

**OFFICE OF
WATER PROGRAMS**
Annual Report
2006-07



OFFICE OF WATER PROGRAMS

California State University, Sacramento

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GAY KORNWEIBEL, Assistant Director

MARK MOOSHIAN, Interim Assistant Director

TRAINING

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INTRODUCTION

The Office of Water Programs (OWP) at California State University, Sacramento, provides training and engineering research services. OWP is a self-supporting program and employs 49 faculty, staff, and student assistants in its Training and Research groups.

OWP continues to be a global leader in providing high-quality, low-cost training programs for operators and managers of water treatment and distribution systems; wastewater collection and treatment systems; and utility managers.

Since 1972, OWP has developed 41 training courses. Our training manuals are sold in 108 countries and several have been translated into other languages. Six hundred forty colleges and universities purchase and use OWP materials as part of their curriculum.

OWP continues to embrace new technology, and courses that were once available only by correspondence are now available on VHS and DVD, CD-ROM, and the internet. During the past year, 48,300 manuals, 880 CDs, 768 VHS and DVD sets, and 15,325 enrollments were purchased by water and wastewater operators, stormwater dischargers, and agencies worldwide. The revenue generated by these training programs is reinvested in our customers by keeping our materials current and by funding development of new materials and methods. Our goal remains to be the premier global provider of water and wastewater operator training materials and methods.

The OWP Research Group continues to assist the California Department of Transportation (Caltrans) with stormwater research, especially discharge characterization, source identification and control, and treatment control studies. The results of these studies have been and will continue to be applied in the design, development, and implementation of the Caltrans Stormwater Management Program.

The Research Group also provided stormwater research services to the El Dorado County Department of Transportation, the California Stormwater Quality Association, and Kristar Enterprises. In addition, distance learning courses based on the California Stormwater Quality Association's (CASQA) Stormwater Best Management Practice (BMP) handbooks are in their third year of sales. Approval of CASQA BMP on-line courses by state operator certification boards has grown to a total of 28 states.

TRAINING GROUP

Developing and implementing new water quality standards and treatment technologies requires that operators and managers of drinking water and wastewater systems continually update their training. OWP responds to these training needs by frequently updating training materials, courses, and training methods.

Keeping our training materials current remains a top priority for our professional staff as they participate with industry, professional organizations, and regulatory and certification advisory committees. This year, OWP published the Fifth Edition of Water Treatment Plant Operation (Vol. II), and reprinted Small Water System Operation and Maintenance.

NEW COURSES

WATER DISTRIBUTION SYSTEM OPERATION AND MAINTENANCE ON-LINE COURSES

Three new courses were created to meet the growing training needs for water distribution system operators: WAT 703A Safety, WAT 703C Quality and Disinfection, and WAT 703D Operation and Maintenance Activities. Each course provides 18 contact hours of training credit and uses the same internet delivery system that has proven so successful with other OWP on-line course offerings. The last course in the water distribution series, System Administration, will be released in the coming year.

CONTRACTS

CALIFORNIA WATER ENVIRONMENT ASSOCIATION

The California Water Environment Association (CWEA) contracted OWP to conduct training workshops for CWEA volunteers to improve their training effectiveness. OWP staff, in collaboration with the Sacramento State Center for Teaching and Learning (CTL), developed and conducted two workshops for CWEA trainers, one in Sacramento and one in San Diego.

SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT

OWP renewed its consulting services contract with the Sacramento Regional County Sanitation District (SRCSD) for a new 3-year term. OWP staff assisted SRCSD by conducting an analysis of methyl mercury contamination of the Sacramento River watershed with the objective of helping reduce contamination levels. OWP staff also conducted a study of wastewater treatment plant effluent flow measurements with the goal of improving flow measurement accuracy to protect the water quality of the Sacramento River watershed.

CALIFORNIA DEPARTMENT OF HEALTH SERVICES

The California Department of Health Services (DHS) contracted OWP to develop a "Basic Small Water System Operations" course. Completing the course will allow successful candidates without a high school diploma to qualify for the California Water Treatment Operator and Distribution System Operator certification exams. Course development is projected to be complete next year.

IMPLEMENTING NEW TECHNOLOGY

From its beginnings in the 1970s, the OWP customer base has grown exponentially, and OWP has kept pace with this dynamic environment. Through the use of new customer database business software, the ordering and shipping processes were greatly streamlined, resulting in customers now having their phone orders shipped the same or next day. During this fiscal year alone, 6,664 new student records were added to the database of more than 120,000 students who have enrolled in OWP water and wastewater courses. Upgrades and expansion of OWP server farms and customer service representative desktop systems ensure OWP is ready to meet the challenges of continued growth in the coming year.

RESEARCH

For the past ten years, OWP research engineers and scientists have assisted Caltrans in planning and managing its stormwater management program. This group, along with some Caltrans engineers, is known as the Applied Studies Team (AST). The major elements of this program are stormwater runoff characterization monitoring, field testing of best management practices (BMPs), and source identification and control. The Research Group began the current 3-year contract in June 2005. The Research Group also performed work under contracts with the El Dorado County Department of Transportation, the California Stormwater Quality Association (CASQA), and Kristar Enterprises.

CALTRANS

CHARACTERIZATION MONITORING

Although a major portion of the stormwater runoff characterization projects are complete, OWP continues to assist Caltrans with special characterization projects to study long-term stormwater runoff characterization trends, Areas of Special Biological Significance (ASBS), source identification, pathogens, herbicides, toxicity, California Toxics Rule (CTR) constituents, and first flush characteristics.

TREATMENT BEST MANAGEMENT PRACTICES PILOT STUDIES

The Applied Studies Team is currently conducting various stages of 150 full-scale pilot studies and various small-scale studies. The pilot studies are determining the treatment performance, life cycle costs, and maintenance requirements for the following technologies: detention basins (various operation modes and inlet/outlet structures); sand filters; alternative media filters (activated alumina, iron modified activated alumina, and limestone); small footprint media filters; linear filters; infiltration trenches; vegetated strips; vegetated swales; bioretention facilities; porous friction course; and gross solids removal devices.

The Research Group is collaborating with the university's Chemistry Department to develop and test drain inlet inserts. The work is being performed at the Used Oil Demonstration Project testing facility located on campus. The small-scale treatment BMP testing facility in the Lake Tahoe Basin is being used for testing various combinations of sedimentation, filtration (media and filter fabric), and chemical

addition. Over 50 systems were piloted during the past year, including studies on the toxicity of chemically treated stormwater as well as the stability of flocculants formed by chemically treated stormwater.

SOURCE CONTROL

OWP continues to collaborate with staff at the Cal Poly San Luis Obispo Erosion Research Facility. One ongoing project is enhancing a tool that specifies and calculates seed and live plant materials for transportation projects. Another project is testing the treatment performance of biostrips with ornamental vegetation. In addition, there are several new projects focused on identifying sources of contaminants found in Caltrans stormwater runoff.

CALTRANS—DATA MANAGEMENT, TOOL DEVELOPMENT, AND ANNUAL REPORTING

Services to Caltrans also include data management, tool development, and preparation of several annual reports (the "Treatment BMP Technology Report," the "Storm Water Monitoring and BMP Status Report," and the "Storm Water Monitoring and Research Program Annual Data Summary Report"). The Research Group is responsible for housing and administering the Caltrans Stormwater Library, as well as housing and administering the Caltrans Stormwater Information System (SWIS), a continuously updated database that stores all Caltrans monitoring and pilot study data. The group is also responsible for administering the monthly Caltrans research webcasts.

Data management duties also include oversight, training, and enforcement of Caltrans data collection and analysis protocols. The Caltrans Monitoring Equipment Inventory, Storage, and Maintenance Program is administered by the Research Group as well. OWP researchers are spearheading an effort to write a guidance manual for the planning, executing, and reporting stages of BMP pilot studies.

EL DORADO COUNTY

This past year, OWP prepared a stormwater discharge characterization sampling and analysis plan.

CALIFORNIA STORMWATER QUALITY ASSOCIATION (CASQA)

OWP prepared and delivered an updated version of the Basin Sizer computer program that automates the synthesis of historical rainfall data and the computation of water quality volumes and water quality flows for the design of stormwater treatment control devices in California. The program was expanded to include CASQA methods and additional rainfall data.

KRISTAR ENTERPRISES

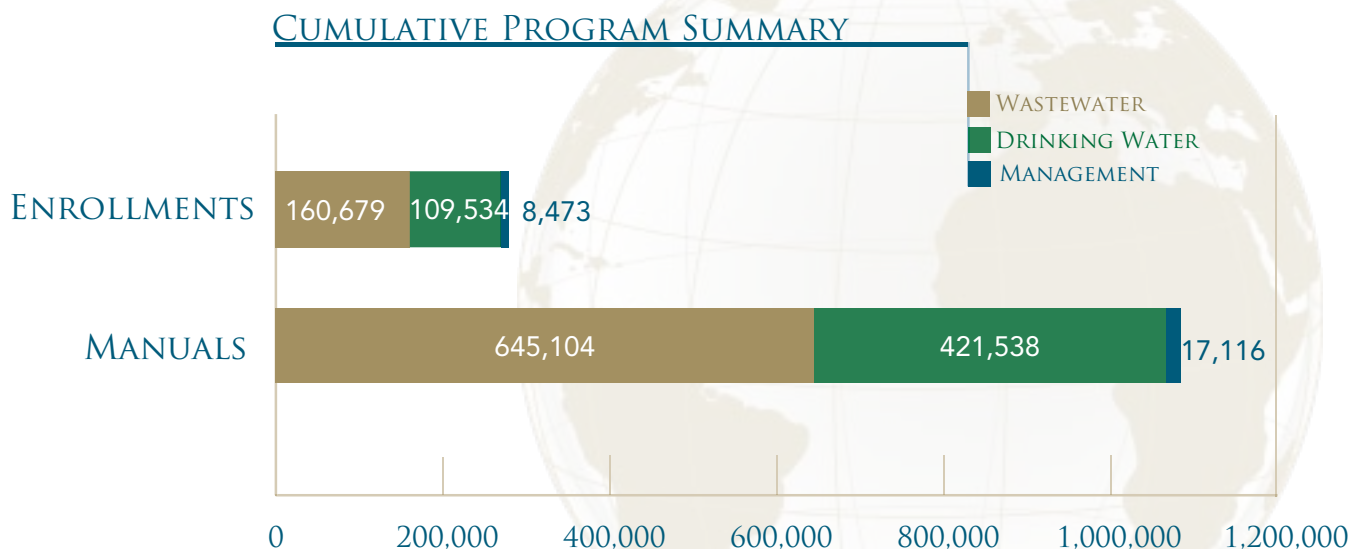
The Research Group is testing the treatment performance of one of Kristar Enterprises' stormwater treatment BMPs at the Used Oil Demonstration Project testing facility located on campus. Select water quality analyses were performed on campus. This project will be the subject of a master's thesis in Civil Engineering. The project continues to employ Sacramento State Students.



APPENDIX A

SUMMARY

Totals for activity during this fiscal year (July 1, 2006–June 30, 2007) brought overall cumulative totals to 1,083,861 manuals sold, and 280,295 course enrollments. Cumulative totals for major programs are shown below.



WASTEWATER

SMALL WASTEWATER SYSTEM OPERATION AND MAINTENANCE VOL. I (SWWS I) (FIRST EDITION, 1997)

7,641 manuals (current year 800)
3,439 enrollments (current year 400)

This course describes the responsibilities of the small wastewater systems operator and presents descriptions of the equipment and processes commonly used in small community wastewater systems. Other topics include how to develop a maintenance program and how to set rates.

SMALL WASTEWATER SYSTEM OPERATION AND MAINTENANCE VOL. II (SWWS II) (FIRST EDITION, 2002)

2,295 manuals (current year 569)
814 enrollments (current year 207)

Building on the knowledge obtained in Volume I, this course focuses on the knowledge and skills needed to operate and maintain several types of package wastewater treatment processes. The course also describes various effluent disposal options, how to perform basic lab procedures, and how to administer a small wastewater system.

OPERATION OF WASTEWATER TREATMENT PLANTS VOL. I (OWTP I)
(FIRST EDITION, 1971; SIXTH EDITION, 2004)

209,304 manuals (current year 6,874)
64,190 enrollments (current year 2,516)
370 CDs

Designed to train operators in the safe and effective operation and maintenance of wastewater treatment plants, this course emphasizes the knowledge and skills needed to operate wastewater treatment plants as efficiently as possible. Operators will gain an understanding of the basic operational aspects of their plant and learn how to analyze and solve operational problems.

OPERATION OF WASTEWATER TREATMENT PLANTS VOL. II (OWTP II)
(FIRST EDITION, 1971; SIXTH EDITION, 2003)

149,876 manuals (current year 4,949)
32,845 enrollments (current year 1,191)

Continuing from Volume I, this course shifts emphasis toward larger conventional treatment plants. This course teaches good management practices, including maintenance programs, recordkeeping, using computers, and preparing and writing reports.

ADVANCED WASTE TREATMENT (AWT)
(FIRST EDITION, 1987; FIFTH EDITION, 2006)

58,340 manuals (current year 2,172)
14,036 enrollments (current year 610)

This course provides information to operators of advanced wastewater treatment plants, covering biological treatment processes as well as physical and chemical treatment processes.

TREATMENT OF METAL WASTESTREAMS (TMW)
(FIRST EDITION, 1986; THIRD EDITION, 2003)

29,557 manuals (current year 528)
8,347 enrollments (current year 228)

This course teaches safe and effective operation and maintenance of wastewater treatment facilities for electroplating, metal finishing, and printed circuit board manufacturing. Emphasizes how to operate and maintain facilities that neutralize acidic and basic waters, treat wastes containing metals, destroy cyanide, and also treat complex metal-wastes.

INDUSTRIAL WASTE TREATMENT VOL. I (IWT I)
(FIRST EDITION, 1987; THIRD EDITION, 2005)

31,938 manuals (current year 1,663)
5,715 enrollments (current year 297)

This course covers the importance and responsibilities of an industrial wastewater treatment plant operator. Information is provided on the importance of being an operator, waste minimization, industrial waste monitoring, physical and chemical treatment processes, treatment of metal wastestreams, instrumentation, safety, and maintenance.

INDUSTRIAL WASTE TREATMENT VOL. II (IWT II)
(FIRST EDITION, 1987; SECOND EDITION, 1995)

16,990 manuals (current year 680)
2,375 enrollments (current year 169)

This course continues the emphasis from Volume I on the responsibilities of an industrial wastewater treatment plant operator, and includes information about aerobic and anaerobic treatment processes, residual solids management, and maintenance.

PRETREATMENT FACILITY INSPECTION (PFI)
(FIRST EDITION, 1988; THIRD EDITION, 1996)

16,656 manuals (current year 377)
6,584 enrollments (current year 220)

This course stresses the duties and responsibilities of a pretreatment facility inspector. It provides information on changes and recommendations resulting from the Domestic Sewage Study and Pretreatment Implementation Review Team, and information on how inspectors can assist and encourage industry with waste minimization programs.

PRETREATMENT FACILITY INSPECTION TRAINING VIDEOS (PFI V)
(FIRST EDITION VIDEOS, 1998; COURSE, 2003)

1,314 VHS videos (current year 46)
29 enrollments (current year 13)

An excellent introduction to the knowledge, skills, and abilities needed by new pretreatment facility inspectors, these five 30-minute videos portray real-world experiences and feature inspectors of industrial pretreatment facilities performing actual tasks. Current inspectors also will find helpful ideas to improve their performance.

OPERATION AND MAINTENANCE OF
WASTEWATER COLLECTION SYSTEMS
VOL. I (COLL I)
(FIRST EDITION, 1976; SIXTH EDITION, 2003)

69,429 manuals (current year 3,324)
14,584 enrollments (current year 879)

This course provides operators with information needed to operate and maintain wastewater collection systems efficiently and effectively. Emphasis is on tasks performed by line maintenance crews. Various types of collection systems and construction inspections are covered.

OPERATION AND MAINTENANCE OF
WASTEWATER COLLECTION SYSTEMS
VOL. II (COLL II)
(FIRST EDITION, 1976; SIXTH EDITION, 2004)

50,470 manuals (current year 2,308)
7,377 enrollments (current year 429)

This course emphasizes the duties of operating and maintaining lift stations, maintenance of equipment, and sewer rehabilitation. Other topics include administration and organization for system O&M.

COLLECTION SYSTEMS: METHODS FOR
EVALUATING AND IMPROVING
PERFORMANCE (CSM)
(FIRST EDITION, 1998; COURSE, 2004)

2,611 manuals (current year 161)
280 enrollments (current year 86)

This course assists collection system agencies in evaluating the adequacy and effectiveness of their O&M program and identifying areas where improvements could be made. The course includes system and operations data from 13 highly effective collection system agencies; benchmarking procedures and worksheets; procedures for establishing an effective O&M program; procedures to identify problems and select methods for improving the performance of a collection system; and case histories showing how top-performing agencies achieve high levels of performance.

COLLECTION SYSTEM OPERATION AND
MAINTENANCE TRAINING VIDEOS (COLL V)
(FIRST EDITION, 1997; COURSE, 2004)

1,598 DVDs (current year 118)
64 enrollments (current year 27)

This six-part video series on one DVD is suitable for training potential, new, and experienced collection system operators to safely operate and maintain both sanitary and combined sewer systems. The videos demonstrate the equipment and procedures collection system crews use to safely and effectively operate and maintain their collection systems. Operators learn how to properly identify, solve, and record solutions to existing and potential collection system problems.

DRINKING WATER

WATER TREATMENT PLANT OPERATION
VOL. I (WTPO I)
(FIRST EDITION, 1983; FIFTH EDITION, 2004)

141,396 manuals (current year 6,874)
45,842 enrollments (current year 2,369)

Designed to train operators in the safe and effective operation and maintenance of drinking water treatment plants. Volume I emphasizes the knowledge and skills needed by an operator working in a conventional water treatment plant used for treating surface waters.

WATER TREATMENT PLANT OPERATION
VOL. II (WTPO II)
(FIRST EDITION, 1983; FIFTH EDITION, 2006)

89,941 manuals (current year 4,263)
21,197 enrollments (current year 1,076)

This continued course provides information needed by all operators responsible for the administration and management of a water treatment plant.

WATER DISTRIBUTION SYSTEM OPERATION AND MAINTENANCE (WDS)
(FIRST EDITION, 1983; FIFTH EDITION, 2005)

119,414 manuals (current year 7,620)
26,960 enrollments (current year 1,902)

This course describes the responsibilities of being an operator for water storage and distribution systems. Provides an understanding of the basic operational and maintenance concepts of water distribution systems and will help operators develop the ability to analyze and solve problems when they occur.

SMALL WATER SYSTEM OPERATION AND MAINTENANCE (SWS)
(FIRST EDITION, 1983; FOURTH EDITION, 1999)

70,199 manuals (current year 2,243)
15,028 enrollments (current year 688)

Designed to train operators in safe and effective operation and maintenance of small water systems and treatment plants, this course contains information for operators with responsibility for wells, pumps, disinfection, and small water treatment plants (serving populations of fewer than 10,000).

SMALL WATER SYSTEMS VIDEO INFORMATION SERIES (SWS V)
(FIRST EDITION, 2001)

561 VHS video sets (current year 39)
112 CD video sets (current year 64)
229 learning booklets (current year 153)
335 enrollments (current year 42)

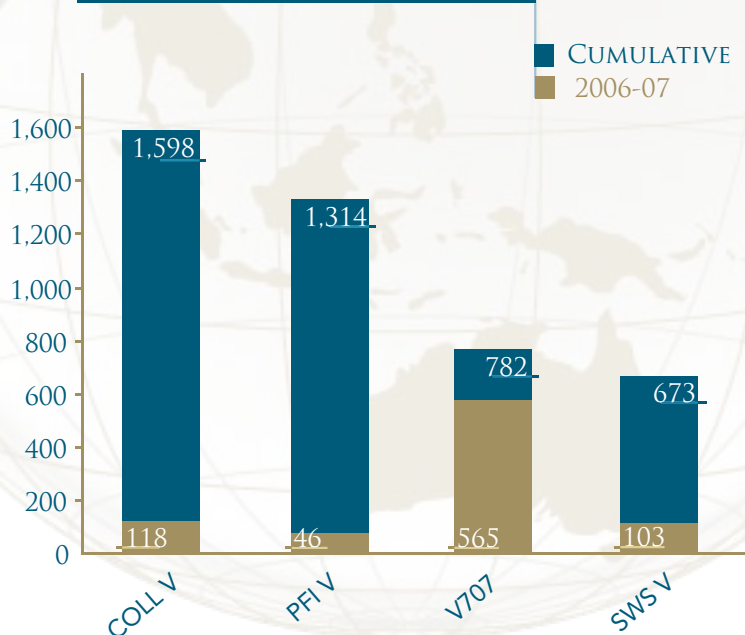
This ten-part video series and the accompanying Learning Booklet were developed to serve the needs of the operators, managers, owners, and elected board members of very small water systems. It presents information on the basic operation and maintenance of small groundwater and surface water supply systems and water distribution systems.

WATER SYSTEMS OPERATION AND MAINTENANCE VIDEO TRAINING SERIES (V707)
(FIRST EDITION, 2004)

282 VHS video sets (current year 177)
500 DVD video sets (current year 388)
359 learning booklets (current year 292)
181 enrollments (current year 99)

This seven-part video series and accompanying Learning Booklet covers different topics presented by working operators, engineers, or managers who are experts in their field. The videos all feature real operators performing duties at their facilities.

DRINKING WATER AND WASTEWATER VIDEO COURSES SOLD



MANAGEMENT

UTILITY MANAGEMENT (UM)
(FIRST EDITION, 1998; SECOND EDITION, 2004)

15,287 manuals (current year 1,083)
7,339 enrollments (current year 633)

This course offers detailed information regarding all major responsibilities of a utility manager's key job elements and provides practical guidelines for policies and procedures. Explanations are given on how to assess the financial strength and stability of a utility, principles of budgeting, and how to fund capital improvements.

MANAGE FOR SUCCESS—EFFECTIVE UTILITY LEADERSHIP PRACTICES (MFS)
(FIRST EDITION, 2005)

1,829 manuals (current year 925)
1,134 enrollments (current year 681)

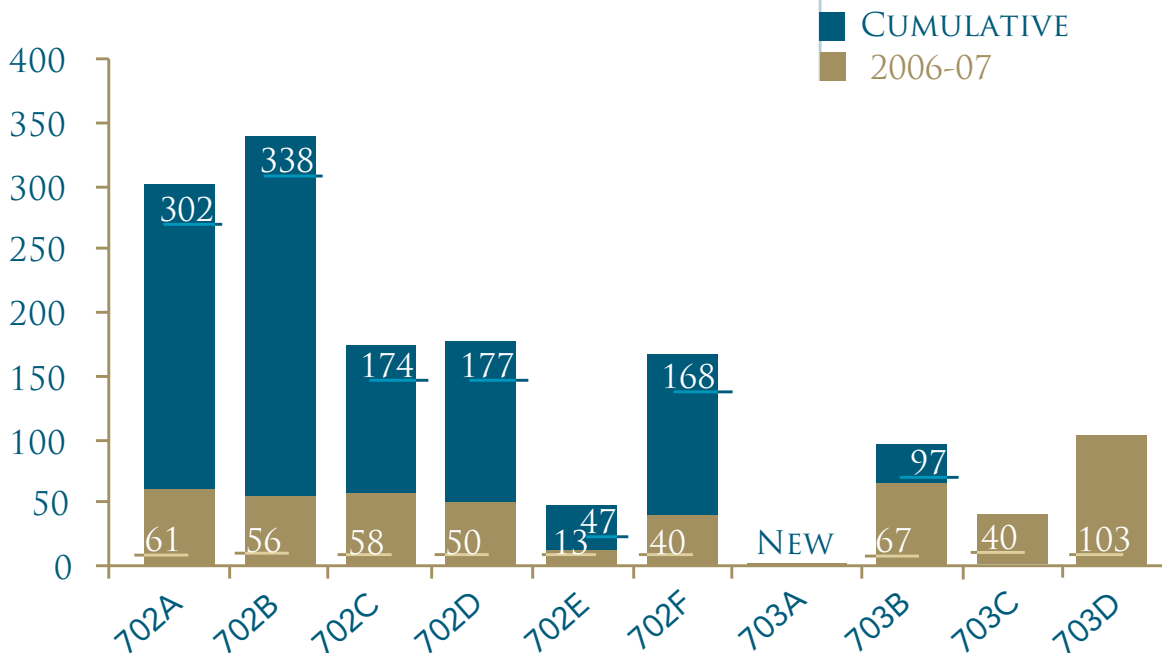
Utilities can help ensure their management capacity by having their management personnel complete this training program. The program stresses problem identification and solutions, teamwork, communication, motivation, and evaluating and improving solutions to problems.

ON-LINE COURSES

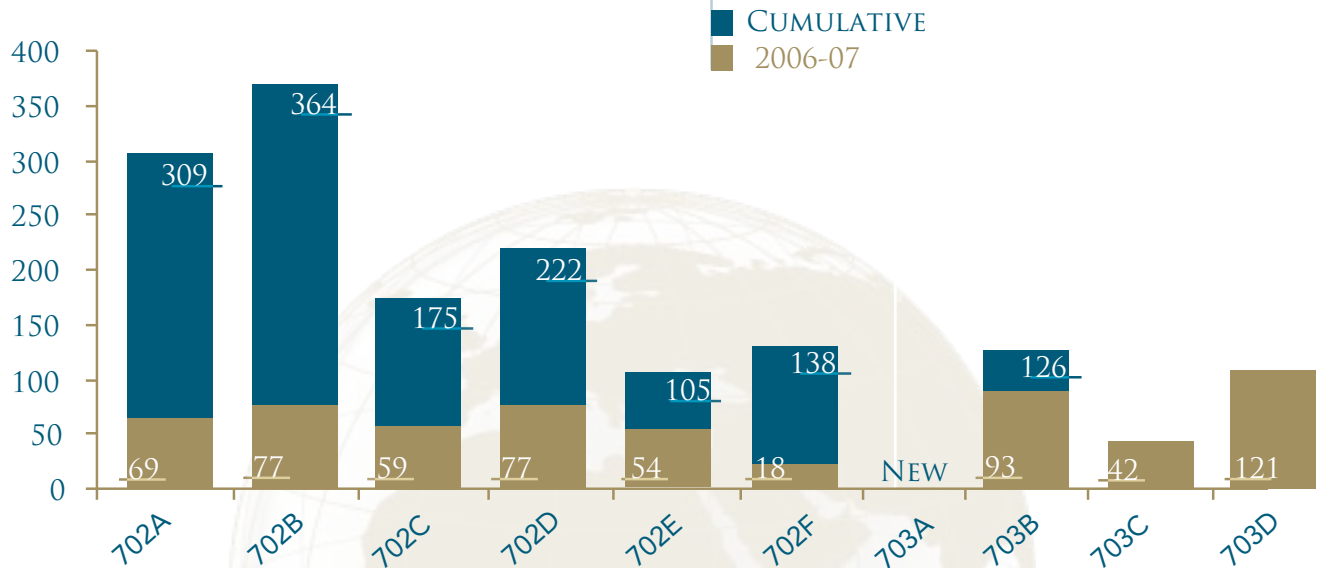
SMALL WATER SYSTEMS

These distance learning courses are delivered over the internet, and include lessons, readings, video clips, animated illustrations, student exercises, and on-line exams. The readings, student exercises, and video clips are contained on a companion CD that integrates with the on-line materials.

ON-LINE COURSES, ENROLLMENTS



ON-LINE COURSES, CD SALES



WAT 702A–WATER SOURCES AND TREATMENT (FIRST EDITION, 2003)

302 enrollments (current year 61)
309 CDs (current year 69)

Topics include: water supply system components; operator responsibilities; certification requirements; hydrologic cycle; sanitary survey methods; regulatory website information; treatment system components; and relevant math solution techniques.

WAT 702B–WELLS (FIRST EDITION, 2003)

338 enrollments (current year 56)
364 CDs (current year 77)

Topics include: wellhead protection; well and pump system components; maintenance; pump and tank operation; inspection; disinfection; recordkeeping; sand removal; troubleshooting; site selection; evaluation and testing; drilling methods; and well plugging.

WAT 702C–SMALL WATER TREATMENT PLANTS (FIRST EDITION, 2003)

174 enrollments (current year 58)
175 CDs (current year 59)

Topics include: treatment requirements and methods for surface and groundwaters; coagulation; flocculation; sedimentation; filtration; disinfection; corrosion control; solids-contact clarification; sand filters; mineral removal; maintenance; and safety.

WAT 702D–DISINFECTION (FIRST EDITION, 2003)

177 enrollments (current year 50)
222 CDs (current year 77)

Topics include: regulations; effectiveness; physical and chemical methods; applicability of disinfection to various types of equipment; chlorination rates; chlorine residual measurement; safety; and relevant math solution techniques.

WAT 702E–WATER RATES/SAFETY (FIRST EDITION, 2004)

47 enrollments (current year 13)
105 CDs (current year 54)

Topics include: safety program implementation; equipment use; safe practices; lockout/tagout procedures; inspections; and water rate determination, calculation, and administration.

WAT 702F–LABORATORY (FIRST EDITION, 2004)

168 enrollments (current year 40)
138 CDs (current year 18)

Topics include: basic laboratory analysis procedures and equipment; sampling techniques and devices; tests (alkalinity, hardness, coliform bacteria counts, jar tests, and others); relevant math solution techniques.

WATER DISTRIBUTION SYSTEMS

WAT 703A–SAFETY (FIRST EDITION, 2007) NEW COURSE

Upon completion of this course, operators should have a clear understanding of operator responsibilities, certification requirements, and career management strategies. Operators completing this course should also be able to develop and conduct a safety program and tailgate safety sessions; be able to safely operate and maintain pumps and wells, and vehicles and equipment. Operators will also learn about defensive and safe vehicle driving, routing traffic, working safely in streets, protecting the public, and conducting safety inspections of waterworks facilities.

WAT 703B–FACILITIES (FIRST EDITION, 2006)

97 enrollments (current year 67)
126 CDs (current year 93)

This course covers water storage facilities and water distribution system facilities. Topics for water storage facilities include types, locations, safe operation and maintenance, inspections, troubleshooting, disinfection, corrosion protection, and maintaining records. The topics covered for water distribution system facilities include purpose, importance of hydraulics, storage and pumping facilities, types of pipes and joints, installing pipe, meters, and backflow prevention devices.

WAT 703C–QUALITY AND DISINFECTION (FIRST EDITION, 2006)

40 enrollments (current year 40)
42 CDs (current year 42)

Upon completion of this course, operators should be able to identify various types of contaminants and contamination sources, and identify and correct causes of water quality degradation in water mains and storage facilities. Operators should also be able to disinfect new and existing wells, pumps, mains, and storage facilities; calculate chlorine dosage; operate and maintain hypochlorinators and chlorinators; troubleshoot chlorination systems; and conduct a chlorine safety program.

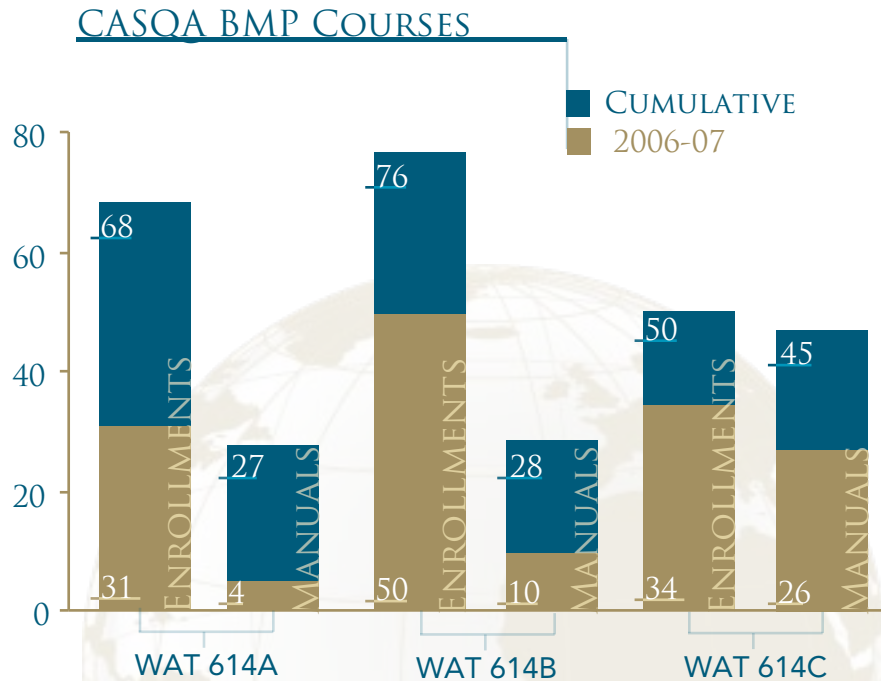
WAT 703D–OPERATION AND MAINTENANCE ACTIVITIES (FIRST EDITION, 2006)

103 enrollments (current year 103)
121 CDs (current year 121)

Upon completion of this course, operators should be able to develop and conduct a water distribution system surveillance program, a water quality monitoring program, and a cross-connection control program; locate and repair buried pipes and leaks; make pipe connections; flush and clean pipes; thaw frozen pipes and hydrants; test and read meters; disinfect mains and storage facilities; conduct effective recordkeeping; respond to emergencies; deal with the public; perform landscape maintenance around facilities; and safely operate and maintain a water distribution system.

CASQA BMP COURSES

These distance learning courses are based on the California Stormwater Quality Association's (CASQA) Stormwater Best Management Practices (BMP) handbooks. These courses are designed to provide continuing education for professional engineers, employees of municipal agencies, regulatory agencies, developers, construction companies, and others to increase their knowledge of stormwater best management practices.



WAT 614A–NEW DEVELOPMENT AND REDEVELOPMENT (FIRST EDITION, 2004)

68 enrollments
27 manuals

This course provides general guidance for selecting and implementing BMPs to reduce pollutants in runoff in newly developed areas and redeveloped areas to waters of the state. Topics covered include planning for new development and redevelopment, site and facility design for water quality protection, source control BMPs, treatment control BMPs, and long-term maintenance of BMPs.

WAT 614B–CONSTRUCTION (FIRST EDITION, 2004)

76 enrollments
28 manuals

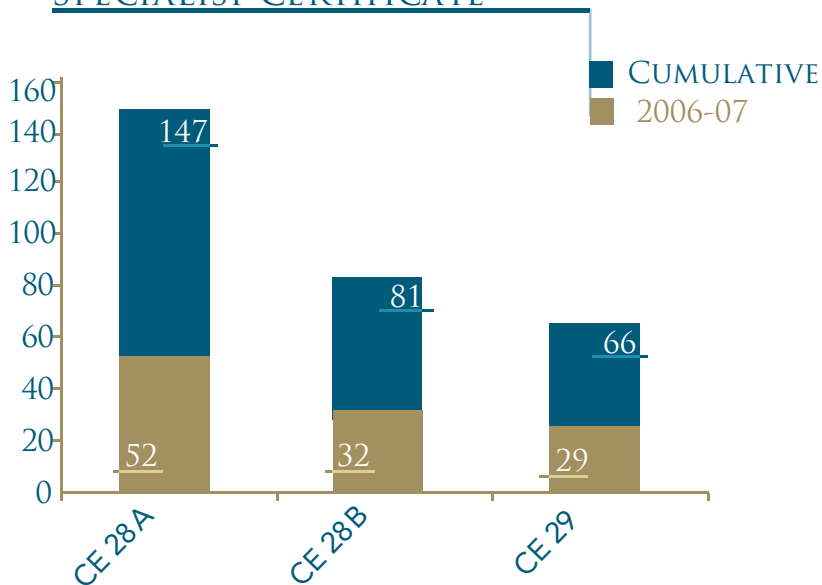
This course provides guidance on developing and implementing stormwater pollution prevention plans that document the selection and implementation of BMPs for particular types of construction projects.

WAT 614C–MUNICIPAL (FIRST EDITION, 2004)

50 enrollments
45 manuals

This course provides general guidance for selecting and implementing BMPs to reduce pollutants in runoff from municipal operations to waters of the state. Topics covered include regulatory requirements, pollution prevention planning, source control BMPs, treatment control BMPs, and long-term maintenance of BMPs.

WATER TREATMENT PLANT OPERATIONS
SPECIALIST CERTIFICATE



CE 28A–WATER TREATMENT PLANT OPERATION I
(FIRST EDITION, 2002)

147 enrollments (current year 52)

This introductory course provides an overview of the need for water treatment, the importance of providing safe water for the public, and the theory and operation of conventional water treatment plant processes. Emphasis is placed on developing knowledge and skills needed by an operator working in a conventional water treatment plant treating surface water.

CE 28B–WATER TREATMENT PLANT
OPERATION II
(FIRST EDITION, 2002)

81 enrollments (current year 32)

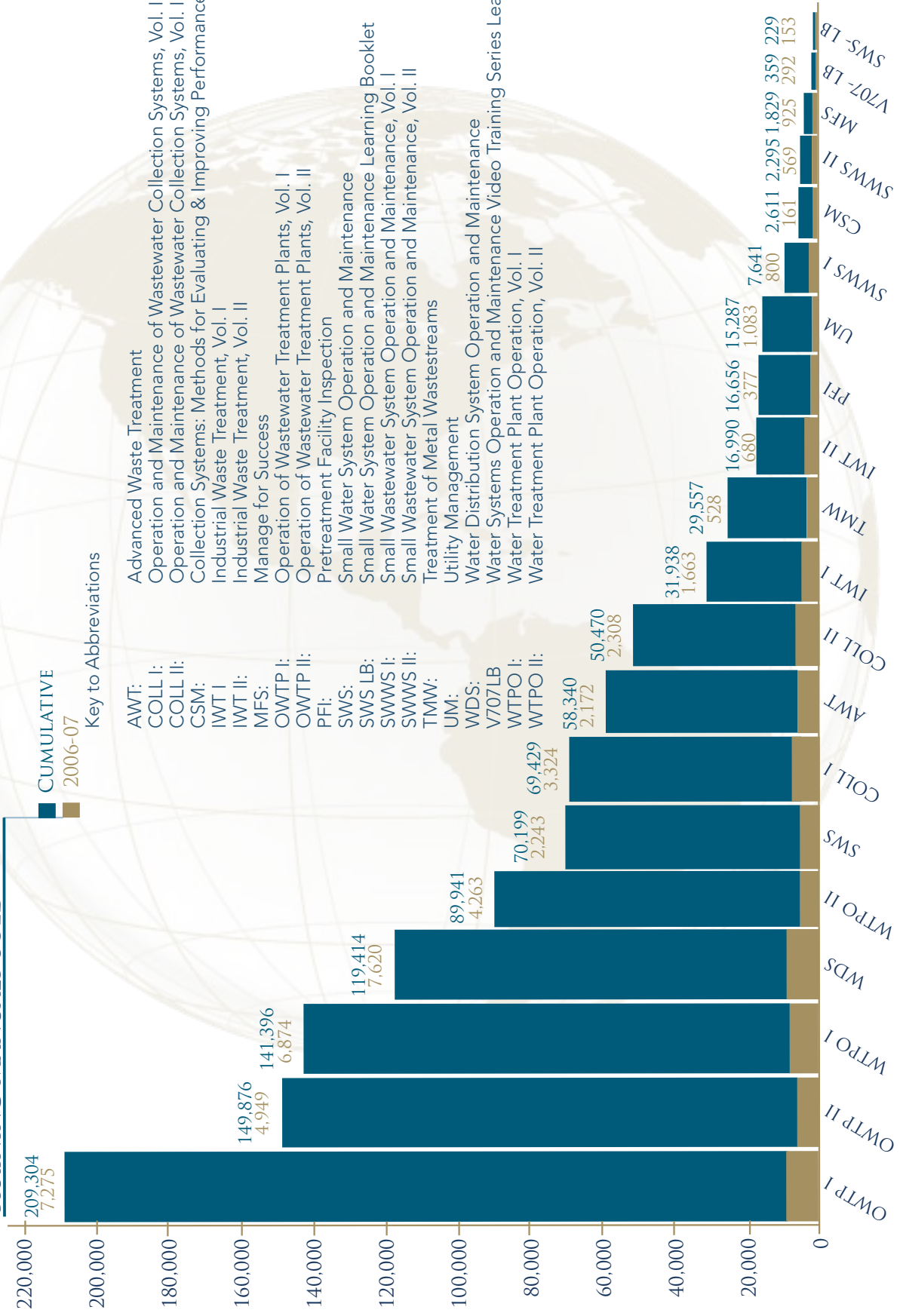
Building on the knowledge obtained in I, this secondary course introduces advanced information on the theory and operation of conventional water treatment plant processes. In addition, the more advanced processes including iron and manganese control, fluoridation, softening, trihalomethane prevention, demineralization, and handling and disposal of process wastes are presented. Emphasis is placed on developing advanced knowledge and skills needed by an operator working in a conventional water treatment plant treating surface water, including instrumentation, safety, advanced laboratory procedures, water quality regulation, and administration.

CE 29–SMALL WATER SYSTEM OPERATION AND
MAINTENANCE
(FIRST EDITION, 2002)

66 enrollments (current year 29)

This course is designed to train operators in the practical aspects of operating and maintaining small drinking water supply and treatment systems, with emphasis on the use of safe practices and procedures. Topics include the role and duties of small system operators, water sources and treatment processes; operation and maintenance procedures for small water treatment plants; disinfection; safety; laboratory procedures; setting water rates; and how to solve water treatment plant math problems. Detailed descriptions of the components of a drinking water well are presented, and operators will learn how to set up a wellhead protection program; operate, maintain and rehabilitate wells; disinfect wells and pumps; and troubleshoot operating problems.

TRAINING MANUALS SOLD



APPENDIX B

PRESENTATIONS AND PUBLICATIONS

PRESENTATIONS

- Currier, Brian**, "Mixing and Matching: Pollutants, Source Control and Treatment," *American River Watershed Conference*, Sacramento, CA, April 12-13, 2007.
- Currier, Brian**, "Guidelines for Critical Assessment of Small-Footprint Post-Construction BMP Performance Data," *Central and Western NY Stormwater Conference*, Buffalo, NY, March 26-27, 2007.
- Currier, Brian**, "Guidelines for Critical Assessment of Small-Footprint Post-Construction BMP Performance Data," *2007 International Erosion Control Association (IECA) Environmental Connection*, Reno, NV, February 13-16, 2007.
- Currier, Brian**, "Storm Water Policy: Key concepts from the 'Storm Water Panel Recommendations to the California State Water Resources Control Board'," *2006 Summer Issues Seminar of the California Council for Environmental and Economic Balance*, Sacramento, CA, July 20, 2006.
- Kerri, Ken**, Chair, Technical Session, "Drinking Water Treatment Plant Management and Operation," *International Water Association (IWA) World Water Congress*, Beijing, China, September 12, 2006.
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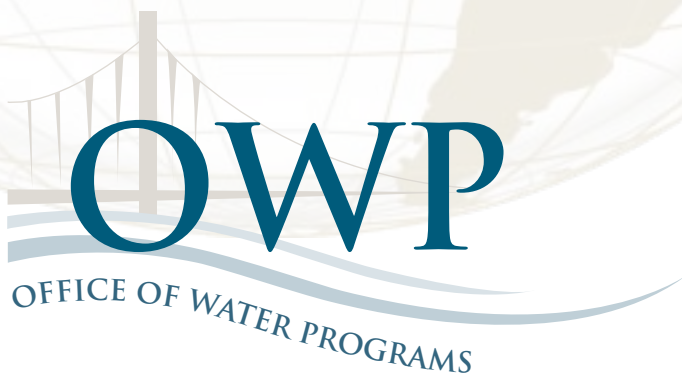
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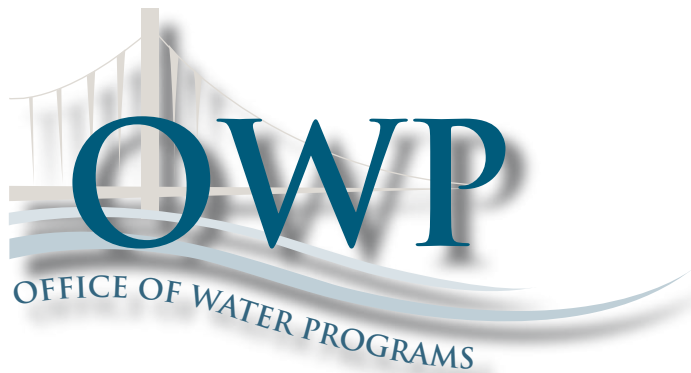
CONTACT INFORMATION:

6000 J STREET
1001 MODOC HALL
SACRAMENTO, CA 95819-6025

TRAINING
PHONE NUMBER: (916) 278-6142
FAX: (916) 278-5959
E-MAIL: WATEROFFICE@OWP.CSUS.EDU

RESEARCH
PHONE NUMBER: (916) 278-8100
FAX: (916) 278-8140
E-MAIL: NADINE.CROSS@OWP.CSUS.EDU





www.owp.csus.edu