant writing, grant administration, and project management experience in Southern California. She has a strong working knowledge of local, state, and federal laws pertaining to management of water resources including Urban Water Management Plan analyses and updates; specialized focus and demonstrated success in implementation of Department of Water Resources (DWR's) Proposition 84 IRWM Grant Program, writing successful grant applications, and associated IRWM plan development.

PATRICK TREANOR, PE

INFRASTRUCTURE ENGINEER

Patrick Treanor is a civil engineer with a broad range of skills and experience in water and wastewater infrastructure engineering. Patrick has 12 years of experience at Kennedy/Jenks and is adept in project management, planning, asset management, detailed design, field engineering, and construction management. Patrick has worked as a project manager or lead engineer on over 30 design and construction projects. He has also completed a long list of planning and feasibility studies and has started projects from the planning stages, and overseen them through design, bidding, construction, start-up, and final completion. His experience managing interdisciplinary design projects has given him significant insight and knowledge of electrical, mechanical, instrumentation and structural engineering disciplines in addition to civil engineering.

JENNIFER (LAU) LARSEN, PE

WATER RESOURCE ENGINEER

Jennifer Larsen is a registered civil engineer with a range of experiences in water resources planning. She has assisted in the development and coordination of numerous plans and strategies related to water supply/demand, floodplain

SECTION 4 | KEY PERSONNEL

management and flood emergency response, wastewater, and water/energy efficiency. Jennifer has developed multiple water balances and mathematical models to support planning projects and programs and has contributed to the writing of Integrated Regional Water Management Plans and grant applications, storm water resource plans, wastewater master plans, CEQA documentation, and groundwater assessment reports.

Jennifer is well-versed in California Department of Water Resources IRWMP documentation requirements. Jennifer has completed multiple water supply and demand projections, analyzing demographic, land use, and conservation (SBx7-7) data and implications. Jennifer has years of experience with writing IRWM planning documents, SWRP and grant applications.

MARTIN FEENEY, PG, CEG, CHG

TECHNICAL ADVISOR

Mr. Feeney has more than 30 years experience in groundwater consulting. After employment as a well-site geologist in the oil industry and again as an engineering geologist, Mr. Feeney was a founding Principal of Staal, Gardner and Dunne, Inc. (later became Fugro West, Inc.) and managed this firm's Monterey County office for 9 years. Mr. Feeney later was a member of the firm, Balance Hydrologics, Inc. Mr. Feeney is currently a private consultant. Mr. Feeney's experience in groundwater supply issues includes well siting and design, preparation of project specifications and contractor supervision, well maintenance and repair, water treatment, groundwater modeling (both flow and solute-transport), perennial yield analysis, artificial recharge (surface and injection), water quality assessments, regulatory compliance and groundwater modeling.

Mr. Feeney has significant experience in drilling and well construction technology. During his career Mr. Feeney has designed and managed the construction of over 80 municipal wells with diameters up to 24-inches and discharge rates of up to 6,000 gpm at locations around the world.

MATT ZIDAR

TECHNICAL ADVISOR

Matt has been engaged in surface water and groundwater resources planning, management and engineering for 30 years in both the public and private sector, and is positioned to support clients implement programs to comply with the California Sustainable Groundwater Management Act signed. He has developed a number of groundwater management plans and integrated regional management plans, and the needed technical and policy analysis required to help communities make decisions. This includes working in high priority groundwater basins and those in critical overdraft. Areas of expertise include groundwater recharge/storage, conjunctive use, reservoir operations, nitrates, seawater intrusion, wastewater recycling, water rights, water conservation, surface and groundwater modeling, GIS applications, projects formulation, alternatives evaluation, regulatory compliance (CEQA, NEPA, ESA, CWA), grant writing, process facilitation and stakeholder involvement. Areas where my expertise has been applied include the California Central Coast, Sacramento and San Joaquin Valleys and Delta, and Southern California desert.

SECTION 5 | FIRM QUALIFICATIONS

QUALIFICATIONS TO MEET YOUR NEEDS

The Kennedy/Jenks Team's experience in assisting clients within the Salinas Valley and regional, watershed based planning efforts such as Integrated Regional Water Management (IRWM) Plans and Storm Water Plans that are similar in size and scope to yours. We feel these projects demonstrate our firm and team's extensive qualifications in preparing groundwater management documents, integrated water plans and administration of grants. A summary table follows with the agency and the types of groundwater IRWM services that the Kennedy/Jenks team has provided. More detailed project descriptions follow the table.

Kennedy/Jenks Team Experience			
AGENCY/CLIENT NAME	GROUNDWATER STUDIES, MODELING & PLANS	IRWM PLAN AND SWRP PREPARATION	GRANT APPLICATIONS/ADMINISTRATION
KENNEDY/JENKS CONSULTANTS			
Salinas Valley Basin Groundwater Sustainability Agency			X
City of Salinas		X	X
Monterey Regional Water Pollution Control Agency		X	X
Monterey County Water Resources Agency	X		
YCFCWCD/Westside IRWMP		X	X
Tuolumne Utilities District/Tuolumne- Stanislaus IRWM		X	X
Castaic Lake Water Agency/Upper Santa Clara River IRWM	X	X	X
San Diego, Santa Cruz and Santa Barbara IRWM			X
Contra Costa Water District/ East Contra Costa County IRWM			X
Yosemite-Mariposa IRWMP		X	X
Western MWD	X	X	X
AMEC FOSTER WHEELER			
San Antonio Interlake Tunnel and San Antonio Spillway Modification Project, Monterey County, CA	X		
Salinas River Groundwater Basin Investigation and State of the Basin Report, Monterey County, CA	X		
*Regional Groundwater Storage and Recovery Project, City of San Francisco	X		
*Revision of the September Ranch Environmental Impact Report, Carmel Valley	X		
*Hydrostratigraphic Studies and Seawater Intrusion Assessment of the Northern Salinas Valley	X		
*Basin Management Objectives Information Center (BMOIC)	X		
Groundwater Level and Water Quality Data Management and Compliance Reporting Project	X		
Mesquite Lake Sub-basin Groundwater Study, Twentynine Palms, CA	X		
*Santa Margarita Groundwater Basin Investigation, Scotts Valley, CA	X		

* AMEC Staff while with Kennedy/Jenks Consultants

SECTION 6 | DETAILED LIST OF TASKS

Groundwater Sustainability Planning Services - Salinas Valley Basin Groundwater Sustainability Agency

The Salinas Valley Basin Groundwater Sustainability Plan (GSP) is complex both in the skills it will require to prepare, the geography it spans, and the diverse interests involved. The Kennedy/Jenks Team has hydrologists and basin (stakeholder) experts who have extensively collaborated in the Salinas Valley Groundwater Basin that can support the Groundwater Sustainability Agency (GSA) to expedite data dissemination and technical analyses and start informational discussions with the GSA shortly after project initiation.

GSP Preparation Team: As illustrated in Figure 1, the approach is to: (1) quickly organize teams to tackle the specific details; (2) conduct a robust planning process; and (3) undertake the GSP in discrete, specific tasks. Importantly, the Team is very familiar with the DWR SGMA Best Management Practice (BMP) documents as they are key to this project. The DWR BMPs internet links are referenced in the task descriptions below. The proposed teams are:

- the GSA Management Team, which would include the GSA General Manager, Legal Counsel, and Financial Officers;
- the Technical Team, made up hydrogeologists, geologists, infrastructure engineers, and groundwater modelers, the members of which are described in this Statement of Qualifications;
- the GSP Advisory Committee, assumed to be a subset of the GSA Advisory Committee, which will be consulted and provide input at critical junctures in the GSP preparation process;
- the Public Outreach Team, assumed to include the Facilitator from the Consensus Building Institute, consulting directly to the Salinas Valley Basin GSA (SVBGSA), which will continue to provide services to the GSA and will be part of the team that performs outreach and facilitation related to GSP development;
- the Plan Preparation Team, which will take the work of the other teams and documents it in the GSP; and
- the Program Management Team, which is made up of representatives from each of the various teams and makes sure the necessary interface between tasks and personnel occur.

GSP Preparation Approach: The SVBGSA area encompasses the entire Salinas Valley Groundwater Basin (SVGB) within Monterey County, and contains seven sub-basins.

Water Code § 10720.7 requires that critically overdrafted basins be managed under a GSP (or coordinated GSPs) by January 31, 2020. The Water Code requires all other groundwater basins designated as high or medium priority basins to be managed under a GSP by January 31, 2022. The SVGB contains 2 sub-basins that are critically overdrafted, the 180/400 Foot Aquifer sub-basin and the Paso Robles Area sub-basin. The remaining sub-basins are the East Side Aquifer, Forebay Aquifer, Upper Valley Aquifer, Langley Area, and Monterey. The schedule to complete the GSP requirements for the critically overdrafted basins is quite aggressive; however, it is the desire of the SVBGSA to complete a compliant GSP that covers all seven sub-basins by January 2020. The Team assumes that a single Groundwater Sustainability Plan will be prepared for the seven sub-basins of the SVGB).

To accommodate this challenging schedule the Kennedy/Jenks Team proposes: (a) evaluating the SVGB as a whole, from upstream (the headwaters of the Salinas River) to downstream to follow the path of water and reviewing sustainability criteria and management actions common to each sub-basin and (b) starting with 3 monitoring sites as representative for each sub-basin (for budget and schedule purposes). The result will be a GSP that is compliant with DWR guidelines.

If, as GSP tasks progress it becomes apparent that it is necessary to prepare more detailed sub-basin analysis - for technical reasons or because of Stakeholder input-priority will be given to the critically-overdrafted basins. Amended GSP sections will be prepared for these sub-basins as data, additional analysis, and stakeholder input are completed. In this manner, the necessary requirements for the critically overdrafted sub-basins can be met and the single GSP amended to incorporate the other sub-basins as completed. Preparing amendments to the GSP (rather than completing the entire GSP by January 2020) will require an amended scope and may require additional budget.

TASK 1. PROGRAM MANAGEMENT

Program Management involves determining the steps needed to complete the GSP, managing the resources undertaking the various GSP tasks, making sure the various teams have the data and input needed to perform their respective tasks, and review of work products. As part of Program Management, twice monthly telephone calls will be held. The calls are intended to keep the SVBGSA informed on the progress of technical analyses, given the GSP's large scope and aggressive schedule. On a quarterly basis the schedule of the GSP will be reviewed and the Program Management Team

SECTION 6 | DETAILED LIST OF TASKS

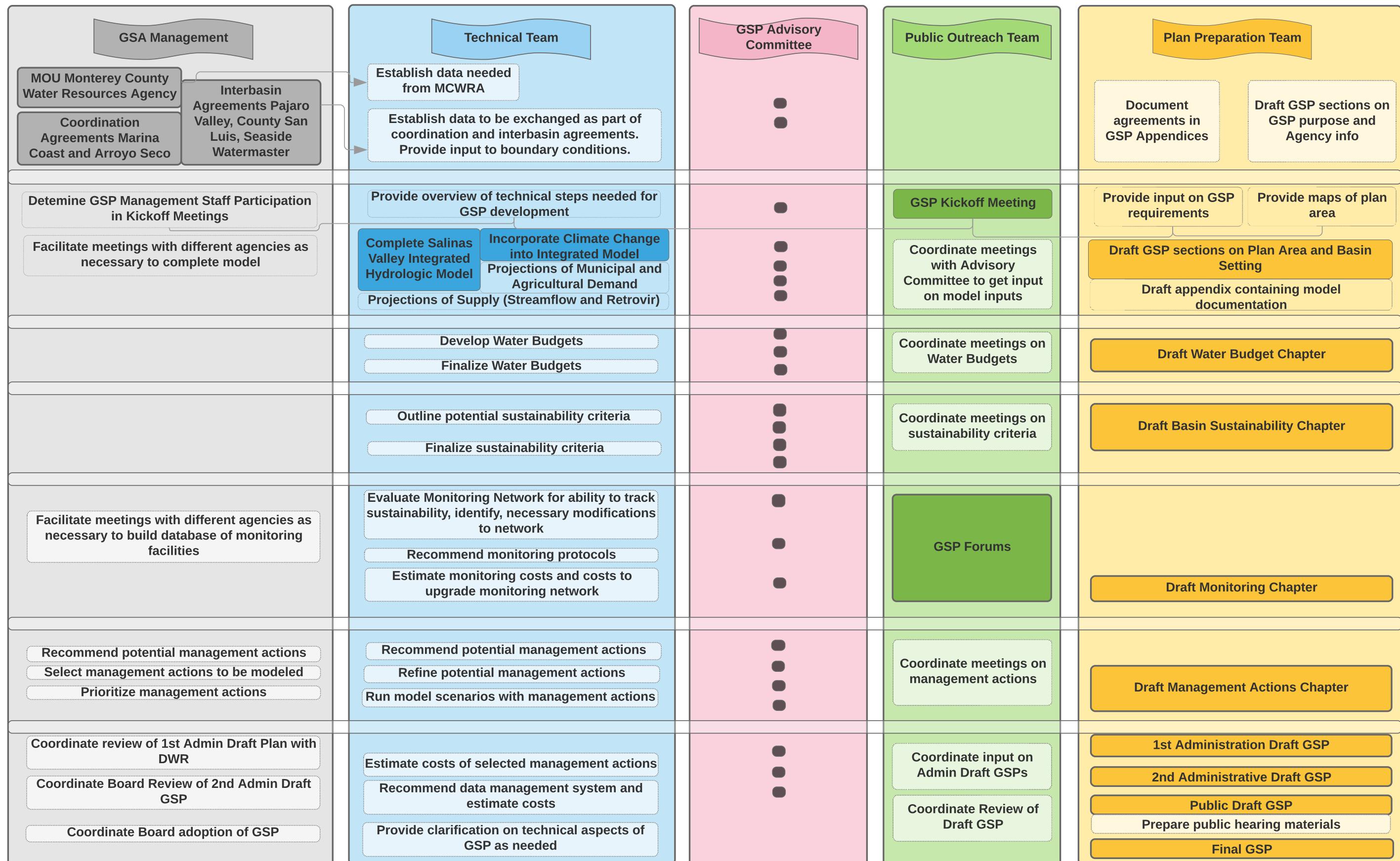


FIGURE 1: GROUNDWATER SUSTAINABILITY PLAN

will determine if adjustment to the approach or tasks are needed.

Deliverables: Monthly technical memorandum (TM) to update the GSA; Twice a month conference calls

Schedule: Ongoing from kickoff to adoption of GSP

Proposed Staff: Sachi Itagaki, Matt Zidar, Martin Feeney, Les Chau, and Meredith Clement

TASK 2. GROUNDWATER SUSTAINABILITY PLAN PUBLIC OUTREACH AND STAKEHOLDER FORUMS PREPARE COMMUNICATIONS/COORDINATION PLAN

This task is an extension of the work that began with the formation of the SVBGSA. It is assumed that much of this task will be handled by the Facilitator used during formation of the GSA, who will report directly to the GSA. At the start of the GSP preparation process, Kennedy/Jenks will develop an outline of the GSP steps and the opportunities for stakeholder and public input. This will provide a foundation for the draft communication and coordination plan to be prepared by the independent Facilitator. Ahead of each major task, Kennedy/Jenks will propose a meeting schedule, including meeting topics and desired outcomes. Based on the lessons learned at each step, Kennedy/Jenks will propose updates and refinements to the communication and coordination plan. Kennedy/Jenks has planned and budgeted for up to two staff:

- At each of the 4 GSP Kickoff Meetings (to be held in different locations)
- At up to 22 meetings of the GSP Advisory Committee
- At 4 GSP Forums in the Spring of 2019
- At 4 GSP Forums in the Spring of 2021 (if needed)
- At the public hearing for the GSP

Deliverables: Extended outline of GSP; GSP Communication and Coordination Plan (by Facilitator)

Schedule: Ongoing from kickoff to adoption of GSP, anticipate covering outreach in twice monthly calls

Proposed Staff: Sachi Itagaki and/or Matt Zidar, and others depending on meeting topic

Conditions, constraints, or problems: There are two major challenges to the outreach aspect of the SVBGSP: (1) the broad geography of the Salinas Valley and (2) the desire for significant input from diverse Stakeholders. To overcome the first challenge, this scope has planned and budgeted for meetings in different geographies. To overcome the second challenge, significant coordination between Kennedy/Jenks and the Facilitator is proposed.

TASK 3. MEMORANDUM OF UNDERSTANDING WITH THE MONTEREY COUNTY WATER RESOURCES AGENCY

This task is already underway, and is being led by GSA management staff. Kennedy/Jenks will support this work by providing specifics on the data needed from MCWRA. The status of the MOU will be tracked by the Kennedy/Jenks Project Manager and the resulting terms of the MOU will be provided to the relevant teams. For example, the Project Manager and Technical Team will review the MOU conditions affecting the use of MCWRA data.

Deliverable: TM describing data needed from MCWRA to assist preparation of MOU

Schedule: November 2017 to February 2018

Proposed Staff: Sachi Itagaki and Les Chau

Conditions, constraints, or problems: MCWRA is its own agency with its own authorities and its geography and mission largely overlap with SVBGSH. It will take a concerted effort to develop a framework for an MOU that both agencies are satisfied with. MCWRA has invested significant effort in studies and the development of models related to local groundwater. MCWRA has noted a willingness to share its studies, data, and models with SVGSA but also stated concerns with some of the proprietary aspects of this past work. The need for a sufficient MOU and the complexity and volume of past work by MCWRA could postpone execution of the necessary MOU and delay use of the Integrated Salinas Valley Hydrologic Model on behalf of the GSP. The Kennedy/Jenks Team consists of experts already familiar with the Integrated Salinas Valley Integrated Hydrologic Model and this will help overcome any delays in execution of the MOU and facilitate the quick transfer of the tools to SVBGSH use.

TASK 4. COORDINATE WITH MCWRA

Once the MOU is executed, it will be necessary for the Kennedy/Jenks Team to review the available data and studies. It will also be necessary to expeditiously review the data with MCWRA staff and consultants to fully understand all nuances of the studies, data, and models. Of particular importance:

- “Transfer” and use of the Salinas Valley Integrated Hydrologic Model;
- Groundwater and hydrologic data and GIS maps; and
- Existing studies in support of the GSP and vetting of this information to be reflected in the potential management actions (Task 14).

Deliverable: TM informing the GSA of studies, models, and data that will be used in development of the GSP.

Schedule: February 2018 to April 2018

Proposed Staff: Sachi Itagaki, Les Chau, Matt Baillie,

Martin Feeney, and Meredith Clement

TASK 5. DEVELOP COODINATION AGREEMENTS

The Arroyo Seco GSA proposes to include a portion of the Forebay Aquifer sub-basin, which is also a part of the SVBGSA. The Marina Coast GSA proposes to include a portion of the 180/400 Foot Aquifer and Monterey sub-basins. It is assumed that a result of the Coordination Agreements sub-basins will be divided into formal Management Areas, whereby the SVBGSA agrees to manage a specific portion of the Forebay Aquifer sub-basin (e.g., that portion outside of the City of Greenfield) and a specific portion of the 180/400 Foot Aquifer sub-basin (e.g., that portion south and east of Highway 68). GSA management staff started the Coordination Agreements during GSA formation. Kennedy/Jenks will support this work by recommending how data could be shared between agencies and developing a discussion of conditions at the boundaries of the various management areas.

The resulting Coordination Agreements will be reflected in the GSP “Plan Area” section and included in the Appendices . The status of the Coordination Agreements will be tracked by the Kennedy/Jenks Project Manager and the resulting terms of the agreements will be provided to the relevant teams. For example, the means and manner of taking input from the Arroyo Seco GSA and Marina Coast GSA will be provided to the Public Outreach Team to ensure relevant contacts are added to the interested parties list and included in relevant communications.

Deliverable: TM to assist preparation of GSA agreements; inclusion of Coordination Agreements in GSP

Schedule: April 2017 to March 2018

Proposed Staff: Sachi Itagaki and Martin Feeney

Conditions, constraints, or problems: Neighboring GSAs differ in their governance, their funding and staffing, and their readiness to execute agreements. This may make it difficult to enter into Coordination Agreements early in the GSA process. A way to overcome this issue is to tackle the Coordination Agreements in steps and amend the agreements over time. For example, the parties may first agree on the different management areas, then tackle a common understanding of the existing conditions, then determine how the different GSAs will share data, and ultimately come up with a framework for funding and implementing beneficial management actions. This approach would allow GSPs preparation to proceed while the agreements are being developed and finalized.

TASK 6. DEVELOP INTERBASIN AGREEMENTS

The SVGB is adjacent to basins managed by the Pajaro Valley Water Management Agency, various GSAs in the County of San Luis Obispo overlying the Paso Robles Area sub-basin, and the adjudicated Seaside sub-basin. The goal of the Interbasin Agreements is to ensure that the sustainability goals of the different GSPs not interfere with each other and, if possible, complement each other. The GSA management staff started work on the Interbasin Agreements during GSA formation. The Kennedy/Jenks Team will support this work by recommending how data could be shared between agencies and developing a discussion of conditions at the boundaries of the various basins. The Interbasin Agreements will be reflected in the GSP section on “Plan Area” and included in the Appendices to the GSP. The status of the Interbasin Agreements will be tracked by the Kennedy/Jenks Project Manager and the resulting terms of the agreements will be provided to the relevant teams.

Deliverable: TM to assist preparation of Interbasin agreements

Schedule: April 2017 to March 2018

Proposed Staff: Sachi Itagaki, Les Chau, Matt Baillie, and Martin Feeney

TASK 7. DEVELOP GSA BYLAWS

This task, described in the grant application, will be undertaken by others outside of the Kennedy/Jenks Team. However, the resulting GSA Bylaws will be described in the GSP section on “Agency Information” and will be included as a GSP Appendix.

Deliverable: Insert of Bylaws in draft and final GSPs

Schedule: Not Applicable (N/A)

Staff: N/A

TASK 8. DEVELOP FUNDING MECHANISM FOR SVBGSA OPERATIONS

This task, described in the grant application, will be undertaken by others outside of the Kennedy/Jenks Team. However, the resulting GSA budgets will be described in the GSP section on “Agency Information” and will be input to the section “Estimate of GSP Implementation Costs”. The funding plan will be included as a GSP Appendix.

Deliverable: Insert of GSP funding plan in draft and final GSPs

Schedule: N/A

Proposed Staff: N/A

Conditions, constraints, or problems: The SVBGSA is currently operating based on contributions from member agencies and this funding is expected to allow GSA operation for two years. A funding mechanism is necessary for continued existence of the GSA. One difficulty is that the funding mechanism will likely be developed before all the plan management actions are defined, evaluated, and selected. Once the GSP management actions are selected and the costs understood it may be necessary to update the planned funding mechanism.

TASK 9. COMPLETE AND USE SALINAS VALLEY INTEGRATED HYDROLOGIC MODEL, INCLUDING CLIMATE CHANGE

This task covers all efforts required to use the Salinas Valley Watershed Model (SVWM) and Salinas Valley Integrated Hydrologic Model (SVIHM) to support analyses required for GSP preparation. The SVIHM will be used to prepare historical water budgets and groundwater conditions for the GSP Basin Setting section (see Task 11). Consistent with DWR Best Management Practices, the SVWM and SVIHM will be modified to: 1) produce a baseline model; 2) incorporate climate change into the model; and 3) incorporate projects and management actions.

As noted below (Task 12), the SVIHM will be the main quantitative tool used to craft the Sustainable Management Criteria and to assign Representative Monitoring locations. The SVIHM started development in 2013 and is currently transitioning from the USGS to consultants for its intended use in support of all environmental and engineering projects and most importantly to assess the water balance (budget) in the Salinas River Valley groundwater basin.

Groundwater Model Selection: The SVIHM is an integrated groundwater-surface water model, built using the MODFLOW-OWHM code, that also incorporates reservoir operations directly into the numerical modeling software, as shown on figure 2. This model uses state-of-the-art approaches to groundwater flow simulation, surface water routing, demand calculations, and reservoir operations, and satisfies the requirements of the GSP Emergency Regulations and the recommendations in the DWR BMP for Modeling. During development of the SVIHM, the Technical Advisory Committee (which included representatives from stakeholders in the SVGB) discussed existing models and alternative modeling software codes, and agreement was reached that a new model (i.e., the SVIHM) would be constructed to supplant

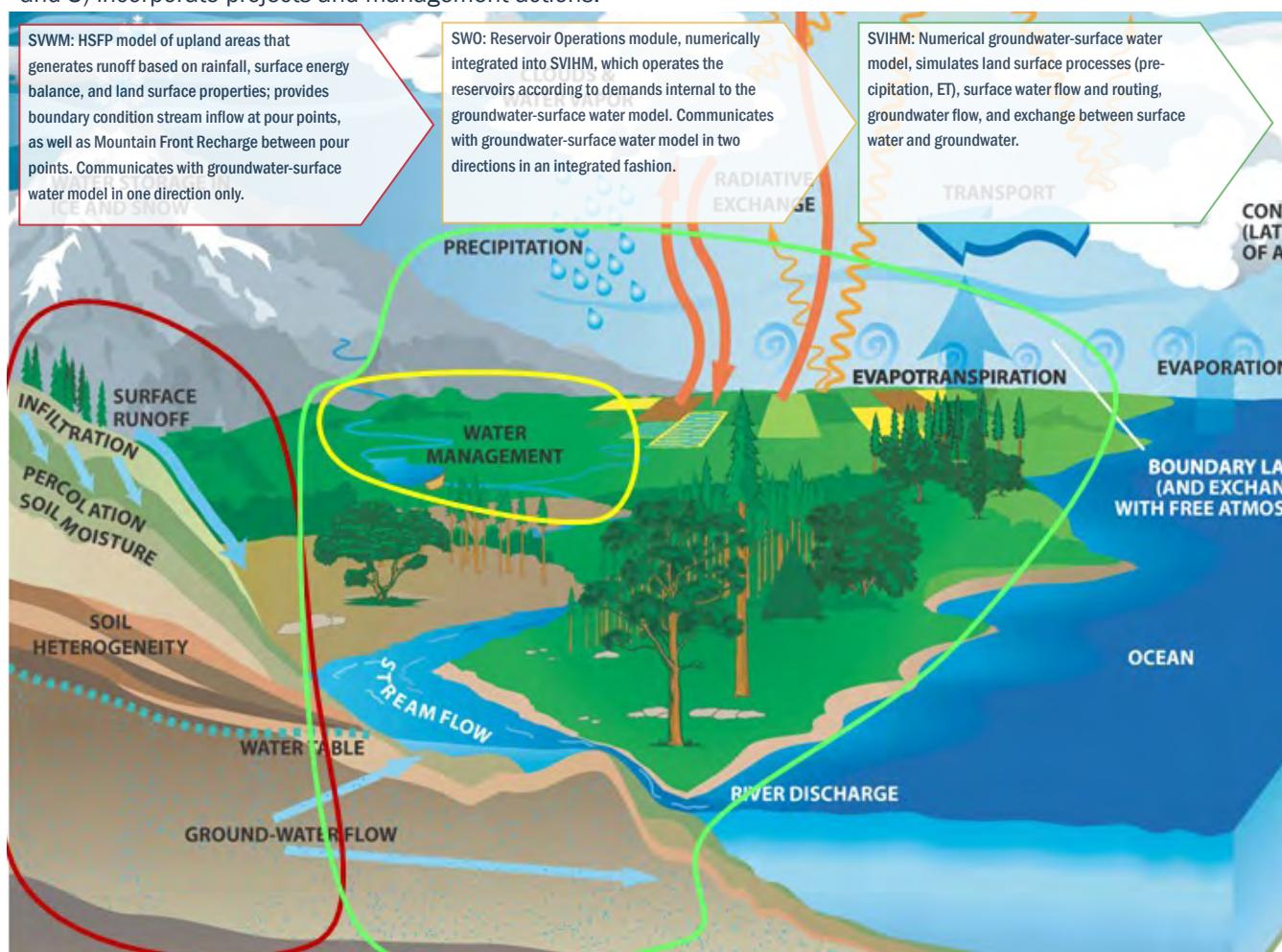


FIGURE 2: INTEGRATED HYDROLOGIC MODEL

previous basin-wide models (e.g., the SVIGSM), which were deemed to be outdated, and would use the MODFLOW-OWHM code, which was determined to be the most appropriate modeling code for simulating conditions in the SVGB. This project will rely on the SVIHM (and the associated SVWM, which simulates runoff from upland areas into the SVIHM) to simulate conditions within the groundwater-surface water system; the SVIHM will satisfy the needs of the GSP. Additional modeling tools may be appropriate for specialized applications (such as the existing Salinas River HEC-RAS model), but the bulk of the GSP work will use the SVIHM.

As required by the GSP Emergency Regulations, the Baseline Model hydrology will be based on the past 50 years of precipitation, temperature, evapotranspiration, and streamflow; future water demand will rely on the most recent land use information (e.g., land use, crop coefficients, and evapotranspiration); and future water supply will rely on the most recent water supply information. The Baseline Model will simulate future conditions assuming current levels of supply and demand continue over the GSP planning and implementation period. Groundwater and surface water flows simulated under the Baseline Model will be included in the GSP Water Budget.

Analysis of Climate Change Effects: This task will include a quantitative assessment of the effects of climate change and sea level rise on the groundwater system, accomplished by incorporating climate and sea level futures into the SVWM and SVIHM. The model will use a prepared set of climate change data provided by DWR, or will rely on USGS Basin Characterization Model (BCM) datasets, which have the advantage of being: 1) spatially continuous with the results of General Circulation Models (GCMs) used by the Intergovernmental Panel on Climate Change (IPCC); 2) temporally continuous with the historical record; and 3) available at a fine spatial resolution (270 meters). A suite of potential climate futures has been prepared for the BCM, which, when incorporated into the SVWM and SVIHM, will provide for a robust analysis of the uncertainty inherent in climate change. Similarly, sea level rise projections for the suite of IPCC climate futures have been prepared for the California coast. Scenarios incorporating climate change and projects and management actions will be compared to both current conditions and the Baseline Scenario (to show the impact of climate change or the project or management action being considered). Climate change and sea level rise scenario results will be incorporated in the GSP Water Budget.

Use of the Groundwater Model: The SVWM and SVIHM will be updated to incorporate planned or potential projects

and management actions (developed as part of Task 14) to demonstrate their effects on the groundwater system. The simulated conditions will be compared to the Baseline Model to show the effect of each project or management action in isolation, and additional simulations will show the combined effects of several management actions. These simulations will be used to evaluate the feasibility of proposed projects and management actions for achieving the Sustainability Goal in each sub-basin over the planning and implementation period, and will be used to set measurable objectives. The project and management action scenario results will be incorporated into the GSP Water Budget.

Deliverable: TMs to inform the GSA of model results for various GSP sections. The number of TMs will not exceed 7, one every other month.

Schedule: February 2018 to October 2018

Proposed Staff: Matt Baillie, Jim McCord, Seth Jelen, Sachi Itagaki, Matt Zidar, Martin Feeney and Bob Abrams

Conditions, constraints, or problems: The schedule above assumes that the USGS will deliver the historical SVIHM, calibrated through 2014, in a ready-to-use state by February 2018. It is assumed that the model will include a fully operational version of the Surface Water Operations (SWO) package, which operates the reservoirs tributary to the SVGB based on demands calculated dynamically from conditions within the integrated groundwater-surface water model. No changes to the structure of the historical model (e.g., layering, aquifer parameters, location and type of boundary conditions, etc.) are anticipated to prepare it for use as a predictive model.

TASK 10. PLAN AREA AND BASIN SETTING

Extensive data on land use (existing and projected), existing water resource monitoring and management, parties affected by the GSP, principal aquifers and aquitards, surficial geology, soils, recharge areas, and surface water features already exist, as do data on groundwater quality and seawater intrusion, including:

- Geology of Southern Monterey Bay Region, 1977.
- Salinas Valley Seawater Intrusion Study, 1984.
- Sources of Saline Intrusion in the Pressure 400-Foot Aquifer, Castroville Area, CA, 1989.
- Hydrogeologic Investigation of the Salinas Valley Basin in the Vicinity of Fort Ord and Marina, Salinas Valley, California, 2001.
- Geohydrology of a Deep-Aquifer System Monitoring-Well Site at Marina, 2002.
- Hydrostratigraphic Analysis of the Northern Salinas Valley, 2004.
- Protective Elevations to Control Sea Water Intrusion

in the Salinas Valley, 2013.

- Groundwater Usage Analysis, 2014.
- Storage Change Analysis, 2015.
- State of the Basin Report, MCWRA 2015

The approach to this task will be to use existing information to the extent possible, updated to be consistent with the SVIHM, and data produced during negotiations of the Coordination Agreements and Interbasin Agreements. An overview of the entire Salinas Valley will be prepared with separate sections on each of the sub-basins and management areas.

Deliverable: Draft Plan Area Chapter for the GSP

Schedule: February 2018 to August 2019

Proposed Staff: Meredith Clement, Sachi Itagaki, Catrina Paez, Jennifer Lau, Les Chau, Matt Baillie, and Bob Abrams

TASK 11. WATER BUDGETS

The GSP Emergency Regulations (Section 354.18) require the development of a detailed water budget that quantifies annually, for each sub-basin: all groundwater inflows and outflows; surface water inflows and outflows; groundwater entering or leaving storage; and the amount of overdraft, if any. The GSP water budget information must cover past, present, and future conditions. The water budget must also estimate sustainable yield. Water budgets will be presented in both graphical and tabular formats, and will also be described narratively.

The Water Code defines sustainable yield as “the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result.” The sustainable yield will be calculated using the historical water budget, and will represent the average amount of groundwater that can be removed from each sub-basin without causing undesirable results. Because the Salinas River is managed in part to recharge the groundwater sub-basins, streamflow losses will not necessarily (or fully) be considered an undesirable result, although their impact on habitat and other constraints will be considered.

The Salinas Valley Groundwater Basin is out of balance (State of the Basin Report, MCWRA 2015). The planned engineering projects as listed in Task 14 and the GSP process are intended to collectively and in time achieve sustainable use of the basin water resources. Balancing the water budget across subbasins and in the entire SVGB has been, and will be, a challenging effort one which will require the continued collective effort by upstream and downstream users to agree on practicable

and sustainable management criteria (Task 12).

The SVWM and SVIHM will be used to prepare Water Budgets for the entire model area and for each sub-basin covered by the model area, following the requirements of the GSP Emergency Regulations and the recommendations in the DWR BMP for Water Budgets; additional water budgets can be prepared for any grouping of cells within the model domain, as appropriate. Historical water budgets will be compared to independent estimates of water budget components, such as those given in the State of the Basin Report.

Deliverable: TM on water budget

Schedule: October 2018-January 2019

Proposed Staff: Matt Baillie, Craig Stewart, Les Chau, Martin Feeney, Bob Abrams and Matt Zidar

Conditions, constraints, or problems: This task assumes that available estimates of water budget components, including those directly measured (e.g., municipal and agricultural well pumping rates, surface water flow at gauges), those estimated based on measurements (e.g., the storage change estimates, and those calculated by numerical models (e.g., SVIGSM, and the Seaside Basin groundwater model), will be made available.

TASK 12. ESTABLISHMENT OF SUSTAINABLE MANAGEMENT CRITERIA

This task covers efforts related to the establishment of Sustainable Management Criteria, which includes several steps that lead up to the establishment of an overall Sustainability Goal for each sub-basin. These criteria represent actionable, quantitative measures that demonstrate whether a sub-basin is being managed sustainably. The Sustainable Management Criteria will be set based on information from the Basin Setting and Hydrogeological Conceptual Model (Task 9), results of SVIHM simulations, observed “current” (as of January 1, 2015) conditions, and consultation with the GSA and stakeholders. Criteria include Undesirable Results, Minimum Thresholds, Measurable Objectives, and the Sustainability Goal; these will be defined as required in the GSP Emergency Regulations, also relying on recommendations from the DWR BMP for Sustainable Management Criteria.

Undesirable Results are caused by groundwater conditions affecting one of the six Sustainability Indicators (Chronic Lowering of Groundwater Levels, Reduction of Groundwater Storage, Seawater Intrusion, Degraded Water Quality, Land Subsidence, and Depletions of Interconnected Surface Water) to a “significant and unreasonable” degree, and are defined based on exceedances of Minimum Thresholds. Minimum Thresholds are the basic quantitative measures of each Sustainability Indicator, and must be set at each representative monitoring site

for each applicable Sustainability Indicator. Measurable Objectives are quantitative goals that represent the desired groundwater conditions in a sub-basin; like Minimum Thresholds, Measurable Objectives must be set at each representative monitoring site in each sub-basin for each Sustainability Indicator, and should leave a margin of operational flexibility above the Minimum Thresholds to allow for fluctuations due to climatic conditions and normal groundwater management activities. The GSP must also include a set of Interim Milestones, which represent progress toward the Measurable Objectives in 5-year increments; Interim Milestones will be used to track movement of the sub-basin toward sustainability.

Measurable Objectives will concentrate on those Sustainability Indicators that have a demonstrated history of concern in the sub-basins, particularly Chronic Lowering of Groundwater Levels, Reduction of Groundwater Storage, and Seawater Intrusion, as well as Degraded Water Quality and Depletions in Interconnected Surface Water, as applicable.

Collaborative Development of Sustainable Management Criteria:

Undesirable Results, Minimum Thresholds, Measurable Objectives, and Interim Milestones will be developed in consultation with the GSA and stakeholders, relying on the SVWM and SVIHM as tools for crafting the Sustainable Management Criteria, visualizing the effects of groundwater conditions on beneficial uses and users, and showing the effect of Sustainable Management Criteria on conditions in adjacent sub-basins.

The Sustainability Goal represents the endpoint and objective for the GSP, and the desired condition of the sub-basin by the end of the 20-year statutory implementation period. Unlike the other Sustainable Management Criteria, the Sustainability Goal is not a quantitative measure, but relies on an absence of Undesirable Results to demonstrate sustainability. The overall Sustainability Goal will be developed collaboratively with the GSA and stakeholders, and will focus on beneficial uses and users, existing and planned projects and management actions, and the results of SVIHM simulations. A priority focus of the Sustainability Goal is likely to be the reversal of groundwater level and storage declines, and the seaward migration of the existing seawater intrusion front.

Deliverable: TM to inform the GSA of recommended Management Criteria

Schedule: January 2019 to May 2019

Proposed Staff: Matt Baillie, Les Chau, Martin Feeney, Sachi Itagaki, and Matt Zidar

Conditions, constraints, or problems: As required by the GSP Emergency Regulations, Sustainable Management Criteria for the SVGB must be developed in a way that supports the Sustainability Goals of adjacent basins, by ensuring that conditions within the SVGB do not adversely affect groundwater conditions within those basins. This task requires careful coordination with the GSA, stakeholders, as well as adjacent GSAs, to ensure that Sustainable Management Criteria are consistent across basin boundaries.

TASK 13. EVALUATE MONITORING NETWORK

This task consists of an analysis of the suitability of the existing monitoring network to show progress toward sustainability (demonstrated using the Measurable Objectives) in each sub-basin, following the requirements of the GSP Emergency Regulations and the recommendations contained in the DWR BMPs for Monitoring Protocols, Standards, and Sites and Monitoring Networks and the Identification of Data Gaps. The Monitoring Network must measure groundwater and surface water conditions, the interconnection of surface water and groundwater, and any other critical information at a temporal and spatial frequency sufficient to demonstrate short-term, seasonal, and long-term trends in conditions related to each of the six Sustainability Indicators. The evaluation of the Monitoring Network will begin by considering the existing monitoring network and datasets, including identification of Representative Monitoring Sites, which will be used as proxies for conditions in surrounding areas.

The assessment of the existing Monitoring Network will identify data gaps, where groundwater and surface water conditions are not monitored at a sufficient spatial or temporal resolution to demonstrate progress toward Measurable Objectives or characterize short-term, seasonal, and long-term trends. This includes identification of monitoring sites that are unreliable, and data collection approaches that do not meet the needs of the GSP and the BMP recommendations. This assessment will also identify how the GSA will respond, by adjusting the temporal frequency and/or spatial density of monitoring, in the event of exceedances of Minimum Thresholds, highly (spatially or temporally) variable conditions, demonstrated adverse impacts on beneficial uses and users of groundwater, or potential adverse impacts on adjacent sub-basins.

The Monitoring Network evaluation will rely on the published evaluation of the MCWRA monitoring network, which centered on an analysis of the existing monitoring network in the Salinas Valley, determining the adequacy of the network for monitoring groundwater conditions in the four largest sub-basins of the SVGB. This analysis will be extended to the entire SVGB, updated to reflect the

current state of the monitoring network, and expanded to include surface water flow and the interconnection between surface water and groundwater.

Deliverable: TM to inform the GSA of recommended monitoring network for each sub-basin and data collection and submittal protocols.

Schedule: May 2019 to July 2019

Proposed Staff: Craig Stewart and Les Chau

Conditions, constraints, or problems: This task assumes that existing monitoring networks in all seven sub-basins of the SVBG will be incorporated into the overall SVBGSA Monitoring Network, including the extensive MCWRA monitoring network, which covers most of the SVBG. Individual entities will continue to own and operate monitoring points, but will report data to the SVBGSA, who will then report it to DWR. This task does not anticipate any field work, but will rather rely on information (including condition assessments) provided by the entities who currently operate the various monitoring networks.

TASK 14. MANAGEMENT ACTIONS

A significant amount of work has been performed to identify means to improve management of water resources in the Salinas Valley. Past work has focused on identifying physical solutions rather than prescribed reductions.

Identified projects include:

- Interlake Tunnel
- Castroville Seawater Improvement Project Expansion
- Salinas River Stream Maintenance Program
- Salinas River Management
- Permit #11043
- Jerrett Dam
- Jenson Flat Reservoir

The Technical Team and Plan Preparation Team will review the information available on each of these proposed projects and identify the potential benefits of each project by Management Area/sub-basin. Following this work the Plan Preparation Team and Public Outreach Team will present the potential management actions to the GSA Advisory Committee and solicit other ideas and options to meet GSP objectives.

Following these meetings, the Technical Team will recommend a suite of management actions to be tested using the SVIHM and supported by Team's extensive Salinas Valley hydrogeologic investigative experiences. Prior to modeling, a finite number of recommended management action will be ranked in the order of importance, feasibility, and deemed critical path in each sub-basin and SVBG. Following the modeling, the Technical Team will rank management actions and identify the need for any additional actions to bridge the gap between projected con-

ditions and sustainable conditions. The Plan Preparation Team will document the evaluation of the management actions and the proposed actions in the "Management Actions" chapter of the GSP.

Deliverables: TM on recommended management actions; TM ranking management actions and identifying need for additional actions to achieve sustainability.

Schedule: May 2019 to August 2019

Proposed Staff: Martin Feeney, Matt Zidar, Les Chau, Sachi Itagaki, and Meredith Clement

OPTIONAL TASK – MANAGEMENT ACTIONS

The management actions described in Task 14 are all actions previously identified by MCWRA and other agencies. Task 14 will rely on existing data, studies, and cost information. As an optional Task the Kennedy/Jenks Team will (a) further develop existing management actions (e.g., refine cost estimates) and (b) develop and model additional management actions.

TASK 15. DEFINE PLAN IMPLEMENTATION ACTIONS

Using information generated in Tasks 1 through 14, the Plan Preparation Team will develop an estimate of costs for GSP implementation, a schedule for implementation of the plan, and a template for reporting. The process and triggers for GSP evaluation will be documented. The Technical Team will identify the data management needs and the Plan Preparation Team will work with vendors to identify the potential costs of a Data Management System.

Deliverable: TM to inform the GSA of recommended Plan Implementation Actions for each sub-basin and the whole SVBG.

Schedule: June 2018 to August 2019

Proposed Staff: Meredith Clement, Sachi Itagaki, Lauren Everett, and Catrina Paez.

TASK 16. DRAFT AND FINAL GSPS

The purpose of this task is to bring together the chapters/sections already prepared as part of other tasks and fill-in the few remaining missing sections. As part of Tasks 1-15 the following draft sections will have been prepared with input from GSA Management and the GSP subcommittee:

- Agency Information
- Plan Area
- Basin Setting
- Sustainable Management Criteria
- Monitoring Network
- Management Actions

- Plan Implementation, including the data management system

Sections remaining include the executive summary, introduction, and GSP organization. These would be prepared as part of the First Administrative Draft GSP for circulation, review and comment by the GSP Advisory Committee, adjacent and interbasin GSA representatives, and DWR. Based on this input, the First Administrative Draft GSP will be revised to create the Second Administrative Draft GSP and sent for review and input by the Board of Directors. Following this review, the Board will give direction about how to create the Public Draft GSP. A public hearing will be held on the Public Draft GSP. The comments received on the Public Draft GSP will be considered by the GSA prior to plan adoption. Upon adoption, the GSP will be considered “final”; the final draft will be submitted to DWR for review and approval.

Deliverables: 1st Administrative Draft GSP; 2nd Administrative Draft GSP; and Public Draft GSP

Schedule: August 2019 to December 2019

Proposed Staff: Meredith Clement, Sachi Itagaki, Lauren Everett, and Catrina Paez, Jennifer Lau, Les Chau and Matt Baillie.

TASK 17. GRANT ADMINISTRATION

The specifics of this task will depend on the terms and conditions in the grant agreement with any funding agencies. Activities will include developing a schedule for the submission of required progress and final reports and invoices to the funding agency. The Kennedy/Jenks Team will prepare templates for required deliverables (e.g., progress reports and invoices). Kennedy/Jenks will prepare monthly emails summarizing the grant materials needed and their due dates. The Kennedy/Jenks Team will review draft reports and invoices for accuracy and completeness and will work with GSA staff to correct any issues discovered during the review of draft reports and invoices. After re-view, draft reports and invoices will be submitted to the funding agency. Once the funding agency has deemed the materials complete, Kennedy/Jenks will notify GSA staff that materials are ready for signature and provide instructions for the submission of the completed documents. All materials, including correspondence with the funding agency, will be documented in an administrative record. Kennedy/Jenks will work with GSA staff to request modifications to the grant scope of work, budget, and schedule as needed to maximize grant funding (based on past grant experience 4 modifications have been budgeted).

Deliverables: Up to 16 invoice and progress report

packages for submittal to grantor agency

Schedule: March 2018 (assumed grant award date) to April 2022

Proposed Staff: Meredith Clement and Catrina Paez

TASK 18. AS-NEEDED SERVICES

Tasks 1-17 represent the Kennedy/Jenks Team’s best estimate regarding the scope of work to prepare a compliant GSP for the SVGB. During the course of the GSP preparation, we anticipate that other needs may arise such as additional meetings, groundwater modeling, development of management actions, etc. Therefore, we have included this as-needed services task to be authorized by the GSA General Manager on a case-by-case basis. Specific scopes and budgets will be prepared prior to commencing work under this as-needed services task.

This task list represents a starting point for a more detailed scope of work that will be developed in partnership with GSA management.

SECTION 7 | SCHEDULE

ENSURING COMMUNICATION AND COLLABORATION THROUGH EACH PHASE OF THE PROJECT

Kennedy/Jenks has reviewed our current and planned workload and confirms that we have the resources available to complete all the work outlined in the Scope of Work. Upon notice to proceed, we will re-evaluate the proposed schedule with you to confirm proposed dates and identify opportunities to improve the schedule based on Salina's Valley Basin Groundwater Sustainability Agencies needs and priorities.



SECTION 8 | RATE SCHEDULE

Please see the separate sealed envelope for our rate schedule and budget.

SECTION 9 | CONDITIONS, CONSTRAINTS OR PROBLEMS

The conditions, constraints or problems were integrated into the tasks in Section 6 with full descriptions. See below for a summarized version organized numerically by task.

TASK

2

Public Outreach

The broad geography of the Salinas Valley and the desire for significant input from diverse Stakeholders. To overcome the first challenge this scope has planned and budgeted for meetings in different geographies. To overcome the second challenge significant coordination between Kennedy/Jenks and the Facilitator are proposed including during development of the Communications and Coordination Plan and regular updates to the outreach plan.

3

Memorandum of
Understanding

MCWRA is its own agency with its own authorities and its geography and mission largely overlap with SVGSP. It will take a concerted effort to develop a framework for an MOU that both agencies are satisfied with.

5

Develop Coordination
Agreements

Neighboring GSAs differ in their governance, differ in their funding and staffing, and their readiness to execute agreements. This may make it difficult to enter into Coordination Agreements early in the GSA process.

8

Develop Funding
Mechanism

The GSA is currently operating based on contributions from GSA member agencies and this funding is expected to allow GSA operation for about two years. Developing a funding mechanism is necessary for continued existence of the GSA and to complete the GSP. One difficulty is that the funding mechanism will likely be developed before all the plan management actions are defined, evaluated, and selected.

9

Climate Change
Scenario

The schedule above assumes that the USGS will deliver the historical SVIHM, calibrated through 2014, in a ready-to-use state by February 2018.

10

Integrated Hydrologic
Model

The SVG contains 2 subbasins that are critically overdrafted, the 180/400 Foot subbasin and the Paso Robles subbasin. The remaining subbasins are the East Side, Forebay, Upper Valley, Langley Area, and Monterey. The schedule to complete the GSP requirements for the critically overdrafted basins is quite aggressive and priority will need to be given to these subbasins. As data and stakeholder input can be completed for the other subbasins GSP sections will be prepared for these subbasins. In this manner the necessary requirements for the critically overdrafted basins can be met and the plan amended to incorporate the other subbasins as completed. This will also insure that any difficulties with a given subbasin do not delay completion of the GSP requirements for the other basins.

11

Plan Area and Basin
Setting

The SVBGSA area encompasses the entire Salinas Valley Groundwater Basin (SVGB) within Monterey County, and contains seven subbasins. Water Code § 10720.7 requires that critically overdrafted basins be managed under a GSP (or coordinated GSPs) by January 31, 2020. The Water Code requires all other groundwater basins designated as high or medium priority basins to be managed under a GSP by January 31, 2022. The SVGB contains 2 subbasins that are critically overdrafted, the 180/400 Foot subbasin and the Paso Robles subbasin.

SECTION 10 | CLIENT REFERENCES

Please contact the following references of projects that are similar in type, scope and complexity to your project. These clients can attest to our team's knowledge and recent experience on designing and completing successful public projects.



PROPOSITION 1 – GROUNDWATER SUSTAINABILITY PLAN (GSP) GRANT APPLICATION, SALINAS VALLEY BASIN GROUNDWATER SUSTAINABILITY AGENCY (SVBGSA), SALINAS, CA -

Kennedy/Jenks Consultants, Inc. interactively prepared the grant application by working with the Salinas Valley general manager to develop the 6 key attachments for the grant application: 1. Authorization, 2. Eligibility, 3. Project Justification, 4. Work Plan, 5. Budget, and 6. Schedule by working with the SVBGSA General Manager and integrating the suite of information. Critical to a highly ranked application were the Project Justification which describes the extensive technical work in the Salinas Valley Basin, the Current Need for a GSP, the Technical Needs including the coordination, and transparency from a robust stakeholder engagement and coordination program that meets both the agricultural and municipal users, and the extensive project support for this effort.

A detailed workplan of 16 tasks, integrating the Stakeholder Coordination and Engagement with Technical Data and Analysis to develop a compliant GSP is supported by a detailed budget and schedule that results in a GSP for the critically overdrafted subbasins by 2020 and the high and medium priority basins by 2022.

Name: Gary Petersen, Former Public Works Director, City of Salinas

Address: PO Box 1350, Carmel Valley CA 93924, Office: 1411 Schilling Place, Salinas, CA 93901

Email/Telephone Number: peterseng@svbgsa.org, 831-471-7518

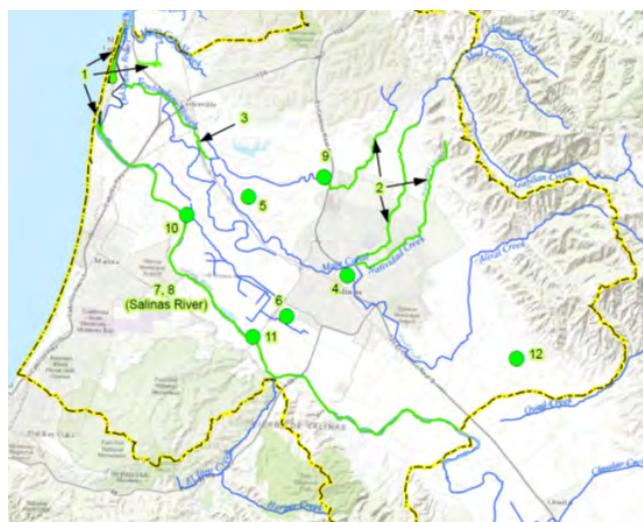
PROP 1 STORM WATER IMPLEMENTATION GRANT AND STORM WATER RESOURCE PLAN (SWRP) FOR GREATER SALINAS AREA, MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY/CITY OF SALINAS, SALINAS, CA -

Kennedy/Jenks prepared a highly successful \$10m grant application to divert and store storm water, agricultural runoff, and industrial wastewater from Salinas to the MRWPCA regional wastewater facility and purify for groundwater injection for seawater intrusion control under Pure Water Monterey Program. Project included preparation of 12 attachments describing the SWRP, Workplan, Experience, Knowledge and Skills; Budget, Schedule, CEQA compliance, Performance Measures, Benefit Quantities, Technical Report Summary, DAC/EDA Benefits and Letters of support. Project also included preparation of the SWRP in accordance with State guidelines including selection and prioritization of projects based on many factors included quantifiable benefits and coordination with the client and stakeholders and ensured requirements were met to provide a plan to meet Prop. 1 requirements for Planning Grants including project prioritization and SWRP sections.

Name: Mike McCullough, Government Affairs Administrator, Monterey One Water

Address: 5 Harris Ct, Monterey, CA 93940

Email/Telephone Number: mikem@my1water.org, 831-645-4618





MONTEREY ONE WATER - PURE WATER MONTEREY, ADVANCED WATER PURIFICATION FACILITY PLANNING AND DESIGN

Kennedy/Jenks has been involved in the planning, CEQA compliance, and design of the Advanced Water Purification Facility and has been working closely with the partner agencies, regulators, funding agencies, and stakeholders on many facets of the Pure Water Monterey Project for several years. Monterey One Water (formerly Monterey Regional Water Pollution Control Agency) and Monterey Peninsula Water Management District (MPWMD) have partnered to create Pure Water Monterey, a \$115M groundwater replenishment project—the first active indirect potable reuse project in Northern California.

The project will purify up to 6.5 mgd of wastewater, surface water and stormwater at an Advanced Water Purification Facility (AWPF) to recharge the Seaside Groundwater Basin and create a new local sustainable supply for the Monterey region. Based on the excellent work of the project team, we were awarded the final design which was completed and bid in early 2017. Parallel to the AWPF design work, our team led the design of the conveyance system and GWR injection well facilities, including optimizing pump station design and operational criteria, conducting hydraulic analysis, and performing injection well modeling—also delivered on a fast-track schedule. The project aims to deliver purified water in 2019.

Name: Paul Sciuto, General Manager, Monterey One Water

Address: 5 Harris Ct, Monterey, CA 93940

Email/Telephone Number: paul@mrwpcac.com, 831-645-4600

WESTSIDE SUBREGION OF THE SACRAMENTO RIVER FUNDING AREA, IRWM PLAN PREPARATION AND 2014 AND 2015 IRWM IMPLEMENTATION GRANT APPLICATIONS YOLO, SOLANO, NAPA, AND LAKE COUNTIES, CA

The Kennedy/Jenks Consultants team was selected to prepare an IRWM Plan in 2011 and was completed in August 2013 for the Westside Subregion of the Sacramento River Funding Area comprised of the Cache Creek Sub-Watershed in Lake and Yolo Counties, the Putah Creek Sub-Watershed in Napa and Solano Counties, and adjacent Bay-Delta areas. Kennedy/Jenks was tasked with integrating some of the already prepared IRWM Plans within a newly formed broader IRWM region with a more diverse set of challenges and opportunities. A collaborative process was implemented that included extensive public outreach and stakeholder involvement for the IRWM Plan under the structure of targeted Topics of Engagement in order to keep the stakeholder meetings and Plan development focused and productive. These Topics of Engagement included Current Conditions, Future Conditions, Challenges and Opportunities, Potential Projects and Integration, Benefit and Impacts, Project Selection and Priority, Plan Recommendations, Governance, Finance, and Plan Performance and Monitoring. Stakeholder and public outreach included meetings and preparation of a public outreach website and materials to reach the water community, the general public, and both DAC and Native Tribes. Technical work to support Plan preparation include water budgets to better understand the water management challenges and opportunities within a sub-watershed and within the region and research and analysis of land-use, water use, water quality, environmental resources, special status species, aquatic and terrestrial invasive species, flood risk reduction, planning, demographic, and other data necessary to develop elements of the IRWM Plan.

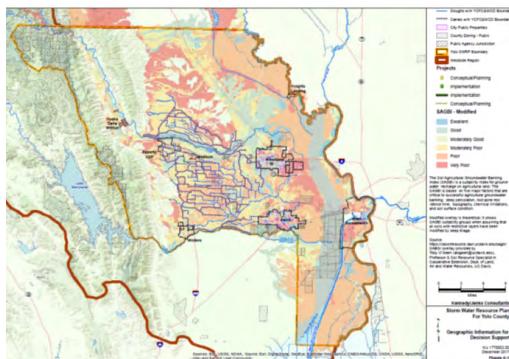
Kennedy/Jenks also prepared a successful \$7 million 2014 Drought Proposition 84 and a \$2.2 million Proposition 84 2015 IRWM Implementation grant application for the Westside IRWM. Projects included coordination of 7 project proponents per application and developing and compiling necessary documentation including multiple attachments for a competitive grant application.

Name: Chris Lee, Principal Water Resources Specialist, Solano County Water Agency

Address: 810 Vaca Valley Pkwy, Vacaville, CA 95688

Telephone Number: 707-455-1105

PROP. 1 PLANNING GRANT AND STORM WATER RESOURCE PLAN PREPARATION FOR YOLO COUNTY, YOLO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, WOODLAND, CA – Kennedy/Jenks preprepared a SWRP planning grant application and SWRP to conform with Proposition 1 Guidelines. Led preparation of successful \$325,000



grant application to prepare Storm Water Resource Plan in accordance with State guidelines for Yolo County. Application included identification of projects using GIS, quantifiable methods for estimating water supply, water quality benefits as well as for prioritizing projects, disadvantaged community and stakeholder outreach, and preparation of SWRP document. After planning grant award, provided client support in negotiation the final scope of work, budget, and schedule with the state for completion of the SWRP. In development of the SWRP, Sachi coordinated with the client and subconsultants, facilitated stakeholder and outreach meetings, and ensured that draft sections meet guideline requirements.

Name: Kristin Sicke, Assistant General Manager, Yolo County Flood Control and Water Conservation District

Address: 34274 State Highway 16 Woodland, CA 95695

Telephone Number: (530) 662-0265

AMEC FOSTER WHEELER

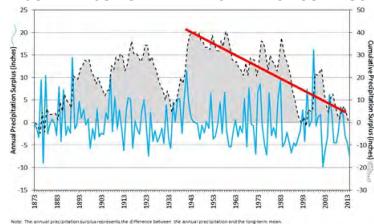
GROUNDWATER MONITORING NETWORK EVALUATION AND REDESIGN, MONTEREY COUNTY WATER RESOURCES AGENCY, MONTEREY COUNTY, CA

Amec Foster Wheeler was retained by the Monterey County Water Resources Agency to evaluate, optimize, and redesign the Salinas Valley groundwater monitoring network. This project involved design of basin-wide monitoring programs addressing a wide variety of geologic and hydrogeologic features, including major recharge sources and groundwater extraction well fields. The Salinas groundwater basin extends from Monterey Bay southeast about 80 miles inland. The residents, agriculture, and industry of the basin are highly dependent on groundwater, and the groundwater basin is subject to overdraft and groundwater quality impacts from seawater intrusion and agricultural and industrial activities. Water demand in the basin is increasing and no outside sources of water are currently available.

HYDROGEOLOGIC MODELING SERVICES FOR THE NACIMIENTO – SAN ANTONIO INTERLAKE TUNNEL AND SAN ANTONIO SPILLWAY MODIFICATION PROJECT, MONTEREY COUNTY WATER RESOURCES AGENCY (MCWRA), MONTEREY COUNTY, CA

Amec Foster Wheeler was selected to provide Hydrogeologic Modeling Services in support of the Monterey County Water Resources Agency's Nacimiento – San Antonio Interlake Tunnel and San Antonio Spillway Modification Project and for Salinas River groundwater basin water resources management. Amec Foster Wheeler is working with the US Geological Survey and MCWRA in utilizing modeling tools to assess adaptive management of climate change effects on reservoir operations, coastal infrastructure and water resources, environmental planning, and operations of existing and future Salinas Valley water augmentation (engineering) projects.

FIGURE 1 – CUMULATIVE PRECIPITATION SURPLUS

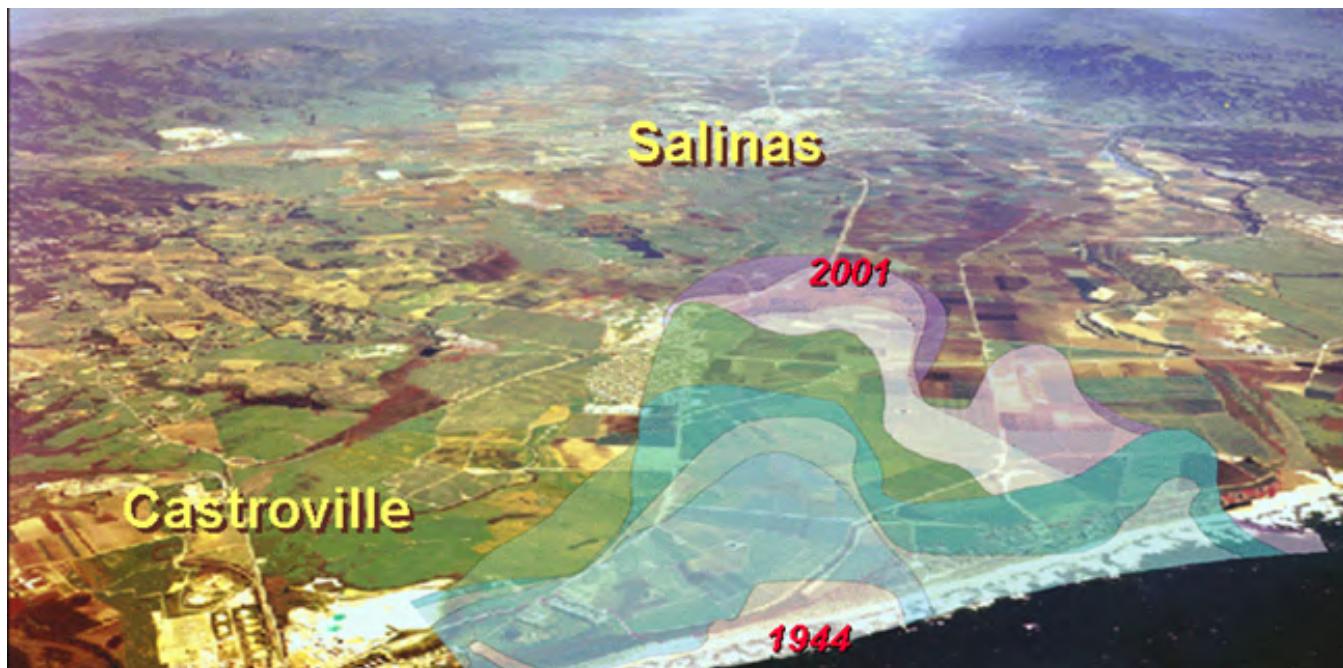


The intended outcome of the project is that groundwater and surface water will conjunctively supply up to 90 percent of the agricultural need in the Salinas Valley. The modeling is important in assessing: 1) optimal reservoir release schedules, 2) climate effects on rainfall / recharge, 3) flood control measures along the Salinas River, 4) seawater intrusion into the coastal groundwater supply, and 5) sustainable groundwater supply and quality for local diversions.

One of the effects of climate change is that the cumulative rainfall "surplus" in the Salinas Valley has been declining (from average) over the past 74 years since 1943 as depicted in Figure 1. The connection of the two reservoirs via a one-mile, 12-foot diameter tunnel will provide additional water storage in wet seasons and controlled releases to mitigate flooding and managed water supply for downstream usages.

One major downstream diversion is the mitigation of seawater intrusion into the coastal aquifers which supply water for urban and agricultural needs. Seawater has been blending (intruding) with freshwater supply since 1940. Figure 2 illustrates the expanse of seawater intrusion and its advancement one mile every ten years.

FIGURE 2 – SEAWATER INTRUSION IN THE SALINAS VALLEY



Name: Mr. Howard B. Franklin, PG, Senior Hydrologist, Monterey County Water Resources Agency

Address: 1411 Schilling Place, Salinas, CA 93901

Telephone Number: (831) 755-4860

COMMUNITY WATER SYSTEM FEASIBILITY STUDIES AND SUPPLY SYSTEM DESIGN, MONTEREY COUNTY, CA

The small community of San Lucas in the Salinas Valley has been without a reliable potable water supply for several years, following problems with nitrate contamination and total dissolved solids in the water from their supply well. In support of the County of Monterey, the Amec Foster Wheeler team has been working to identify a reliable source of water for the community. Amec Foster Wheeler's scope of work for the grant-funded project included a detailed review of available groundwater and hydrogeologic data for the area and review of the design and operation of the San Lucas County Water District (SLCWD) water system.



Based on the review, Amec Foster Wheeler performed a detailed feasibility study to evaluate water supply options, including a new supply well, water treatment, and importing water from King City. Important aspects of the work included consideration of surface water-groundwater interactions, water rights, capital costs, and future water rates. The SLCWD selected the option of a new water-supply line from King City, approximately 8 miles north of San Lucas. Amec Foster Wheeler performed an evaluation of possible pipeline alignments and prepared a Preliminary Design Report, including long-term demand and operational considerations. In 2018, at the direction of the County, Amec Foster Wheeler will provide additional evaluation of groundwater treatment options, including consideration of impacts to water rates. The project also involved collaboration with various stakeholders, including the community of San Lucas and neighboring agricultural property owners.

Name: Mr. Nick Nichols, PE, Monterey County Resources Management Agency

Address: 1411 Schilling Place, Salinas, CA 93901

Telephone Number: 1-831-555-5386, NicholsN@co.monterey.ca.us

BOB ABRAMS, PHD, PG REFERENCE

Name: David Costa, Costa Farms, Inc.
Address: 36817 Foothill Road, Soledad, CA 93960
Telephone Number: (831) 678-0799

MARTIN FEENEY, PG, CEG, CHG REFERENCES

Name: Jon Lear, Principal Hydrogeologist, Monterey Peninsula Water Management District
Address: Building G, 5 Harris Ct, Monterey, CA 93940
Telephone Number: (831) 658-5600

Name: Brian Lockwood, General Manager, Pajaro Valley Water Management Agency
Address: 36 Brennan St, Watsonville, CA 95076
Phone Number: (831) 722-9292, Lockwood@pvwater.org

Name: Bob Jaques, Technical Program Manager, Seaside Basin Watermaster
Address: PO Box 51502 Pacific Grove CA 93950
Phone Number: (831) 641-0113, bobj83@comcast.net

Name: Eric Tynan, General Manager, Castroville Water District
Address: 11499 Geil St, Castroville, CA 95012
Phone Number: (831) 633-2560, eric@castrovillecisd.org

Name: Taj Dufor, Chief Engineer, Soquel Creek Water District
Address: 5180 Soquel Dr, Soquel, CA 95073
Phone Number: (831) 475-8500, TajD@soquelcreekwater.org

Name: Howard Franklin, Senior Hydrologist, Monterey County Water Resources Agency
Address: 1441 Schilling Pl, Salinas, CA 93901
Phone Number: franklinh@co.monterey.ca.us

MATT ZIDAR REFERENCES

Name: Phil Desatoff, General Manager, Consolidated Irrigation District
Address: 2255 Chandler St., Selma, CA 93662
Telephone Number: (559) 896-1660

Name: Gary Serrato, General Manager, Fresno Irrigation District
Address: 2907 South Maple Avenue, Fresno, CA 93725
Telephone Number: (559) 233-7161

SECTION 11 | LEGAL PROCEEDINGS/ARBITRATIONS/ COURT ACTIONS

KENNEDY/JENKS

Virtually all design projects for construction involves job controversies during construction, which despite attention, occasionally give rise to negotiation, mediation, arbitration or litigation. Similar to consulting firms of our size (2017 Gross Revenue of \$83 million) within our geographic area and fields of practice, Kennedy/Jenks Consultants is and has been over its operating history a defendant in several claims and lawsuits. Our policy is to maintain insurance to protect our clients and practice, and pursue early resolution of claims through negotiation, mediation and other alternate dispute resolution methods. We have been very successful in our claims resolution activities, with very few claims resolved by court judgments over our nearly 100 years of operation. In the opinion of Kennedy/Jenks Consultants' management, the resolution of current claim or litigation matters will not have a material adverse effect upon the Company and its ability to perform services for this project.

AMEC FOSTER WHEELER

Amec Foster Wheeler is a large international service company and as such, there are inevitably disputes arising from time to time. While details of these disputes are confidential, we can confirm that there are no disputes or litigation of any kind that individually or collectively will have a material effect upon the quality of Amec Foster Wheeler's performance and its ability to provide services for this contract.

The Company has never failed to complete a project for which it was paid by the client. From time to time, the Company's clients have suspended or terminated projects for their convenience.

SECTION 12 | CONFLICT OF INTEREST

KENNEDY/JENKS

We do not know of any conflict of interest situations, but in the utmost of transparency, we are listing the clients in the subbasin that we are working for.

Salinas Valley GSP
List of Clients
Monterey County Department of Public Works
Monterey Regional WPC
Monterey Mechanical Company
Carmel Area Wastewater District
Chevron USA
Cal American Water Service

AMEC FOSTER WHEELER

Amec Foster Wheeler's current projects in the Salinas Valley do not pose any conflicts of interest. Mr. Gary Petersen confirmed with Mr. Les Girard of the Chief County Council that there are no conflicts.

Kennedy/Jenks Consultants

Prepared for Salinas Valley Basin Groundwater Sustainability Agency

APPENDIX

Sachi Itagaki, P.E., QSD

Project Manager

Education

M.S., Civil Engineering (Water Resources/Groundwater Hydrology), Stanford University
B.S., Ocean Engineering, Stanford University

Registrations

Professional Engineer, California (50221)

Memberships/Affiliations

Association of California Water Agencies
Groundwater Resource Association of California
WateReuse Association

Professional Summary

Sachi Itagaki has over 25 years of water resources and civil engineering experience, specifically in conducting integrated water resource planning and management programs including surface water and groundwater investigations; utility (water, recycled water, wastewater, and stormwater) infrastructure management, master planning, modeling, and design studies; water quality and hazardous waste investigations; and supporting the preparation of CEQA Compliance documents and obtaining project permits. She has worked extensively in groundwater management and investigation as well as the Integrated Regional Water Management Program (IRWMP) since its inception preparing both IRWM Plans and IRWM Planning and Implementation grant funding applications that have collectively resulted in approximately \$110 million of financial support for water resource planning and management programs as well as over \$451 million for groundwater investigations, recycled water and stormwater feasibility studies and construction of a range of water-related facilities including desalination, recycled water, ecosystem restoration, potable water infrastructure, and treatment. Sachi has also worked in Monterey County and the Salinas Valley area since 2006 on projects including a groundwater evaluation near the Carmel River, storm water Low impact development and storm water resource plan (SWRP) preparation as well as a successful \$10 million storm water implementation grant application.

Select Project Experience

Proposition 1 – Groundwater Sustainability Plan (GSP) Grant Application, Salinas Valley Basin

Groundwater Sustainability Agency (SVBGSA), Salinas, CA. Reviewer/Advisor for the 6 attachments of 1. Authorization, 2. Eligibility, 3. Project Justification describing technical work in the Salinas Valley Basin, the Current Need for a GSP, the Technical Needs including a robust stakeholder engagement and coordination program that meets both the agricultural and municipal users, 4. Work Plan detailing of 16 tasks, integrating the Stakeholder Coordination and Engagement with Technical Data and Analysis to develop a compliant GSP is supported by a 5. Budget and 6. Schedule that results in a GSP for the critically overdrafted subbasins by 2020 and the high and medium priority basins by 2022.

Storm Water Resource Plan (SWRP) for Greater Salinas Area, Monterey Regional Water Pollution Control Agency/City of Salinas, Salinas, CA – Project Manager – Led preparation of SWRP in accordance with State guidelines. Coordinated with the client and stakeholders and ensured requirements were met to provide a plan to meet Prop. 1 requirements for Planning Grants.

Proposition 1 Storm Water Implementation Grant Application, Monterey Regional Water Pollution Control Agency/City of Salinas, Salinas, CA. Project Manager. Led preparation of successful \$10m grant application to divert and store storm water, agricultural runoff, and industrial wastewater to MRWPCA regional wastewater facility and purify for groundwater injection for seawater intrusion control under Pure Water Monterey Program.

Westside Sacramento Integrated Regional Water Management Plan, Westside Sacramento Regional Water Management Group, Yolo County Flood Control and Water Conservation District, Woodland, CA – *Project Manager* for preparation of IRWM Plan and preparation of \$7 million Proposition 84 2014 Drought IRWM Implementation grant application. The IRWM Plan required extensive public outreach and stakeholder involvement for the Cache Creek Sub-Watershed in Lake and Yolo Counties, the Putah Creek Sub-Watershed in Napa and Solano Counties, and adjacent Bay-Delta areas. IRWM Plan preparation included preparation of water budgets to better understand the water management challenges and opportunities within a sub-watershed and within the region, preparation of a public outreach website, and research and analysis necessary for elements of the IRWM Plan.

Westside Sacramento Region 2015 IRWM Grant Application, Napa County Flood Control and Water Conservation District, Napa, CA – *Project Manager* for preparation of \$2.2 million Proposition 84 2015 IRWM Implementation grant application. Project included coordination with project proponents and developing and compiling necessary documentation for a competitive grant application.

Westside Sacramento IRWM – Prop 84 2014 Drought Application, Vacaville, CA. Project Manager Led preparation of successful \$7 million grant application for 8 projects. Application included preparation of project description, workplan, budget, and schedule for completion of the work and quantitative economic benefits analysis.

Prop. 1 Storm Water Resource Plan for Yolo County, Yolo County Flood Control and Water Conservation District, Woodland, CA – *Project Manager* for preparation of SWRP planning grant application and SWRP to conform with Proposition 1 Guidelines. After planning grant award, provided client support in negotiation the final scope of work, budget, and schedule with the state for completion of the SWRP. In development of the SWRP, Sachi coordinates with the client and subconsultants, facilitates stakeholder and outreach meetings, and ensures that draft sections meet guideline requirements.

September Ranch Development Water Resources Availability Assessment for Revised Environmental Impact Report, Monterey County, CA. Task Leader for review of water rights availability legal opinion, hydrogeologic studies, geologic maps and preparation of water balance and hydrologic availability evaluation for proposed residential sub-division in Monterey County. The Water Resources study is in support of a Revised Environmental Impact Report for the project.

Water Resources Association of San Benito County, Alternatives Analysis, Groundwater Management Plan Update, and Programmatic Environmental Impact Report Technical Support, Hollister, CA. Program Manager for preparation of alternative methods of managing groundwater in the Hollister area of San Benito County. Analysis included development of municipal and industrial water demand projections, preparation of groundwater balance under various water supply alternatives, and qualitative and quantitative evaluation of various combinations of water resources (imported and local surface water, groundwater, and recycled water) to meet future demands. Organized and presented analysis at two public meetings. Groundwater Management Plan Update included identification and development of 36 programs/projects including recycled water,

distribution pipeline, constructed wetlands, water filtration/demineralization, water conservation, water banking to manage the water resources of San Benito County. Update also included prioritization of programs/projects and preparation of planning-level estimates of probable costs of construction. Also provided Technical Support for Programmatic Environmental Impact Report for the Groundwater Management Plan Update including preliminary water balance analyses, development of water level operational goals, and potential wastewater disposal alternatives.

Low Impact Development Guideline Development, Regional Water Quality Control Board-

Central Coast Region and City of Salinas. As Project Technical Advisor, have provided review of relevant stormwater documents such as General Plan, ordinances, and stormwater permit for City. Have participated in workshops with City, Regional Board staff, and developer community and advised on approaches to collection and management of technical information in order to evaluate opportunities for low impact development (LID) in large and small developments. LID options considered included pervious pavement, vegetated swales, subsurface storage and infiltration, rainwater cisterns, and green roofs.

Napa River Diversion Feasibility Study, Napa County Flood Control and Water Conservation

District, Napa, CA – Project Engineer – Tasks included analysis of surface water hydrology to develop drainage area-runoff correlations and to assess availability of excess winter time flows; development of water rights data base, and assessment of existing and proposed storage sites, hydrogeologic reports, and water-level data to assess and review groundwater recharge/conjunctive use potential. Conjunctive Use evaluation included review of available USGS reports and County information to assess whether or not the existing hydrogeologic information was adequate to develop a feasibility-level groundwater conjunctive use project. The project would involve the release of stored surface water supplies for groundwater recharge purposes and the installation of M&I extraction wells in lieu of a water treatment plant facility upgrade and several miles of water transmission mains. Hydrogeologic reports, including well logs, lithologic cross-sections, historic pumpage quantities, rates of stream recharge and water quality, were reviewed and assessed to evaluate groundwater recharge and extraction potential.

Confidential Client, Hydrologic Study, Salton Sea, CA. Evaluated whether groundwater quantities and quality were sufficient to serve both municipal and industrial supply and agricultural uses within each of the three-layer aquifer systems. Determined aquifer characteristics by analyzing groundwater well logs, developing schematic cross sections, and evaluating water-level and water quality data. Identified the availability of and evaluated the chemical composition of groundwater in a southern California basin to determine whether quantities would be sufficient to serve both municipal and industrial supply and agricultural uses. Assessed groundwater quality and yield by analyzing groundwater well logs, water-level and water quality data.

Strategic Plan Preparation, Solano County Water Agency, Vacaville, CA – Project Manager for preparation of Strategic Plan including stakeholder meetings involving both elected officials and staff of fifteen-member agencies. This project is broken into two parts: Phase 1 – information gathering from the stakeholders regarding goals and expectations for the Strategic Plan Update and kicked-off the Urban Water Management Plan technical analyses for the urban water suppliers; Phase 2 – Conduct stakeholder meetings, educational workshops, and small work group meetings; attend board meetings to deliver progress reports; and develop Strategic Plan based on meeting input and results of organizational assessment.

Tuolumne-Stanislaus Proposition 84 Integrated Regional Water Management Program
Planning Grant Application and IRWM Plan Preparation, Tuolumne Utilities District, Tuolumne

County, CA – Lead Grant Writer/Project Manager – Prepared the IRWM Planning Grant application and IRWM Plan. Preparation of the IRWM Plan for the Tuolumne Stanislaus Region required organizing and presenting at stakeholder meeting including preparation of agendas, presentations, and handouts, leading public outreach to Disadvantaged Communities (DAC) as well as Native American Tribes to better understand water management challenges and opportunities, identification and development of projects/programs/actions that benefit the region as a whole as well as DAC and Native American Tribes, and guiding the sequential crafting and editing of the IRWM Plan for presentation to the Planning Grant Committee.

Updated Integrated Regional Water Management Plan, Western Municipal Water District, Riverside, CA – Project Manager for preparation of an integrated regional water management plan that includes development projected water demands under baseline, and conservation conditions for ten subagencies of Western, evaluation of demand management measures, identification of water source opportunities including groundwater, recycled water, brackish groundwater desalination, conjunctive use to meet long-term demands and to meet short-term water needs resulting from facilities outages.

Tahoe-Sierra Integrated Regional Water Management Plan, Tahoe-Sierra Regional Water Management Group, South Tahoe Public Utility District, South Lake Tahoe, CA – Project Manager – Services included developing the Sierra IRWM Plan Update, Salt and Nutrient Management Plan and Proposition 50 Integrated Regional Water Management Program Implementation Grant Application, El Dorado County, CA.

Integrated Regional Water Management Plan, Yosemite-Mariposa Regional Water Management Group, Mariposa County Resource Conservation District, Mariposa, CA – Project Manager for preparation of the IRWM Plan. Worked with Yosemite-Mariposa Regional Water Management Group (RWMG) staff members to set project goals and priorities; facilitated regular, effective communication

between the RWMG and team members; tracked project budget status and coordinated regularly with the RWMG's Project Manager; and identified opportunities to add value to the planning efforts by identifying projects with multiple benefits, such as economic, environmental and social (triple bottom line) elements.

2007, 2013, and 2018 Watershed Sanitary Survey Update, City of Santa Cruz Water Department and San Lorenzo Valley Water District, Santa Cruz County, CA – Project Manager for the current preparation of the update to the 2013 Watershed Sanitary Survey for 2 agencies. Preparation includes evaluation of water quality data, of drinking water regulations, drinking water quality, prepared and review narrative, and facilitated preparation of GIS maps of the tributary watershed area.

2000, 2005, 2010 and 2015 Watershed Sanitary Survey Update, Marin Municipal Water District – Project Manager for updating an existing sanitary survey covering multiple watersheds, including coordinating staff water quality analysis, conducting telephone interviews for potential pollutants that could affect drinking water quality, summarizing status of recommendations of the original survey, identifying other recommendations to improve watershed management and public communication, preparing survey report and maps documenting findings. Ms. Itagaki was also the project manager for the 2005 and 2010 updates of Marin Municipal Water District's WSS.

Meredith E. Clement

Deputy Project Manager

Education

BS, Environmental Policy, Analysis and Planning, University of California at Davis, 1996
MS, City and Regional Planning, California Polytechnic State University, 2000
MS, Transportation Engineering, California Polytechnic State University, 2000

Memberships/Affiliations

American Public Works Association
American Water Works Association
Association of Environmental Professionals

Professional Summary

Meredith Clement has over 20 years of environmental consulting experience on projects throughout California. Meredith has special expertise with water planning projects, urban planning, grant and loan funding for infrastructure, and environmental compliance documentation, including the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

Selected Project Experience

Upper Santa Clara Integrated Resources Water Management Plan Including Climate Change

Vulnerability Assessment, Castaic Lake Water Agency, Santa Clarita, CA - *Project Manager* - Project manager for the preparation of an integrated water resources plan for the Upper Santa Clara River Region (Los Angeles County). Project involved assistance to, and coordination of, an eight-member management group and approximately 30 stakeholders. Developed materials for stakeholder education, assisted with identification of water management objectives, development of screening criteria and metrics, and evaluation of projects put forth by stakeholders for consistency with objectives, financial feasibility, and compliance with State mandated requirements. Have prepared two updates to the plan to meet changed State Guidelines. One update involved preparing a climate change vulnerability analysis and a Salt Nutrient Management Plan.

For the climate change vulnerability assessment, used available data on projected changes in average air temperatures and precipitation ratios downscaled to the region level for a variety of global climate models and global greenhouse gas emission scenarios. This data was used to develop an array of climate change scenarios for regional water resources. Defined the watershed characteristics that may be vulnerable to the climate change scenarios developed for the region. Incorporated previous and current studies of watershed characteristics such as Federal Emergency Management Agency (FEMA) floodplain mapping activities, the Corps of Engineers Feasibility Study's findings on hydrology and geomorphology, and local zoning and general plans. The vulnerability assessment included a hydrologic analysis, a demand analysis, a reservoir analysis, an ecological analysis, a groundwater recharge analysis, a sea level rise analysis, and other analyses that address water quality changes and potential impacts of extreme events including extended droughts, high precipitation events, flooding, and wildfires.

Mojave Region Stormwater Resources Plan, Mojave Water Agency, Apple Valley, CA – *Project Manager* – Project Manager for the preparation of a Stormwater Resources Plan for the Mojave Basin area. The Stormwater Resources Plan was prepared through extensive coordination with the local Integrated Regional Water Management group.

Water Supply Alternatives Study, Calleguas Municipal Water District, Thousand Oaks, CA – *Project Manager* – Project Manager for study that identified, evaluated, screened, and prioritized twenty-six potential emergency water supply options for southern Ventura County.

Peer Review of Water Supply Reliability and Water Demand Estimates, Los Angeles County
Department of Public Works, Los Angeles, CA – *Project Manager* – Technical Author and QA/QC reviewer for demand and supply assumptions for a 12,322-acre new town located in the northwest corner of Los Angeles County.

Water Resources Background Report for the General Plan Update, County of Ventura *Project Manager and Author* – Prepared detailed overview of the water resources in Ventura County including surface water, groundwater, stormwater, recycled water, and sea water. Outlined how the various federal, state, and local laws frame water resources management. Described existing water supplies and water quality, estimated water demands, and mapped the 162 water suppliers in the County. Prepared description of the linkage between land use and water demand and water quality. Provided information on trends toward integrated water resources management.

2015 Urban Water Management Plan, Ventura Water, Ventura, CA - *Project Manager* - Prepared the 2015 update to City of Ventura's existing Urban Water Management Plan. Tasks included evaluating future land use scenarios, forecasting water demands and evaluating supplies proposed projects.

2015 Urban Water Management Plan, Ventura County Waterworks District 8, Simi Valley, CA - *Project Manager* – Updated the demand projections for the City of Simi Valley and surrounding unincorporated county, coordinated with Calleguas Municipal Water District on water supply reliability, and assisted with update to the District's Water Shortage Contingency Plan.

Water Supply Assessment Oil and Gas Production Kern County, County of Kern, Bakersfield, CA - *Project Manager* – Prepared a water supply assessment (WSA) analyzing the proposed amendment to the Title 19 Kern County Zoning Ordinance focused on Chapter 19.98 (Oil and Gas Production) related to oil and gas regulations (exploration, extraction, operations, and production activities etc.) in unincorporated Kern County. Analyzed supplies from the Central Valley Project, State Water Project, Kern River, local groundwater basins, and produced water (water extracted as part of oil and gas operations). Worked with modelers to develop estimates of water demands at all stages of oil and gas activities including well development, injection, well stimulation, production, and well abandonment. Estimates were sensitive to the oil well type (steam or water). Prepared an overall estimate of water supply and water demand for the oil production region of Kern County.

Drought Preparedness and Water Shortage Contingency Plan for Goleta Water District, Goleta, CA – *Primary Author* – Prepared a plan that evaluated drought severity indicators, supply mitigation options, and drought response actions. Specific drought response actions were recommended for five different shortage stages. Response actions evaluated included voluntary and mandatory conservation measures, allocations, enforcement, and pricing structures. Report also included specific implementation resources including a process flow chart and schedule, organization chart, communications plan, public outreach plan, draft ordinances, and draft hearing notices.

Grant Administration Support, County of Ventura, Ventura, CA – *Grant Administrator* – Acted as grant administrator for 11 project proponents that successfully competed for Proposition 50 Integrated Regional Water Management Plan funding. Assisted project proponents with contract negotiations, coordination of deliverables, regulatory compliance for projects, preparation of invoices, and progress reports. As part of grant administration, assisted with the design and development of a web platform, electronic input forms, and database.

Local Model Water Efficient Landscape Ordinance Riverside County, Western Municipal Water District, Riverside, CA – *Deputy Project Manager* - Prepared a County-wide Local Model Water Efficient Landscape in coordination with the Riverside County Water Task Force. Ordinance was based on existing Riverside County ordinances and the State Model Water Efficient Landscape Ordinance.

Jennifer (Lau) Larsen, P.E.

Water Resource Engineer

Education

BS, Civil Engineering, University of California,
Davis, 2009

Registrations

Professional Civil Engineer, California (81220)

Years of Experience

8 years

Professional Summary

Jennifer Larsen is a registered civil engineer with a range of experiences in water resources planning. She has assisted in the development and coordination of numerous plans and strategies related to water supply/demand, floodplain management and flood emergency response, wastewater, and water/energy efficiency. Jennifer has developed multiple water balances and mathematical models to support planning projects and programs and has contributed to the writing of Integrated Regional Water Management Plans and grant applications, storm water resource plans, wastewater master plans, CEQA documentation, and groundwater assessment reports.

Jennifer is well-versed in California Department of Water Resources IRWMP documentation requirements. Jennifer has completed multiple water supply and demand projections, analyzing demographic, land use, and conservation (SBx7-7) data and implications. Jennifer has years of experience with writing IRWM planning documents and grant applications.

Selected Project Experience

Westside Sacramento Region 2015 IRWM Grant Application, Napa County Flood Control and Water Conservation District, Napa, CA – *Project Engineer* – Assisted the District in obtaining funding for project implementation by preparing the 2015 Proposition 84 IRWM 2015 Implementation Grant Application. Preparation of the grant application included information collection, conference calls with stakeholders and the preparation of project work plans that aligned to the IRWM plan's goals and objectives, as well as support in the development of budgets, schedules, and technical justification of the projects.

Prop. 1 Storm Water Resource Plan for Yolo County, Yolo County Flood Control and Water Conservation District/Yolo Water Resources Association, Woodland, CA – *Deputy Project Manager/Project Engineer* – Part of the development team for the Storm Water Resource Plan for Yolo County in conformance with Proposition 1 Guidelines. Duties include preparing materials for and participating in Stakeholder/Outreach meetings, drafting sections, and assisting in project development/benefits quantification. Jennifer is also assisting in project management duties with monthly check-in calls, invoice submittals, and delegation of tasks. Jennifer also assisted in the preparation of a Proposition 1 Planning Grant proposal package to fund the Storm Water Resources Plan process. After the grant had been preliminarily awarded, provided support by working with the client and stakeholders to respond to Board comments and questions during grant contract negotiation.

Storm Water Resources Plan – Greater Salinas Area, Monterey Regional Pollution Control Agency and City of Salinas, Salinas, CA – *Project Engineer* – Assisted in the development of a Storm Water Resources Plan conforming with Proposition 1 Guidelines. Duties included drafting sections, assisting agencies in project development and refining, project prioritization, and benefits quantification.

Integrated Regional Water Management Plan Update, San Luis Obispo County, San Luis Obispo County, CA – *Project Engineer* – Assisted in the update to the San Luis Obispo County IRWMP, including developing materials for and submitting the Proposition 84 Implementation Grant Application, updating geographic and demographic data, and updating the plan to conform with the 2012 IRWMP Guidelines.

Gateway Integrated Regional Water Management Plan, Los Angeles Gateway Region Joint Powers Authority, Los Angeles, CA – *Project Engineer* – Developed a regional water balance for the Gateway Region IRWMP. Work included gathering and processing water supply and demand and demographic information from various sources, including Urban Water Management Plans and individual water purveyors. Also assisted in the development and submittal of the Gateway Round 2 Implementation Grant and the 2014 Drought Grant.

Eastern San Joaquin County Integrated Regional Water Management Plan Update, San Joaquin County Public Works Department, Stockton, CA – *Project Engineer* – Developed a regional water balance for the Eastern San Joaquin IRWMP. Work included gathering and processing water supply and demand and demographic information from various sources, including Urban Water Management Plans and Municipal Services Reviews.

Integrated Regional Water Management Plan, Imperial Irrigation District, Sacramento, CA – *Project Engineer* – Applied multiple methods to analyze historical and future population estimates, current land use, and current water use for the purposes of forecasting future average water demand in the Imperial County. The forecasts were used to identify potential water supply projects, as required by California Proposition 84 Integrated Regional Water Management Planning (IRWMP) Guidelines and Standards.

Yosemite-Mariposa Integrated Regional Water Management Plan Preparation, Mariposa County Resource Conservatory, Mariposa, CA – *Staff Engineer* – Participated in site visits and documented the needs and conditions of 6 separate small water systems within the IRWM Plan boundary. Developed technical memorandums for each participating small water system documenting existing conditions, recommended projects and technical justification, and preliminary implementation schedules and budgets for the purposes of developing the information needed to submit for future funding applications.

Groundwater Assessment Report, Kings River Conservation District, Fresno, CA – *Project Engineer* – Researched and analyzed agricultural cropping and irrigation practices in the Tulare Region to characterize the areas at risk for nitrogen. Used GIS data, research papers and publications, information provided by area growers, and the internet to conduct her research.

Lauren Everett

Water Resources Planner

Education

BS, Environmental Studies, University of California, Santa Barbara, 1999

MS, Environmental Science and Management, University of California, Santa Barbara, 2001

Years of Experience

16

Professional Summary

Lauren is a Water Resources Planner with over 16 years of experience in environmental and regulatory compliance, water supply and demand management planning, integrated water resource planning, grant writing, grant administration, and project management experience in Southern California. Her diverse range of water resource and watershed related projects include integrated regional water management plans, California Environmental Quality Act analyses, water resource studies, State Water Project transfers, groundwater banking programs, water supply assessments, and pipeline construction projects. She has provided technical and management support to numerous water resource and watershed projects for clients.

Lauren's strong working knowledge of local, state, and federal laws pertaining to the management of water resources facilitates timely permit acquisition.

Project Experience

CLWA-SWPP, Sand Canyon, Castaic Lake Water Agency, Santa Clarita, CA – Environmental Scientist - This project consists of the expansion of the existing Rio Vista Water Treatment Plant (RVWTP) treatment capacity from 30 million gallons per day (MGD) to 60 MGD. Ms. Everett's responsibility included preparation of a Storm Water Pollution Prevention Plan to meet NPDES requirements.

Honby Phase II, Permit Assistance, Santa Clarita, CA – Environmental Scientist - This project consists of the construction of a 60-inch buried steel water pipeline intended to replace an existing 33-inch Honby pipeline, in a new alignment. Ms. Everett's responsibility included preparation of a Storm Water Pollution Prevention Plan to meet NPDES requirements.

Commercial and Residential Recycled Water Program, City of Ventura, CA – Permit Specialist – Assisted the City of Ventura with obtaining regulatory approval for a commercial and residential recycled water program at the Ventura Harbor Wastewater Treatment Plant. The City wished to expand the use of recycled water to City parks, provide recycled water to industrial and commercial users, and to individual residents. Ms. Everett assisted in preparing the Wastewater Change Petition form, information required by the Division of Drinking Water to protect health and safety, and preparation of the CEQA MND.

2015 Urban Water Management Plan, Castaic Lake Water Agency, Santa Clarita, CA – Deputy Project Manager – Managed a team that prepared the 2015 update to the Santa Clarita Valley's Regional Urban Water Management Plan on behalf CLWA and its retail water purveyors. The plan provides an assessment of water supplies and demands available to the Agency and purveyors over a 25-year planning horizon.

2017 CLWA Reliability Plan Update – Project Manager – Managed the update of the CLWA Reliability Plan.

Salt and Nutrient Management Plan (SNMP) Supplemental Environmental Document (SED), Santa Clarita, CA – Project Manager – This project consisted of the preparation of an Initial Study for the SNMP for the Upper Santa Clara River East Subbasin pursuant to CEQA guidelines, including a completed Environmental Checklist. The SED supported the final SNMP that was submitted to the Regional Water Quality Control Board for inclusion in a Basin Plan Amendment.

2015 Urban Water Management Plan, Palmdale Water District *Project Manager* Managing the update of the regional Urban Water Management Plan in conformance with DWR Guidelines.

2015 Urban Water Management Plan, Twentynine Palms Water District *Project Manager* Managing the update of the regional Urban Water Management Plan in conformance with DWR Guidelines.

Peer Review of the Water Supply and Demand Analysis for the Centennial Development, Tejon Ranch Corporation, Santa Clarita, CA – Project Manager - Project Manager – This project consisted of a peer review of the administrative draft environmental impact report (ADEIR) for the Centennial Development which analyzes the project's water demands and supply. The purpose of the peer review was to verify and evaluate the reasonableness and accuracy of the revised water supply and demand analysis and the effectiveness of the proposed water monitoring, and enforcement and mitigation measures.

Upper Santa Clara River IRWMP Proposition 84 Round 2 Implementation Grant Application, Castaic Lake Water Agency, Santa Clarita, CA - *Project Manager* - Managed successful grant application and was awarded \$7,006,481.

Upper Santa Clara River IRWMP Proposition 84 Round 2 Planning Grant Application, Castaic Lake Water Agency, Santa Clarita, CA *Project Manager* Managed successful grant application and was awarded \$734,000.

West Saugus Formation Groundwater Resources Monitoring Project, Local Groundwater Assistance Proposition 84 Grant Application, Castaic Lake Water Agency and Newhall County Water District, Santa Clarita, CA *Grant Specialist* Applied for and was granted \$158,450 for each agency.

Upper Santa Clara River IRWMP Proposition 84 Round 1 Implementation Grant Application *Project Manager* Managed grant application for and was awarded \$6,931,000.

Upper Santa Clara River IRWMP Proposition 84 Round 1 Planning Grant Application, Kennedy/Jenks *Project Manager* For successful grant application and was awarded \$265,000.

Patrick D. Treanor, P.E.

Infrastructure Engineer

Education

BS, Civil Engineering, Loyola Marymount University,
2003
MS, Environmental Engineering, University of
California, Berkeley, 2004

Registrations

Professional Civil Engineer, California (70895)

Certifications

Certification Name, Certification Issuer

Memberships/Affiliations

American Society of Civil Engineers - Discharge of
Concentrate to Oceans Subcommittee Member
Bay Area Water Works Association
Pipe Users Group
Tau Beta Pi Engineering Honors Society
Alpha Sigma Nu Jesuit Honors Society

Years of Experience

13.4 years with the firm
0 years with other firms

Professional Summary

Patrick Treanor is a civil engineer with a broad range of skills and experience in water and wastewater infrastructure engineering. Patrick has 12 years of experience at Kennedy/Jenks and is adept in project management, planning, asset management, detailed design, field engineering, and construction management. Patrick has worked as a project manager or lead engineer on over 30 design and construction projects. He has also completed a long list of planning and feasibility studies and has started projects from the planning stages, and overseen them through design, bidding, construction, start-up, and final completion. His experience managing interdisciplinary design projects has given him significant insight and knowledge of electrical, mechanical, instrumentation and structural engineering disciplines in addition to civil engineering.

Project Experience

Wastewater Treatment Plant Improvements, Confidential Client, San Joaquin County, CA - *Resident Engineer* - Part-time On-site Engineer/Inspector for treatment plant. Inspected equipment installation, piping, and heating, ventilation, and air conditioning (HVAC).

Recycled Water Distribution System Design Bid Packages 1 to 3, City of Redwood City, Redwood City, CA - *Civil Engineer* - Lead designer responsible for creating design drawings for 30,000 linear feet of polyvinyl chloride (PVC) recycled water distribution system pipelines ranging from 8- to 30-inches in diameter. Due to the large scope of work, the project was split into several separate construction bid packages. The pipelines were installed in city streets with many existing utilities. The design included the use of mechanical joint restraints and fittings requiring petrolatum tape wrap as well as vertical curves.

Seawater Desalination Pilot Study of San Francisco Bay Water, Marin Municipal Water District, Corte Madera, CA - *Field Technician* - Involved in all aspects of design and construction of high-profile state-of-the-art reverse osmosis desalination facility. Selected pumps for intake discharge and process pumping. Selected other equipment used in the plant including chemical metering pumps, valves, and flowmeters. Served as on-site construction specialist installing the majority of water piping, chemical systems, and compressed air systems. Also served as an operator on a weekly basis once the plant was commissioned.

Incremental Recycled Water Program (IRWP) Discharge Compliance, City of Santa Rosa, Santa Rosa, CA - *Field Technician* - Implemented pilot test to collect data and assess the environmental impact of discharging wastewater plant effluent to percolation ponds or groundwater injection wells. This was accomplished by designing and building a large soil column treatment train (200-feet-long), which

Kennedy/Jenks Consultants

showed the attenuation of metal constituents in wastewater plant effluent traveling through unsaturated and saturated soil columns. Involved in all aspects of design and construction of the pilot and was the lead in constructing the soil columns as well as the structural components to support the columns which were 5- to 12-feet-tall and weighed up to 800 pounds.

Big Hill Water System Improvements, Tuolumne Utilities District, Sonora, CA - *Civil Engineer* - Designed equipment layout plans for pre-design of two 5-mgd membrane filtration plants requiring efficient use of space due to small size of building footprint.

Groundwater Recovery Enhancement and Treatment (GREAT) Desalter Facility, City of Oxnard, Planning and Environmental Services, Oxnard, CA - *Civil Engineer* - Designed plant yard piping and a pump station which feeds a distribution system. Reviewed shop drawings and responded to contractor requests for information, process, and yard piping related.

BS1 South Property Well, City of Oxnard, Oxnard, CA - *Civil Engineer* - Designed booster pump station and blending station for drinking water distribution system.

Recycled Water Distribution System Design Bid Packages 4 and 5, City of Redwood City, Redwood City, CA - *Project Manager* - Lead designer responsible for creating design drawings for 10,000 linear feet of polyvinyl chloride (PVC) recycled water distribution system pipelines ranging from 8- to 30-inches in diameter. Due to the large scope of work, the project was split into several separate construction bid packages. The pipelines were installed in city streets with many existing utilities. Bid Package 4 included striping plans and a bore and jack section of the pipeline under an existing box culvert.

Final Design and Construction Support for Wastewater Treatment Plant Improvements, Sausalito-Marin City Sanitary District, Sausalito, CA - *Project Engineer* - Designed mechanical improvements for pumping systems into and out of the Primary Digester. Assisted the District in pre-purchasing piping for the Primary Digester Mixing System. Designed piping improvements for numerous systems in and around the Primary Digester. During the construction phase, assisted the District in managing construction of chemical storage improvements. Tasks included shop drawing review, responding to contractor questions, inspections, and coordination.

South Upper Truckee Well 3 Corrosion Control Study, South Tahoe Public Utility District, South Lake Tahoe, CA - *Civil Engineer* - Constructed and operated a corrosion treatment alternatives system that monitored corrosion rates in well water that received different levels of treatment to determine the best method to control corrosion. Treatment options tested included aeration and aeration combined with sodium silicate chemical addition. This was compared with the untreated water as a baseline. Corrosion rates were measured using linear polarization.

Peer Review and Consulting - WWTS Improvements, Confidential Client, Merced County, CA - *Field Technician* - Served as onsite reverse osmosis (RO) equipment technician and engineer for pilot test equipment.

Rio Vista Water Treatment Plant Expansion, Final Design, Santa Clarita Valley Water Agency, Santa Clarita, CA - *Civil Engineer* - Designed Ozone contact pipeline for 60 MGD water treatment facility. Also, designed chemical receiving facilities and civil plans.

Paradise Wastewater Treatment Plant Improvements, Sanitary District No. 5 of Marin County, Tiburon, CA - *Civil Engineer* - Engineer of record for design of a San Francisco Bay outfall (6-inch-diameter treated effluent outfall) extending 400 feet into the San Francisco Bay. The outfall was designed to be constructed by horizontal directional drilling from the shore to reduce potential environmental impacts of construction to the bay ecology in the tidal zone and along the bay floor. The horizontal directional drilling method allowed for the entire pipe to be buried except for the end diffuser

Catrina I. Paez

Water Resource Planner

Education

BS, Environmental Sciences, University of California at Riverside, 2009
MS, Environmental Science and Management, University of California Santa Barbara, 2011

Registrations

Registration Name, Registration State/Prov Name (Registration Number)

Certifications

Certification Name, Certification Issuer

Memberships/Affiliations

Resume Description

Years of Experience

6.3 years with the firm

Professional Summary

Catrina is a Water Resources Specialist with more than six years of experience in conducting and assisting in environmental and water resource-related research and field assessments. At Kennedy/Jenks Consultants, Catrina has provided fieldwork assistance on tracer studies, collecting water samples, operating and monitoring pumps, and coordinating tests with appropriate staff and team members. Catrina regularly provides consulting services for implementing DWR's Proposition 84 Integrated Regional Water Management Grant Program and associated Plan development, urban water management planning, and supply and demand forecasting. Catrina has been conducting grant administration of Proposition 50 and 84 grants for multiple agencies and has successfully contributed to a variety of grant applications for public works projects, including 2012 Bureau of Reclamation Title XVI grants for Eastern Municipal Water District and Western Municipal Water District totaling over \$5 M in authorized funding. Additionally, Catrina has been expanding on her diverse multi-disciplinary experience to include regulatory agency permitting assistance for National Pollution Discharge Elimination (NPDES) permits with a focus on stormwater and Stormwater Pollution Prevention Plan (SWPPP) preparation.

Project Experience

Grant Administration Support, County of Ventura, Ventura, CA - *Grant Administrator* - Supporting grant administration for 11 project proponents under Proposition 50 and 8 projects under Proposition 84 of the Integrated Regional Water Management Program. Assisting project proponents with coordination of deliverables, preparation of invoices, and progress reports.

Santa Barbara Countywide Integrated Regional Water Management Plan-Prop 50, Implementation Grant Administration, County of Santa Barbara, DPW, Santa Barbara, CA - *Experience Discipline Name* - NEED PROJECT DESCRIPTION AND YOUR ROLE

Backbone Improvement Program: Calabasas and Agoura Hills Alignments Project, Las Virgenes Municipal Water District, Calabasas, CA - *Grant Administrator* - Prepared the preliminary SWPPP for the 1235 Ft. Backbone Improvement Project Calabasas Pipeline.

As-Needed Grant Support Services, Western Municipal Water District, Riverside, CA - *Grant Administrator* - Providing ongoing as needed support to the Western Municipal Water District (Western) for multiple grant programs. Tasks include grant application preparation, including a recent Bureau of

Reclamation WaterSMART application, preparation of a State Revolving Fund loan application, and monthly summaries of upcoming grant opportunities.

WMWD-As-Needed Grant Support, Western Municipal Water District, Proj City, Proj State Code - Grant Administrator - Prepared and assisted with preparation of technical proposal components, including project description and grant evaluation, as well as, draft letters of support.

Rio Vista Water Treatment Plant, Pre-ozone Contact Tracer Study, Santa Clarita Valley Water Agency, Santa Clarita, CA - *Grant Administrator* - Assisted with setup of tracer tests and conducted tracer tests at the Rio Vista Water Treatment Plant, including collecting samples in coordination with CLWA staff and other team members.

2010 Urban Water Management Plan Update, City of Oxnard, Planning and Environmental Services, Oxnard, CA - *Grant Administrator* - Assistance in revisions and updates to the Urban Water Management Plan for the City of Oxnard. Revising and editing plan based on current and up-to-date regional conditions and incorporating stakeholder comments and edits.

City of Ontario-As-Needed Grant Ser, City of Ontario, Engineering Department, Proj City, Proj State Code - *Grant Writer* - Assisted the Ontario Municipal Utilities Department with grant application preparation. Recent grant applications were prepared for seismic retrofit of buried water supply tanks and wellhead treatment of perchlorate. Tasks also include coordination of specialized cost benefit analyses.

Chino Desalter Phase 3 Expansion Grant Support, Western Municipal Water District, Proj City, Proj State Code - *Grant Administrator* - Assisted with preparation of the successful Bureau of Reclamation Title XVI grant application for treated water pipeline and pump station components of the Chino Desalter Phase III Expansion Project. Prepared and assisted with preparation of technical proposal components, including project description and grant evaluation, as well as, draft letters of support.

Integrated Regional Water Management Plan Update, Santa Clarita Valley Water Agency, Proj City, Proj State Code - *Grant Administrator* - Assistance in revisions and updates to the Integrated Regional Water Management Plan (IRWMP) for the Upper Santa Clara River Region (Los Angeles County). Updating plan based on new Prop 84 IRWMP standards and current regional conditions, developing materials for stakeholder meetings and addressing stakeholder comments and edits.

San Francisco Bay Area Integrated Regional Water Management Plan Update, Marin Municipal Water District, Marin County, CA - *Grant Administrator* - Assistance in revisions and updates to the Integrated Regional Water Management Plan for the San Francisco Bay Area Region. Updating plan based on new Prop 84 IRWMP standards and current regional conditions, developing materials for stakeholder meetings and addressing stakeholder comments and edits.

EMWD-BOR Grant-Audie Murphy Ranch, Eastern Municipal Water District, Proj City, Proj State Code - Grant Administrator - Assisted with preparation of the successful Bureau of Reclamation Title XVI grant application for the Recycled Water System Pressurized and Expansion Project. Prepared and assisted with preparation of technical proposal components, including project description and grant evaluation criteria.

Rio Vista Water Treatment Plant (RVWTP) Clearwells Tracer Study, Santa Clarita Valley Water Agency, Santa Clarita, CA - *Grant Administrator* - Assisted with setup of tracer tests and conducted tracer tests at the Rio Vista Water Treatment Plant, including collecting samples, operating tracer metering pump and monitoring tracer feed pump in coordination with CLWA staff and other team members.

MARTIN B. FEENEY, P.G., CEG., CHg. *Resume*
Consulting Hydrogeologist

- CONTACT:** P.O. Box 23240, Ventura, CA 93002
805-643-7710, 831-915-1115
mfeeney@ix.netcom.com
- EDUCATION:** M.A., Environmental Planning (Groundwater), California State University, 1987
Graduate Program, Water Science, University of California, Davis, 1981-1982
Secondary Teaching Credential, University of California, Santa Barbara, 1979
B.S., Earth Science (Geology), University of California, Santa Cruz, 1976
- QUALIFICATIONS:** Professional Geologist, California, No. 4634
Certified Engineering Geologist, California, No. 1454
Certified Hydrogeologist, California, No. 145
Certified Groundwater Professional, NGWA, 1994
- EXPERIENCE:** Mr. Feeney has more than 30 years experience in groundwater consulting. After employment as a well-site geologist in the oil industry and again as an engineering geologist, Mr. Feeney was a founding Principal of Staal, Gardner and Dunne, Inc. (later became Fugro West, Inc.) and managed this firm's Monterey County office for 9 years. Mr. Feeney later was a member of the firm, Balance Hydrologics, Inc. Mr. Feeney is currently a private consultant. Mr. Feeney's experience in groundwater supply issues includes well siting and design, preparation of project specifications and contractor supervision, well maintenance and repair, water treatment, groundwater modeling (both flow and solute-transport), perennial yield analysis, artificial recharge (surface and injection), water quality assessments, regulatory compliance and groundwater modeling.
- Mr. Feeney has significant experience in drilling and well construction technology. During his career Mr. Feeney has designed and managed the construction of over 80 municipal wells with diameters up to 24-inches and discharge rates of up to 6,000 gpm at locations around the world.
- Selected representative project experience includes:***
- WATER SUPPLY PROJECTS:** **Point of Diversion Study, Monterey County, California-American Water Co.** The feasibility of diverting subsurface flow from the Carmel River rather than direct diversion from the reservoirs was evaluated. The change would allow existing treatment facilities and pipelines to be utilized while providing important fisheries and riparian habitat benefits as well as reduced treatment costs. The scope included re-evaluating the geometry of the uppermost Carmel River alluvial aquifer, adapting the existing groundwater model to incorporate the proposed changes in point diversion, and assisting the local water district in modifying its operational models and in-stream flow simulations.
- Desalination Project, Marina Coast Water District.** Marina Coast Water District built the first operating desalination facility in mainline California. Work included design and supervision of construction of the project's seawater intake and brine disposal wells. Additional work included performance of aquifer and injection testing and analysis, detailed groundwater flow and transport modeling as part of feasibility analysis, and assessment of injection well plugging phenomena.
- Sand City Desalination Plant Saline Intake and Brine Disposal Monterey Peninsula Water Management District —, Monterey County**
- In order to satisfy increased water demands, the MPWMD has proposed the construction of a 3.0 MGD seawater desalination facility that will extract water from coastal dune sands through the use of Ranney collectors. The feasibility of this approach was investigated and the conclusion reached that three Ranney collectors at the site would be capable of producing the required design flow. Also investigated was the use of Ranney collectors to inject brine into the shallow subsurface offshore. The project included drilling, well construction, aquifer testing and solute/flow modeling. It successfully demonstrated that Ranney collectors would be suitable for use and that brine injection was feasible.

Pilarcitos Creek Study -San Mateo County

Anticipating the listing of certain species of fish that migrate up coastal streams, the Coastsid Water District, in conjunction with San Francisco Water Department, contracted for a study of the feasibility of modifying the method of diversion from Pilarcitos Creek. The study included the review of reservoir operations, analysis of distribution system, evaluation and modeling of the District's wellfield, and the assessment of fisheries conditions in specific reaches of the creek. The report concluded that it was feasible to shift diversions to the wellfield from the reservoir and that this would result in the re-establishment of up to 2 miles of additional fisheries habitat. However, the overall benefit of the proposed modification was not clear as the modification would have no effect on the more-critical impacted fisheries habitat downstream of the District's property.

EXPERT/3rd PARTY REVIEW PROJECTS	<p>Salinas Valley Hydrogeologic Conference “White Paper”. Mr. Feeney was a one of eight participants in a ‘blue-ribbon’ committee convened by the MCWRA to address the hydrogeologic issues facing the Salinas Valley. As part of two day conference, the committee evaluated available data regarding seawater intrusion, the overall water balance and water quality issues. The committee reached general consensus and prepared a report recommending a solution to the water supply shortfall.</p> <p>Soquel Creek Water District IGSM Development -- Technical Advisory Committee (TAC) Member. Mr. Feeney was retained by Soquel Creek Water District to participate in a TAC reviewing the development of the IGSM model by a consultant for the District. This recently completed model, shares its southern boundary with the Pajaro IGSM model. Water level and water quality conditions within the northern portion of PVWMA area are linked between the two models.</p> <p>Pajaro Valley Water Management Agency – Groundwater Model Development Project – TAC Chairperson The USGS was contracted to convert the Pajaro Valley Water Management Agency’s (PVWMA) existing groundwater model from the IGSM code to MODFLOW2000 code. Mr. Feeney was retained by PVWMA to chair and as a participant in the advisory TAC that supervised the conversion of the model. This task entailed review and acceptance of a revised hydrostratigraphic model of the Pajaro Basin, review and acceptance of the water balance and recharge assumptions. The conversion project is on-going and a working, calibrated model has been completed.</p> <p>Seaside Groundwater Basin Watermaster – Groundwater Model Development Project – TAC Chairperson As part of the court decree, the Seaside Groundwater Basin Watermaster (Watermaster) was tasked with developing a groundwater model of the basin for management purposes. Mr. Feeney was retained to chair a panel of modeling experts to evaluate the existing groundwater models of the basin and the need for a new model. This review focused on the need and desired uses for a model, identification of data gaps that may limit model utility and validity, the suitability of flow verses solute transport models, and generalized approaches to the modeling effort. The results of the review resulted in the selection and modification of an existing model to meet the Courts requirement.</p> <p>National Water Resources Institute – TAC Panel Member– Monterey Regional Water Pollution Control Agency –Reclaimed Water Recharge Project in the Seaside Basin. Mr. Feeney was again asked to serve as the groundwater expert on a NWRI panel reviewing the Monterey Regional Water Pollution Control Agency’s proposed Reclaimed Water Recharge Project in the Seaside Basin. This project proposes to take highly-treated wastewater and use it for recharge in the Seaside Basin – either through percolation or direct injection. The review focused on the feasibility of the plan and the potential impacts and benefits of implementation. The panel is on-going.</p>
PROFESSIONAL AFFILIATIONS:	Groundwater Resources Association Association of Groundwater Scientists and Engineers American Institute of Hydrology Monterey Bay Geologic Society

Robert H. Abrams, PhD, PG, CHg

Hydrogeologist

Geology and Hydrogeology

Geologic, Groundwater, and Vadose Zone Modeling
Groundwater Banking
Water Resources Evaluations
Artificial Groundwater Recharge Modeling
Aquifer Test Analyses
Fate and Transport Modeling for Metals and Organic Constituents
Redox Zone Analyses
Anti-Degradation Analyses
Probabilistic and Stochastic Analyses
Environmental Forensics

Project Management

Public and Private Sector Project Management
Agency Liaison
Participation in Public and Agency Meetings

Litigation Support

Expert Report Evaluation and Preparation
Model Development for Litigation Purposes

Professional Summary

Dr. Abrams is a California-licensed Professional Geologist and Certified Hydrogeologist specializing in quantitative analysis of groundwater and vadose zone systems. Dr. Abrams has extensive experience developing and implementing models and conducting data analysis to support sustainability and impact analyses, feasibility studies, water rights analysis, and water supply development. He has gained particular expertise in groundwater flow, artificial groundwater recharge, solute transport, and redox zone analyses. He has successfully addressed issues of water quality, groundwater sustainability, enhanced recharge and aquifer storage, and water supply development. His broad background includes projects for agricultural, food and beverage, municipal, petroleum, railroad, and chemical clients. His water quality work has addressed a wide range of issues including nitrates, pesticides, salinity, metals, petroleum hydrocarbons, and chlorinated solvents. Dr.

Abrams has worked successfully as an independent contractor, for private consulting firms, as an adjunct professor for San Francisco State University, and for the USGS.

Work Experience

Principal Hydrogeologist (Oct 2015 – Dec 2017)
Jacobson James & Associates, Roseville, CA

Principal (Nov 2012 – Sep 2015)
Consulting Hydrogeologist, San Carlos, CA

Hydrogeologist (Mar 2009 – Nov 2012)
Kennedy/Jenks Consultants

Principal (2005 – 2009)
Consulting Hydrogeologist, San Carlos, CA

Lecturer and Adjunct Professor (2003 – 2009)
Geosciences Department, San Francisco State University, CA

Senior Hydrogeologist (2002 – 2005)
SGI The Source Group, Pleasant Hill, CA

Research Associate (2000 – 2002)
Department of Geological & Environmental Sciences, Stanford University, CA

Education

Doctor of Philosophy in Geological and Environmental Sciences, Stanford University, 1999
Master of Science in Geological and Environmental Sciences, Stanford University, 1996
Bachelor of Science in Geology, San Francisco State University, 1991

Registrations/Certifications

Professional Geologist, California (8703)
Certified Hydrogeologist, California (931)

Select Projects

Regional Groundwater-Surface Water Model for PEIR Stanislaus County, California

A new IWFM groundwater-surface water model, based on the Central-Valley-wide C2VSim IWFM model, was developed for Stanislaus County to assess impacts, in terms of foreseeable land-use changes and installation of new wells. This model was developed for a program environmental impact report (PEIR) that was prepared to assess impacts caused by Stanislaus County's Groundwater Ordinance, which focuses on sustainability concepts aligned with California's Sustainable Groundwater Management Act.

Well Permit CEQA Analysis Stanislaus County, California

Assist County with evaluation of new major well permit applications based on a recently passed groundwater ordinance requiring evaluation under CEQA for potential pumping-induced impacts to the groundwater basin such as lowered water levels in existing wells, land subsidence, and significant groundwater or surface water depletion. The new ordinance designed in anticipation of implementation of a Groundwater Sustainability Plan in accordance with the Sustainable Groundwater Management Act.

Third-Party Evaluation of Hydrologic Analysis Conducted for Monterey Peninsula Water Supply Project City of Marina, Monterey County, California

A technical analysis was conducted and detailed comments provided regarding the hydrologic analysis undertaken for the draft environmental impact report/environmental impact statement for the proposed Monterey Peninsula Water Supply Project (MPWSP)

Well Efficiency Evaluation

Salinas Valley Grower and Food Processor, Monterey County, California

Well efficiency test results for multiple years and multiple wells were evaluated. Quantitative and statistical analyses were used to assess well performance and make recommendations for potential well maintenance and repair activities.

Analysis of Observed Nitrate Concentration Trends in Irrigation Wells

Salinas Valley Grower, Monterey County, California

The factors influencing nitrate concentrations in well-water produced from approximately 60 irrigation wells on 40 ranches were investigated and an enhanced groundwater monitoring program was developed to support groundwater management activities. Diverse and complex data sets were collected, analyzed, and developed in two separate phases to understand the geologic, hydrologic, and anthropogenic factors that influence well-water nitrate concentrations during short-term and long-term timeframes. A wellhead protection plan was developed based on the results.

Alternative Groundwater Monitoring Plan

Salinas Valley Grower and Food Processor, Monterey County, California

Publicly available groundwater quality data from a set of regularly sampled water-supply wells were evaluated statistically to develop an alternative to installation of new monitoring wells for a land application area that received wastewater from a food processing plant. The effort was driven by a Central Coast Regional Water Quality Control Board order requiring client to participate in the General Waste Discharge Requirements (WDRs) for Fruit and Vegetable Processors, which has stricter monitoring requirements than the previous individual WDRs.

Seawater Intrusion Injection Barriers for Regional Groundwater Mitigation Salinas Valley Grower and Food Processor, Monterey County, California

Published reports and data from international and national seawater intrusion mitigation efforts were reviewed and analyzed. The analysis was to assess the level of effort required, volumes of water necessary, and costs of implementation in the Salinas Valley of a seawater intrusion injection barrier using recycled water. Ongoing injection barrier projects in Orange County and L.A. County were selected for in-depth review to evaluate the feasibility of a similar project in Monterey County.

*Grower-Shipper Association of Central California
Salinas, CA*

Served as an agricultural industry representative on the Technical Advisory Committee for the development of the Salinas Valley Integrated Hydrologic Model, a new MODFLOW model constructed by Monterey County and the U.S. Geological Survey, 2015-2017.

*Salinas MTBE Investigation
Monterey County Water Resources Agency, Salinas, California*

Monte Carlo hydraulic gradient analysis and stochastic 1D and 2D solute transport simulations (analytical solutions) were conducted based on regional groundwater maps and 13 years of monthly groundwater levels from dozens of production wells to determine the most likely MTBE source areas. A customized GIS framework was developed to evaluate source-area probability. Accepted by the Central Coast Regional Water Quality Control Board.

*Groundwater Banking Waste Discharge Requirements Support
Cawelo Water District, Central Valley, California*

Developed three-dimensional, variably saturated flow and reactive solute transport models (MODFLOW-SURFACT) to assess the groundwater impact from arsenic and boron in recharged partially treated oilfield produced water. Transport through the unsaturated zone and saturated zones related to groundwater banking operations for agricultural water supply were simulated. Regulatory approval was granted by the Central Valley Regional Water Quality Control Board.

*Regional-Scale Pesticide Contamination Litigation Support
Sedgwick, Detert, Moran, and Arnold, Fresno, California*

Implemented detailed regional, three-dimensional conceptual model for a 35-year period (MODFLOW and MT3DMS). Geologic data, crop-based time-variant DBCP application rates, pumping, recharge basins, and flow and solute transport in the unsaturated and saturated zones were used to evaluate whether label-recommended use of DBCP caused contamination in municipal wells and to establish likely source areas for high-concentration hot spots.

*Groundwater Modeling for Cleanup and Abatement Order
Agricultural and Food Processing Facility, Central Valley, California*

A calibrated transient three-dimensional model (MODFLOW and MT3DMS) of groundwater flow and solute transport was developed, calibrated, evaluated, to compare estimated timeframes to achieve RAOs for three alternatives. Site data were used to characterize the subsurface, and estimate land application rates and water quality of applied water. Regulatory approval was granted by the Central Valley Regional Water Quality Control Board.

Other Projects

Water Resources

*Model Updates for the Palmdale Regional Groundwater Recharge and Recovery Project
Palmdale, California*

An existing subregional groundwater flow model was updated to include the unsaturated zone and to evaluate additional project alternatives.

*Groundwater Banking and Blending Study
Antelope Valley-East Kern Water Agency (AVEK), Palmdale, California*

Two local-scale groundwater flow (MODFLOW) and solute transport models (MT3DMS) were developed for two sub-regions of the USGS regional Antelope Valley MODFLOW model. Updated geologic characterization was based on recent investigations by the USGS and sparse well logs. Groundwater bank performance was evaluated with respect to water quantity and quality for various operational strategies, including well placement and infiltration schedules.

MATT ZIDAR

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Cell: (916)708-8441 Email: mzidar4water@gmail.com

Biographical Sketch

Matt has been engaged in surface water and groundwater resources planning, management and engineering for 30 years in both the public and private sector, and is positioned to support clients implement programs to comply with the California Sustainable Groundwater Management Act signed. He has developed a number of groundwater management plans and integrated regional management plans, and the needed technical and policy analysis required to help communities make decisions. This includes working in high priority groundwater basins and those in critical overdraft. Areas of expertise include groundwater recharge/storage, conjunctive use, reservoir operations, nitrates, seawater intrusion, wastewater recycling, water rights, water conservation, surface and groundwater modeling, GIS applications, projects formulation, alternatives evaluation, regulatory compliance (CEQA, NEPA, ESA, CWA), grant writing, process facilitation and stakeholder involvement. Areas where my expertise has been applied include the California Central Coast, Sacramento and San Joaquin Valleys and Delta, and Southern California desert.

Education: B.S. Watershed Science and Hydrology. Colorado State University. 1984

Relevant Experience

Private Practice. July 2015 to Present.

Support public and private sector strategic water resources planning with emphasis on integrated water resources planning, regulatory compliance, the Sustainable Groundwater Management Act and salt and nutrient management both on farm and at the basin scale. (Annual income, Variable)

GEI Consultants, Inc. Principal Consultant. Principal Consultant. September 2007 to June 2015

Manage, plan and direct complex water resources analysis and regional planning. Work with joint powers authorities, stakeholder groups and project partners to develop integrated regional water resources management plans, groundwater management plans, conservation and salt/nitrate management plans; formulate and compare project and program alternatives, develop project/program costs; evaluate state and federal requirements, evaluate regulatory and environmental constraints and opportunities. As part of the California Department of Water Resources FloodSafe program, work to develop the Forecast-Coordinated Operations program for the Sacramento and San Joaquin Valleys reservoirs, including evaluation of real time forecasts and reservoir operations, develop decision support tools, conduct annual exercises; support development of State Plan of Flood Control, review projects and programs throughout California, identify risk, needs, current and planned facilities for flood control. Project Director to develop the Upper Kings IRWMP, Imperial Region IRWMP, Consolidated Irrigation District GMP, including management of model development and application. Coordinate technical studies, feasibility analysis, project formulation and alternatives analysis for complex water resources projects. Manage stakeholder and public outreach effort. (Annual income = \$150,000)

Water Resources Information Management and Engineering, Inc. (WRIME). Principal Consultant. August 2003 to September 2007

Manage, plan and direct complex water resources analysis and corporate marketing efforts. Assist in development and implementation of corporate strategic plan, develop proposals and teaming arrangements for projects. Coordinate technical and policy level analysis for clients and develop IRWMPS

and GMPs. Coordinate technical studies, feasibility analysis, project formulation and alternatives analysis for complex water resources projects. Manage stakeholder and public outreach effort. Provide technical support under on-call contract to DWR's the Groundwater Management Branch. (Annual income = \$120,000)

Environmental Science Associates. Director, Central Valley/Sierra Region. Director, Water Wastewater Business Group. April 2001 to July 2003

Manage regional operations for a 24-person environmental planning and consulting firm branch office. Provide environmental and natural resources planning for Water/Wastewater and Local Government client sectors. Core emphasis is on CEQA/NEPA, and compliance with local, state, and federal regulations. Coordinate major proposal development efforts. Establish strategic goals and objectives and implement business plan. Manage and direct all business development, administrative process, program management, marketing, project oversight, client relations, and quality control. Supervise, direct and manage interdisciplinary environmental planning teams. Recruit, hire, mentor, and review professional and support staff. Services include water and land use planning; biological, cultural, and hydrologic surveys; alternatives evaluation; habitat conservation plans; and development of integrated permitting and regulatory compliance strategies for a wide range of capital improvement and development projects. (Annual income = \$110,000)

Jones & Stokes. Project Manager, Senior Environmental Scientist. April 1997 to March 2001

Assist water resource districts, cities, and agencies to identify effective solutions to water resource issues and challenges; develop and implement regulatory compliance plans and strategies, prepare CEQA/NEPA documents for flood control and water supply projects. Coordinate development of HCP/NCCP plans to mitigate project impacts. Manage hydraulic, hydrologic, water quality, water rights and hydrogeologic assessments and impact evaluations. Coordinate major proposal development and marketing efforts. (Annual income = \$95,000)

Monterey County Water Resources Agency. Senior Hydrologist, Principal Hydrologist, Manager of the Water Management Division. January 1987- March 1997.

Coordinate and manage all data collection, analysis, modeling activities. Manage Nacimiento and San Antonio operations and release scheduling; ALERT flood warning network. Participate on SEMS team during county wide flood operations. Develop and conduct hydrology and hydrogeologic investigations. Manage up to 23 staff and budgets up to \$2M. Develop and implement basin scale management water supply and quality management plans, develop and evaluate project alternatives, coordinate internal and external environmental review and permitting activities. Develop and apply water supply, conservation, flood control and water quality related policies. Coordinate and facilitate stakeholder and technical advisory groups. (Annual income = \$65,000)

Water Management Planning

Kings Basin Groundwater Assessment Report (GAR). Kings Basin Water Quality Coalition and Kings River Conservation District.

Project Manager for the Kings Basin GAR which was prepared to comply with the Regional Water Quality Control Board General Order issued as part of the Irrigation Lands Regulatory Program. The Order establishes the general waste discharge requirements from irrigated lands. The GAR identifies and prioritizes areas where groundwater is subject to salt and nitrate contamination from agriculture. It also provides the technical basis informing the scope and level of effort for development and implementation of the Management Practices Evaluation Program and groundwater monitoring requirements. Matt coordinated development and application of a GAR Analyst tool, a GIS based index overlay that includes capabilities for statistical analysis to generate risk ratings for the representative variables used to define vulnerability in risk categories. The risk categories included intrinsic physical conditions, regional water management, on-farm management and drinking water. The GAR Analyst also supports managing the index overlay analysis, integrating GIS layers and visualization of data and analysis results.

Integrated Water Resources Management Plan, Imperial Irrigation District, Imperial, CA.

As part of the effort to increase regional reliability for future growth and potential decreases in imported water supplies, IID embarked on the development of an Integrated Regional Plan (IRP) and Integrated Regional Water Management Plan (IRWMP) to identify capital improvement projects that would present feasible alternatives to achieve this objective. Project Manager to develop integrated regional plan including supporting staff and board to define goals and objective; evaluate existing supplies; historical and forecasted demands; review water management strategies; develop integration approach; formulate and screen project alternatives for local and regional supply augmentation and demand management measures; evaluate economics; define funding opportunities; identify industrial and urban demand management measures; develop policy options for internal water exchange; and develop implementation plan. This included investigation and analysis of groundwater banking, recycled wastewater, desalination, Colorado River and California water transfer/exchanges, and agricultural and urban conservation program actions. Coordinate stakeholder assessment process and design the second phase of the work effort will be to support development of the Imperial IRWMP with extensive stakeholder input through the RWMG and Imperial Water Forum. Grant Writing.

Flood Emergency Response (Flood ER) Program, California Department of Water Resources, Sacramento, CA.

Principal consultant assisting DWR with a major, multi-year program to overhaul California's Flood Emergency Response Program. Projects Manager for the tasks related to the Forecast-Coordinated Operations (F-CO) work in the San Joaquin Valley. This work was to document current reservoir operations and constraints; identify real time gaging needs; improve reservoir inflow forecasts; apply and further develop the F-CO Decision Support System; coordinate with local reservoir operators; identify hydrologic and hydraulic issues and opportunities; and develop operational exercises to orient operators.

Engineering Services for Floodplain Management, California Department of Water Resources, Sacramento, CA.

Principal consultant assisting with activities in support of the National Flood Insurance Program and DWR's Floodplain Management Programs. The firm is coordinating community floodplain management support activities. Matt Zidar was the Project Manager to coordinate and deliver table top and functional exercises for reservoir operators in the San Joaquin Valley, including planning and executing the exercises and preparing after action reports.

Statewide Flood Management Planning, California Department of Water Resources. Statewide, CA.

Projects Manager to coordinate outreach to Napa, Contra Costa, San Mateo and several mountain counties inventory existing and planned flood control projects, gather flood information, review studies to characterize flood risk, identify local agencies and response plans, discuss financing approaches.

F-CO Design, Yuba County Water Agency, Marysville, CA.

The purpose of the Forecast-Coordinated Operations is to improve the real-time flood control operations of the Yuba-Feather system and to provide coordinated operation of Lake Oroville and New Bullards Bar Reservoir, based on forecasted flood flows. Project Manager to prepare the final project report documenting the multi-year program to improve real time reservoir operations and release scheduling. Program included improvements to the real time gaging network, reservoir inflow and downstream flood forecasts; development of ResSim models for New Bullard Bar and Lake Oroville; design, development and installation of the F-CO Decision Support System; coordination of the changes to operating protocols to meet objective flows; design and conduct of exercises; and support to the Interagency Management Team consisting of local, state and federal agency partners.

San Joaquin F-CO Design and Implementation, California Department of Water Resources.

Project Manager to evaluate F-CO opportunities during a multi-year program to improve real time reservoir operations and release scheduling for federal, state and local reservoirs. Program included improvements to the real time gaging network, reservoir inflow and downstream flood forecasts; development of ResSim models for San Joaquin Valley reservoirs, development and installation of the F-CO Decision Support System; design and conduct of exercises; and support to the Interagency Management Team consisting of local, state and federal agency partners.

Sacramento-San Joaquin Delta Flood Emergency Management Plan. California Department of Water Resources.

Research, write and produce the plan to support coordinated flood emergency response actions in the Delta, including access and coordination between local, state and federal agencies through watch, warning, response and recovery functions.

California Department of Water Resources and U.S. Army Corps of Engineers. California Department of Water Resources.

Develop interagency coordination plan for preparedness, response and recovery operations during emergency flood response activities, including all PL-84-99 federal support access, FEMA response and recovery operations.

Upper Kings Water Forum, Integrated Water Resources Management Plan (IRWMP). California

Department of Water Resources, Kings River Conservation District.

Project Manager for a regional water planning effort to whose purposes is to develop an IRWMP consistent with state standards. Technical support was provided to the Upper Kings Water Forum, a group of stakeholders comprised of water districts, cities, overlying counties, environmental interests and other local and state agencies working to develop the IRWMP. Activities included evaluation of historical and future water demands, development of an integrated hydrologic modeling strategy, preparation of technical presentation and briefing materials on water management strategies, and production of a work plan for development of the IRWMP. The work plan was subsequently used by KRCD to prepare a Proposition 50 grant applications for support in development of the IRWMP.

Lower Kings River Groundwater Management Plan. Kings River Conservation District.

Project Manager to updated and integrated six prior AB 3030 plans and produce the Lower Kings Groundwater Management Plan (GWMP). The GWMP documented current groundwater conditions, evaluated historical and future water demands and supply components, assessed water quality and water availability, established Basin Management Objectives (BMOs), described governance and financing options, reviewed management options, and provided an implementation strategy to improve groundwater management and develop conjunctive use project. Work was coordinated through a Basin Advisory Panel of water district and land owner representatives.

Gateway Integrated Regional Water Management Plan, Los Angeles Gateway Region JPA, Sacramento, CA.

In close partnership with the Gateway Water Management Authority and its 23 member cities and districts, the GEI team is producing an Integrated Regional Water Management Plan (IRWMP) for the Gateway Region, southeast Los Angeles County.

Yuba County Integrated Regional Water Management Plan, Yuba County Water Agency, Marysville, CA.

Mr. Zidar was an in-house consultant to provide quality control and assurance of technical materials and report sections. He also provided strategic support and helped direct and manage specific staff efforts during plan development.

Water Quality Standards, Conditions and Constraints. Kings River Conservation District, California Department of Water Resources.

Project Manager and analyst to collect water quality data from state and local sources to document historic and current groundwater conditions. Map key constituents including nitrates using GIS. Document historical conditions with trilinear and stiff diagrams.

Consolidated Irrigation District Groundwater Management Plan.

Project Manager to prepare an SB 1938 compliant groundwater management plan which defined groundwater recharge projects. Identify opportunities to integrate land use and groundwater management actions of the District, local cities and Fresno County by defining mitigations for the contribution of new development to overdraft.

North Fork Group Technical Study and Groundwater Assessment. California Department of Water Resources, Kings River Conservation District.

Project Manager to evaluate current groundwater conditions, develop conjunctive use project concepts, and prepare the technical work plan program for site characterization, geologic exploration and drilling, and conduct of preliminary engineering of recharge project alternatives. The North Fork Group is a group of water districts and ditch companies along the Kings River working to develop conjunctive use and artificial recharge facilities to resolve issues of overdraft and increase local groundwater supplies. The work plan was subsequently used by KRCD staff to prepare a successful AB 303 groundwater assistance grant application.

Madera County Dairy Development Standards. Madera County, California.

Project manager to develop dairy development standards and technical guidelines for the Madera County General Plan Dairy Element. The standards and guidelines were prepared to comply with revised state and federal compliance requirements, to assist the dairy industry in preparing dairy development permit applications to the County, and help the County to evaluate proposals for new dairies. Work included evaluation of dairy development zones and maximum dairy heard size for the county, production of standards and compliance requirements to be consistent with local, state, and federal water quality requirements, and providing technical support to the Madera County Dairy Committee.

Castroville Seawater Intrusion Project, Salinas Valley. Monterey County Flood Control and Water Conservation District.

Project Manager to evaluate engineering alternatives, coordinate regulatory permitting, and prepare of a joint EIR/EIS for CEQA and NEPA compliance. Directed all groundwater technical analysis and application of IGSM to evaluate of project alternatives, impacts, and benefits. This in-lieu conjunctive use project purpose is to provide a long-term, firm supply of good-quality water to the northern part of the Salinas Valley by distributing reclaimed wastewater treated through a distribution system to 12,000 of irrigated agricultural. The project was constructed and water deliveries began to all customers in September 1997.



Les L. Chau, BCES

Principal Hydrogeologist

Professional summary

Mr. Chau is a Principal Hydrogeologist with 26 years of consulting experience in groundwater resource studies, water quality compliance projects, and water infrastructure asset management. Mr. Chau was the Principal Investigator and Project Manager of the Salinas River Groundwater Basin Water Supply Investigation for the County of Monterey. The project started in 2014 is a five-year investigation of long term water supply, drought and climate change related risk assessments on water quality and supply. He leads a team of quantitative hydrogeologists, surface water hydrologist to participate in the Technical Advisory Committee and stakeholder discussions to manage; data collection, groundwater pumping (i.e. new state legislation and formation of GSA), climate change impacts on water quality and supply, and seawater intrusion mitigation.

From 2008 to 2013, Mr. Chau served as Project Manager for the San Francisco Public Utilities (SFPUC) South-Westside Groundwater Basin Groundwater Storage and Recovery Project and the San Francisco Groundwater Project. He managed the multifaceted program as the Project Manager. He also served as project manager for the environmental impact studies for the project which was completed with public comments in 2013. The project concluded with the certification of the EIR in August 2014 and construction began early 2015.

In addition, from 2009 to 2012, Mr. Chau served in the RWQCB Region 5 Groundwater Advisory Workgroup which was a panel of groundwater and geochemistry experts that advises the Regional Board on groundwater monitoring programs for Title-27, T-27 exempt, and for impaired water cleanup dischargers.

Representative projects

Lake Nacimiento and San Antonio Interlake Tunnel Project, Monterey County Water Resources Agency, County of Monterey, CA. Principal Investigator and Project Manager for a hydrology study that includes numerical modeling of reservoir operations and Salinas basin water supply. Leads a team of surface water, groundwater, and watershed hydrologists and hydrogeologists conducting quantitative impact studies and operational scenarios of the two reservoirs, which are connected by a 10-foot-diameter water tunnel. The computer models will provide support for environmental reviews and the SGMA Groundwater Sustainability Plan.

The Salinas River Groundwater Basin Investigation, Resource Management Agency and Water Resources Agency, County of Monterey, CA. Principal Investigator & Project Manager. Conducted a basin wide groundwater and surface water supply study in response to the drought conditions in the County of Monterey. The first part of the project was the assessment of the "State of the Basin" and its findings included potential immediate actions to be taken by the County to address continued drought related water supply issues. The Report was presented to the Monterey County Board of Supervisors.

The second part of the project included quantitative evaluation of the Salinas River groundwater basin to support Policy 3.1 Water Supply in the 2010 County General Plan. The work focused on the development of a basin-wide groundwater surface-water model that is recharged by the scheduled water releases from the Nacimiento and San Antonio reservoirs. The numerical model will be used to predict the sustainability of water supplies in the Valley to 2030 that accounts for changes in land-use, water demand, and climate. The MODFLOW model accounts for land-use and crop pattern changes projected to the year 2030 (County 2010 General Plan).

Regional Groundwater Storage and Recovery Project, San Francisco South Westside Basin, San Francisco Public Utilities Commission, CA. Project Manager. This multi-year inter-agency in-lieu recharge groundwater storage program involved numerous projects, including the installation of 48 deep monitoring wells, design for 16 production wells, installation of six test wells and 35 percent design of above-ground treatment systems. The project, to be completed in 2017 will provide 76,000 acre-feet of locally banked groundwater in the South Westside Groundwater Basin in the Peninsular and to supply water for San Francisco and its neighboring communities during drought years. The project ended with the certification of the EIR in August 2014 and construction began early 2015.

Hydrostratigraphic Studies and Seawater Intrusion Assessment of the Northern Salinas Valley, Monterey County Water Resources Agency, CA, United States. Project Manager/Principal Investigator. The study created a 3-D visualization model comprised of 16 hydrostratigraphic cross-sections to evaluate the natural paths of seawater

amec
foster
wheeler

Years with Amec Foster Wheeler: 2

Years' Experience: 26

Education

MS, Geology, University of California at Riverside, 1989

BS, Geophysics, University of California at Berkeley, 1986

Professional certifications and training

Board Certified Environmental Scientist, American Association of Environmental Engineers and Scientists

Location

West US – Oakland, CA

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intrusions in the Monterey Bay and Northern Salinas Valley. Seawater fronts were induced by local pumping centers and severe overdrafts of the 200- and 400-foot aquifers. Data for the 3-D model were organized in a GIS, and cross-sections were generated on-the-fly with specialized ESRI Spatial Analyst™ software. The study also examined Cal Water wells and potential conduits of high chloride ground waters between the shallow and deep aquifers.

Revision of the September Ranch EIR, Monterey County Landuse, CA. Principal hydrogeologist for providing hydrogeologic data and interpretation updates to the Final EIR. The ongoing investigation reviewed the existing EIR and related documents and supplement their findings as deemed necessary to provide sufficient and substantial evidence in the determination of 1) baseline water use; 2) groundwater storage; 3) surface/near surface water drainage into the September Ranch and Carmel Valley aquifers; and 4) riparian rights to extraction of a subterranean aquifer system. The aquifer recharge and storage analyses provided better understanding and forecasting of annual demands and aquifer yield, ranging from drought to El Nino scenarios.

Hydrogeological Master Services Contract, Monterey County Health Department, Monterey, CA. Project Manager responsible for performing hydrogeological evaluations of subdivision development and land use. Worked with County staff in preparing scopes of work and contracts for each redevelopment project. Assisted the County with determination of water use, nitrate loading in groundwater, comprehensive studies of hydrogeology, and water budgets.

Evaluation and Proposed Redesign of the Salinas Valley Groundwater Monitoring Network, Monterey County Water Resource Agency, CA. Project Manager and hydrogeologist for evaluation and redesign of monitoring well network in the Salinas Valley Groundwater basin. The network provided data needed to manage and protect groundwater resources and sustain beneficial uses. A web-based GIS containing over 2,000 wells for data collection and to evaluate seawater intrusion, local overdraft, and high nitrate concentrations. Responsible for design and implementation of web-based data management system.

Groundwater System Improvement Study (GSIS), San Fernando Valley, Los Angeles Department of Water and Power, CA. Project Manager. Managed the team to develop the National Contingency Plan and the CDPH Policy 97-05 compliant database and GIS enterprise system for the San Fernando Valley Superfund site. The database supports site investigations, compliant reporting, and the design of the water purifications system and cost recovery. Management duties included software integration of the latest web based data systems and GIS, managing software vendors, and ensuring data quality objectives.

California Statewide Groundwater Elevation Monitoring (CASGEM) Program, in Compliance with Senate Bill X7-6, City of San Diego, CA. Principal Hydrogeologist. Mr. Chau was the principal investigator and hydrogeologist in the preparation of the CASGEM report. The City of San Diego (City) submitted a monitoring entity notification to the DWR CASGEM Program to indicate the City's intent to become a monitoring entity and to monitor groundwater levels in seven groundwater basins located in the City's local water resources area in San Diego County.

California Statewide Groundwater Elevation Monitoring (CASGEM) Program, in Compliance with Senate Bill X7-6, San Francisco Public Utilities Commission, CA. Principal Hydrogeologist. Mr. Chau was involved in the selection of the monitoring wells in six groundwater basins within the City of San Francisco. The detailed monitoring plan involved the review of past and current hydrogeologic investigations conducted by the City consultants. The design on the CASGEM monitoring well field required detailed mapping of existing monitoring wells and field verifications of their conditions and ownerships.

Los Osos Groundwater Basin Recharge Project, Los Osos, CA. Project Hydrogeologist. Responsible for updating the conceptual model and supervising the updates of the existing MODFLOW numerical flow and MT3D transport models. The simulations were intended to provide a theoretical water balance for the upper aquifer and the deeper drinking water aquifer as a result of spreading and injection of treated waste water for mitigating seawater intrusion. The solute transport (MT3D) model was intended to simulate mass loading of salt and nitrogen (or nitrate) as treated water mixes into the upper and deeper aquifers. The resultant model helped determine the locations and design of numerous percolation fields and injection well systems.

Central Valley Salinity Alternatives for Long-term Sustainability (CV-SALTS), Central Valley Salinity Coalition, CA. Project Manager/Principal Hydrogeologist. This two-phased project included a Central Valley basin-wide investigation and mapping of beneficial uses for all surface water systems, GIS data creation for Basin Plan water quality objectives, discharge source identification and mapping, and characterization of agriculture dominated water sources. Phase 2 included identifying agricultural water quality zones and developing irrigation water quality objectives.

Basin Management Objectives Information Center (BMOIC), Water Resources and Conservation Division, County of Butte, CA. Project Manager and Senior Hydrogeologist. BMOIC was funded by an AB303 State Grant. The project expanded from Butte County participation to the "Four County Memorandum of Understanding" with the addition of Tehama, Colusa and Glenn counties. Mr. Chau provided senior-level water resources management advice, needs assessments, and detailed design and conceptualization of the online data sharing, GIS mapping, and hydrogeologic

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interpretation tool. The web-based hydrogeologic and water quality data management tool was used to help the four counties in sharing water resources and water-quality-related information, and to foster collaborative management of the Lower Tuscan groundwater basin.

Publications and presentations

- Onsoy, S., Chau, L., Maley, M., Baillie, M., Tachaichi, L., and Marks, D. 2012 "State Water Project Chloride Modeling Analysis, An Upper Santa Clara River Chloride TMDL Study". Poster presentation at the California Water and Environmental Modeling Forum.
- Wilczak, A., Boozarpour, M., Drago, J., Chau, L., and Leong, L. 2011 "To Switch or Not To Switch... Periodically from Chloramine to Free Chlorine for Nitrification Prevention?" – A SFPUC Study. Presentation at CA-NV SECTION AWWA Santa Clara, CA April 2 – 5, 2012.
- Chau, L., McKillop, K., Preiss, J., 2009. "Groundwater Basin Management Objectives – Information Management and Mapping". Presentation at GRA EIM-2 Symposium 2006, Poster Session at 26th Biennial GRA Symposium 2007.
- Chau, L., McLeod, M., Loomis, K., Preiss, J., and the Monterey County Water Resources Agency, 2004. "Three-Dimensional Hydrostratigraphy and Seawater Intrusion Pathways in the Northern Salinas Groundwater Basin", 2004 Groundwater Foundation Annual Conference, Abstract and Paper in Proceedings.
- Chau, L., Franklin, H., Stewart, C., Preiss, J., 2002. "Evaluation and Proposed Redesign of the Salinas Valley Groundwater Monitoring Network", 2004 23rd Biennial Groundwater Conference & 13th Annual GRA Meeting.
- Chau, L.L., 1989. "A Magnetotelluric Study in the Northern Nevada Rift Zone: Implications on Tertiary Extension in the Central Basin and Range," abstract published in the Society of Exploration Geophysicists (SEG) Great Basin Section; Gold Exploration Seminar and Expanded Abstract in the 60th Annual SEG Conference.



Matthew Baillie, PG, CHg

Senior Hydrogeologist

Professional summary

Mr. Baillie is a quantitative hydrogeologist with more than 10 years of experience in consulting, specializing in numerical modeling, with extensive expertise in the MODFLOW suite of programs. His past projects have involved all aspects of the water cycle, including groundwater-surface water interaction, groundwater flow, runoff generation, statistical analysis of precipitation patterns, and solute transport. His modeling experience ranges in scale from individual sites to entire alluvial basins. Additionally, Mr. Baillie is experienced in aquifer storage and recovery, seawater intrusion, climate change, natural and environmental tracers (including stable isotopes and temperature), and aquifer test performance and analysis.

Mr. Baillie has presented technical results of select projects in technical settings, such as the Groundwater Resources Association of California annual meeting. He has also assisted on field projects, including the installation and testing of monitoring wells and investigation of potential collector well sites.

Representative projects

Lake Nacimiento and San Antonio Interlake Tunnel Project, Monterey County Water Resources Agency, County of Monterey, CA. Groundwater Lead for a hydrology study that includes numerical modeling of reservoir operations and Salinas Basin water supply. Member of a team of surface water, groundwater, and watershed hydrologists and hydrogeologists conducting quantitative impact studies and operational scenarios of the two reservoirs, which are connected by a 10-foot-diameter water tunnel. The computer models will provide support for environmental reviews and the SGMA Groundwater Sustainability Plan.

Basin-scale Groundwater-surface Water Interaction Model, County of Monterey Resource Management Agency, Salinas Valley, CA. Technical Lead. Project included performance of an in-depth hydrogeologic study of the Salinas River Groundwater Basin system, with statistical analyses investigating the driving factors leading to storage changes in the basin. The results were published in 2015 as the State of the Basin Report, and presented in a public forum before stakeholders. The study results were used as the basis for development of a conceptual hydrogeologic model of the basin and an initial integrated numerical groundwater-surface water interaction model, using MODFLOW-OWHM, HSPF, and the Basin Characterization Model (BCM). Developed a methodology for utilizing public pesticide usage data to create time series of cropping data throughout Monterey County. Acted as the chief technical staff member in interactions with the model Technical Advisory Committee, which included representatives from the U.S. Geological Survey, local governmental and non-governmental agencies, and other interested parties.

Mesquite Lake Sub-basin Investigation, Twentynine Palms Water District, Twentynine Palms, CA. Numerical Hydrogeologist. Performed an in-depth hydrogeologic study of the service area of the Twentynine Palms Water District (TPWD) in arid inland southern California, which relies entirely on local groundwater for its water supply. The study developed a comprehensive conceptual model of the entire hydrologic system, including precipitation, evapotranspiration, mountain front recharge, and groundwater exchange between fault-delineated sub-basins. Constructed a numerical groundwater flow model in MODFLOW based on the conceptual model, and used it to investigate the effect of shifting pumping from TPWD's heavily overdrafted southern sub-basins (where water quality is excellent) to the relatively under-utilized northern sub-basin (where fluoride concentrations are elevated).

Regional Groundwater Storage and Recovery Project, San Francisco Public Utilities Commission, San Francisco, CA. Hydrogeologist. Prepared hydrogeologic studies to support the Environmental Impact Report for the SFPUC Regional Groundwater Storage and Recovery Project. Pre- and post-processed numerical groundwater model inputs and outputs for simulation of Project operations under baseline and design drought conditions, which represented a seven-year extreme drought. Authored a technical memorandum analyzing the predicted occurrence of seawater intrusion under simulated conditions, and co-authored technical memoranda detailing simulated project effects on groundwater-surface water

Years with Amec Foster Wheeler: 2

Years' Experience: 11

Education

MS, Hydrology and Water Resources, University of Arizona, 2005

BS, Geology, Arizona State University, 2001

Professional qualifications

Certified Hydrogeologist, CA, #977, 2013

Professional Geologist, CA, #8811, 2010

Registered Geologist, AZ, #52310, 2011

Memberships/affiliations

American Geophysical Union

Groundwater Resources Association

Office Location

West US – Oakland, CA

Continued...

interaction and groundwater levels and storage. Also oversaw the installation, sampling, and testing of nested monitoring wells as part of the hydrogeologic investigation that preceded the numerical modeling investigation.

Llagas Sub-basin Groundwater Flow and Pathline Modeling, Confidential Client, Santa Clara County, CA. Numerical Hydrogeologist. Updated and modified an existing MODFLOW model of the area of an environmental site in Morgan Hill, including MODPATH pathline modeling to delineate three-dimensional capture zones. The existing model was modified to introduce additional layers, change the resolution, overhaul the approach to parameterization, and convert from steady-state to transient conditions. Modeling contributed to an annual report and a feasibility study. Performed a spatial moment analysis to characterize the location and spread of a contaminant plume.

Groundwater Modeling, Various Clients, Various Locations Throughout the West United States. Groundwater Modeler. Worked on various groundwater modeling projects throughout California, including Scotts Valley and Antelope Valley as well as in Oregon, Washington, and Montana. Models ranged in scale from individual petroleum contamination sites to large basins in southern California. Learned the use of the MODFLOW suite of programs as well as selected other numerical and analytical modeling approaches, including an analysis of seawater intrusion in the Westside Basin of San Francisco.

Publications and presentations

- Baillie, M. N. & Maley M. P. (2012). Developing a MODFLOW model in an arid environment near Twentynine Palms, California. Poster presented at *Groundwater Resources Association of California 2012 Annual Meeting*, Rohnert Park, CA.
- Baillie, M. N., Gomez J. D., & Wilson, J. L. (2011). Small, inexpensive temperature sensors as a tool for investigating reach-scale stream-aquifer exchange in a mountain catchment. Poster session presented at *Groundwater-Surface Water Interaction: California's Legal and Scientific Disconnect*. Symposium conducted at the meeting of the Groundwater Resources Association of California, Sacramento, CA.
- Baillie, M. N. (2011). Groundwater model of the arid Twentynine Palms Basin. *Proceedings of the conference MODFLOW and more 2011: Integrated hydrologic modeling*, International Ground Water Modeling Center (pp. 546-550). Golden, CO: Colorado School of Mines.
- Baillie, M. N. and Wilson J.L. (2008). Hyporheic exchange in a small mountain catchment (Valles Caldera, NM): observations using temperature sensors. *Eos Transactions of the American Geophysical Union*, 89(23), Joint Assembly Supplement, Abstract NS31B-12.
- Baillie, M. N., Hogan, J. F., Ekwurzel, B., Wahi, A. K., & Eastoe, C. J. (2007). Quantifying water sources to a semiarid riparian ecosystem, San Pedro River, Arizona. *Journal of Geophysical Research: Biogeosciences*, 112(G3), G03S04.
- Baillie, M. N. (2005). *Quantifying baseflow inputs to the San Pedro River: a geochemical approach* (Master's thesis). Department of Hydrology and Water Resources, University of Arizona, Tucson, Arizona, 74pp.
- Baillie, M. N., Hogan, J.F., Ekwurzel, B., Wahi, A.K., & Eastoe, C.J. (2005). Using geochemical tracers to quantify baseflow inputs to the San Pedro River, Southeast Arizona, *Eos Transactions of the American Geophysical Union*, 86(18), Joint Assembly Supplement, Abstract H43D-02.
- Baillie, M. N. (2001). *Ground subsidence and earth fissure evolution near Casa Grande, Arizona* (Unpublished senior thesis). Department of Geology, Arizona State University, Tempe, Arizona, 80pp.



James McCord, PhD, PE

Principal Engineer – Hydrogeology

Professional summary

Dr. McCord has more than 30 years of experience in hydrology, hydrogeology, and water resource investigations, with emphasis on characterization of groundwater and surface water systems, numerical modeling of hydrologic systems, river basin planning and management, water supply and availability analysis, vadose zone hydrology, contaminant hydrology, surface water and groundwater interaction, and water rights. He is a recognized expert in Vadose Zone Hydrology, teaching short courses for the Nuclear Regulatory Commission and the International Atomic Energy Authority on this topic. He has authored numerous consulting reports and technical peer-reviewed papers, and co-authored the textbook, *Vadose Zone Processes* (CRC Press, 1999). He served as an Adjunct Professor of Earth Science at New Mexico Technical University since 1991, as well as Adjunct Professor of Civil Engineering at the University of New Mexico and of Civil and Environmental Engineering at New Mexico Tech since 2007.

Representative projects

Lake Nacimiento and San Antonio Interlake Tunnel Project, Monterey County Water Resources Agency, County of Monterey, CA. Senior Advisor for a hydrology study that includes numerical modeling of reservoir operations and Salinas basin water supply. Member of a team of surface water, groundwater, and watershed hydrologists and hydrogeologists conducting quantitative impact studies and operational scenarios of the two reservoirs, which are connected by a 10-foot-diameter water tunnel. The computer models will provide support for environmental reviews and the SGMA Groundwater Sustainability Plan.

Pecos River Basin Studies in Support of River System Re-operations and Adjudication Settlement, NM. Project manager and lead hydrologist for several New Mexico Interstate Stream Commission (ISC) studies related to issues on the lower Pecos River. Tasks included representing ISC on the Hydrology Work Group for developing an Environmental Impact Statement (EIS) for re-operations of Pecos River projects; developing and applying linked surface water – groundwater hydrologic model to support adjudication settlement discussions for the lower Pecos River; analyzing seepage losses from the Carlsbad Irrigation District main canal; disaggregating unidentified losses from Brantley Reservoir into three components; and analyzing seepage/bank storage, submerged spring inflow, and ungaged tributary inflows.

Impairment to Existing Water Rights due to Coal-bed Methane Development in Northern San Juan Basin, La Plata and Archuleta counties, and Northern Raton Basin, Huerfano County, CO. Conducted hydrologic evaluations and served as an expert witness (including filing of affidavits in Colorado District Court, Water Division 7 and Colorado Supreme Court) to assess potential impairment to senior water rights due to groundwater production that occurred as part of a coal bed methane development in southwest and southeast Colorado. Included in project tasks was the development of a groundwater flow model for the northern Raton Basin in Colorado and critical evaluation of groundwater models developed by energy development companies in San Juan Basin in southwest Colorado.

Wadi Ibrahim Basin Scale Hydrogeochemistry and Isotope Hydrology Study, Saudi Geological Survey. Project Manager and Principal Hydrogeologist. Specific tasks included the evaluation of aquifer hydrochemistry and geochemistry including isotope chemistry, recharge sources and rates, hydraulic properties, flow path characterization, and design and implementation of single- and multi-well tracer tests to determine aquifer transport characteristics, and also to determine contamination sources within the aquifer system. Tracer testing included design and construction of test apparatus, and implementation and interpretation of test results.

South Platte River Conjunctive Use Water Availability, Lower South Platte River, City of Boulder, CO. As groundwater hydrology expert, evaluated and critiqued numerous water supply augmentation plans submitted by alluvial aquifer water users / irrigators. The evaluations focused on assessing the quantity and timing of depletions to South Platte flows (and potential injury to senior water rights) caused by groundwater pumping, preparing expert reports, and giving depositions and testimony in Colorado Water Court.

Years with Amec Foster Wheeler: 16

Years' Experience: 30

Education

PhD, Geoscience, New Mexico Institute of Mining and Technology, 1989

MS, Hydrology, New Mexico Institute of Mining and Technology, 1986

BS, Civil Engineering, Virginia Polytechnic Institute and State University, 1981

Professional qualifications

Professional Engineer, NM, #15568, 2002

Professional Engineer, CO, #42958, 2009 (Expired)

Location

West US – Santa Barbara, CA

Continued...

Pueblo of Isleta Hydrology Expert and Technical Support, NM. Hydrology expert and project manager for various water resource issues for the Pueblo of Isleta, New Mexico, including evaluating surface water - groundwater interactions in support of Rio Grande riparian habitat restoration, and evaluation of injury to Pueblo water rights due to age to municipal transfers.

Zuni Basin (New Mexico) and Little Colorado Basin (Arizona) Adjudications, Navajo Nation, NM and AZ. Project manager and hydrology expert on these two water rights adjudications. Tasks included evaluating water claims and demands (including agricultural, M&I, and domestic) by other water users in the basin, developing Navajo claims, evaluating surface water and groundwater supplies and availability in the basins, and developing expert reports for adjudication court proceedings.

South Metro Denver Planning Study, CO. As project manager, developed and applied a three-dimensional MODFLOW model of the Denver Basin aquifer system to support conjunctive use water supply planning studies. Developed a database of well pumping schedules for historic, current, and future conditions, and estimated local (well and well-field) drawdown from regional modeling results.

Hydro-Economic and PESIA Analysis and Prioritization Study, Water Resource Investments, 2030 WRG, a Division of the IFC / World Bank Peru. Team leader for a consulting team conducted by Amec Foster Wheeler Peru and UK offices, with support by Peruvian and Spanish subcontractors, to compile a database of more than 2,300 water resource projects proposed for the Pacific coastal portion of Peru, and identify which of those projects would be most suitable for private investment. The prioritization process involved a prescreening step to eliminate unsuitable projects, and then developing a modeling tool that incorporated both Hydro-Economic (cost / benefit) factors, as well as Political, Environmental, and Social Impact Assessment (PESIA) to prioritize projects of interest for investment by the private sector. Phase I has been completed and presented to the Peruvian National Water Agency (ANA, Autoridad Nacional de Agua), which officially adopted as the preferred methodology for prioritization.

Expert Witness (partial list of cases)

- 2009 Colorado State Engineer, CBM Produced Water Nontributary Rulemaking Hearing, Groundwater expert for Public Counsel of the Rockies testifying on technical review of northern San Juan Basin groundwater model produced by CBM industry consultants (Client: Public Counsel of the Rockies).
- 2009 Isleta Pueblo vs Santa Fe Water Resource Alliance, NEW MEXICO Office of the State Engineer File No. SD-04729 & RG-74141 into SP-4842, Hearing No. 07-059. Expert reports filed and hearing testimony related to hydrologic impact of surface water transfers that moved point of diversion (and depletion) along the Rio Grande from south of Isleta Pueblo to north of Isleta Pueblo (Client: Pueblo of Isleta).
- 2007 Vance et al vs Wolfe (Colorado State Engineer) et al. Colorado Water Court Division 7, Case No. 05CW63. Plaintiffs' hydrology expert in case to determine jurisdiction of Colorado State Engineer to adopt permitting requirements for coalbed methane wells that may be impacting plaintiffs' decreed water rights. Plaintiffs prevailed in Water Court, and case was appealed to the Colorado Supreme Court, which in 2009 affirmed the lower court ruling (see http://www.westernwaterlaw.com/articles/Vance_v_Wolfe.html).
- 2006 Low Line Ditch Well Users, An Application For Water Rights And Approval Of Plan For Augmentation, Colorado District Court, Water Division No. 1 Case NO. 2003CW094. Deposition testimony in October 2006 on impacts of groundwater pumping aspects of water rights application on senior water rights holder. (Client: City of Boulder, CO; Moses, Wittemyer, Harrison, and Woodruff, P.C.)

Reports and Publications

Textbooks

- Selker, J.S., C.K. Keller, and J.T. McCord, 1999. Vadose Zone Processes, Lewis / CRC Press, Boca Raton, FLA, 339 pp.
- McCord, J.T., and J.S. Selker, 2003. Transport Phenomena and Vulnerability of the Unsaturated Zone, in Encyclopedia of Life Support Systems, UNESCO, www.eolss.net.

Refereed Journal Articles

- McCord, J.T., C.A. Gotway, and S.H. Conrad. 1997. Impact of geological heterogeneities on recharge estimation using environmental tracers. *Water Resources Research*, 33(6):1229-1240.
- Goodrich, M.T. and J.T. McCord. 1995. Quantification of uncertainty in exposure assessments of hazardous waste sites. *Ground Water*, 33(5):727-732.
- Eaton, R.R. and J.T. McCord. 1995. Monte Carlo stochastic analysis of effective conductivities for unsaturated flow. *Transport in Porous Media*, 18(3).

Continued...

- McCord, J.T. 1991. On the application of second-type boundaries in modeling unsaturated flow. *Water Resources Research*, 27(12):3257-3260.
- McCord, J.T., J.L. Wilson, and D.B. Stephens. 1991. The importance of hysteresis and state-dependent anisotropy in modeling flow through variably saturated soils. *Water Resources Research*, 27(7):1501-1518.
- McCord, J.T., D.B. Stephens, and J.L. Wilson. 1991. Toward validating macroscopic state-dependent anisotropy in unsaturated soils: Field experiments and modeling considerations. *Journal of Contam. Hydrology*, 7:145-175.
- McCord, J.T. and D.B. Stephens. 1987. Comment on 'Effect of ground-water recharge on configuration of the water table beneath sand dunes and on seepage in lakes in the Sandhills of Nebraska, USA' by Thomas C. Winter. *Journal of Hydrology*, 95:365-367.
- McCord, J.T. and D.B. Stephens. 1987. Lateral moisture flow beneath a sandy hillslope without an apparent impeding layer. *Hydrological Processes*, 1(3):225-238.

Conference and Symposia Proceedings

- McCord, J.T., and S. Gangopahyay, 2016. Stochastic numerical analysis of up-scaled aquifer and streambed properties for modeling lagged river depletions due to well pumping, Geological Society of America Annual Meeting, 25-28 Sept 2016, Denver, CO.
- McCord, J.T., D.B. Stephens, and T.C. Jim Yeh, 2016. Moisture dependent anisotropy in unsaturated flow: theory and application, Geological Society of America Annual Meeting, 25-28 Sept 2016, Denver, CO.
- McCord, J.T., C. Roman, M.F. Hernandez, M.F., S. Panday, R. Dwivedi, 2013, Sensitivity analysis of variably saturated flow and transport in a heap leaching operation, proceedings Heap Leach 2013, Vancouver, Canada.
- Hernandez, M.F., J.T. McCord, J. Clark, and B. Byler, 2013, Variably saturated flow in filtered tailings, proceedings Tailings 2013, Santiago Chile, August 2013.
- McCord, J.T., M. Etienne, D. Emerson, J. Clark, D. Romero-Suarez, and S. Panday, 2011, Evaluation and Production of Lithium Brines Resources in the Salares of Argentina: A Hydrogeologic Perspective and Impact of Aquifer Heterogeneity, Proceedings of 10th Congreso Latinoamericano de Hidrogeología, Salta, Argentina.
- McCord, J.T., J.A. Clark, N. Starr, R. McGregor, and N. Mandic, 2011. Applied Telescopic Mesh Refinement in Groundwater Modeling: Three Case Studies, NGWA National Groundwater Modeling Summit, Denver, CO.

Dr. McCord has over 50 additional conference papers and presentations; the full listing of his papers can be provided upon request



Seth Jelen, PE, CFM, CWRE

Principal Engineer-Water Resources

Professional summary

Mr. Jelen, PE, CFM, CWRE is a Principal Engineer with over 26 years of professional experience in the field of water resources science and engineering, modeling, software development, and GIS analysis. His first project was to calibrate an HSPF hydrologic model for the Napa River at St. Helena, California. His practice grown to surface water including flow (both runoff and water supply prediction), flooding (hydrology, flood elevation, flood mitigation, and floodplain mapping and management), and water quality (instream and pollutant load modeling). He is an expert in: continuous hydrologic modeling; hydraulic modeling in 1- and 2-dimensions and both steady and unsteady/dynamic states; water quality analysis; transport of sediment and pollutants in streams and upland off urban surfaces; and in custom application development using C++, Visual Basic and other languages. He is an expert with HSPF for hydrology and water quality; HEC-RAS (steady and unsteady); DELFT3D (rectilinear, curvilinear, and finite element); and many others. Recent project work includes HSPF simulation on an 80-mile river in Virginia, HEC-RAS analysis of the Mojave River in California, and DELFT3D analysis of 10 miles of a river in southern Michigan.

Representative projects

Lake Nacimiento and San Antonio Interlake Tunnel Project, Monterey County Water Resources Agency, County of Monterey, CA. Surface Water Lead for a hydrology study that includes numerical modeling of reservoir operations and Salinas basin water supply. Member of a team of surface water, groundwater, and watershed hydrologists and hydrogeologists conducting quantitative impact studies and operational scenarios of the two reservoirs, which are connected by a 10-foot-diameter water tunnel. The computer models will provide support for environmental reviews and the SGMA Groundwater Sustainability Plan.

Granite Creek and Watson Reservoir HSPF Study, City of Prescott, AZ. Lead Engineer. HSPF model development and calibration of Granite Creek watershed draining Prescott. Modeling includes flow, sediments, nutrients, and other constituents needed to quantify existing condition and assess potential improvements to address regulatory mandates.

WRIA 25/26/27/28 Watershed Assessment, Grays-Elokoman, Cowlitz, Lewis and Salmon-Washougal Watersheds, Lower Columbia Fish Recovery Board (LCFRB), WA. Lead Engineer. Developed and calibrated HSPF hydrologic models to simulate continuous streamflows in a number of watersheds in southwest Washington. Delineated modeled streams into a series of connected stream reaches and the watershed basins into local drainage areas draining directly to these stream reaches. HSPF input files include details that incorporated the connectivity of the stream reaches, the sources for rainfall and evaporation data needed to simulate streamflow, and tabulations of areas of the many land segments draining to each of the many stream reaches. Characterized low flows, monthly mean flows, peak flows, and their variation between land use types and between pre-settlement and current levels of development. Developed spreadsheet tool that compared flow statistics for the current condition to flow statistics for an alternative scenario of land use and to fisheries requirements.

HSPF Modeling of Flow, Sediment, and Other Constituents in North Fork Holston River, Confidential Client, Saltville, VA. Lead Hydrologic and Hydraulic Engineer. Data analysis and calibration of continuous HSPF model of 80-mile river in western Virginia. Extensive hydrologic investigation and data comparison; analysis of sediment transport data; development of conceptual models relating observed quality parameters to modeled processes of erosion and washoff and in-stream scour, deposition, and transport.

Los Peñasquitos Lagoon Watershed and Flanders Canyon Sediment Monitoring, City of San Diego, San Diego, CA. Project Engineer. Hydrology and Sediment Transport Modeling: Mr. Jelen led review of sediment model studies and calibration and identified many areas for improvements to the modeling and calibration in order

Years with Amec Foster Wheeler: 22

Years' Experience: 26

Education

MS, Civil Engineering,
Stanford University, Palo Alto, California, 1990

BS, Engineering & Applied Science, Chemistry,
California Institute of Technology, Pasadena, 1989

Professional qualifications

Professional Engineer, OR,
#17221

Professional Engineer, WA,
#31539

Professional Engineer, ID, #
8199

Professional Engineer, MT,
#12423PE

Professional Engineer, WY,
#PE8045

Professional Engineer, AK,
#CE9049

Certified Water Rights Examiner, OR, #388

Certified Floodplain Manager, ASCEPM, US-05-01533

Memberships/affiliations

Association of State Floodplain Managers (ASCEPM)

Office Location

West US – Portland, OR

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to improve model ability to forecast annual sediment loads to support sediment TMDL study. Mr. Jelen also led review of hydrologic study involving flow-duration modelling and the watershed hydromodification program. Mr. Jelen provided technical consulting on interpretation of sediment core quality data including 210Pb and 137Cs results that were unusually complex and on comparison of laboratory and Laser In-Situ Scattering and Transmissometry (LISST) particle size analyses. Cost: \$384,000

Stoney Creek Gravel Augmentation Study, Orleans, CA. Project Engineer. Analyzed hydrologic and hydraulic loadings to reach of Stoney Creek downstream of Butte Dam reservoir to Sacramento River based on regression and USGS gage data and in-stream hydraulics in arid, central-California valley area. Sediment transport analysis quantified effects of scour and deposition on sediment fate in stream and to analyze effects of gravel augmentation near reservoir to compensate for sediment dropped from stream by reservoir.

Altar Wash Sediment and Hydraulics Analysis, Tucson, AZ. Principal Engineer. Provided consulting and expertise for hydraulic, hydrologic and sediment transport analysis of alluvial arid-region stream bed to quantify rate of expected lateral motion and assess risk to adjacent utility infrastructure. Included arid-region hydrology.

Teton Canyon Road, Federal Highways Administration Western Federal Lands Highway Division, Choteau, MT. Project Manager and Lead Engineer. Evaluating hydraulic structures using HEC-RAS for this WFLHD roadway project. A number of structures required coordination with several irrigation districts to evaluate capacity requirements and existing structure performance. In addition Mr. Jelen led development of a HEC-RAS hydraulic model for about 2 miles of the Teton River at a location where the roadway and the river are in close proximity. Model showed the extent of the floodplain relative to the proposed roadway alignment and helped to evaluate alternative alignments and demonstrate no-rise condition for proposed road improvements.

Clackamas Surface Water Management Program Master Plan Clackamas County W.E.S., Clackamas OR. Lead Water Resources Engineer. Established hydrologic models for the entire system area including proposed expansion areas. These models were used in conjunction with HEC-RAS hydraulic models to establish a current and comprehensive analysis of waterways within the service district. Reviewed previous HEC-RAS models against current topography and field observations. Developed and calibrated HSPF models for the entire 36-square mile study area, which included the Rock Creek and Richardson Creek Basins plus the headwaters of the Noyer and Sunshine Creek Basins.

Tualatin Basin Floodplain Remapping, Clean Water Services, Washington and Clackamas Counties, OR. Lead Engineer. Massive floodplain remapping project for Clean Water Services (CWS) under FEMA's Cooperating Technical Partners (CTP) program that involved the development of floodways, flood profiles, digital FIRMs, and report information for approximately 166 miles of waterways throughout the 705 square mile Tualatin River Basin. It was one of the first countywide DFIRM restudy submittals in FEMA's Region X.

JPL Bridge Scour, Jet Propulsion Laboratory, La Canada, CA. Lead Engineer. Developed flows and HEC-RAS hydraulics through east bridge to JPL over Arroyo Seco under high-sediment-transport conditions at outflow from steep San Gabriel Mountains north of Pasadena. Assessed bed change potential.

William Hamer, PG, CEG

Senior Hydrogeologist



Professional summary

Mr. Hamer has performed and managed water resources investigations and environmental studies for more than 35 years. His water resources expertise includes basin studies, conjunctive use evaluations, water quality studies, production well field analysis, litigation support for water rights issues, supply well rehabilitations, and geologic and hydrogeological studies. His environmental experience includes site characterizations and assessments, remediation of contaminated soil and groundwater, and regional screening and siting studies.

Mr. Hamer has managed and performed groundwater investigations throughout Southern and Central California, including studies of both coastal and inland basins. He has performed hydrogeological and environmental evaluations of more than 20 groundwater basins in the eastern and northern Mojave Desert, and for basins in other parts of California. His work experience also includes development of detailed groundwater basin water balances for water supply.

Additionally, Mr. Hamer has designed and overseen the construction of hundreds of wells using multiple drilling and sampling techniques including mud-rotary, air-rotary, reverse rotary, dual-wall air hammer, and cable tool. He has prepared and given numerous presentations for technical advisory committees, public meetings, and regulatory agency meetings. Many of his projects have involved the development of detailed conceptual and numerical models for evaluating groundwater quality, contaminant transport, and water supply options.

Representative projects

Groundwater Basin Water Balance and Supply Study, San Luis Obispo County, CA. Senior technical advisor and reviewer for a basin-wide water balance study. Work included evaluation of domestic and agricultural water uses and demands and evaluation of current and historical groundwater pumpage. Work included consideration of surface and groundwater interactions.

Surface Water Recharge Studies Verdugo Basin, Los Angeles County, CA. Project manager for a feasibility study for capturing and recharging surface water flows to augment groundwater supplies. Project included installation of automated stream gauging equipment, installation of groundwater monitoring wells, evaluation of recharge potential by installing and testing recharge test pits, and development of a conceptual plan for recharge to the local groundwater basin.

Groundwater Conjunctive Use Study, Vertigo Basin, Los Angeles County, CA. Managed a basin hydrogeologic feasibility study for groundwater storage and artificial recharge. Evaluated existing geologic and hydrogeologic data and developed a conceptual model and water balance (including a detailed review of the water balance calculations as presented in the Report of Referee) for the basin. Evaluated groundwater pumping and water demand. This project included consideration of water quality (including nitrate levels) and development of a MODFLOW groundwater flow model for use in evaluating possible recharge scenarios. Worked closely throughout the project with a Technical Advisory Committee (TAC) that included the Upper Los Angeles River Area Watermaster, the City of Glendale, the California Department of Health Services, and the Regional Water Quality Control Board (RWQCB). The project was funded by Department of Water Resources (DWR) under AB 303, and was selected in 2004 as a highlight project for the AB 303 annual report. The study provided an important framework for management of the basin and the project team received a commendation letter from the Watermaster's office.

Conjunctive Use Study, Upper Mojave River Basin, CA. Project Manager. Responsible for the development and use of a groundwater flow model for a large portion of the Upper Mojave River Basin (Victorville area). Reviewed and evaluated existing hydrogeologic data and produced a conceptual basin model and water balance. The model was reviewed by the U.S. Geological Survey and, with their input, a multi-layer MODFLOW groundwater flow model was prepared for the basin area. The model was used to evaluate groundwater flow volumes in specific areas, to estimate the amount of available groundwater storage capacity, to determine future impacts of pumping under various growth scenarios, and to evaluate groundwater

Years with Amec Foster Wheeler: 14

Years' Experience: 35

Education

Master of Science,
Geology/Hydrogeology,
California State University,
Los Angeles, 1986

Bachelor of Science,
Geology/Hydrogeology,
California State University,
Los Angeles, 1978

Professional qualifications

Certified Hydrogeologist,
CA, 634, 1999

Certified Engineering
Geologist, CA, 1211, 1984

Professional Geologist, CA,
3878, 1984

Memberships/affiliations

Member, American Water Works Association

Member, National Association of Groundwater Scientists and Engineers
California Groundwater Resources Association

Location

West US – Irvine, CA.

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mounding from artificial recharge. The model was also used to estimate groundwater flow paths and travel times for recharged water.

Basin-Wide Water Resources Data Base, Bunker Hill Groundwater Basin, Southern CA. Project Manager. Oversaw development of a large well and hydrogeologic database for the Bunker Hill Groundwater Basin. Collected water-quality and water-level records and well logs for more than 3,000 wells. Interpreted logs for more than 1,000 wells and entered lithologic and well-construction data into the database. Developed a conceptual model for evaluating shallow groundwater conditions in the central-western part of the basin. The database was used to generate 3-dimensional geologic views of portions of the groundwater basin using EarthVision software. A Web interface was developed as part of the project so that interested parties, including local water purveyors and water regulators, could query the data. The interface included a graphic, map-based display as well as the capability to plot charts of water level and chemical data for single or multiple wells. Made numerous presentations of the database and Web interface to local water agencies and industry groups.

Groundwater Basin Power Plant Water Supply Evaluation, Upper Coachella Valley, CA. Task manager for groundwater basin evaluation and environmental studies for a power plant. Work included development of a basin water balance including evaluation of groundwater pumping rates, evaluation of environmental impacts from groundwater pumping, artificial recharge of groundwater using Colorado River Aqueduct water, and use of reclaimed water for power plant cooling. Prepared environmental reports for the RWQCB and the California Energy Commission (CEC). The CEC report was functionally equivalent to an Environmental Impact Report (EIR).

Community Water System Feasibility Studies and Supply System Design, Monterey County, CA. Project manager for an evaluation of the water supply for the community of San Lucas. The project included preparation of a detailed feasibility study and water system improvements to increase supply reliability. Work included evaluation of groundwater quality and surface and groundwater interaction.

Basin-Wide Geophysical Study, Verdugo Basin, Los Angeles County, CA. Managed a basin-wide geophysical study, including a micro-gravity survey, to estimate the depth to bedrock and the thickness of the alluvial aquifer system in the basin. This first-of-its-kind study for southern California included micro-seismic and resistivity surveys at specific locations to evaluate aquifer materials and their suitability for artificial recharge. Worked closely throughout the project with a TAC including the Upper Los Angeles River Area (ULARA) Watermaster and former Watermaster. Project was funded by DWR under AB 303.

Water Rights Litigation Support, Antelope Valley, CA. Provided expert opinion regarding water uses at numerous facilities owned by the State of California. Evaluated water uses for roadside rest areas, a prison, and DWR aqueduct facilities.

Water Supply Well Evaluation Program, CA. Principal-in-charge for development of a software program to assist the largest private water company in California in evaluating the economics of maintaining more than 400 water supply wells. Project included development of methods to evaluate when wells needed to be rehabilitated and when it was more economical to replace them. This software had many benefits in supporting the water company in rate hearings for the California Public Utilities Commission (PUC).

Water Supply Well Evaluation, Imperial County, CA. Project manager and technical lead for the evaluation of an agricultural supply well and pump performance. Provided support to the DWR by reviewing well and pump data, evaluating changes in well and pump performance over time, and determining the degree of wear on the pump. Findings of this study were used by DWR to support a legal position regarding the well.

Power Plant Water Supply Evaluation, Shasta County, CA. Hydrogeologist for groundwater basin evaluation for power plant water supply in a basalt aquifer. Developed basin water balance, and performed a detailed review and analysis of oxygen 18 and carbon isotope data for regional groundwater evaluation. Worked closely with biologists to present information to state and federal agencies. Prepared reports and presented testimony before the CEC.

Water Supply Methyl Tert-Butyl Ether (MTBE) Impacts Consultation, Verdugo Basin, CA. Hydrogeologic consultant to the Crescenta Valley Water District regarding MTBE impacts to local water supply wells in the Verdugo Basin. Project work focused on developing solutions for maintaining water supply reliability during possible contamination-related shutdown of area wells.

Water Well Siting, Design Studies, and Pilot Hole Drilling Program, Glendale Water & Power, Los Angeles County, CA. Project Manager. Responsible for evaluating hydrogeologic and water supply system conditions for the selection of sites for new water supply wells in the Verdugo Basin. This project included evaluation of basin hydrogeology and local groundwater conditions, as well as construction of monitoring wells in the basin. Also, evaluated the condition of older water wells.

Basin-Wide Groundwater Monitoring Program; San Fernando Valley, CA. Project Manager and Basin Characterization Lead. Responsible for overseeing the development of a large groundwater monitoring program for water supply well fields.

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Project included development of plans and specifications for installation of approximately 25 deep multi-port monitoring wells, and preparations for a large multi-year well drilling program.

Water Balance Evaluation, Cabazon, CA. Project Manager. Responsible for producing a white paper describing the water balance for the local groundwater basin. Also, managed an initial California Environmental Quality Act (CEQA) study for water supply development in the Cabazon County Water District. Reviewed various water balances for the surrounding groundwater basin and evaluated surface and groundwater components.

Municipal Water Supply Well and Recharge Facilities, Los Angeles County, CA. Project Manager. Responsible for siting and designing a new well and 42-inch-diameter water pipeline and recharge facilities. The project allowed for artificial recharge and spreading of surplus imported water from northern California and for extraction of the water for potable use. This project also included preparation of well and pipeline bid packages, construction management and contract administration services, and meeting California Department of Health Services permitting requirements for a municipal supply well.

Design and Construction of Water Supply Wells, Bunker Hill Basin, CA. Project Manager. Responsible for siting, engineering design, and construction of two deep dewatering and supply wells. Prepared a Preliminary Design Report (PDR), engineering plans, and specifications for the wells, pump and packer systems, control systems, and several thousand feet of water discharge piping. Also, provided construction oversight for the project.

The wells, producing 1,600 gallons per minute each, included a unique throttling packer system to regulate flow from multiple aquifers. The wells were 20-inches in diameter and more than 400 feet deep. As the wells extracted and dewatered high-total dissolved solids (TDS) water from a shallow aquifer, the packer system automatically adjusted the flow of low-TDS water from a deeper aquifer so that the well discharges water met regulatory requirements. The project included innovative down-hole water quality sampling and aquifer pumping during drilling.

Conjunctive Use Recharge Studies, Hayfield Basin, CA. Hydrogeologist for original Metropolitan Water District of Southern California (MWDSC) conjunctive use studies for underground storage of Colorado River Aqueduct water. Collected and evaluated available hydrogeologic data for the basin and performed groundwater recharge mound modeling.

Spring Water Supply Studies; San Bernardino Mountains, and Palomar Mountain, CA. Managing Hydrogeologist. Provided oversight for installation of stainless steel boreholes and spring water catchment facilities. Performed detailed water quality evaluations to confirm the hydraulic connection between springs and bore holes. Also, prepared spring water supply reports for regulators and CEQA initial studies.

Salt Removal Well Design and Operation, MWDSC, Bunker Hill Basin, CA. Project Manager. Conducted a pilot study to address high TDS groundwater. The project included installation of a production well to remove salt-laden shallow groundwater from the basin.

Water System Review, City of Loma Linda, CA. Task Manager. Responsible for review of city water system operations and development of alternative approaches including water transfers, well pumping modifications, and system modifications to reduce perchlorate concentrations.

High Groundwater Study, Rialto-Colton Basin, CA. Project Manager and Hydrogeologist. Reviewed historic data for the basin including the relationship between groundwater levels and the 1969 basin judgment.

Dewatering Study, Colton Quarry, CA. Hydrogeologist for a dewatering study for a proposed quarry extension. Responsible for limestone and alluvial aquifer testing and evaluating potential drawdown during dewatering.

Water Resource Evaluation, MolyCorp Mine, San Bernardino County, CA. Project Hydrogeologist. Evaluated and well field and helped design new wells to supply a source of low fluoride water to the MolyCorp Mine. Included design and construction of three water wells.



Craig Stewart, PG, CHg

Principal Hydrogeologist

Professional summary

Mr. Stewart has more than 35 years of professional experience in the fields of hydrogeology, groundwater resources assessment and management, soil and groundwater quality assessment and remediation, and engineering geology. He has worked on projects involving groundwater basins, groundwater quality and resources evaluations, production water well design, groundwater recharge facilities, and surface water/groundwater interactions in diverse groundwater basins in coastal, inland, bedrock, and alluvial hydrogeologic environments. He has developed and refined basin water balances, characterized hydrogeologic conditions using a wide variety of drilling, sampling, and exploratory techniques in unconsolidated sediments and bedrock, conducted and analyzed data from a wide variety of hydraulic tests in boreholes and wells, and applied numerical models to simulate groundwater flow in a variety of hydrogeologic settings. Mr. Stewart has provided expert consultant services for matters involving water rights, subsidence, and soil and groundwater contamination.

Representative projects

Groundwater Monitoring Network Redesign, Monterey County Water Resources Agency, Salinas Valley, CA. Principal Hydrogeologist/Technical Reviewer. This project involved detailed evaluation of existing hydrogeologic conditions throughout a 560-square-mile study area in the Salinas Valley and development of recommendations for re-design for the groundwater monitoring network. The recommendations proposed a phased approach for network re-design, emphasized addition of monitoring points in areas most threatened by seawater intrusion or where specific data were needed to better understand hydraulic or groundwater quality conditions, and identified wells that were potentially redundant and could be deleted to provide cost savings.

Analysis of Groundwater Production Impact on Streamflow, Cambria, CA. Project Hydrogeologist. Project activities included: review of existing reports, permits, and historical pumping and water level data; analysis of the safe yield of the groundwater basin; and development of conclusions related to the potential impacts of groundwater pumping on surface water flows necessary to meet permit conditions designed to protect a steelhead population.

Groundwater Management Expert Consulting, State of California, Chino Basin, CA. Technical Expert. Provides expert consultant services to the State of California in relation to the State's role as a party to the adjudication agreement for the Chino groundwater basin. Mr. Stewart's responsibilities have included reviewing and providing comments on numerous documents; participating in a wide variety of workshops; interacting with other parties, their counsel, and technical consultants; and providing input to the client's legal, management, and operations personnel.

West Coast Basin Seawater Intrusion Barrier Project, Los Angeles County, CA. Project Hydrogeologist. This project involved siting, design, and construction of three new injection wells and one dual-completion monitoring well along the north reach of the West Coast Basin Seawater Intrusion Barrier Project (WCBBP).

Verdugo Basin Groundwater Model, Crescenta Valley Water District, Crescenta Valley, CA. Technical Advisor. Provided technical review for development and calibration of a groundwater flow model of the Verdugo Basin in Los Angeles County, California for the Crescenta Valley Water District (CVWD).

Study of Basin Safe Yield, Groundwater Pumping, and Water Levels, Confidential Client, Southern CA. Project Manager. This study involved groundwater resources evaluation, basin-wide groundwater monitoring, and analysis of existing and planned groundwater extraction wells and their potential impact on water levels in a groundwater basin in southern CA. Potential hydrologic impacts of planned new pumping wells were evaluated and recommendations were developed to balance the objectives of water supply and habitat protection.

Publications and presentations

"New Insights into the Hydrogeology of the Santa Monica Groundwater Basin." K. Holland-Chominsky, C. Stewart, M. Einarson, J. Robinson, F. Legall, S. Lindvall, and B. Kueper. 8th International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey California. May 21-24, 2012.

"Quantitative Calibration of a Numerically Difficult Model." C.M. Mok, H.M. Gonnermann, C.A. Stewart, and D.M. Bean. Proceedings of Modflow 2001, Golden, CO. September, 2001.

Years with Amec Foster Wheeler: 25

Years' Experience: 35

Education

MS, Geology, University of Missouri, Columbia, 1982

BS, Geologic Engineering, Harvey Mudd College, 1980

Professional qualifications

Certified Hydrogeologist, CA, HG106, 1995

Professional Geologist, CA, GEO4087, 1986

Certified Engineering Geologist, CA, EG1277, 1986

Memberships/affiliations

Member, Groundwater Resources Association

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- "Groundwater Management in Urban Alluvial Aquifer Systems: Case Studies from Three Continents: Agadir, Lima, and Los Angeles." G.C. Bianchi, C.A. Stewart, B. Kent, and J.M. Sharp. 2001.
- "Water Rights and Water Management: A Case Study of Three Cities on Different Continents." R. Kent, C.A. Stewart, and G. Bianchi Mosquera. 2000 National Ground Water Association Meeting, Las Vegas, NV. 2000.
- "Effects of Urbanization on Groundwater Resources." J.M. Sharp, C.N. Hansen Jr., J.D. Mather, and C.A. Stewart. EOS. v. 81, n. 19, p.S9. May 19, 2000.
- "Combining Chemometric and Graphical Methods as Tools in Hydrogeologic Characterization." C.A. Stewart, T.A. Delfino, S.D. Warner, and S.L. Neville. Proceedings of the First International Conference on Remediation of Chlorinated and Recalcitrant Compounds. May 18–21, 1998.
- "Earth Fissuring, Ground-Water Flow, and Ground-Water Quality in the Chino Basin, California." C.A. Stewart, N.D. Colby, R.T. Kent, J.A. Egan, and N.T. Hall. Land Subsidence, Case Studies and Current Research. Proceedings of the Dr. Joseph F. Poland Symposium on Land Subsidence. J.W. Borchers, Editor. Association of Engineering Geologists, Special Publication No. 8. p.195–205. 1998.

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