

State Water Board Grant Projects

2018 - 2022 \$4.5M

SWB Grant # (Phase)	Project #	Project Title	Project Budget (SWB + MWD + WRF)	Objectives
Grant 1	4951	Adopt the use of probabilistic methods to evaluate treatment performance and quantitative microbial risk assessment (QMRA)	\$200,000	Develop and implement a quantitative microbial risk assessment (QMRA) to confirm the necessary base-line log removal values (LRVs) and incorporate probabilistic analysis of treatment train performance (PATTP).
Grant 1	4952 4988 4989	Conduct pathogen monitoring in raw wastewater	\$1,100,000	Collect new pathogen data to understand occurrence of pathogens in wastewater to develop better empirical data on their concentrations and variability
Grant 1	4990	Investigate feasibility of collecting pathogen data during an outbreak	\$50,000	Investigate the feasibility of collecting pathogen concentration data associated with community outbreaks of disease
Grant 1	4991	Treatment for Averaging Potential chemical peaks	\$200,000	Identify suitable treatment options for final treatment processes that can provide some “averaging” with respect to potential chemical peaks (in particular, for chemicals that have the potential to persist through advanced water treatment).
Grant 1	4992	Investigate Options for Non-Targeted analysis (NTA) and analysis of low molecular weight compounds	\$32,000	Evaluate potential analytical methods for assessing unknown contaminants, such as non-targeted analysis (NTA), to identify contaminants not presently detected by current monitoring approaches, particularly low molecular weight compounds that may occur in wastewater and may not be removed by advanced treatment (e.g., halogenated solvents, formaldehyde, and 1,4-dioxane).
Grant 2 (Ph 1)	4832	Evaluation of CEC Removal by Ozone/BAF Treatment in Potable Reuse Applications	\$300,000	Quantify the removal of compounds of emerging concern (CECs) through ozone/biologically active filtration (BAF) based treatment of wastewater effluent. Analyze data from past and existing sites to quantify CEC removal and correlated removal efficiency with treatment train design, operations, and water quality parameters
Grant 2 (Ph 1)	4833	Understanding Wastewater Treatment Performance on Advanced Water Treatment Processes and Finished Water Quality	\$300,000	To investigate the impact of primary, secondary, and tertiary wastewater treatment on advanced water treatment (AWT) process selection and performance for potable reuse.
Grant 2 (Ph 2)	4953	Considerations and Blending Strategies for Drinking Water System Integration with Alternative Water Supplies	\$400,000	<ul style="list-style-type: none"> ☑ Identifying and evaluating impacts of alternative water supplies, such as potable reuse, on the water quality to the end users’ existing drinking water systems that have known issues with tuberculation (e.g., corrosion, biological regrowth, legionella, aesthetics, biofilm, etc.) ☑ Understand impacts of blending ratios of alternative water supplies, including potable reuse, at a full-scale system into existing treated water on a variety of issues (e.g., nitrification, total chlorine residual, ammonia, nitrite, nitrate, etc.). ☑ Develop management strategies and options to mitigate adverse impacts.
Grant 2 (Ph 2)	4954	Integration of High-Frequency Performance Data for Microbial and Chemical Compounds Control in Potable Reuse Treatment Systems	\$400,000	<ul style="list-style-type: none"> ☑ Evaluate the integration of performance data and statistical process control (e.g., control charts) into potable reuse operations. ☑ Evaluate the use of control charts for process control. ☑ Develop recommendations to design potable reuse monitoring and control systems to process and utilize the large quantity of data collected on a real-time basis. ☑ Develop recommendations for the commissioning of sensors networks and monitoring systems.

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Grant 2 (Ph 2)	4955	Indicator Viruses to Confirm Performance of Advanced Physical Treatment	\$300,000	<ul style="list-style-type: none"> ☑ Review and summarize research conducted evaluating the removal of viruses by advanced physical treatment processes. ☑ Recommend virus types and cost-effective quantification methods for use in periodic evaluation of performance of advanced physical treatment processes ☑ Collect full-scale virus data (e.g. RNA, DNA, pathogens, etc.) for treatment processes and aquifer recharge projects ☑ Correlate, where possible, full-scale sampling virus data with potential online surrogates.
MWD/FFAR	4956	Addressing Impediments and Incentives for Agricultural Reuse	\$100,000	<ul style="list-style-type: none"> Investigate practical solutions to impediments identified in State of Irrigated Agricultural Water Reuse – Impediments and Incentives (Reuse-15-08) Develop a plan to overcome the regulatory, health, and economic barriers to expand the adoption of water reuse for agricultural irrigation Investigate the most cost-effective, farm-friendly approach to implement water reuse for agricultural irrigation for large, medium, and small-scale farms per the FDA’s definition Provide real-world solutions to existing obstacles to agricultural water reuse for producers, regulators, and water utilities to consider
Grant 2 (Ph 2)	4957	Compiling Evidence of Pathogen Reduction through Managed Aquifer Recharge and Recovery	\$100,000	<ul style="list-style-type: none"> ☑ Document and quantify performance of pathogen reduction through groundwater based on the following parameters: <ul style="list-style-type: none"> – Residence Time – Aquifer characteristics, both physical and geochemical – Temperature – Source water quality – Method of introduction (surface spreading vs. direct injection)
Grant 2 (Ph 2)	4958	New Techniques, Tools, and Validation Protocols for Achieving Log Removal Credit across NF and RO Membranes	\$350,000	<ul style="list-style-type: none"> ☑ Build off the results from project WRRF-12-07. ☑ Perform extensive challenge testing under a variety of conditions (ex: oxidized membrane, chemically clean membrane, new membrane). ☑ Evaluate chemicals and particles at the same time; consider possible relationship between the two. ☑ Consider the use of QPCR techniques.
Grant 2 (Ph 2)	4959	Evaluation of a Validation Protocol for Membrane Bioreactors Based on a Correlated Surrogate to Achieve Pathogen Credit for Potable Reuse	\$25,000	<ul style="list-style-type: none"> ☑ Determine if a proposed Tier 3 validation protocol for MBRs is feasible. ☑ Adapt validation protocol for potential testing in the United States. ☑ Develop recommendations on how to implement protocol.
Grant 2 (Ph 2)	4960	Review of Industrial Contaminants Associated with Water Quality or Adverse Performance Impacts for Potable Reuse Treatment	\$200,000	<ul style="list-style-type: none"> ☑ Identify contaminants or families of compounds related to industry or manufacturing (e.g. pharmaceuticals, CECs, etc.), and the types of industries that may discharge these compounds. ☑ Group listed contaminants in terms of risk to water quality (public health and aesthetic) and impact to advanced treatment effectiveness (e.g. loss of throughput, impact to treatment, etc.). ☑ Develop mitigation strategies including, but not limited to, treatment, inspection frequency and methodology, and monitoring requirements.
Grant 2 (Ph 2)	4961	The Use of Next Generation Sequencing (NGS) Technologies and Metagenomics Approaches to Evaluate Water and Wastewater Quality Monitoring and Treatment Technologies	\$300,000	<ul style="list-style-type: none"> ☑ Include case studies that show the applicability of these technologies as well as pit-falls that may be encountered. Examples include, 1) how do microbial communities impact treatment systems (e.g., biological filtration), and 2) how these methods can be used to inform risk, including antibiotic resistance. ☑ Special attention should be given to the following: data interpretation, databases used to query, importance of peer review and appropriate expertise in initiation and management of the project.

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Grant 2 (Ph 2)	4962	Identifying the Amount of Wastewater That Is Available and Feasible to Recycle in California	\$105,000	<ul style="list-style-type: none"> ☑ Identify the amount of treated municipal wastewater that is available for recycled water production now in California and projected into the future. ☑ Determine how much of the treated municipal wastewater much could feasibly be produced and used, and the associated cost (feasibility should consider the required minimum instream flows, water quality, and feasibility considerations including cost).
Grant 2 (Ph 2)	4963	Developing a New Foundational Understanding of SAR-Soil Structure Interactions to Provide Management Options for Recycled Water Use in Agriculture	\$200,000	<ul style="list-style-type: none"> ☑ Investigation for a better understanding of SAR/EC interactions with specific soils (e.g. textural classes, SOM content). ☑ Investigation of specific plant – soil interactions as affected by irrigation with saline waters.
Grant 2 (Ph 2)	4964	Assessing the State of Knowledge and Impacts of Recycled Water Irrigation on Agricultural Crops	\$120,000	<ul style="list-style-type: none"> ☑ Create a database regarding the characterization and variability of recycled water quality used for agricultural irrigation and treatment technologies. ☑ Assess recycled water properties (such as TDS, SAR, sodium and chloride concentrations) and potential impacts on soil physical, chemical, and microbial properties crossing a range of different types of soil and agricultural management.
Grant 2 (Ph 2)	4993	Potential of Oilfield Produced Water for Irrigation in California	\$150,000	<ul style="list-style-type: none"> ☑ Evaluate Title-22 Recycled Water Regulations as a Science and Policy Template for produced water. <ul style="list-style-type: none"> - Review the history – both procedural and scientific - for developing Title-22 Recycled water regulations. - Review Scientific Literature and Identify Data Gaps on produced water reuse. - Prioritize Data Needed in Support of a produced water Fit-For-Purpose Classification Framework. ☑ Develop a geospatial model and online, interactive map identifying areas with the greatest potential for expanded reuse of produced water for irrigation, using inputs from the two indices, information on OPW availability, and water demand for irrigation, and other relevant factors.
Grant 2 (Ph 3)	5047	Guidelines for the Demonstration of Pathogen Log Removal Credits in Wastewater Treatment	\$100,000	To develop guidance for crediting water resource recovery facilities (WRRFs) with pathogen log reduction values.
Grant 2 (Ph 3)	5048	Integrating Real-Time Collection System Monitoring Approaches into Enhanced Source Control Programs for Potable Reuse	\$200,000	<ul style="list-style-type: none"> • Determine what level of real-time collection system monitoring is feasible, appropriate, and/or necessary for protection of downstream potable reuse • Develop a framework for integrating real-time monitoring into existing pretreatment program requirements (permits, local limits, etc.), including data management and security considerations
Grant 2 (Ph 3)	5050	Applicability of the UV/Chlorine AOP: Assessment of Applicability, Operational Issues, and Potential By-Products	\$150,000	<ul style="list-style-type: none"> • Provide a framework to enable utilities to determine which AOP is most suitable to their treatment application both in the context of RO-based treatment and in alternative treatment approaches. • Detail the photochemical mechanisms of oxidation, identification of radical species, and dependency on pH, UV dose, chlorine dose, ammonia concentration, and monochloramine concentration. • Assess the dynamic and unique operational challenges of operating a UV/Cl₂ AOP system including identification of critical control points, challenges with regard to monitoring, and management of the formation of by-products of concern. • Utilize traditional analytical chemistry to evaluate the existence of or potential for formation of by-products.

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Grant 2 (Ph 3)	5051	Geochemical Considerations for Managed Aquifer Recharge (MAR) Implementation in Potable Reuse	\$112,000	<ul style="list-style-type: none"> • Estimate the influence of geochemical conditions on the fate of regulated and unregulated contaminants during MAR. • Identify advanced water treatment (AWT) effluent water quality parameters of interest for aquifer compatibility, including the impact of disinfection on geochemistry. • Develop direction for stabilizing AWT effluent to mitigate mobilization of aquifer geochemistry prior to recharge. • Provide guidance to utilities considering MAR that includes potential application point impacts, water quality compatibility considerations, and monitoring techniques for risk mitigation.
Grant 2 (Ph 3)	5052	Standardizing Methods with QA/QC Standards for Investigating the Occurrence and Removal of ARB/ARGs in Wastewater and Advanced Treated Water	\$200,000	<ul style="list-style-type: none"> • Develop a consensus for a standardized approach to profile ARB and ARGs that can be used to generate comparable data for use in future research to validate the analytical methods. • Identify QA/QC components and data quality objectives.