



QUALITY SYSTEM REVIEW

**California State Water Resources Control Board
and Regional Water Quality Control Boards**

October 17 – 18 2017

FINAL REPORT

Prepared by

**US EPA Region 9
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February 16, 2018

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EXECUTIVE SUMMARY

QUALITY SYSTEM REVIEW

The U.S. EPA Region 9 Quality Assurance Section, Science Services Branch, Environmental Management Division, conducted a review of the quality system supporting the California State Water Resources Control Board (State Water Board) and Regional Water Quality Control Boards of California (Regional Boards) on October 17-18, 2017. This review was conducted as part of an Agency-wide management assessment program as required by EPA CIO 2105.0 (May 2000).

OBJECTIVES OF THE QUALITY SYSTEM REVIEW

The general objectives of a Quality System Review (QSR) are those that typically apply to all environmental quality system audits to:

- confirm conformity of the implemented quality system with EPA quality policies as defined by EPA CIO 2105.0 (May 2000),
- confirm compliance of State Water Board programs with Federal extramural agreement regulations pertaining to quality,
- determine the conformity of the State Water Board quality system implementation to the quality assurance (QA) and quality control (QC) practices applied to activities performed in support of environmental data collection and use, and
- determine the suitability and effectiveness of the quality practices being implemented by the State Water Board.

GENERAL OBSERVATION

EPA approved the State Water Board's Quality Management Plan (QMP) on February 9, 2017. This QSR reviewed records and files for QA-related documentation and interviews with managers and staff as they related to the information about the system contained in the QMP.

In addressing the objectives of the QSR, the EPA Team found that:

The State Water Board addresses the critical quality management elements needed to support current technical programs. The quality assurance and quality control practices being implemented appear to be adequate for the State Water Board mission, which largely involves receiving and using data from many sources. These practices have been implemented effectively in the programs reviewed.

1.0 INTRODUCTION

1.1 Background

EPA Order CIO 2105.0, *Policy and Program Requirements for the Mandatory Agency-Wide Quality System* (May 2000) requires that all EPA-funded extramural agreements shall be supported by individual quality systems that comply fully with the American National Standard ASQ/ANSI E4-2014, *Quality Management Systems for Environmental Information and Technology Programs – Requirements with Guidance for Use* (2014).

Each quality system must be described in an approved QMP that details the policies and procedures, roles and responsibilities, and quality assurance (QA) and quality control (QC) activities used to plan, implement, and assess the effectiveness of the quality system.

EPA policy also requires the periodic assessment of the effectiveness of the quality systems being implemented.

1.2 Approach

EPA Region 9 Quality Assurance Section performs these assessments to:

- assure conformity of the implemented quality system with Agency quality policies as defined by EPA CIO 2105.0,
- assure compliance of the organization with Federal extramural regulations pertaining to quality,
- assure conformity of the implemented quality system with the approved QMP, and
- determine the effectiveness of the implemented quality system in assuring that the results from the environmental programs supported by the quality system are adequate and sufficient for their intended use.

A QSR is a documented activity performed to verify, by examination and evaluation of objective evidence, that applicable elements of the quality system are appropriate and have been developed, documented, and implemented effectively in accordance, and in conjunction, with specified requirements.

On October 17 – 18, 2017 Eugenia E. McNaughton and Marlon Mezquita of the EPA Region 9 Quality Assurance Section conducted a review of the quality system supporting the State Water Board and Regional Boards of California .

2.0 CALIFORNIA STATE WATER BOARD QUALITY ASSURANCE SYSTEM

The State Water Board QA System consists of the staff, functions, tools, and procedures in place to improve and assure the quality of data generated for data users and decision-makers across the organization. An effective QA System requires a solid foundation comprised of the following basic elements:

- An overarching QMP and associated guidance documents,
- A Quality Assurance Policy Statement endorsed by the agency leadership,

- A designated Quality Assurance Manager and Assistant Quality Assurance Manager,
- A multi-disciplinary Quality Assurance Team,
- Regular quality assurance training opportunities, and
- Quality Assurance System Status Assessments/Reports.

A requirement for QA systems implemented in a state environmental organization that accepts EPA funding is to have an EPA-approved QMP. Region 9 approved the State Water Board QMP on February 9, 2017.

The State Water Board, located in Sacramento, CA, is a state-wide agency that has oversight responsibilities for nine Regional Boards throughout the state. The State Water Board programs reflect state and national legislative mandates to provide safe drinking water and water that supports beneficial uses for recreation, body and non-body contact, fishing, shellfish harvesting and aquatic and aquatic-dependent wildlife. State Water Board programs include Safe Drinking Water, Environmental Laboratory Accreditation Program (ELAP), National Pollution Discharge Elimination System (NPDES), Surface Water Analysis and Monitoring Program (SWAMP), Stormwater Pollution Prevention, and Beach Monitoring. The data collection responsibilities for many of these programs resides with the nine Regional Boards; the Drinking Water Program has a separate organization that includes 24 districts. Beach monitoring is conducted by coastal counties. Data from all programs are loaded into several dedicated databases for review by the State Water Board and submittal to EPA national databases.

During the two-day EPA QSR, we interviewed managers and staff in person and by telephone from the Office of Information Management and Assessment (OIMA), the Water Quality Monitoring and Assessment Branch, the Drinking Water program, SWAMP, Stormwater, and Ocean Programs (Beach Monitoring) and the Quality Assurance Officer. Regional Board staff from Regional Board 2 (San Francisco Bay) and Regional Board 9 (San Diego) discussed the role of quality assurance in the Non-Point Source (NPS) Total Maximum Daily Load (TMDL) data collection effort.

2.1 Participating Management and Staff

- Greg Gearheart, Director, Office of Information Management and Analysis (OIMA)
- Renee Spears, Quality Assurance Officer (OIMA)
- Eric Maag, Data Integration and Analysis, (OIMA)
- Melissa Morris, Quality Assurance Data Management, SWAMP Unit (OIMA)
- Lori Webber, Supervisor, SWAMP Unit (OIMA)
- Karen Larsen, Deputy Director, Division of Water Quality (DWQ)
- Rebecca Fitzgerald, Manager, Water Quality Standards and Assessment Section, Surface Water/Regulatory Branch (DWQ)
- Rebecca Greenwood, Industrial/Construction Stormwater Unit, Surface Water Permitting Section (DWQ)
- Michael Gjerde, Ocean Standards Unit, Beach Monitoring Program (DWQ)
- Maria de la Paz Carpio-Obeso, Supervisor, Ocean Standards Unit(DWQ)
- Karen Black, Ocean Standards Unit, Beach Monitoring Program (DWQ)

- Robert Brownwood, Assistant Deputy Director, Division of Drinking Water (DDW)
- Betsy Lichti, Supervisor, Quality Assurance Section, (DDW)
- Jacob Oaxaca, Program Development, Environmental Laboratory Accreditation Program (ELAP), (DDW)
- Janet O’Hara, Basin Planning, San Francisco Regional Water Quality Control Board (RWQCB)
- Farhad Ghodrati, Basin Planning, San Francisco (RWQCB)
- Helen Yu, Monitoring Assessment and Research, San Diego (RWQCB)

2.2 Documents Reviewed

- Annual Quality Assurance Report and Work Plan, State Water Resources Control Board (October 1, 2016 to September 30, 2017)
- National Pollution Discharge Elimination System Quality Assurance Program Plan (2017)
- California Ocean Plan (2015)
- Discharge Monitoring Report – Quality Assurance (DMR-QA)
 - Study 36 Report (2016)
 - Study 37 Notification Letter (2017)
 - Study 37 Report (2017)
- Quality Management Plan, Policy Report (2017)
- List of Quality Assurance Project Plans
- Beach Water Quality Workgroup, Nov 09, 2107 North Cal. Meeting Agenda
- Beach Water Quality Workgroup, November 15, 2017 South Cal Meeting Agenda
- Notice of Public Solicitation of Water Quality Data and Information for 2018
- California Integrated Report-Clean Water Act Sections 305(b) And 303(d)
- Notice of Public Solicitation of Water Quality Data and Information for 2018 California Integrated Report – Clean Water Act Sections 305(b) and 303(d)
- CA Water Boards Data Management Strategy (2017)

3.0 SUMMARY OF INTERVIEWS, OBSERVATIONS AND RECOMMENDATIONS

With the understanding that the State Water Board oversees a complicated set of interrelated but not necessarily integrated data collection programs, EPA reviewers have attempted to summarize our understanding of the role of quality in the data collection system as represented in this series of interviews. Based on that understanding, we provide the EPA QA Section’s observations and make recommendations. We hope that this report will result in a useful dialogue between and among the various programs and that it will support the on-going relationship between the State Water Board and EPA.

OFFICE OF INFORMATION MANAGEMENT AND ANALYSIS

The **Office of Information Management and Analysis (OIMA)** is responsible for managing programs that integrate data from the State Water Board regulatory programs. The programs include the California Integrated Water Quality System (CIWQS), which tracks information about places of environmental interest, manages permits and other orders, tracks inspections, and manages violations and enforcement activities; and the California Environmental Data Exchange Network (CEDEN), a central repository and publicly accessible site containing information about California’s water bodies, including streams, lakes, rivers, and the coastal ocean.

OIMA is pursuing an Open Data initiative to integrate the databases. California’s Open Data Portal (<https://data.ca.gov/>) states that: “California open data portal will bring government closer to citizens and start a new shared conversation for growth and progress...”

“Open data” encourages feedback. With transparency comes scrutiny of data quality. Therefore, it is important to maintain the elements that demonstrate the validity of the data before they are entered into the data management process.

Observation

OIMA Data Management Strategy diagram depicts the Water Board’s conceptual model for data integration (see Appendix B, “Integration of Data to Inform”). The model incorporates the fundamentals of a quality system as defined by ASQ/ANSI E-4 and goes further to expand on the quality principle of continuous improvement by characterizing the last phase of the familiar “Plan-Do-Check-Act” cycle as “evaluating and learning”.

Recommendation

The Data Flow Diagrams illustrate a step that involves “Data Checkers,” that assess data quality as part of the data entry process. One area to review in greater detail during a future QSR might be the data checker process to better understand how data quality is assessed.

Data Management System

OIMA is in the process of developing an all-encompassing **Data Management System**. The most frequent data quality issues are associated with data entry operations. Technical staff at Regional Boards do not always have the time to verify data entry.

The State Water Board has many database portals. The majority of the databases can be found at the following link: CSWRCB open data portal (<https://data.ca.gov/group/california-state-water-resources-control-board>).

Observation

The effort to bring the different databases together in one integrated system has revealed the potential for errors in data quality and data verification.

Recommendation

State Water Board staff recommends that Regional Boards designate dedicated data entry staff, and/or data entry software modules (data entry wizards) to streamline that process and reduce errors.

Quality Assurance Office

The **Quality Assurance (QA) Office** prepares the State Water Board Quality Management Plan. It oversees the Quality System documents developed by the Regional Boards for environmental data collection activities. The Quality Office coordinates the annual NPDES Discharge Monitoring Report - Quality Assurance (DMR-QA) study that evaluates the analytical ability of laboratories that perform or support self-monitoring analyses required by NPDES permits. The Office holds quarterly QA Round Table meetings with the Regional Boards. The QA Office also responds to program invitations to make presentations about on-going and up-coming QA policy developments.

Observation

The QA Office is developing a QA curriculum to respond to State Water Board program and Regional Boards requests for training.

Recommendation

Training should concentrate on presenting QA concepts in applied contexts. The training should be reviewed annually and revised in response to lessons learned as QA concepts are implemented by programs.

Surface Water Ambient Monitoring Program

The **Surface Water Ambient Monitoring Program (SWAMP)** Unit downloads and analyzes monitoring program data that has been reviewed by the SWAMP QA staff. The Unit prepares and reviews reports. It is responsible for data visualization and develops tools for preparing interactive maps. Staff write guidance documents and SOPs, collaborating at times with CA Fish & Wildlife staff. The Unit prepares data summaries, performs statistics on the data, and identifies historical trends. The information it produces is available on a public web site: https://www.waterboards.ca.gov/water_issues/programs/swamp/data_management_resources/ and is used to prepare internal memos upon request for board members.

Observation

The SWAMP Unit relies on its QA team to evaluate the quality of the data it receives. Staff perform data analysis and statistics, looking for trends in order to develop water quality information reports for the public, State Water Board management and EPA.

Recommendation

A unified data management system would greatly enhance the effort to include all available data in an integrated format. Continue to support all efforts to develop a unified data management system.

SWAMP Quality Assurance

The **SWAMP Quality Assurance (QA)** program has a standardized data storage system SOP for sampling, and a water quality indicator list. Other State Water Board programs that collect ambient surface water data may develop a Program Plan using appropriate elements of the SWAMP Quality Assurance Program Plan.

Observation

The SWAMP QA unit has been in place for less than five years during which time it has made a very strong effort to integrate quality into its data collection and review system. A comprehensive QAPrP was approved last year. Work is on-going to bring all the monitoring programs into the quality system.

Recommendation

EPA would like to acknowledge the accomplishments and ongoing QA work of the SWAMP QA unit.

DIVISION OF WATER QUALITY

The **Division of Water Quality** regulates wastewater discharges to surface water (rivers, ocean, etc.) and to groundwater (via land). The State Board also regulates storm water discharges from construction, industrial, and municipal activities; discharges from irrigated agriculture; dredge and fill activities; the alteration of any federal water body under the 401 certification program; and several other activities with practices that could degrade water quality (https://www.waterboards.ca.gov/water_issues/programs/ciwqs/who_is_regulated.shtml).

Observation

The State Water Board is committed to the integration of QA into the programs in the Division of Water Quality. There is an on-going effort for all data collecting programs to develop Quality Assurance Program Plans (QAPrP). The State Water Board and EPA recently approved an NPDES QAPrP. The next phase of QA integration into the program will be the implementation of the quality commitments described in the QAPrP.

Recommendation

State Water Board and Regional Board staff should be trained in all the elements described in the NPDES QAPrP.

Water Quality and Assessment

The **Water Quality and Assessment Section** oversees the collection of State and Regional Water Boards' water quality monitoring data. California's surface waters are assessed every two years to determine if they contain pollutants at levels that exceed protective quarter quality standards.

Observation

The data call notice for the 303(d) list identifies QAPP requirements for projects submitting data to CEDEN. The inclusion of QA requirements in the data call has increased the confidence in the data submitted to CEDEN.

Recommendation

As data submitted require that they are collected under an approved QAPP, it might be useful to include information about where to find QA training along with the Data Call Notification.

Stormwater Management Program

The **Stormwater Management Program** includes providing oversight and support for efforts to control flooding, reduce erosion and improve water quality related to rainfall events. It relies on best management practices (BMPs); i.e., structural, vegetative or managerial practices to treat, prevent or reduce water pollution. The NPDES stormwater permit requires the development and implementation of a site-specific Storm Water Pollution Prevention Plan (SWPPP). California has the delegation for Industrial, Construction, and Municipal Stormwater NPDES permits.

The discharger must certify and submit an Annual Report via the Stormwater Multiple Application and Report Tracking System (SMARTS) using the standardized format and checklists.

Email notices (“reach outs”) are sent to those permittees failing to provide annual reports and/or discharge reports. Inspections are performed by Regional Boards. Permittees with exceedances under the Industrial General Permit are required to follow up with submission of exceedance response action (ERA) reports.

Observation

The self-reporting Stormwater Program has more than 12,000 permittees in the Industrial General Permit program. There are about 9,600 construction general permits and 700 for municipal programs. Permittee annual report lists are spot checked as to status and any water quality exceedances. Staff follow up with permittees to resolve any issues.

Recommendation

Staff indicated that permittees need further guidance and training on the collection and submittal of data. A fact sheet on SMARTS, the data collection system, would be helpful. Guidance on how to review the quality of data submitted by dischargers would help staff develop appropriate data driven permits for all Stormwater programs.

Ocean Standards Unit - Beach Monitoring Program

The **Beach Monitoring Program** is part of the Ocean Unit. Sixteen coastal counties collect bacteriological samples that are reported to the Program. Depending on the analytical results, one of four types of warnings about beach water conditions may be publicized: postings, closures, rain advisories, and permanent postings. The State Board displays the closure and posting data submitted from the County Health Officers on its web site monthly.

Observation

The Beach Monitoring Program is in the process of developing a QAPrP. It has collected SOPs from all the coastal monitoring counties.

Recommendation

The QAPrP should list all the relevant bacteriological methods. QA topics and training could be included at the quarterly Northern and Southern California Beach Monitoring meetings.

REGIONAL BOARDS

The **Basin Plan and Total Maximum Daily Load Programs**, as conducted by the Regional Boards, collects and receives water quality data on which it bases 303(d) lists and 305(b) reports. Section 303(d) of the Clean Water Act requires States to identify and make a list of surface water bodies that are polluted, referred to as “water quality limited segments.” States must prioritize the water bodies on the list and develop Total Maximum Daily Loads (TMDLs) to improve water quality. CWA Section 305(b) requires states to report on water quality conditions.

Observation

Regional Board 2 has a QA system in place that includes both SWAMP and other sampling protocols. ELAP certified labs provide analytical services. When project-specific sampling is needed and the project budget is less than \$20K, email communication and a map is accepted in place of a QAPP.

Regional Board 9 follows QA practices such as checking duplicates, blanks and surrogate recoveries. The program uses a graded approach requiring only a QAPP for projects costing more than \$20K. The Regional Board has three QA officers for surface water, ground water and core regulatory permits.

Recommendation

The SWAMP Quality Office is preparing a Data Quality Objectives (DQO) form to use for “informal”/small projects. Use of this form for all projects and providing training in data quality objectives and review would provide staff with a broader understanding of the QA system.

DRINKING WATER PROGRAM

The **Drinking Water (DW) Program** has three branches: [the Northern California Field Operations Branch](#) (FOB), the Southern California FOB, and [the Program Management Branch](#) and oversees 24 DW districts. Thirty counties have primacy for community systems with fewer than 200 people. The FOBs are responsible for the enforcement of the federal and California Safe Drinking Water Acts (SDWAs) and the regulatory oversight of ~7,500 public water systems. FOB staff perform field inspections, issue operating permits, review plans and specifications for new facilities, take enforcement actions for non-compliance with laws and regulations, review water quality monitoring results, and support and promote water system security. FOB staff work with county health departments, planning departments, and boards of supervisors. For counties that have primacy, FOB staff provide oversight, technical assistance, and training.

Observation

The DW Program moved from the Department of Health Services to the State Water Board within the last three years. A QA Section was developed this year. The Drinking Water Program is working to improve data quality incrementally to ensure that all the laboratories that do testing for water systems meet ELAP requirements.

Recommendation

The DW Program is committed to submitting a draft QAPrP to EPA for review by April 2018. The Program should make use of the resources at the State Water Board to develop its quality system.

California Environmental Laboratory Accreditation Program

The **California Environmental Laboratory Accreditation Program (ELAP)** evaluates and accredits environmental laboratories that send results to the State drinking water, wastewater, shellfish, food, and hazardous waste programs for regulatory compliance. ELAP is part of the Division of Drinking Water, located in Sacramento, Glendale, and Richmond. The Headquarters in Sacramento is home to the Program Development, Research, and Enforcement Unit (PDREU). The PDREU is responsible for developing all program initiatives, performing technical research, and processing enforcement cases. The Glendale Field Office is the On-Site Assessment Unit, a group of specialized auditors. The Richmond Field Office is the Proficiency Testing (PT) Unit responsible for evaluating annual PT results.

Observation

Since moving from the Department of Health Services, ELAP has been in the process of reviewing and writing its policies and procedures, including the QA manual and Standard Operating Procedures.

Recommendation

All staff should receive training on the new policies and procedures. Training should be mandatory and include regularly scheduled refresher courses in QA and technical subjects.

4.0 CONCLUSION

The EPA QA Section would like to thank State Water Board and Regional Boards management and staff for their help in arranging and taking the time to meet with us. The Quality System Review found that the State Water Board addresses the critical quality management elements needed to support current technical programs. The QA Office is working with State Water Board and Regional Boards to update and integrate QA elements into all programs. The recommendations in this report represent ideas for continuous improvement of the quality system. EPA expects to conduct the next QSR of the State Water Board and Regional Boards in October 2020.

APPENDIX A

State Water Resources Control Board and Regional Boards

Office of Information Management and Analysis

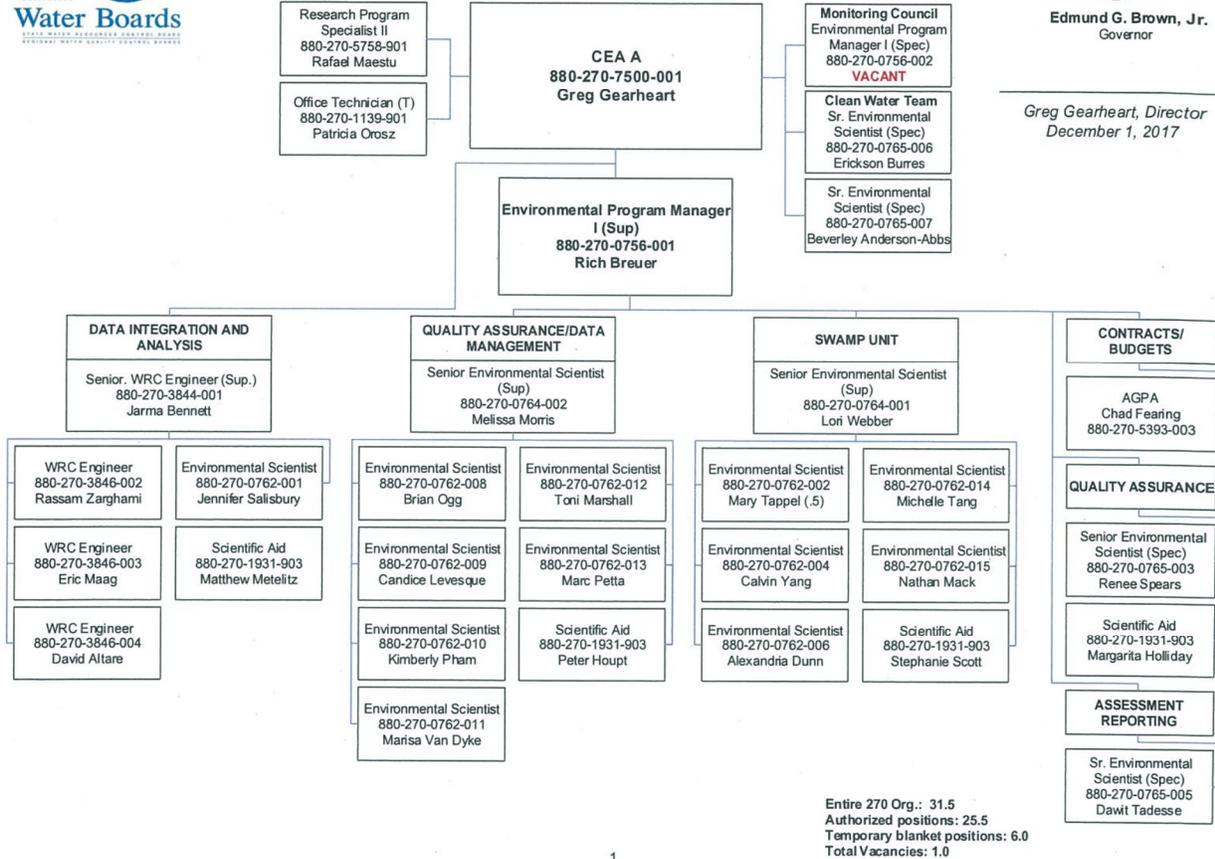


STATE WATER RESOURCES CONTROL BOARD OFFICE OF INFORMATION MANAGEMENT AND ANALYSIS



Edmund G. Brown, Jr.
Governor

Greg Gearheart, Director
December 1, 2017



Entire 270 Org.: 31.5
Authorized positions: 25.5
Temporary blanket positions: 6.0
Total Vacancies: 1.0

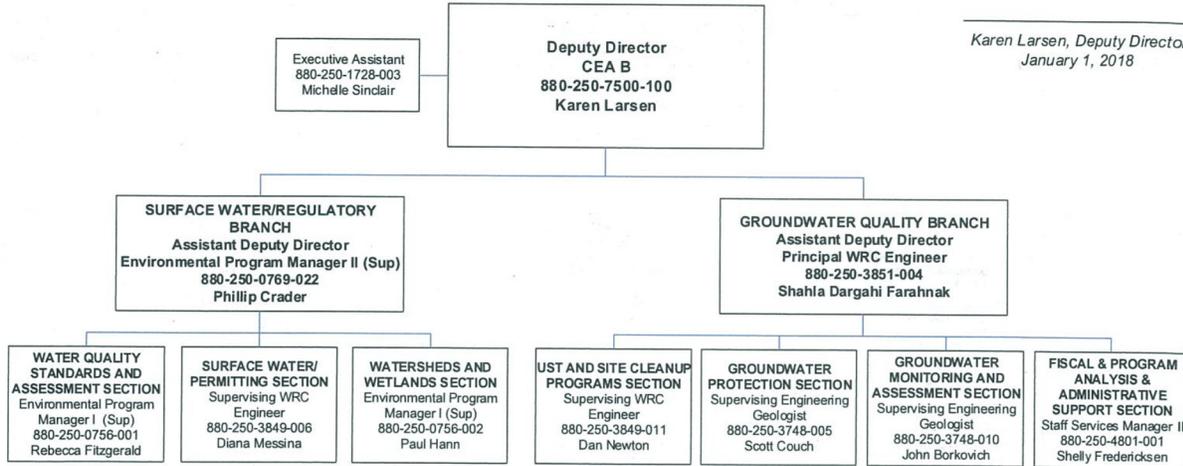
Division of Water Quality



STATE WATER RESOURCES CONTROL BOARD DIVISION OF WATER QUALITY



Edmund G. Brown, Jr.
Governor



Entire 250 Org.: 160.8
Authorized positions: 140.8
Temporary blanket positions: 20.0
Total Vacancies: 18.3

Division of Water Quality – Surface Water/Regulatory Branch

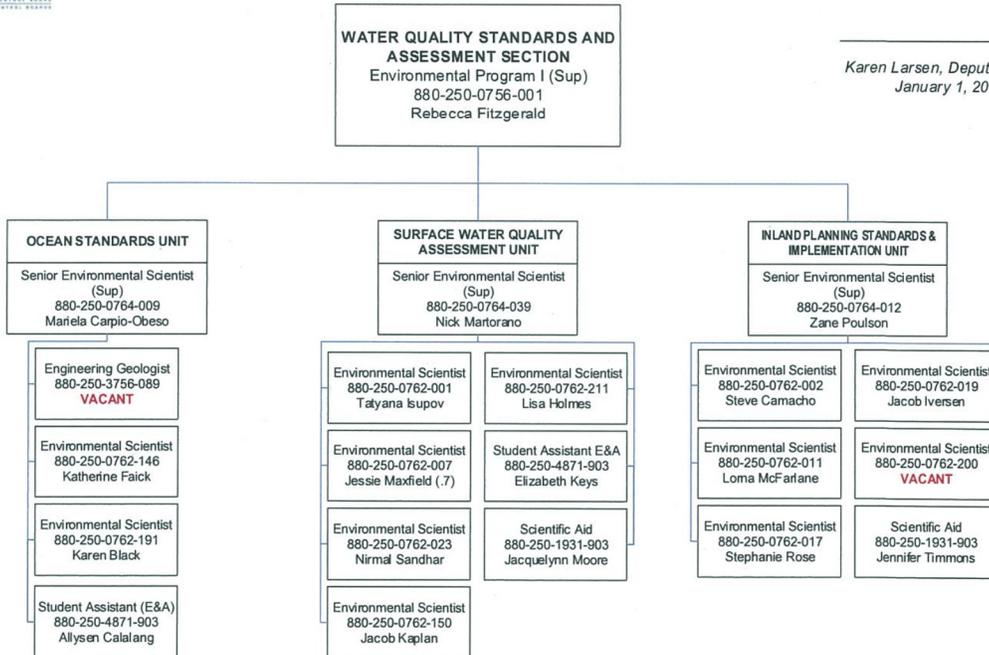


STATE WATER RESOURCES CONTROL BOARD DIVISION OF WATER QUALITY SURFACE WATER/REGULATORY BRANCH



Edmund G. Brown, Jr.
Governor

Karen Larsen, Deputy Director
January 1, 2018



Division of Drinking Water

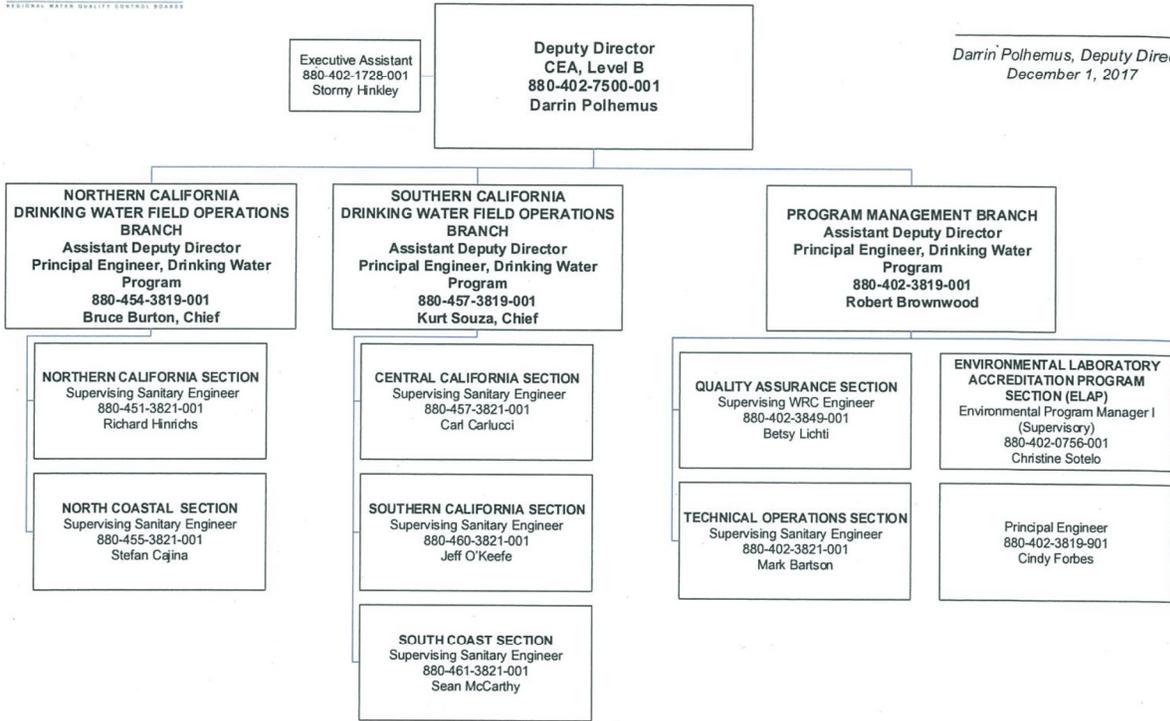


STATE WATER RESOURCES CONTROL BOARD DIVISION OF DRINKING WATER



Edmund G. Brown, Jr.
Governor

Darrin Polhemus, Deputy Director
December 1, 2017



Entire Org.: 262.0
Authorized positions: 242.0
Temporary blanket positions: 21.0
Total Vacancies: 15.0

APPENDIX B

Integration of Data to Inform

