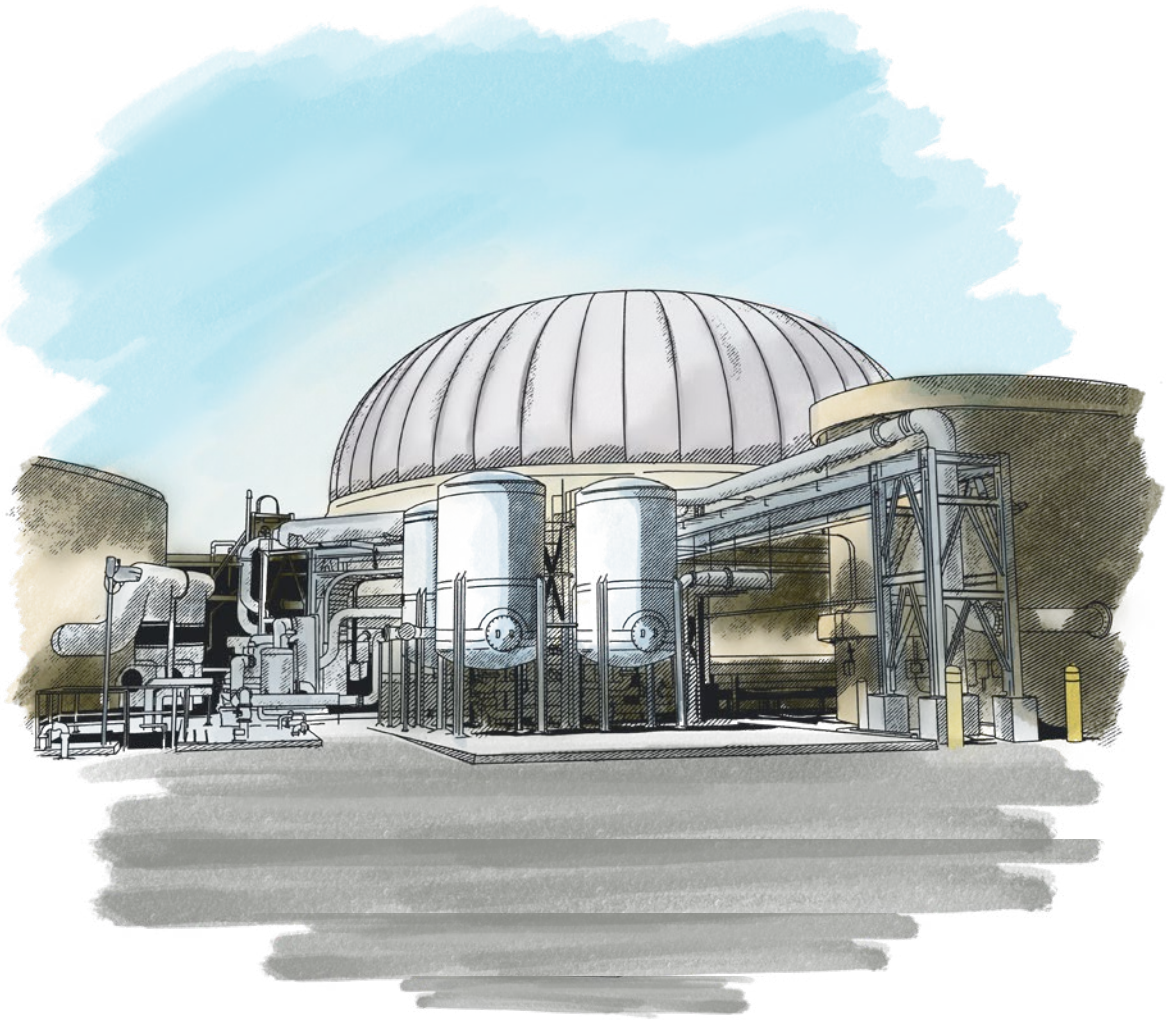
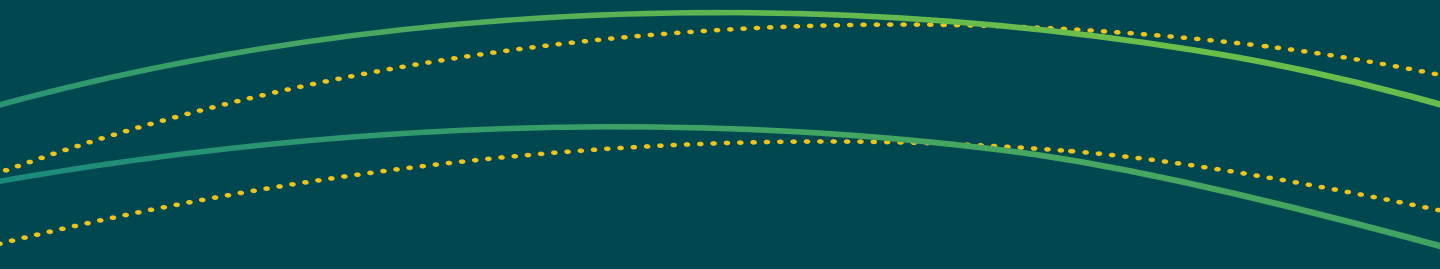
2022–2023

ANNUAL REPORT



WATER PROGRAMS
Sacramento State



Contents

About Us

The Office of Water Programs (OWP) at California State University, Sacramento (Sacramento State) publishes the industry standard in drinking water and wastewater training materials and provides valuable, science-based applied research services for water management in California and elsewhere.

Our team of approximately 60 professionals, trained in a variety of academic disciplines, collaborates to produce high-caliber work that furthers OWP's mission and values. The next three pages highlight the local, national, and international universities, colleges, and degree programs from which OWP staff made their start.

California State University, Sacramento

MS, Civil Engineering (4)
MS, Civil & Environmental Engineering
MBA, Management (2)
BA, Mathematics
BA, Communication Studies (2)
BA, English
BS, Business Administration
BS, Civil Engineering (3)
BS, Geology
BS, Computer Science
BS. Mechanical Engineering
BS, Graphic Design (2)
Instructional Design for eLearning Certificate

University of California, Davis

PhD, Civil & Environmental Engineering (2)
PhD, Agricultural & Resource Economics
MA, Creative Writing
MS, Civil & Environmental Engineering
MS, Hydrologic Sciences
BA, English Language and Literature
BS, Civil Engineering
BS, Civil & Environmental Engineering (2)
BS, Environmental Biology and Management
BS, Geology

University of California, Berkeley

PhD, Civil & Environmental Engineering
MS, Civil & Environmental Engineering
Professional Technical Editing Certificate

University of California, Santa Cruz

BA, Biology
BA, Global Economics

Stanford University

MS, Environmental Engineering (2)
MS, Civil & Environmental Engineering
BA, Human Biology
BS, Civil Engineering (2)

California State Polytechnic University, Humboldt

BA, Economics

California Polytechnic State University, San Luis Obispo

BS, Environmental Management & Protection

California State Polytechnic University, Pomona

BS, Civil Engineering (Environmental Focus)

California State University, Fresno

BA, Mass Communication & Journalism

California State University, Northridge

BA, English (Writing)

Brandman University

MBA, Business Intelligence & Data Analytics
BA, Business Administration

Mills College

MFA, English & Creative Writing

Professionals from around the globe...

Washington State University

MS, Geology

Utah State University

PhD, Environmental Engineering

MS, Mathematics

MS, Environmental Engineering

University of Wisconsin, Madison

BS, Civil & Environmental Engineering

New York University

MS, Integrated Marketing

Skidmore College, Saratoga Springs

BA, Government

Rutgers University, New Jersey

PhD, Industrial Relations & Human Resources

University of Oregon

BS, Journalism

Oregon State University

MS, Civil & Environmental Engineering

University of Arizona

MS, Chemical Engineering

University of North Texas, Denton

MPA, Public Administration

Indiana University, Bloomington

PhD, Public Affairs

University of Georgia

PhD, Water Resources & Remote Sensing

Harvard University

MA, History

Brandeis University

BA, English and History

Tufts University

BS, Chemical Engineering

University of Nebraska, Lincoln

PhD, English

Southern New Hampshire University

BA, Graphic Design & Media Arts (Web Design)

University of Maine

MS, Agriculture & Resource Economics

Zhytomyr State Technological University

MS, Computer Engineering

American University of Beirut

BS, Geology

University of Baghdad

BS, Civil Engineering (Structures Division)

Queen Mary University of London

PhD, Water Quality Management

Imperial College London

MS, Engineering Hydrology

University of Leeds

MS, Engineering Geology

University of Surrey

BS, Chemical Engineering

Hindu College, University of Delhi, India

BA, Economics

FORE School of Management, New Delhi, India

MBA, Management

Student Assistants

OWP has hired more than 70 student assistants since 2021. After graduation, a few have moved into full-time positions at OWP while others have attained positions with high-profile companies in the Sacramento area and beyond.

2022–2023 Student Assistant Majors

Business Administration (1)

Civil Engineering (4)

Communication Sciences and Disorders (1)

Communication Studies (2)

Computer Engineering (1)

Computer Science (11)

Environmental Science (1)

Graphic Design (1)

Health Science (2)

Psychology (2)

Social Work (1)

Student Assistants Employed in 2022–2023

Graduate Candidates

6

Undergraduate Candidates

21

Background: Danny Phan–Computer Science, Elizabeth Nguyen–Civil Engineering, Kilana Eugenio–Health Science, Yaira Arellano Alcala–Health Science, Alex Fedorov–Computer Science, Aayush Shukla–Computer Science
Foreground: Bo Heffner–Graphic Design, Darya Antonyuk–Civil Engineering

Student assistants help bring new perspectives and fresh ideas to OWP.

From My Desk: Ramzi Mahmood

A 26-Year Journey

As I look back at the year 2022–2023 accomplishments for OWP, I cannot help but look at what has happened in the past 26 years—the time that has passed since I started as a director in 1997. I am mentioning this because this will be my last Annual Report. I am planning to retire in early 2024. This was a hard decision to make on a personal level. However, OWP programs will continue to thrive with the leadership capacity within OWP. Kevin Murphy, Associate Director of Research, has been leading this group for about two decades. He continues to play a key role in the success of the research group and OWP. Jamie McCartney, Associate Director of Administration, has had a significant impact on improving OWP's business processes and outreach programs although she has only been with us for a little over a year. I can go on listing more leaders within OWP (I call them "champions") that contribute day in day out to our successes, but the list would fill most of this report.

OWP programs will continue to thrive with the leadership capacity within OWP…

This annual report shows that OWP continues to be successful as a campus center. Our work at OWP—including developing training materials, executing applied research projects, and providing technical assistance to disadvantaged communities—has been impactful locally, regionally, statewide, nationally, and internationally. Examples of our work and its impact include:

- The Environmental Finance Center (EFC), housed at OWP, was selected and funded for $2M as one of two EFCs in the nation to run the Community Solutions Team (CST) pilot program for the western half of the US (EPA Regions 6–10). The program was designed ultimately to assist disadvantaged communities (DACs) in securing federal funding made available by the Bipartisan Infrastructure Law (BIL). The pilot program was designed to provide a vehicle through which the CST team can assemble lessons learned that DACs can apply when seeking funding from the full-scale BIL program. See the Spotlight section about OWP's EFC for more details.
- OWP was successful in providing statewide technical assistance (TA) to small disadvantaged communities with funding provided by the

California State Water Resources Control Board (State Water Board). We accepted 160 TA requests, and we assisted 70 communities.

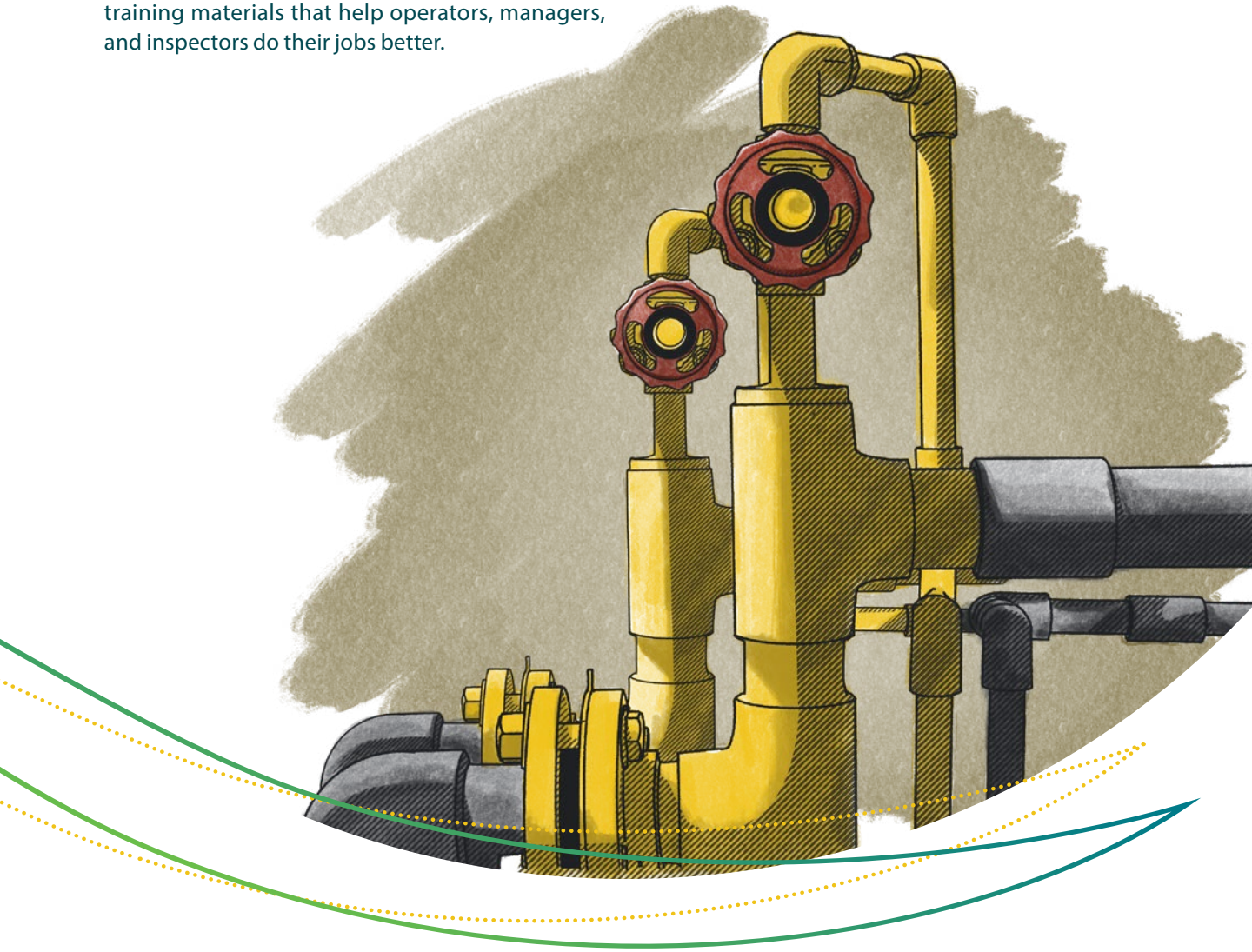
- OWP collected drinking water quality data at California licensed child care centers for a statewide effort to reduce lead exposure in young children. We collected 14,285 drinking water samples from 2,101 child care facilities.
- OWP finalized the revision of Volume 3 of our *Operation of Wastewater Treatment Plants* training manual series, as well as Volume 1 of our *Industrial Waste Treatment* series. Together, these series offer operators, managers, and inspectors up-to-date information on the effective and safe use of equipment and processes that protect public health and the environment.
- We continue to engage our student assistants in real-world problems to gain experience before they embark on their professional careers.

I hope you enjoy this annual report. OWP, as it embarks on its sixth decade with new leadership, will continue to be a viable and relevant organization that addresses regional, state, and national challenges in the water sector by building in-house expertise, collaborating with faculty at Sac State and other universities, producing high-quality training materials, providing assistance to communities, and most importantly, mentoring students along the way. I am honored and fortunate to have served among such a talented group of people for the last 26 years.

Training Services

2022–2023 Highlights

Offering over 50 print, online, and video courses for water and wastewater sector professionals, OWP delivers affordable training materials that help operators, managers, and inspectors do their jobs better.



Manual orders

30,756

Adult learners

14,149

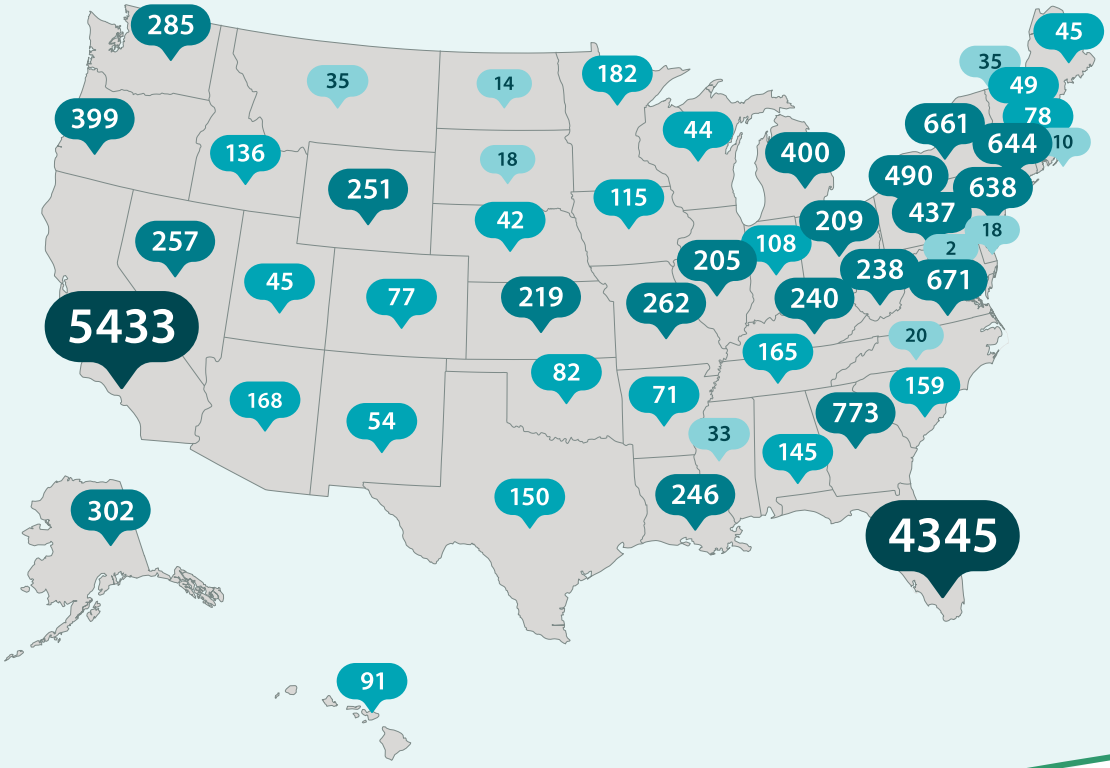
Course enrollments

22,134

Training Manual Sales & Course Enrollments (Y2Y)

- Training manual orders reached 30,756, with 76% of orders placed outside California.
- 14,149 adult learners were enrolled in our courses for continuing education units, contact hours, or academic credit, accounting for more than 22,134 of our course enrollments.
- With the majority of our US students residing outside of California, OWP continues to be a leading national training provider.
- International orders from the Canada, Belize, New Zealand, Jamaica, Barbados, and others accounted for 8% of our manual sales and 11% of our course enrollments this year.

US Course Enrollments Sold (by State)

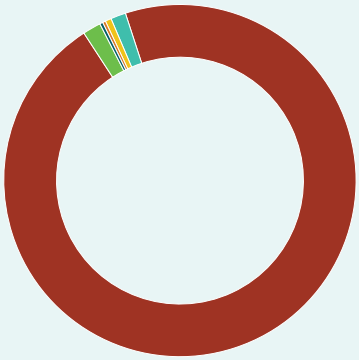


19,800
Total US Course Enrollments

12,612
US Student Enrollees

28,278
Training Manuals Sold in US

Course Enrollments Sold Outside the US (by Country)



Canada	2233
Jamaica	36
Belize	35
Barbados	12
New Zealand	9
Bahrain	3

Not shown in the chart is the quantity of one course enrollment sold for each of the following countries: UK, Portugal, India, El Salvador, the Philippines, and the Cayman Islands.

2,334
Course Enrollments Outside US

1,537
Student Enrollees Outside US

2,478
Training Manuals Outside US

Popular Training Materials

Wastewater Courses

Operation of Wastewater Treatment Plants, 3 volumes (training manual, CD, course enrollment, online)

Advanced Waste Treatment (training manual, course enrollment)

Membrane Bioreactors (training manual, course enrollment)

Operation and Maintenance of Wastewater Collection Systems, 2 volumes (training manual, DVD, course enrollment)

Collection Systems: Methods for Evaluating and Improving Performance (training manual, course enrollment)

Small Wastewater System Operation and Maintenance, 2 volumes (training manual, course enrollment)

Industrial Waste Treatment, 2 volumes (training manual, course enrollment)

Treatment of Metal Wastestreams (training manual, course enrollment)

Pretreatment Facility Inspection (training manual, DVD, course enrollment)

Drinking Water Courses

Water Treatment Plant Operation, 2 volumes (training manual, course enrollment)

Water Distribution System Operation and Maintenance (training manual, course enrollment, online)

Small Water System Operation and Maintenance (training manual, DVD, course enrollment, online)

Water Systems Operation and Maintenance Video Training Series (training manual, DVD, course enrollment)

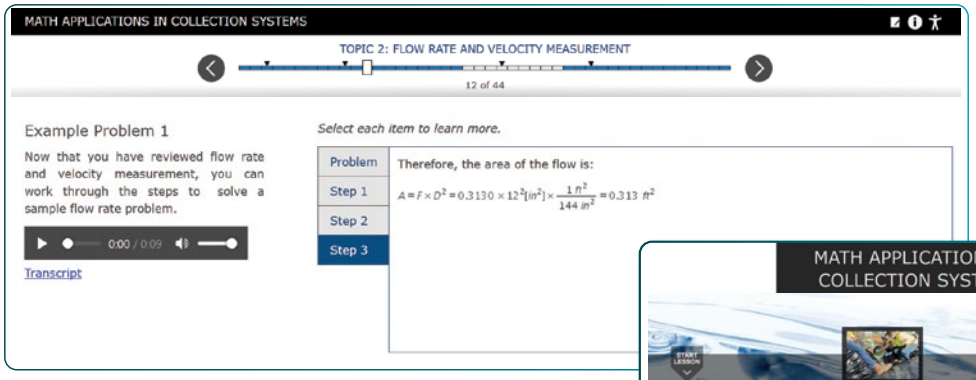
Basic Small Water System Operations (training manual)

Management Courses

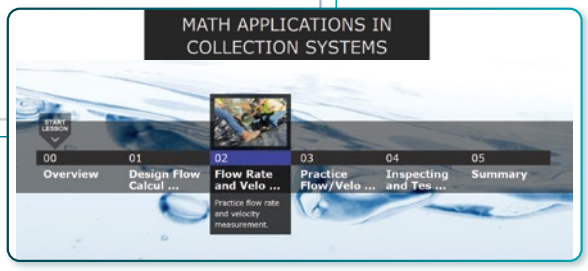
Manage for Success (training manual, course enrollment)

Utility Management (training manual, course enrollment)

Online Math Courses for Operators



Step-by-step examples with audio notes



Start screen menu with lesson topics

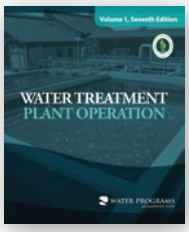
Math applications in:

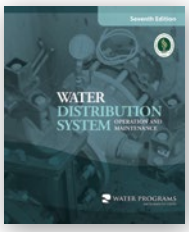
- Water Treatment
- Water Distribution Systems
- Collection Systems
- Wastewater Treatment

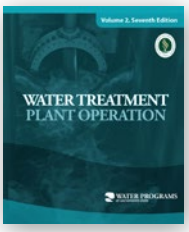
Courses feature:

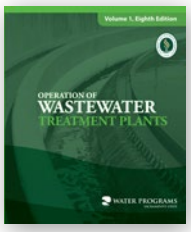
- Detailed, step-by-step example problems
- Example problems include audio notes, figures, and tables to expand your learning experience
- US and metric versions available

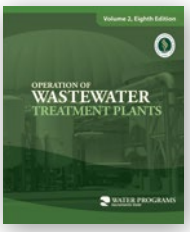
Most Popular











- Water Treatment Plant Operation, Volume 1
- Water Distribution System Operation and Maintenance
- Water Treatment Plant Operation, Volume 2
- Operation of Wastewater Treatment Plants, Volume 1
- Operation of Wastewater Treatment Plants, Volume 2

WATER SEMINAR SERIES

Exploring Water Use, Management, & Protection in California

OWP's Water Seminar Series brings together expert speakers, water sector professionals, the Sacramento State community, and the public to explore key California water issues.

**Seminars are currently presented live via Zoom.*

October 2022:

Michael Anderson, State Climatologist for California, reviews water year 2022 and compares facets of it to past years and then looks ahead to set expectations for water year 2023.

December 2022:

Dr. Jackson Webster, Associate Professor of Civil Engineering at California State University, Chico, talks about stormwater quality following urban burning and lessons learned from recent destructive fires like the 2018 Camp Fire.

March 2023:

Rich Juricich, Principal Engineer with the Colorado River Board of California, shares details on the governance, decision-making, and alternative approaches of the Colorado River Basin.

June 2023:

Dr. Jay Lund, Vice-Director of the Center for Watershed Sciences and Distinguished Professor of Civil and Environmental Engineering at the University of California, Davis, explains the prospects and limitations of capturing and managing large storms and wet winters in California.

Listen now at:
www.owp.csus.edu/water-seminars/ ›

SPOTLIGHT

EFC: Environmental Finance Center

OWP's Environmental Finance Center (EFC at Sacramento State) ramped up service activities during the past year, having been recognized by the EPA and others for our contributions over the six years of the EFC's existence as well as OWP's 50-year-plus history. Primary EFC services included training and technical assistance (TA) for water systems in small and disadvantaged communities.

Some activities were made possible through EPA grant agreements to the EFC Network, a collaboration of eight university-based EFCs located throughout the US that includes the EFC at Sacramento State. The EFC at Sacramento State, funded by these small system grants, developed and delivered training sessions covering a diverse range of topics intended to support water and wastewater system operators and managers in developing technical, managerial, and financial (TMF) capacity. Topics included asset management, rates analysis, financial planning, GIS mapping, the Safe Drinking Water Act's lead and copper rule, water conservation, water loss, and funding sources. Training was targeted to practitioners in Ohio, Arizona, California, Nevada, Kentucky, Utah, Hawai'i, and South Dakota. National webinars were also delivered.

Technical assistance was provided to approximately 30 communities throughout the US, involving support for funding resources, asset management, and GIS mapping. For this same grant, the EFC at Sacramento State contributed

the EFCN's blog and podcast series, covering topics from OWP's training manuals and TMF capacity development strategies. Funding matrices that compile opportunities for water systems to finance a variety of needs, including constructing infrastructure, were also developed for states and territories in EPA Region 9.

In summer 2022, EPA selected the EFC at Sacramento State to help launch a new initiative for addressing drinking water and wastewater insufficiencies in underserved communities throughout the western US. The University of North Carolina at Chapel Hill EFC was selected as lead for the eastern states. The initiative formed community solutions teams (CSTs) to help local water systems identify their water infrastructure needs, plan infrastructure projects, and apply for funding through state revolving fund (SRF) programs, which are federal-state partnerships that provide low-cost financing to communities for a wide range of water quality infrastructure projects. The initiative was a response to the unprecedented funding made available through the Bipartisan Infrastructure Law that will supplement annual SRF dollars over the next five years. For this CST pilot effort, the EFC at Sacramento State partnered with EPA, state programs, and other technical assistance providers to support fourteen communities and dozens of water systems in California, Hawai'i, Arizona, Colorado, Missouri, Wyoming, and Oregon, as well as two tribal communities. Services have involved community engagement to inform visions and solutions; creation of GIS maps for planning and prioritization; and facilitation of discussions among community representatives, regulators, and funders. The CST pilot will be wrapping up in September 2023, but EPA is expanding the EFC TA program. The EFC at Sacramento State was awarded one of 29 five-year grant agreements to fund centers nationwide. This program will help further OWP's mission to provide cost-effective solutions for protecting and enhancing water resources, public health, and the environment through training, scientific research, and public education—particularly for underserved communities.

Water systems looking for technical assistance can reach out to our EFC at ***efc@csus.edu*** or fill out a request from one of the following websites:

www.efcnetwork.org/get-help

www.epa.gov/water-infrastructure/water-technical-assistance-waterta

EFC Resources

EFC at Sacramento State:
www.efc.csus.edu

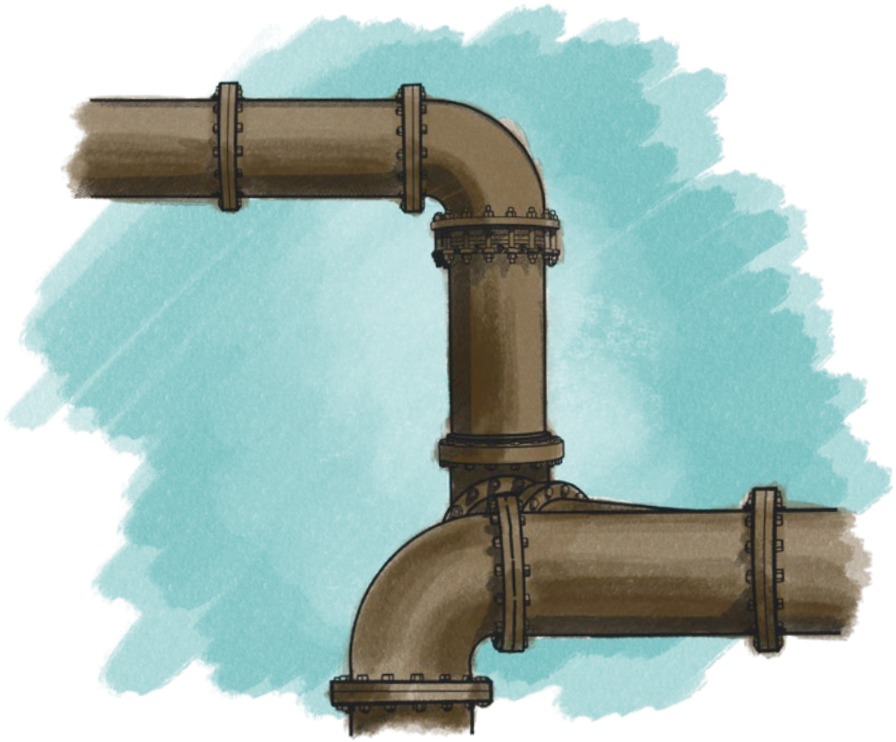
EFC Network:
www.efcnetwork.org

EFC at Sacramento State training:
www.efc.csus.edu/training

EFCN's blog and podcast series:
www.efcnetwork.org/multimedia

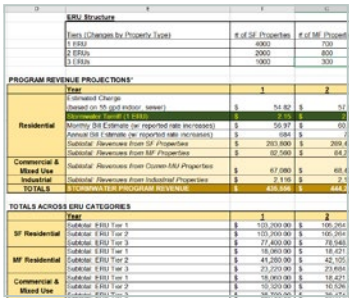
Funding matrices:
www.efcnetwork.org/resources/funding-tables

EFC TA program:
www.epa.gov/waterfinancecenter/efcn



Technical Tools & Services

Our robust, science-based, and customizable resources for water sector professionals focused on research, design, and planning include numerical modeling, permit compliance, and stormwater design software tools developed and maintained by OWP's research engineers.



ERU Structure

Tiers (Changes by Property Type)	# of SF Properties	# of MF Properties
1 ERU	4000	700
2 ERUs	2000	800
3 ERUs	1000	300

PROGRAM REVENUE PROJECTIONS*

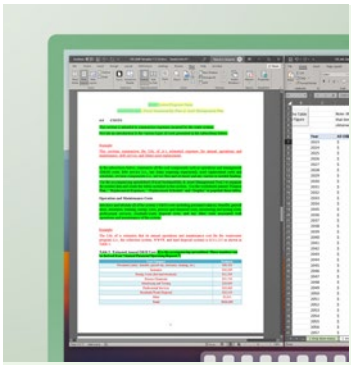
	Year	1	2
Residential	Estimated Charge (based on 16 gpd indoor sewer)	$ 54.82	$ 57
	Stormwater Tariff (1 ERU)	$ 2.65	$ 2
	Monthly Bill Estimate (w/ reported rate increases)	$ 56.97	$ 60
	Annual Bill Estimate (w/ reported rate increases)	$ 684	$ 7
	Subtotal: Revenues from SF Properties	$ 283,800	$ 289,4
	Subtotal: Revenues from MF Properties	$ 82,500	$ 84,2
Commercial & Mixed Use	Subtotal: Revenues from Comm-MU Properties	$ 67,080	$ 68,4
Industrial	Subtotal: Revenues from Industrial Properties	$ 2,116	$ 2,1
TOTALS	STORMWATER PROGRAM REVENUE	$ 435,396	$ 444,2

TOTALS ACROSS ERU CATEGORIES

	Year	1	2
SF Residential	Subtotal: ERU Tier 1	$ 103,700.00	$ 105,264
	Subtotal: ERU Tier 2	$ 103,700.00	$ 105,264
	Subtotal: ERU Tier 3	$ 77,400.00	$ 78,548
MF Residential	Subtotal: ERU Tier 1	$ 18,060.00	$ 18,421
	Subtotal: ERU Tier 2	$ 41,280.00	$ 42,105
	Subtotal: ERU Tier 3	$ 23,220.00	$ 23,684
Commercial & Mixed Use	Subtotal: ERU Tier 1	$ 18,060.00	$ 18,421
	Subtotal: ERU Tier 2	$ 10,320.00	$ 10,526
	Subtotal: ERU Tier 3	$ 38,700.00	$ 39,474

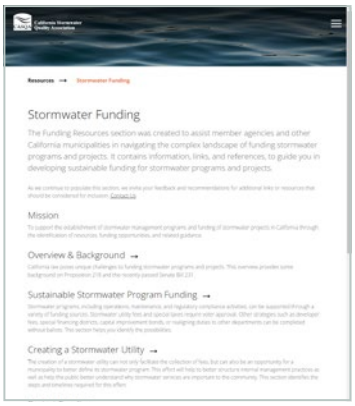
Toolkit for Stormwater Asset Management and Funding

OWP's Environmental Finance Center (EFC) developed a free toolkit to assist municipal stormwater practitioners in implementing asset management. The toolkit includes a guidance report and worksheets that help record data on system assets from pipes to gutters to green infrastructure. The toolkit also helps prioritize maintenance needs, estimate long-term costs, and evaluate revenues from various rate scenarios.



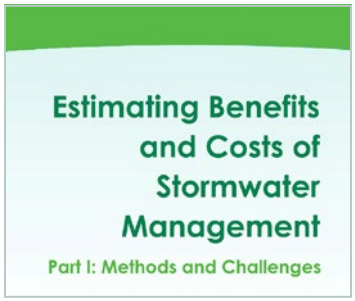
Fiscal Sustainability Plan/Asset Management Plan (FSP/AM) Template and Tool

OWP's EFC developed a downloadable kit called the Fiscal Sustainability and Asset Management Plan Template and Tool for small water and wastewater community service districts (CSDs). The template document provides CSDs with a starting point when developing their own asset management plans. This can be used to fulfill the fiscal sustainability plan required to receive CWSRF funding. The Fiscal Sustainability tool also provides CSDs with a blueprint to help track their ongoing costs and keep their budgets on track throughout the life of their systems. These documents have been distributed through the EFC network and are available on the EFC at Sacramento State's website.



California Stormwater Quality Association Stormwater Funding Resources Webpages

OWP's EFC collaborated with SCI Consulting and Larry Walker Associates to develop stormwater funding resources webpages for the California Stormwater Quality Association (CASQA). These provide municipal stormwater practitioners with comprehensive resources to explore opportunities for and obtain program and project funding. Program funding topics include stormwater utility fees, realignment of services, local development impact fees, and special taxes. Project funding topics include ways to achieve multiple benefits, resources for estimating costs, and opportunities for grants and loans.

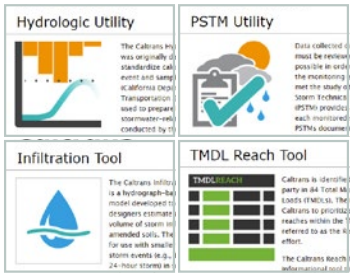


Data Tables and Analysis for Costs of California Stormwater Programs

OWP's EFC accumulated, standardized, and analyzed costs for stormwater management across California municipalities. Reported spending activities and the data used in the analysis are available as executable files. The database serves as the basis for statewide assessments of municipal permit compliance costs by the California State Water Resources Control Board (State Water Board).

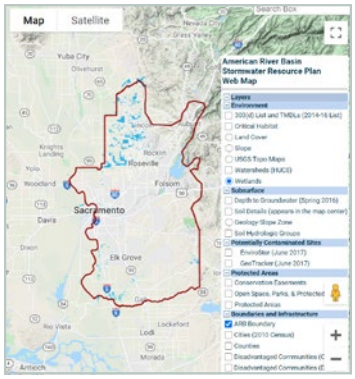
The Stormwater Funding Storyboard

The EFC at Sac State developed an interactive storyboard with tools and information that stormwater utilities can use to create effective and sustainable stormwater programs, including resources for early-stage stormwater utility planning and rate development systems.



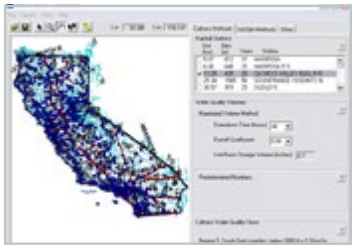
Caltrans Stormwater Tools and Utilities

OWP develops and maintains multiple stormwater analysis and data management tools for Caltrans. Many of these tools are developed to meet specific requirements for the collection, management, and analysis of data for various regulatory monitoring and compliance tasks. Other tools assist designers with meeting stormwater design requirements and documentation.



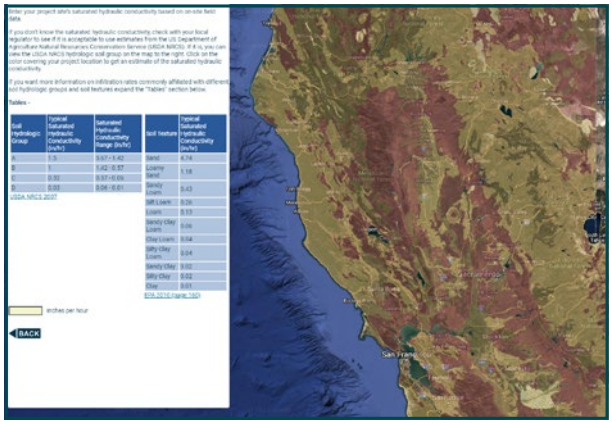
American River Basin Stormwater Resource Plan Web Map

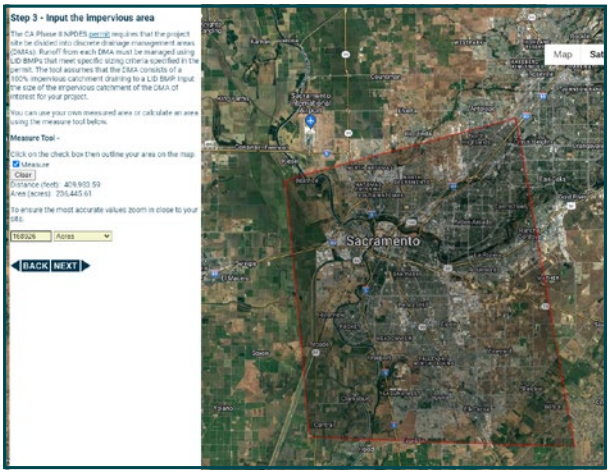
This web-based geographic information system (GIS) map assists users in identifying and evaluating stormwater capture and use project opportunities for the American River Basin Stormwater Resource Plan. The interactive map provides multiple layers of surface, subsurface, environmental, and community characteristics for eastern Sacramento County, western Placer County, and surrounding regions. OWP developed the tool with funding awarded from the State Water Board Proposition 1 Storm Water Planning Grant Program.

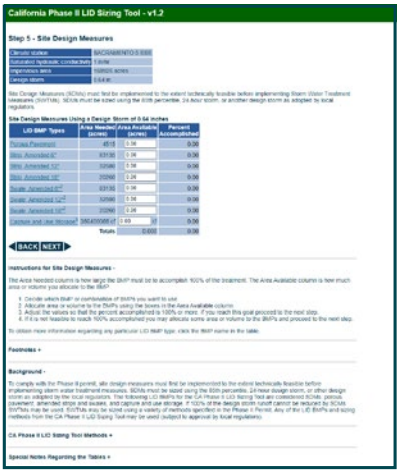


Basin Sizer

Assisting stormwater practitioners in sizing stormwater basins anywhere in California, Basin Sizer is a software tool that calculates water quality volumes and water quality flows using various methods and data obtained from rainfall stations throughout the state. Users can easily select project locations using the interactive map.

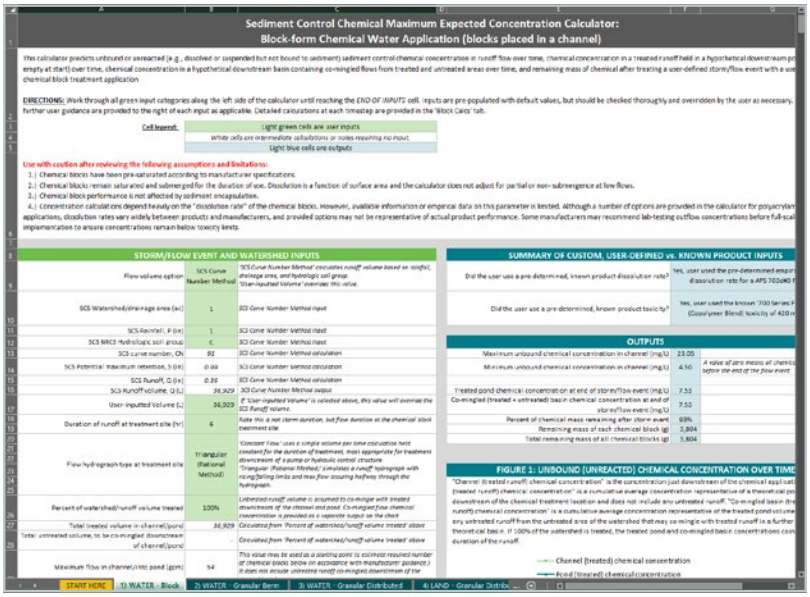






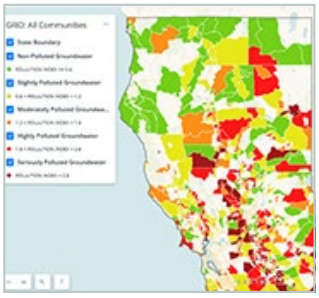
California Phase II Low Impact Development Sizing Tool

The Low Impact Development (LID) Sizing Tool assists stormwater practitioners with selecting and sizing LID best management practices that meet sizing requirements in California's National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges from small municipal separate storm sewer systems. OWP developed the tool with funding awarded from the State Water Board's Proposition 84 Stormwater Grant Program.



Passive Chemical Dosing Discharge Calculator

The passive chemical dosing discharge calculator employs a mass balance timestep modeling approach to predict the maximum expected concentration of erosion control treatment chemicals in effluent water following a user-defined pre-storm application for erosion control or enhanced treatment via sedimentation. The tool, developed using information gathered from a literature review of existing empirical data and existing best management practices, manufacturer and vendor guidance, and input from a technical advisory committee, demonstrates the benefits of using basins to attenuate spikes in concentration over a larger volume. This planning tool assists users in designing environmentally safe erosion and sediment controls that use treatment chemicals at construction and industrial sites.



The California Groundwater Risk Index

The California Groundwater Risk Index (GRID) is an interactive map that shows disadvantaged communities at risk of exposure to contaminated groundwater. Developed to support grant-funded groundwater remediation projects, GRID combines and maps multiple data sources, including California's Groundwater Ambient Monitoring and Assessment (GAMA) Program data and the CalEnviroScreen tool, to identify disadvantaged and severely disadvantaged communities.

Stormwater Practitioner Training and Exam Administration

In partnership with the California Stormwater Quality Association and the State Water Board, OWP developed and continues to coordinate training and exam administration programs for Construction and Industrial Permit compliance. The program has certified over 10,000 Qualified Stormwater Developers, Qualified Stormwater Practitioners, and Qualified Industrial Stormwater Practitioners since its inception in 2011.

Struvite Tool

The Struvite Tool makes struvite control planning easier by calculating the struvite precipitation potential for a facility based on user-input water quality parameters. The user can vary input parameters to examine "what-if" scenarios when conditions are changed to control struvite precipitation.

Water Quality Planning Tool

This tool provides planners with an easy-to-use website that makes available the watershed information required to create and comply with stormwater permits. A feature of the website enables the user to find a watershed through interactive maps or by entering the postmile number of a project location.

Hydrologic Analysis Tool

Originally developed to prepare hydrographs for stormwater-related studies conducted by OWP, the Hydrologic Analysis Tool (HAT) standardizes complex calculations required for event-based stormwater monitoring. HAT is freely available to the public for NPDES permit monitoring and stormwater studies.

For more information about software tools, visit us online at: www.owp.csus.edu/research/software-tools.php ❯

Applied Research

2022–2023 Highlights

OWP updated the **Water Quality Planning Tool (WQPT)** to use the ESRI ArcGIS Maps Platform. This update also included new information on 303(d) listed waterbodies, flood hazard areas, and wetlands, as well as a postmile lookup tool. The WQPT provides planners and designers with maps and tables that contain site-specific data needed to comply with environmental permits. This website was originally created by OWP for Caltrans in 1999 and has been continuously updated since then, including several major revisions. It currently serves over 100 users per day.

OWP is a technical assistance (TA) provider…

OWP is a **technical assistance (TA) provider** to the State Water Resources Control Board, Division of Financial Assistance (DFA) under three Agreements, totaling approximately $40,000,000, including Proposition 1, Groundwater and the Safe and Affordable Drinking Water Fund (SAFER).

OWP executes TA Requests received from DFA by delivering technical assistance to disadvantaged communities (DACs) throughout California for planning activities to develop, fund, and implement drinking water, groundwater, and wastewater capital improvement projects. In response to each TA request, OWP prepares a work plan laying out the project scope, budget, schedule, and deliverables. OWP manages all projects, and then employs consultants to perform engineering, planning, environmental, and other tasks required to support the solution to the water quality issues.

OWP has received 160 TA requests from the DFA under the Prop 1, Groundwater and SAFER Agreements since 2017. Of these 160 TA requests, 70 have been completed and closed out. Of the remaining 90, 35 work plans are under development and 65 work plans are executed and active. During 2022–2023, OWP managed approximately 56 work plans. These projects provide a significant improvement to the DAC's drinking water and wastewater systems.

In 2022–2023, a team led by OWP collected 14,285 drinking water samples from 2,101 California-licensed child care centers for the **Lead Testing in Child Care Centers** program. In compliance with AB 2370 of 2018, the samples are analyzed for lead (Pb) and compared to an action level that was developed specifically for

In 2022–2023, a team led by OWP collected 14,285 drinking water samples from 2,101 California-licensed child care centers for the Lead Testing in Child Care Centers program.

Our team of student assistants is integral to the success of this project.

child care centers. Water from drinking water outlets (such as faucets and fountains) that test at 5.5 ppb and above were immediately taken out of service to protect the health of children, which is why the OWP Lead Assistance Team's mantra is, "A tested facility is a safe facility." All child care centers tested by OWP that exceeded the action level were offered financial assistance to replace affected outlets.

OWP also offers retesting. Replaced outlets that retest below 5.5 ppb can be returned to service. All child care centers, even those that pay for their own testing, can contact OWP to get an explanation of their test results and discuss next steps. To manage outreach efforts, sample scheduling, and testing results, OWP developed a website for both the public and team members: ***https://ab2370assistance.owp.csus.edu/.***

Partners include the California Rural Water Association and the California Child Care Resource and Referral Network. Two state agencies—the State Water Resources Control Board and the California Department of Social Services—provide funding. Eight student assistants in Environmental Studies, Public Health, Communication Studies, Engineering, and Computer Science majors assisted the OWP Lead Assistance team with performing literature reviews, pipe flow calculations, outreach, and website and database programming. **Our team of student assistants is integral to the success of this project.** This project will continue into the next fiscal year.

Applied Research

Funded Grants & Contracts

Lead in Drinking Water Projects

The State Water Board contracted $4,900,000 with OWP (10/1/19–1/31/23) to provide technical assistance to Licensed Child Care Centers to collect and analyze drinking water samples and, subsequently, remediate lead contamination that exceeds thresholds.

The California Department of Social Services (CDSS) contracted $5,241,000 with OWP (7/1/21–10/31/23) to provide the Community Care Licensing Division Child Care Program (CCP) with assistance in outreach and technical assistance to priority licensed child care centers to collect and analyze drinking water samples for lead.

Santa Monica Basin Groundwater Sustainability Project

Dudek Engineering and Environmental contracted $148,400 with OWP (starting 9/3/19) to assist the City of Santa Monica and the Santa Monica Basin Groundwater Sustainability Agency in achieving their goals of long-term sustainability and water independence by analyzing potential projects and basin management strategies.

Stormwater Technical Assistance Project

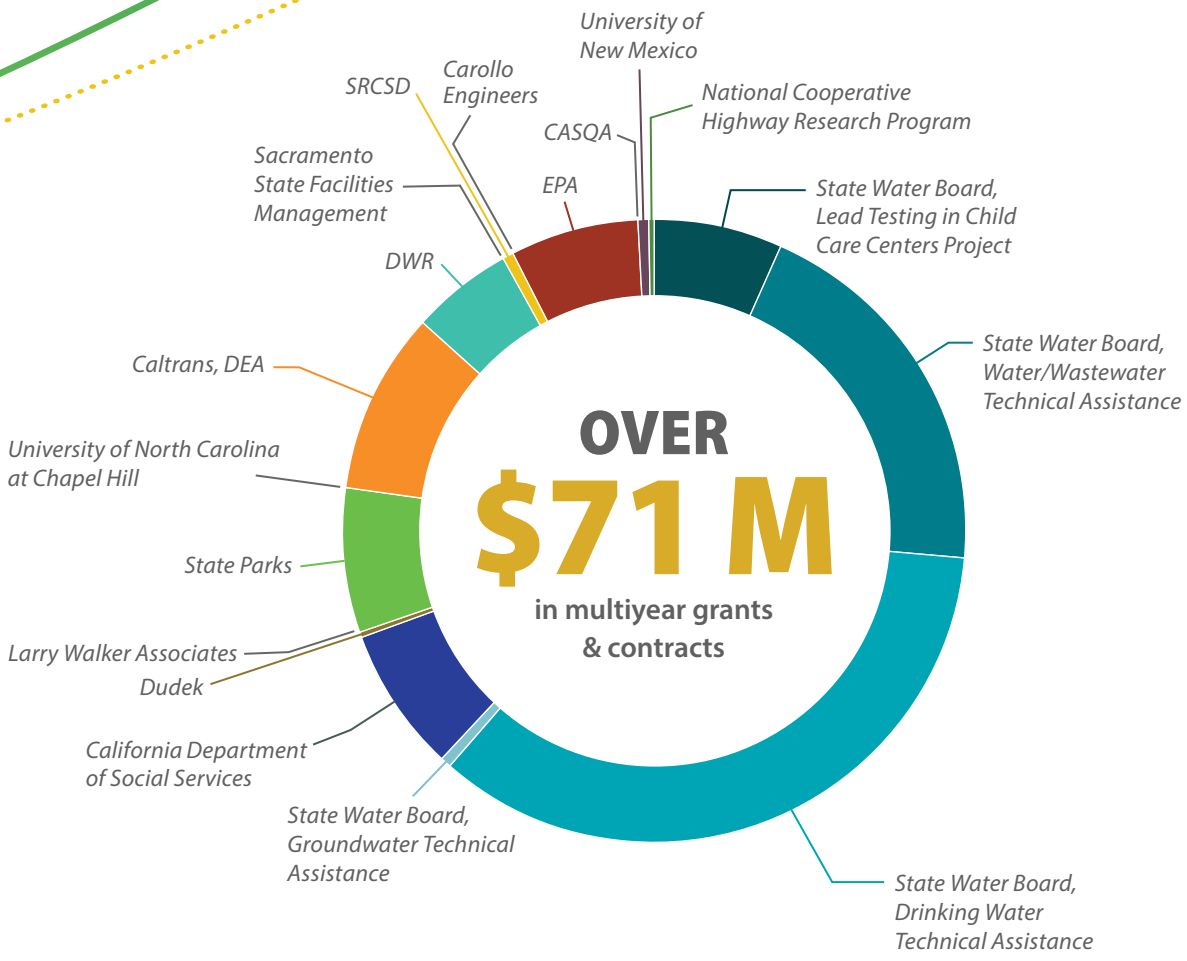
Larry Walker Associates contracted $87,500 with OWP (12/20/19–12/31/22) to assist with regulatory and monitoring services for the Sacramento Stormwater Quality Partnership.

Geographic Information Systems Training for Disadvantaged Communities

The University of North Carolina at Chapel Hill contracted with OWP (9/1/18) to provide comprehensive training and technical assistance for geographic information systems (GIS) to disadvantaged communities.

Stormwater Program Technical Assistance

The California Department of Parks and Recreation (State Parks) contracted $5,300,000 with OWP (6/29/21–6/28/24) to provide technical assistance for its stormwater program.



ˆ *Individual funded grants and contracts range from $35K to $25M*

Stormwater Research Technical Assistance

The California Department of Transportation, Division of Environmental Analysis (DEA) contracted $6,794,000 with OWP (12/1/22–11/30/27) to provide technical assistance with stormwater research focusing on discharge characterization, source identification and control, and treatment control studies.

Division of Safety of Dams Mapping Project

The California Department of Water Resources (DWR) contracted $3,750,000 with OWP (1/1/13–6/30/25) to assist the Division of Safety of Dams (DSOD) with dam break flood analysis and emergency action plan development.

Environmental Compliance Support

Sacramento State Facilities Management contracted $35,416 with OWP to assist with stormwater pollution prevention plan (SWPPP) development, trash assessments, and other related tasks.

Wastewater Technical Expertise

The Sacramento Regional County Sanitation District (SRCSD) contracted $400,000 with OWP (executed on 6/11/03) to provide technical assistance, with a focus on wastewater characterization and treatment.

Wastewater Generation Rates Study

Carollo Engineers contracted $40,181 with OWP (starting 5/15/18) to assist with a project designed to determine wastewater generation rates from different sources.

Qualified SWPPP Developer and Qualified SWPPP Practitioner Testing and Certification

The California Stormwater Quality Association (CASQA) contracted with OWP (executed on 1/21/11) to develop and implement an online training delivery system to administer and grade tests and issue certifications for Qualified SWPPP Developers and Qualified SWPPP Practitioners.

Qualified Industrial Stormwater Practitioners Training and Testing

CASQA contracted with OWP (executed on 05/23/16) to develop and implement an online system to train and test Qualified Industrial Stormwater Practitioner certificate candidates.

Environmental Finance Center (Region 9)

The US Environmental Protection Agency (EPA) contracted $4,800,000 with OWP (7/1/16–9/30/23) to develop, operate, and maintain an Environmental Finance Center for Region 9.

Small Systems Technical Assistance Projects

The University of New Mexico contracted $285,000 with OWP (8/1/21–1/31/23) to provide technical assistance for building technical, managerial, and financial (TMF) capacity for small water systems throughout the United States.

The University of New Mexico contracted $125,000 with OWP (8/1/21–1/31/23) to provide technical assistance for building TMF capacity for small wastewater systems throughout the United States.

Drinking Water and Wastewater Technical Assistance and Outreach

The State Water Board, under a Proposition 1 grant, contracted $14,057,000 with OWP (9/1/16–2/29/24) to provide water and wastewater technical assistance to disadvantaged communities in California.

Drinking Water Technical Assistance and Outreach

The State Water Board, under the Safe and Affordable Funding for Equity and Resilience (SAFER) grant, contracted $25,000,000 with OWP (3/9/20–2/28/26) to provide drinking water technical assistance to disadvantaged communities in California.

Groundwater Technical Assistance and Outreach

The State Water Board, under a Proposition 1 grant, contracted $482,363 with OWP (9/1/16–12/31/23) to provide groundwater technical assistance to disadvantaged communities in California.

Trash Rapid Assessment Data Exchange

OWP is assisting Dr. Julian Fulton (Sacramento State Environmental Studies) with an EPA contract for the Trash Rapid Assessment Data Exchange (TRADE) project. OWP is acting as the liaison to the State Water Board and stormwater permittees for the duration of the project (10/1/20–9/30/23).

Bioretention Stormwater Control Measures Synthesis

The National Cooperative Highway Research Program contracted $45,000 with OWP (executed on 3/2/22) to synthesize current state department of transportation practices for the implementation and use of bioretention stormwater control measures.

Professional Activities

Conferences, Forums, & Webinars

August 2022

Association of State Drinking Water Administrators National Capacity Development and Operator Certification Workshop, Alexandria, VA

October 2022

Water Environment Federation Technical Exhibition and Conference (WEFTEC), New Orleans, LA (presenter and coauthor)

California Stormwater Quality Association (CASQA) Conference 2022, Palm Springs, CA (2 presenters and 1 panelist)

November 2022

National Stormwater Practitioners Virtual Forum (1 breakout session notetaker)

January 2023

Water Professionals International (WPI) Innovation in Certification Conference, Clearwater Beach, FL (presenter and exhibitor)

California Water Environment Association (CWEA) Pretreatment, Pollution Prevention, and Stormwater Conference, Monterey, CA (presenter)

February 2023

Sacramento State Environmental Studies/Geology Department Colloquium, Sacramento, CA (presenter)

March 2023

WateReuse Symposium, Atlanta, GA

Nevada Rural Water Association Conference, Sparks, NV (presenter)

American Water Works Association (AWWA) Utility Management Conference, Sacramento, CA

Research engineer Brian Currier attended the CSU-WATER Annual Conference, where he toured Monterey One Water, the local high-tech water reclamation plant, and got to drink the treated water. "Tastes great!" Brian said. The CSU-WATER Conference is for CSU faculty and students to come together to talk about the state's most pressing water issues and present actionable steps to create a more resilient water future.

April 2023

CWEA Conference Expo, San Diego, CA (exhibitor)

CSU-Water Conference, Monterey, CA
(2 presenters, 1 poster)

13th National Monitoring Conference,
Virginia Beach, VA (presenter)

May 2023

EPA Onboarding Webinar for Technical Assistance (TA) Providers: Identifying Communities for Water TA (presenter)

June 2023

Water Environment Federation (WEF) Collection Systems Conference, Kansas City, MO

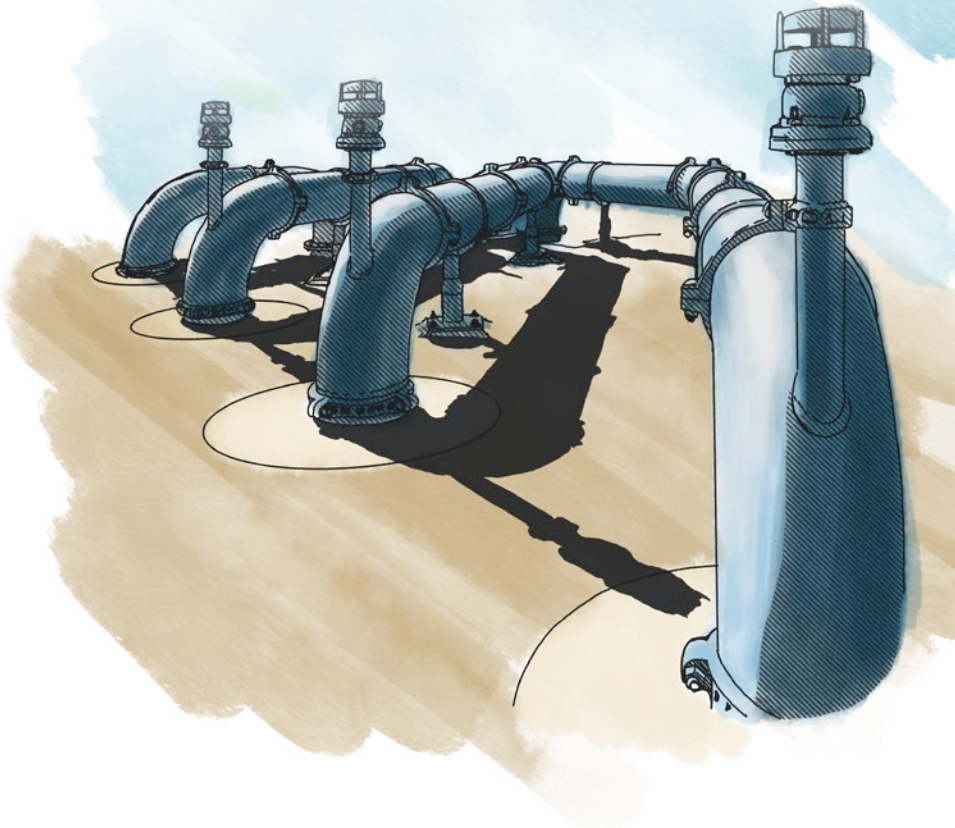
Asset Management for Small System Operators Webinar: In the Field and Beyond (presenter)

Conferences offer insight into the latest trends and technologies relevant to the water sector.

Professional Activities

EFC Small Systems Technical, Managerial, and Financial Training Sessions

The EFC at Sac State hosted or presented at 17 training sessions for small drinking water and wastewater treatment and conveyance systems to increase the technical, managerial, and financial capacity of those systems. These trainings were funded by the US EPA and the Environmental Finance Center Network (EFCN). The trainings were held for state and national audiences on a variety of topics in virtual and in-person formats.



Drinking Water Trainings

August 2022

California—SB 552: Drought Planning for Small Water Suppliers and Rural Communities, virtual (host)

September 2022

California—Asset Management and Financial Forecasting for Small Drinking Water Systems in California, virtual (host)

October 2022

National Webinar (EFCN event)—Water Loss Peer to Peer Discussion Groups, virtual (panelist)

South Dakota—Seminar: Lead and Copper Rule, SDWA Impacts, in person (host)

November 2022

National Webinar—Water Conservation Planning and Forecasting, virtual (host)

Ohio—Asset Management and GIS for Drinking Water Systems in Ohio, in person (host)

January 2023

National Webinar—Small Water System Funding: The Drinking Water State Revolving Fund (DWSRF), virtual (host)

February 2023

Hawai'i—Asset Management IQ, in person (host)

June 2023

Hawai'i—Asset Management for Small Water System Operators: In the Field and Beyond, virtual (host)

Wastewater Trainings

August 2022

National Webinar—Managing Energy Costs for Small Wastewater Systems, virtual (host)

September 2022

Nevada—Asset Management for Small Waste Water Systems in Nevada, virtual (host)

California—Asset Management for Small Waste Water Systems in California, virtual (host)

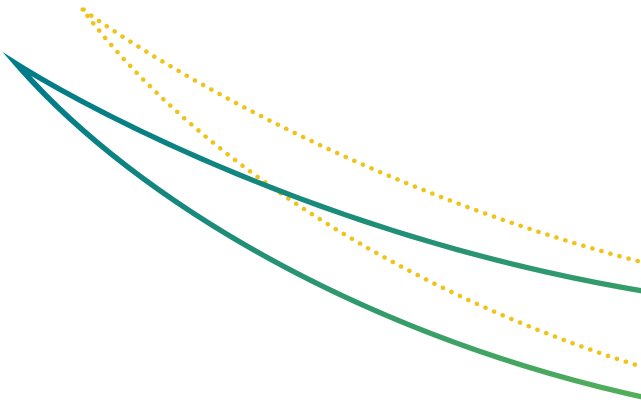
Utah—Asset Management for Small Waste Water Systems in Utah, virtual (host)

Arizona—Asset Management for Small Waste Water Systems in Arizona, virtual (host)

National Webinar—Building Resilience in an Uncertain Future for Small Wastewater Systems, virtual (host)

November 2022

Kentucky—Asset Management and GIS for Wastewater Systems in Kentucky, in person (host)



Professional Activities

Committees & Meetings

ASTM Committee E64 on Stormwater Control Measures

California Stormwater Quality Association

- *Strategic Planning Committee*
- *BMP Effectiveness Subcommittee*
- *BMP Handbook Subcommittee*
- *True Source Control Subcommittee*
- *Conference Subcommittee*
- *Construction Subcommittee*
- *Funding Subcommittee*
- *Industrial Subcommittee*
- *Monitoring and Science Subcommittee*
- *Non-Traditional Phase II Subcommittee*
- *Phase II Subcommittee*
- *Policy and Permitting Subcommittee*
- *Stormwater Capture and Use Subcommittee*
- *Scholarship and Fellowship Working Group*

EFC Network

State Water Resources Control Board (State Water Board)

- *Construction General Permit Training Team*
- *Industrial General Permit Training Team*
- *Northern CA Water Quality Monitoring Group*
- *Southern CA Beach Water Quality Work Group*
- *Safe to Swim Work Group*

We encourage growth by sharing knowledge and helping bring change.

North Coast Stormwater Coalition

NCHRP 25-61: Effective On-Bridge Treatment of Stormwater—Panel Member

NCHRP 24-50: Rewrite of the AASHTO Drainage Manual—Panel Member

Calleguas Creek Watershed TMDL Stakeholder Group

Transportation Research Board—Hydraulics, Hydrology, and Stormwater Committee

Washington State TAPE External Board of Reviewers

Water Environment Federation

Stormwater Committee

Industrial Subcommittee

Professional Activities

Awards

WPI Dr. Kenneth D. Kerri Excellence in Workforce Development

Ramzi Mahmood, January 2023

The award honors OWP founder Dr. Kenneth D. Kerri and recognizes Dr. Mahmood's contributions to the education and training of water system operators and operators-in-training over his 25-year-plus service as OWP's executive director.

Environmental Business Journal Business Achievement Award for Project Merit on Sustainable Water Supply

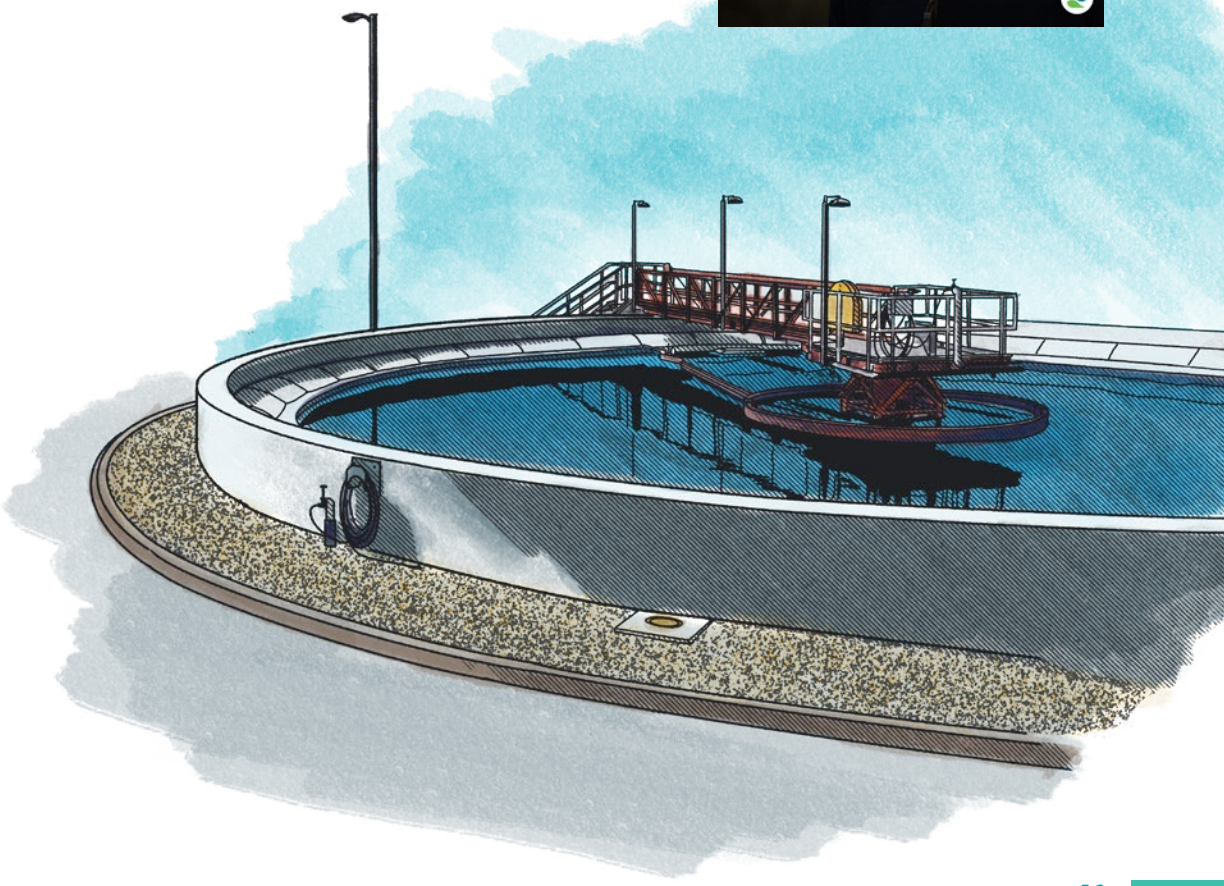
GEI Consultants, March 2023

GEI Consultants worked with OWP to produce the Town of Paradise Options Study Report. The report addresses ongoing water system challenges resulting from the 2018 Camp Fire that destroyed 90 percent of water connections in Paradise. It maps out and evaluates options to enable Paradise's water supplier to foster water supply reliability, safe and affordable drinking water, short- and long-term financial sustainability, and community redevelopment in the town.

CASQA Outstanding Service Award

Brian Currier, October 2022

OWP research engineer Brian Currier received a 2022 CASQA Outstanding Service Award for development and implementation of the CASQA Fellowship Program. The program offers university students the opportunity to assist a CASQA committee or subcommittee with delivery of a project aligned with CASQA's Vision for Sustainable Stormwater Management.



Professional Activities

Publications

Porse, Erik, Chingwen Cheng, Sara Hughes, and N. Claire Napawan. 2022. "Urban water management, planning, and design: Links, opportunities, and challenges." Frontiers in Water, 4: 1010318.

Leo, Caitlyn. 2022. "Local Workforce Development Supports Water Conservation." EFCN Media Library (blog). July 12, 2022. www.efcnetwork.org/multimedia.

Water Environment Federation. Urban Stormwater Controls Operation and Maintenance. Manual of Practice No. 39. 2022. With contributions from Maureen Kerner, Brian Currier, and Kirk Van Rooyan. Alexandria, VA: WEF, ASCE, and EWRI.

National Academies of Sciences, Engineering, and Medicine. 2023. Practices for Bioretention Stormwater Control Measures. With contributions from Brian Currier, Dakota Keene, Caitlyn Leo, and Joel Shinneman. Washington, DC: The National Academies Press. https://doi.org/10.17226/27028.

Porse, Erik, Caitlyn Leo, Erick Eschker, Harold Leverenz, Jonathan Kaplan, John Johnston, Dakota Keene, and David Babchanik. 2023. "Adapting wastewater management systems in California for water conservation and climate change." Sustainable and Resilient Infrastructure: 1-14.

Lezzaik, Khalil. 2023. "EPA H20 Community Solutions Teams: Reinvesting in Aging Water Infrastructure, Prioritizing Disadvantaged Communities." EFCN Media Library (blog). January 5, 2023. www.efcnetwork.org/multimedia.

Pohler-Chapman, Erica. 2023. "Helping Small Water Systems Access Funding: An Overview of How EFCN Technical Assistance Works." EFCN Media Library (blog). January 12, 2023. www.efcnetwork.org/multimedia.

Writing the future of the water sector and providing solutions for protecting and enhancing water resources, public health, and the environment . . .

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