

Experience Summary

Dr. Beggs has 30 years of experience in environmental engineering, soil-water systems and water resource management. His particular areas of expertise include engineering and project management for natural wastewater treatment systems, wetlands systems, water reclamation, groundwater quality, agricultural irrigation, water resources planning, biosolids reuse and food processing wastewater systems. He has substantial expertise in soil-water transport processes and soil-water and groundwater quality monitoring. Rob has extensive experience working with the Regional Water Boards to establish discharge requirements for reclamation, land application and discharge to surface waters.

Assignment

Education

Ph.D., Biological Systems Engineering, University of California, Davis, 2005

M.S., Agricultural Engineering, Utah State University, 1981

B.S., Mechanical Engineering, University of California, Davis, 1977

B.S., Agricultural Engineering, University of California, Davis, 1977

Registration

Professional Civil Engineer 46503, California, 1991

Professional Agricultural Engineer 470, California, 1986

Irrigation Association Certified Level III Designer for Sprinkler Irrigation Systems and Drip Irrigation Systems, 1985

Experience

30 years

Joined Firm

2002

Relevant Expertise

- *Natural wastewater treatment systems*
- *Wetlands evaluation and design*
- *Wastewater reclamation and reuse*
- *Biosolids reuse*
- *Agricultural irrigation*
- *Food processing wastewater systems*
- *Groundwater resources and monitoring*
- *Regional Water Quality Control Board permitting*

Indirect Potable Recharge and Groundwater Recharge Study, Marine Corps Base Camp Pendleton, Oceanside, California

Project Engineer. Rob assisted in the investigation of 8 indirect potable reuse alternatives to increase water supply on Camp Pendleton by up to approximately 3000 acre-feet per year. Rob also provided senior level reviews and quality assurance.

[SID: 42543; Project # 143426; Start: 9/27/2012; End: 9/25/2013 (est.); Fee: \$259K (est.)]

2013 Compliance Plan, Bush Brothers and Company, Wastewater Land Application System

Project Engineer and Senior Reviewer. Rob evaluated the existing wastewater land application/reuse system for this leading bean processor and provided recommendations for upgrades. Rob also provided senior level document reviews.

[SID: 44729; Project # 143953; Start: 1/21/2013; End: 8/31/2013 (est.); Fee: \$177K]

Wastewater

Water Pollution Control Facility Upgrade, City of Woodland, California

Project Manager. The Woodland WPCF requires upgrades to the secondary process that includes a bioreactor retrofit to improve aeration efficiency, increase organic capacity and enhance nitrogen removal. Rob is managing the peer review of the preliminary design report, a value engineering review at 60% design and onsite construction management and inspection for the WPCF. (14216)

Engineering Assistance and Aerated Pond Design, Recology, Dixon, California

Project Engineer. Rob designed a lined, aerated pond for leachate treatment from a food and green waste composting operation. He also managed an odor monitoring program and assisted in public presentations. (27522; Sept 2011 est; \$390K)

Wastewater and Solids Compliance Monitoring and Reporting, Pacific Coast Producers, Woodland, California

Project Manager. Rob has provided ongoing monitoring, regulatory and technical assistance for land application of tomato cannery wastewater and solids since 2002. (27584 and 34483)



Equalization/Settling Pond, Pump Station and Sprinkler Irrigation System Design and Construction Services, Pacific Coast Producers, Woodland, California

Project Manager. Rob designed a 400,000 gallon aerated, lined equalization and settling pond and a six mgd automated variable speed dual turbine pump station for a tomato cannery wastewater sprinkler system. He developed a sprinkler irrigation plan, distribution pipelines specifications and operations plan. Rob also managed the engineering and inspection services during construction and startup.

Wastewater Master Plan, City of Lodi, California

Project Manager. Rob managed the project team and performed an evaluation of alternatives for increasing capacity and meeting new discharge requirements for the White Slough Wastewater Treatment Plant. The master plan included a detailed economic evaluation of alternatives and the development of recommendations for biosolids treatment, storage and seasonal land application to City-owned farmland.

Design Manual, Environmental Protection Agency, Cincinnati, Ohio

Co-Author. Rob authored sections and reviewed drafts of other sections for new EPA Design Manual for Land Treatment of Municipal and Industrial Wastewater.

Decentralized Wastewater Design and Permitting, SYSCO Foods, Pleasant Grove, California

Project Manager. Rob managed the design of a 10,000 gpd wastewater treatment and dispersal system for a private industrial facility. Wastewater system included a recirculating gravel filter, denitrification wetland and percolation ponds. He also prepared a Report of Waste Discharge and negotiated with the Regional Water Board for a site specific discharge permit.

Wastewater System Facilities Planning and Conceptual Design, City of Vernonia, Oregon

Project Engineer. Rob evaluated treatment and alternatives and prepared a preliminary design and cost estimate for a town wastewater plant. The initial design included an innovative recirculating vertical flow wetland and intermittent polishing sand filter to provide advanced treatment performance with relatively passive operation.

Wastewater System Construction Services, SYSCO Foods, Pleasant Grove, California

Project Manager. Rob managed the inspection and engineering services during construction for a 10,000 gpd wastewater treatment and dispersal system for a private industrial facility.

Wastewater Treatment Design and Construction Services, City of Davis, California

Lead Project Engineer. The design of the secondary wastewater treatment facilities included aerated ponds, overland flow and general plant improvements. Rob coordinated project team activities and performed office engineering services during construction, including review of construction and materials submittals.

Wastewater Reuse Facilities Regulatory Assistance and Evaluation of Groundwater Impacts, Pacific Coast Producers, Woodland, California

Project Manager. Rob evaluated regulatory issues, prepared report of waste discharge and performed Regional Board negotiations for upgraded tomato cannery. He addressed salinity, BOD, solids and nitrogen loading issues to enable the upgraded cannery to begin full operation in 2002. Rob also developed an Internet-based groundwater database in conjunction with the City of Woodland to encompass all relevant groundwater monitoring wells in the area. He prepared several studies on impacts and pollution control measures.

Groundwater Impacts Evaluation and Regulatory Assistance, Sensient Deyhydrated Flavors, Livingston, California

Project Manager. Rob performed an analysis and prepared recommendations for operational procedures and equipment to maximize wastewater treatment and disposal capacity for an onion and garlic processing plant. He also prepared a new report of waste discharge and provided ongoing regulatory assistance and groundwater quality evaluation in several subsequent studies.

Land Application Studies, Reporting and Permitting Assistance, Unilever Bestfoods, Merced, California

Project Manager. Rob performed evaluations of process and rinse mud land application alternatives for several sites, including the City of Merced's Industrial Wastewater Reuse site. He assisted in Regional Board

negotiations and permitting for a new remote site and prepared reports for compliance with discharge requirements.

Pipeline Rehabilitation and Wastewater Land Application System Improvements, Pacific Coast Producers, Woodland, California

Project Manager. Rob provided recommendations for wastewater land application system improvements and slip lining for a 20,000 foot long conveyance pipeline. He managed construction inspection services during pipeline slip lining.

Land Application of Process Wastewater, Red Rock Specialty Cheese Company, Delta, Utah

Project Engineer. Rob analyzed data collected from soil and wastewater sampling programs to determine appropriate land application rates. He developed a detailed wastewater plan and facilities layout to ensure compliance with state DWQ regulations.

Cheese Wastewater Land Application and Treatment Recommendations, Dairy Farmers of America, Smithfield, Utah

Project Engineer. Rob developed a predesign report to resolve a notice of violation (NOV) and compliance order, including design criteria for enlarging the winter (non-irrigation) storage reservoir and a new irrigation site to prevent any further violations. He also provided recommendations to improve treatment effectiveness and to achieve compliance with potential nitrate and salinity limitations.

Cheese Processing Wastewater Conveyance and Land Application Alternatives Evaluation, Hilmar Cheese Company, Hilmar, California

Project Manager. Rob evaluated alternatives for 5 miles of pipeline conveyance and land application of 2 mgd of cheese processing wastewater. The project included evaluation of the land application area for groundwater anti-degradation policy compliance.

Manual of Good Practice, California League of Food Processors, Sacramento, California

Author and Editor/Reviewer. Rob authored, reviewed and edited sections for new CLFP Manual of Good Practice for Land Application of Food Process/Rinse Water. He presented material to League members in a workshop forum.

Reclaimed Water Pollutant Transport Modeling, Honolulu Board of Water Supply, Honolulu, Hawaii

Project Engineer. Rob developed a Hydrus model for vadose zone transport of potential pollutants from irrigation with reclaimed water. He calibrated the model to pilot study data. Nitrate and pharmaceutical impacts were found to not be significant, while long term chloride and TDS impact were found to be potentially significant.

Evaluation of Groundwater Impacts and Pond Operation Alternatives, City of Woodland, California

Project Manager. In response to requests from the Regional Water Quality Control Board, Rob evaluated groundwater quality impacts from wastewater and biosolids ponds. He performed in-situ percolation rate studies, installed new monitoring wells, evaluated alternatives for salinity reduction in ponds and evaluated biosolids treatment alternatives.

Investigation of Wastewater Ponds Impacts, UC Davis, California

Project Manager. Rob performed a hydrogeologic investigation of groundwater impacts from unlined wastewater and sludge ponds at a recently closed wastewater treatment plant in accordance with a plan approved by the Regional Water Board. Trends and horizontal distribution of constituents of concern were evaluated using monitoring wells and supplemental borings. Groundwater quality impacts were shown to be localized and resolved by natural attenuation.

Land Application Evaluation, Golden State Vintners, Visalia, California

Project Engineer. Rob evaluated hydraulic loading rates, nitrogen loading rates and potential groundwater quality impacts for land application of winery stillage. He developed recommendations for wastewater conveyance and application improvements to increase capacity and reduce odors and developed groundwater monitoring system improvements.

Wastewater Facilities Planning, City of Davis, California

Project Manager. Rob managed the facilities planning for the upgrade and expansion of the Davis Water Pollution Control Plant. He evaluated natural and conventional treatment alternatives for increasing the plant's capacity from 5.3 to 7.5 mgd and improving plant reliability.

Sewer Capacity Analysis, UC Davis, Davis, California

Project Manager. Rob evaluated potential alternatives for conveyance of wastewater from UC Davis to the City of Davis Water Pollution Control Plant. He modeled city collection system flows and capacities to determine optimal junction points and needed sewer improvements.

Lift Station Improvements Preliminary Design, UC Davis, Davis, California

Project Manager. Rob evaluated capacity and other needs for upgrading the main campus sewer lift station (former Wastewater Treatment Plant lift station). He developed a preliminary design for general improvements and odor control.

Overland Flow Treatment and Rapid Infiltration Disposal Systems, Clark County Sanitation District, Nevada

Project Engineer. Rob led the design of overland flow facilities to treat 1.0 mgd of municipal wastewater. He also coordinated the field investigations and design for rapid infiltration facilities for 1.2 mgd.

Duckweed Wastewater Treatment Pilot Study and Design, City of Davis, California

Project Manager. Rob performed a pilot study of the effectiveness of duckweed covered pond treatment of effluent from conventional wastewater treatment ponds. Following the successful pilot study, he designed full scale facilities.

Rapid Infiltration Facilities Design, California Department of Corrections, Del Norte County, California

Project Engineer. Rob planned and designed wetlands dechlorination and open basin rapid infiltration facilities for treated effluent from a 0.75-mgd tertiary wastewater treatment plant for Pelican Bay State Prison.

Tomato Wastewater Land Treatment Reports and Design, Quality Assured Packing, Stockton, California

Project Manager. Rob prepared reports for the Regional Board and design of irrigation system for land treatment of tomato processing wastewater.

Condenser Water Cooling Pond Design and Washwater Settling Ponds Design, Morning Star Packing, Woodland, California

Project Manager. Rob led the preliminary design for filtration, settling basins and re-aeration basin for 5,000 gpm of tomato cannery washwater with 80-percent recycle rate as well as the preliminary design of 40-acre cooling ponds and a conveyance system in lieu of cooling towers for 10,000 gpm of condenser water.

Detergent Wastewater Land Treatment, Pfizer, Inc., New York, New York

Project Manager. Rob prepared the site evaluation, recommendations and design criteria for land treatment of wastewater from shampoo and detergent production plant near San Jose Iturbide, Mexico.

Facilities Planning, Clark County Sanitation District, Mesquite, Nevada

Project Engineer. Rob prepared an analysis, recommendations and conceptual design for upgrading and expanding a municipal wastewater treatment and disposal system from 450,000gpd capacity to 1.2-mgd capacity. Disposal options evaluated included agricultural reuse, landscape irrigation reuse, river discharge and rapid infiltration. Treatment options evaluated included overland flow, wetlands, facultative ponds and an oxidation ditch.

Infiltration and Drainage, City of Brentwood, California

Project Engineer. Rob evaluated capacities of sites for rapid infiltration and recovery treatment for various application and subsurface drainage alternatives for up to 5.0 mgd of oxidation ditch effluent.

Land Application Study, Tri Valley Growers, Modesto, California

Project Manager. Rob evaluated groundwater quality impacts and potential nuisance conditions for wastewater land application operations.

Land Treatment Test Program, City of Modesto, California

Project Engineer. Rob performed a pilot field study for upgrading a land application program for food processing and municipal wastewater applied to 2,700 acres of crop producing land.

Receiving Waters Studies, Regulatory Negotiations, City of Vacaville, California

Project Engineer. Rob performed water quality and beneficial use studies of a receiving stream. He conducted initial negotiations with Regional Board and Department of Health Services regarding new discharge permit.

Small Community Wastewater Collection and Treatment Study, Shasta Foothills, Dunsmuir, California

Project Manager. Rob developed and evaluated alternatives for the collection and treatment of wastewater from a proposed 110 unit development. Alternatives included conventional sewers, STEP sewers and advanced onsite treatment. He also evaluated upgrades to the City of Dunsmuir wastewater collection and treatment systems.

Onsite Wastewater Reclamation, Lumberjack Store, Redding, California

Project Manager. Rob designed a wastewater treatment and reclamation system to meet DHS class 3 effluent levels for irrigation of large landscape areas surrounding a home improvements products store.

Paradise High School Onsite Wastewater Improvements, City of Paradise, California

Project Engineer. Rob performed the design review, analysis and specifications for re-circulating sand filter treatment and pressure leach field disposal of wastewater from a 2,800-student high school.

Pretreatment Evaluation and Odor Prevention, Basic Vegetable Products, King City, California

Project Manager. Rob evaluated alternatives and prepared recommendations for the pretreatment and land application of 2.4 mgd of onion and garlic wastewater. He also assisted in the report of waste discharge filing and temporary nuisance odor mitigation measures.

Small Community Innovative Wastewater Collection and Treatment, Sutter County, California

Project Manager. Rob performed wastewater facilities planning for the Town of Robbins. Recommended facilities included cluster STEP collection and wetlands treatment and disposal.

Small Community Innovative Wastewater Planning and Design, Stonehurst, California

Project Engineer. Rob performed wastewater facilities planning and design for a new small community development utilizing septic tank effluent pumping (STEP) systems, recirculating sand filter treatment, land disposal and drip irrigation reuse.

Commercial Site Decentralized Wastewater Preliminary Design, Malibu, California

Project Manager. Rob performed the site investigation and preliminary design for a 20,000 gpd advanced wastewater system for a Whole Foods Market Center to meet stringent discharge requirements in this environmentally sensitive area. A septic tank effluent pumping (STEP) collection system was planned to settle and convey wastewater from individual buildings to a main treatment system. The main treatment components included biotextile filters, denitrifying filters and ultraviolet disinfection. Subsurface drip irrigation and pressure dosed leach fields were planned for effluent dispersal. An interceptor drain and deep drain well were modeled to control shallow groundwater mounding in the vicinity of the site.

Evaluation of Alternatives and Formaldehyde Treatment Pilot Testing, Jackson Rancheria, Jackson, California

Project Engineer. Rob evaluated alternatives and performed pilot tests for the removal of formaldehyde from RV park wastewater to prevent the upset of a main wastewater treatment system for this major Northern California casino resort.

Onsite Wastewater Design Assistance and Plans Review for Shandon and Sunbeam Rest Stops, California Department of Transportation, Sacramento, California

Project Engineer. Rob provided design assistance and review of plans and specifications for wastewater systems for highway rest stops in San Luis Obispo and Imperial Counties. The wastewater systems included septic tank effluent pumping systems, recirculating gravel filters and denitrification wetlands. Design flows were 6,000 to 10,000 gallons per day.

Onsite Wastewater Performance Evaluation and Upgrade Recommendations, Chocoholics Divine Desserts, Clements, California

Project Manager. Rob evaluated the design, installation records and performance of a periodically failing onsite wastewater system for a chocolate candies factory and store. The performance evaluation included in-situ infiltration tests for the subsurface dispersal chambers.

Wastewater Irrigation System Design, City of Oakhurst, California

Project Engineer. Rob designed sprinkler irrigation and runoff control systems for treated wastewater.

Biosolids

Co-Composting Feasibility Study, City of Fresno, California

Project Manager. Rob managed the project team and provided technical review for feasibility study of biosolids co-composting. The project included a detailed siting study, air pollution and odor modeling, regulatory agency interaction and detailed economic analysis.

High-Solids Digester Design Review, Onsite Power Systems, Davis, California

Project Manager. Rob coordinated the design review for a novel pilot commercial thermophilic high-solids batch anaerobic digestion system.

Biosolids Program, City of Santa Rosa, California

Lead Project Engineer. Rob managed the project team and performed an evaluation of alternatives for increasing capacity, optimizing existing facilities and meeting potential future biosolids regulations for the Laguna Subregional Water Reclamation Facility. The Phase II program included detailed review of thickening, digestion, dewatering, composting, storage, land application and disposal facilities and operations. Rob developed an economic optimization model to incorporate the effects of improvements on downstream processes.

Biosolids Co-composting Study, City of Modesto, California

Project Manager. Rob evaluated methods for removing and drying wastewater pond biosolids for composting with yard green waste to produce Class A biosolids.

Preliminary Design of Biosolids Stabilization Lagoons, City of Vacaville, California

Project Engineer. Rob performed the preliminary design of aerated biosolids stabilization lagoons for a 15-mgd treatment plant upgrade. Preliminary design included layouts, piping, selection of aerators and buried liners.

Biosolids Storage and Land Application, California Department of Corrections, Del Norte County, California

Project Engineer. Rob designed aerated storage basins and land application facilities for biosolids from a 0.75-mgd tertiary wastewater treatment plant for Pelican Bay State Prison.

Sludge Land Application Site Planning and Design, City of Atwater, California

Project Manager. Rob managed the planning, permitting and site design for land application/reuse of sludge from the city wastewater treatment plant.

Biosolids Drying Lagoon Improvements, City of Davis, California

Project Engineer. Rob performed the preliminary design and design of improvements for biosolids drying lagoons as part of a plant capacity expansion from 5 to 7.5 mgd.

Groundwater

Phase II Wellfield Optimization Study, City of Modesto, California

Project Manager. Rob is leading the development of a geodatabase that will help manage municipal water supply wells and related information in the Modesto groundwater sub-basin. BC compiled well, survey, water level, water quality, maintenance, and other project data from local and state sources into a standardized structure. The database, custom management algorithms, and GIS-based user interface will help provide efficient wellfield management, protect water quality, and allow easier data reporting to the State of California.

Salt and Nutrient Management Plan, Marine Corps Base Camp Pendleton, Oceanside, California

Project Engineer. Rob led the evaluation of groundwater salt and nutrient loadings and implementation measures to improve groundwater quality for two of the major water supply basins for the base. This included an evaluation of recycled water impacts, upstream improvements and artificial recharge projects.

(9881; Sept 2011 est; \$4.2M)

Yolo County Integrated Regional Water Management Plan, Water Resources Association of Yolo County, Woodland, California.

Project Manager. Rob developed objectives, programs and actions, including agricultural drain water management, tailwater recovery, a mercury TMDL, groundwater nitrate reduction, groundwater enhancement, surface water monitoring and subsidence monitoring. He participated in public outreach and prioritization meetings.

Groundwater Management Plan, City of Davis and UC Davis, California

Project Manager. Rob coordinated the preparation of a groundwater management plan conforming to California Department of Water Resources guidelines. Plan development included extensive stakeholder participation and integration of results from numerous previous studies. He developed qualitative and quantitative basin management objectives and a monitoring program to protect groundwater resources.

Phase I and II Deep Aquifer Studies, City of Davis and UC Davis, California

Project Manager. Rob performed a geological investigation, multiple aquifer drawdown and recovery tests, isotope analysis and related investigations to determine the water supply capacity, characteristics and extents of the deep aquifer zone near Davis. The deep aquifer zone was evaluated as a higher quality water supply to replace a portion of production from lower quality intermediate zone wells.

Water Resources Online Database, Yolo County Flood Control and Water Conservation District, Woodland, California

Project Manager. Rob led the development of a Web-based GIS system for display and management of groundwater and well data covering most of Yolo County. Work included interaction with Department of Water Resources (DWR) staff to achieve consistency and compatibility of data with DWR databases. Rob is providing ongoing web interface and database updates.

Aquifer Testing, Conaway Conservancy Group, Davis, California

Project Manager. Rob managed a study to determine agricultural production well pumping impacts on seepage from the Sacramento River. He supervised monitoring well installations, pumping tests and water quality sampling.

Coordinated Groundwater Data Analysis and Planning, Solano Water Authority, Vacaville, California

Project Engineer. Rob led the merging of existing groundwater databases for a group of five adjacent water districts and agencies. The project consisted of computerized base mapping development, compilation and reorganization of existing data, evaluation of existing data quality and linking of databases to base mapping. He developed recommendations for future municipal well construction and well spacing to prevent quality and drawdown problems.

Development and Evaluation of Solutions for Groundwater Contamination, Goehring Meat Company, Lodi, California

Project Engineer. Rob analyzed disposal alternatives and created a report of waste discharge for elevated salinity groundwater.

Expert Witness Services, Westec Farms, West Sacramento, California

Expert Witness. Rob performed an evaluation of impacts to shallow groundwater levels from drainage systems operations. He evaluated depositions and provided recommendations that were used in reaching an out-of-court settlement.

Groundwater Investigation and Protection Plan, Tahoe City Public Utility District, California

Project Engineer. This groundwater investigation and protection plan was partially funded as a demonstration Environmental Protection Agency wellhead protection program. Rob evaluated existing groundwater resources, developed computerized base mapping and linked databases, inventoried contamination sources and delineated wellhead protection zones.

Groundwater Recharge and Water Budgeting, Conaway Conservancy Group, Woodland, California

Project Manager. Rob coordinated recharge and monitoring activities for a seasonal groundwater recharge project on approximately 8,000 acres of farmland near the Sacramento River. The project involved the setup and gathering of hydrologic data for a water budget for the entire area along with a detailed water budget for specific fields. Hydrologic parameters monitored included initial soil moisture, river diversions, creek flows, evaporation, precipitation, ponding depth and groundwater level monitoring. Large scale basin infiltration tests were also performed at the conclusion of the recharge program.

Environmental

Odor Monitoring and Source Evaluation, City of Avenal, Avenal, California

Project Manager. Rob developed and implemented an odor monitoring plan to determine relative impacts of an expanded landfill and other nearby potential odor sources on city residents.

Mitigated Negative Declaration for Additional Deep Wells, Winzler & Kelly Engineers, Eureka, California

Project Engineer. Rob prepared an evaluation of hydrological impacts and potential mitigation measures for additional deep wells for the City of Davis.

Environmental Impact Report, Michael Brandman Associates, Irvine, California

Project Engineer. Rob prepared the wastewater section of an EIR for the 0.7-mgd expansion at California Correctional Center at Susanville.

Irrigation and Water Conveyance

Irrigation Application Engineering, Nelson Irrigation Corporation, Walla Walla, Washington

Design and Applications Engineer. Rob performed product design, testing, applications engineering and marketing for a number of sprinkler irrigation related products. Products included orchard sprinklers, low pressure nozzles, spray booms, spray heads, center pivot sprinklers, big gun sprinklers and field sprinklers.

Irrigation Application Engineering and Marketing, James Hardie Irrigation, El Cajon, California

Northern California District Sales Manager. For a major micro irrigation equipment manufacturer, Rob performed various marketing and engineering tasks. Services included sales, irrigation system design assistance, irrigation system troubleshooting and product applications engineering.

Irrigation Water Conveyance and System Design, St. Supery Vineyards, Rutherford, California

Project Manager. Rob designed conveyance pipelines and a 10,000-gpm pump and filter station for inter-reservoir water transfer and overhead sprinkler frost protection for 200 acres of vineyard in Pope Valley. He performed detailed design of drip and sprinkler irrigation systems for 80 acres.

Stormwater

Stormwater Best Management Practices Evaluation, Tahoe Regional Planning Agency, Zephyr Cove, Nevada

Project Manager. Rob planned and performed a study of the effectiveness of residential stormwater Best Management Practices for pollution load reduction in the Lake Tahoe Basin. His responsibilities included the design and layout of measurement equipment, establishment of sampling protocols, coordination of water quality analyses, data evaluation and reporting.

Water Resources

In-lieu Recharge Evaluation and Planning, Glenn County, California

Project Engineer. BC is investigating the feasibility of importing excess surface water from Glenn-Colusa Irrigation District's contractual water supplies or flood flows from the Sacramento River to recharge this area, decreasing groundwater pumping in most years. This project has the potential to provide significant benefits in the drier years since recharged water would be relied upon, leaving water in the Sacramento. Rob is evaluating surface water delivery alternatives to users in the in-lieu recharge area. (24518; June 2013 est; \$191K)

Future Water Supply Study, City of Davis and UC Davis, California

Project Manager. Rob performed demand projections, evaluated water quality and capacity of alternatives including intermediate depth wells with wellhead treatment, deep wells and treated surface water. He recommended the short term replacement of aging intermediate wells with deep wells and long term measures to bring in treated surface water.

Conjunctive Use of Surface and Groundwater, Department of Water Resources, Sacramento, California

Project Manager. Rob performed a joint study with the California Department of Water Resources for conjunctive use projects in eastern Yolo County. Recommended projects included winter season recharge and in-lieu recharge involving more than 20,000 acres of land.

Expert Witness Services, Goorgian and McCabe, San Francisco, California

Expert Witness. Rob performed an evaluation of water rights, water quality and water usage plans for a dispute regarding appropriate land use for a golf course/resort/vineyard project near Napa Valley. He testified in arbitration proceedings.

Determination of Transferable Water, Alameda County Flood Control and Water Conservation District - Zone 7, California

Project Engineer. Rob evaluated transferable water for a five-year transfer program from Byron-Bethany Irrigation District to Alameda Zone 7. He performed an analysis of real water generated by fallowing, changes in irrigation methods and other water conservation measures. He evaluated the fate of deep percolation and return flows to determine adherence with the "no injury" rule. Rob also participated in negotiations with the California Department of Water Resources.

Third Party Impacts Study, Conaway Conservancy Group, Davis, California

Project Manager. Rob performed project management and technical analysis for a study of economical and physical third party impacts as a result of water transfers from Conaway Ranch in eastern Yolo County.

Water Transfer Feasibility Study, Bella Vista Water District, Redding, California

Project Engineer. Rob performed a feasibility study for the transfer of 5,000 ac-ft per year from Anderson-Cottonwood Irrigation District to Bella Vista Water District. The surplus water was planned to be generated by new groundwater wells and/or canal lining. Rob evaluated alternatives based on costs, impacts on domestic wells, integration with A-CID operations and DWR policies.

Wetlands

Wetlands Treatment Facilities Planning, City of Davis, California

Project Engineer. Rob performed planning, design review and permitting tasks for constructed wetlands. The purposes of the wetlands were to provide stormwater treatment, treated wastewater polishing and wildlife habitat.

Subsurface Wetlands Treatment Performance Evaluation, Springwater, Massachusetts

Project Engineer. Rob evaluated the design and performance of a subsurface lateral flow wetland treatment system that was not meeting effluent quality objectives. He performed oxygen transfer calculations, developed recommendations for additional control pipelines and operational changes to improve performance.

Design of Wetlands Treatment, Rapid Infiltration Facilities and Groundwater Monitoring Program, California Department of Corrections, Del Norte County, California

Project Engineer. Rob designed cattail and bulrush wetlands for dechlorination and rapid infiltration facilities for final treatment and disposal of treated wastewater for Pelican Bay State Prison. He designed monitoring wells and developed a groundwater monitoring program to protect the shallow aquifer.

Submerged Flow Treatment Wetlands, Clark County Sanitation District, Nevada

Project Manager. Rob performed project management and design for a gravel bed wetlands for the polishing treatment of 0.4 mgd of wastewater.

Wetlands for Wastewater Polishing Treatment, Sacramento Regional County Sanitation District, Elk Grove, California

Project Manager. Rob managed a 1.0-mgd wetlands demonstration project at the Sacramento Regional Wastewater Treatment Plant. The project demonstrated the removal of heavy metals and other trace toxics for various types of wetland cell designs and operation. He evaluated fate of heavy metals including soil accumulation and food chain bioaccumulation.

Memberships

Groundwater Resources Association

American Society of Agricultural and Biological Engineers

Water Environment Federation

Publications and Presentations

1. "Natural Systems for Wastewater Treatment," WEF Manual of Practice FD-16., 3rd Edition, coauthor. Water Environment Federation, Alexandria, Virginia. 2010.
2. "Design of Municipal Wastewater Treatment Plants," WEF Manual of Practice 8, 5th Edition, coauthor. Water Environment Federation, Alexandria, Virginia. October 2009.
3. "Process Design Manual - Land Treatment of Municipal Wastewater Effluents," EPA/625/R-06/016, coauthor. Office of Research and Development, USEPA, Cincinnati, Ohio. September 2006.
4. "Fate of Nitrogen for Subsurface Drip Dispersal of Effluent from Small Wastewater Systems," lead author. Journal of Contaminant Hydrology. August 2011.
5. "The Future of Rapid Infiltration," coauthor. Presented at Idaho Water Reuse Conference, Boise, Idaho. May 2011.
6. "Fate of BOD and Nitrogen in Land Application of Food Processing Wastewater," coauthor. Presented at the ASABE Annual Meeting Proceedings, June 2009.
7. "Water Recycling in Small Communities," coauthor. Presented at WEFTEC Annual Conference, Chicago, October 2008.
8. "Groundwater Nitrate Impacts from Land Application of Food Processing Wastewater," Presented at the Groundwater Resources Association Sixth Symposium on Groundwater Contaminants, Fresno, California. November 2002.
9. "Hydrological Impacts of a California Water Transfer," coauthor, Management of Irrigation and Drainage Systems, ASCE. July 1993.
10. "Water Transfers and Conjunctive Use in Northern California," coauthor. Presented at the American Water Resources Association 29th Annual Conference, September 1993.
11. "Odor Management for Land Application of Food Processing Wastewater," coauthor. Presented at the Sixth International Symposium on Agricultural and Food Processing Wastes. December 1990.

12. "Constructed Wetlands at Mesquite, Nevada," coauthor, ASCE. July 1991.
13. Co-authored "Santa Rosa Fine Tunes its Flexible Biosolids Program". Presented at the Water Environment Federation National Residuals and Biosolids Conference. February 2004.
14. "Design and Management Considerations for Drip Irrigation with High Solids Content Source Water," ASCE. May 1989.