

Final Report

Water Quality Strategic Plan 2016 Update



September 30, 2016, Water Quality Division
Water Enterprise, San Francisco Public Utilities Commission

Cover photo of Hetch-Hetchy Reservoir Headwaters

Acknowledgements

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List of Acronyms

1,2,3-TCP #	1,2,3-Trichloropropane Number of measurements
AMI	Advanced metering infrastructure
AOC	Assimilable organic carbon
AOP	Advanced oxidation process
ATP	Adenosine triphosphate
AWWA	American Water Works Association
BDCM	Bromodichloromethane
CALGreen	California Building Code Title 24
CCL	Contaminant Candidate List
CCR	California Code of Regulations
CCR	Consumer Confidence Report
CCT	Corrosion control treatment
CDD	SFPUC's City Distribution Division
CEC	Contaminant of Emerging Concern
CIP	Capital Improvement Plan
Cr(VI)	Hexavalent chromium
cVOC	Carcinogenic volatile organic compound
DBAA	Dibromoacetic acid
DBCM	Dibromochloromethane
DBP	Disinfection by-product
DCAA	Dichloroacetic acid
DDW	Division of Drinking Water (of the SWRCB)
DWR	Department of Water Resources
EDC	Endocrine disrupting compound
EO	Executive Order
EPA	See USEPA
FBR	Filter Backwash Rule
H ₂ O ₂	Hydrogen peroxide
HA	Health Advisory
HAA	Haloacetic acid
HAABr6	Sum of the six brominated haloacetic acids
HAA5	Sum of the five regulated haloacetic acids
HAA9	Sum of nine haloacetic acids
HAL	Household Action Level (for lead)
HH	Hetch Hetchy
HRL	Health Reference Level
HTWTP	Harry Tracy Water Treatment Plant

HVAC	Heating, ventilating, and air conditioning
IDSE	Initial Distribution System Evaluation
IESWTR	Interim Enhanced Surface Water Treatment Rule
IPR	Indirect Potable Reuse
KPI	Key performance indicator
LADWP	Los Angeles Department of Water and Power
LCA	Lower Cherry Aqueduct
LCR	Lead and Copper Rule
LRAA	Locational Running Annual Average
LSL	Lead service line
LT1ESWTR	Long Term 1 Enhanced Surface Water Treatment Rule
LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
LT-LCR	Long Term Lead and Copper Rule
MBAA	Monobromoacetic acid
MCAA	Monochloroacetic acid
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
M/DBP	Microbial/Disinfection By-Products
MGD	Million-gallons-per-day
MRDL	Maximum Residual Disinfectant Level
MWDSC	Metropolitan Water District of Southern California
NDMA	<i>N</i> -nitrosodimethylamine
NL	Notification Level
NPS	National Park Service
NTU	Nephelometric turbidity unit
OEL	Operations evaluation levels (to prevent DBP MCL violations)
PCE	Tetrachloroethylene
PE	Professional Engineer
Peroxone	AOP treatment consisting of ozone combined with hydrogen peroxide
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate
PHG	Public Health Goal
PN	Public Notification
PPCPs	Pharmaceutical and personal care products
PSW	Partnership for Safe Water
PWS	Public Water System
QA/QC	Quality Assurance and Quality Control
RAA	Running Annual Average
Reg-Det	Regulatory Determination
rTCR	Revised Total Coliform Rule

S1D/DBPR	Stage 1 Disinfectants and Disinfection By-Products Rule
S2D/DBPR	Stage 2 Disinfectants and Disinfection By-Products Rule
SB	Senate Bill
SCADA	Supervisory control and data acquisition
SDWA	Safe Drinking Water Act
SFPUC	San Francisco Public Utilities Commission
SJWC	San Jose Water Company
SPU	Seattle Public Utilities
SVWTP	Sunol Valley Water Treatment Plant
SWRCB	State Water Resources Control Board (California)
SWTR	Surface Water Treatment Rule
SY3	Third, six-year regulatory review
TBD	To be determined
TBL	Triple bottom line
TC	Total coliforms
TCAA	Trichloroacetic acid
TCE	Trichloroethylene
TCR	Total Coliform Rule
THM	Trihalomethane
TM	Technical Memorandum
TOC	Total organic carbon
TOrC	Toxic organic chemical
TT	Treatment Technique
TTF	Tesla Treatment Facility
TTHMs	Total Trihalomethanes
UCMR	Unregulated Contaminant Monitoring Rule
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
WaterRF	Water Research Foundation
WQD	SFPUC's Water Quality Division
WQNCP	Water Quality Notifications and Communications Plan
WQPP	Water Quality Protection Plan
WQSP	Water Quality Strategic Plan
WS&T	SFPUC's Water Supply and Treatment Division
WTP	Water Treatment Plant

Executive Summary

The San Francisco Public Utilities Commission (SFPUC) has a history of being proactive in identifying issues and considerations that influence its capital and operational decisions. This practice has enabled the SFPUC to more cost-effectively comply with all state and federal drinking water regulations and continue to provide high quality services to customers. To create a sound foundation for capital and operational investments for drinking water quality that may be required in the next 20 to 25 years, the SFPUC Water Quality Division (WQD) has assessed scenarios and concerns that may emerge in the future, leading to consideration and analysis of potential alternatives that may be implemented in the future.

As a result of the above proactive approach, WQD conducts periodic updates – every six years – to its Water Quality Strategic Plan (WQSP). This report is the latest WQSP update.

Study Need and Objectives

The goals of revising the WQSP included updating prior water quality planning documents issued in 2008 and 2009: the San Francisco Water Quality Protection Plan and Strategic Planning for San Francisco's Water Quality Future, respectively. Overall project objectives included:

- Improving SFPUC regulatory compliance, operations, and understanding of drinking water quality related issues with respect to meeting regulations and proactively protecting public health;
- Ensuring SFPUC is well positioned to respond to future drinking water quality challenges; and,
- Maintaining/improving customer satisfaction in drinking water quality delivered to retail and wholesale customers.

This WQSP includes the following:

- Implementation status of 2008 and 2009 water quality planning recommendations,
- Status of drinking water regulations,
- Input from the 2016 Contaminants of Emerging Concern (CEC) Update, and
- Documentation of Expert Panel discussions and recommendations from the national perspective as relating to the SFPUC situation.

Planning is required because the future is uncertain. Furthermore, it is required in order to maintain relevancy of WQD efforts as the rate of social, environmental, and technological change accelerates. As a result of conducting this planning, there is an improved anticipation of the future; preparing SFPUC to more effectively respond as new challenges emerge.

Planning Process and Input Gathering

The process of following and revising the WQSP is illustrated below in **Figure ES-1**. It is a multi-step process which is grounded primarily on a review of previous work and current water quality, operational, and regulatory conditions and engagement of a group of industry experts to identify and recommend planning actions. This document represents the continuation of a process which is based upon stakeholder consultation and deliberation coupled with WQD staff review and recommendations.

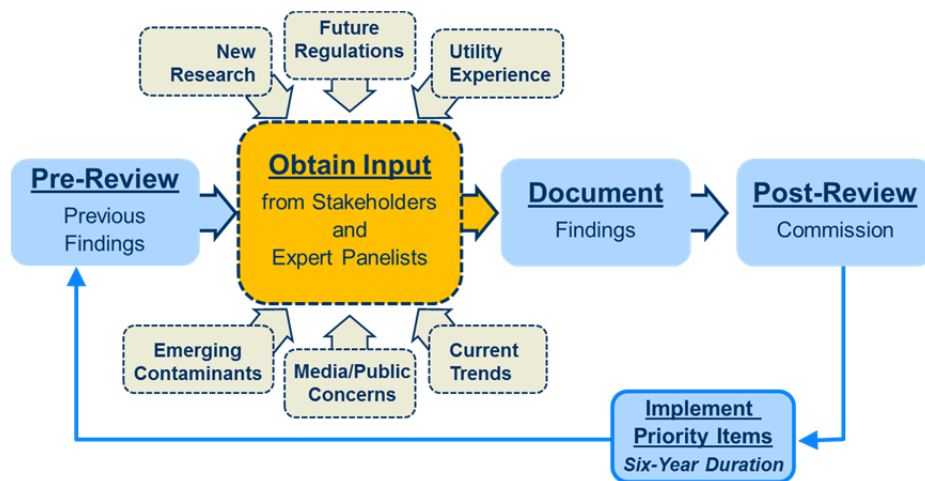


Figure ES-1 Overview of the Water Quality Strategic Planning Process

Water Quality Planning Expert Panel Input

The Expert Panel convened for this WQSP revision consisted of recognized water quality experts from utilities, regulatory agencies, consulting firms, and research organizations. The panel convened by teleconference and also once in-person from March-May, 2016. Panelists included the following (alphabetically):

- **Stefan Cajina PE**, Chief, North Coastal Section, **California State Water Resources Control Board, Division of Drinking Water Region II**;
- **Alex Chen PE**, Director, Water Planning and Program Management Division, **Seattle Public Utilities**;
- **Andrew DeGraca PE**, WQD Director, **SFPUC**;
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Water Quality Planning Focus Areas

Based upon project team and Panel discussions and evaluations, small adjustments were made to the focus areas based upon previous WQSP efforts. These changes were made in order to better define and update them to meet current industry trends and needs. Water quality focus areas described in this report were adjusted to the following:

- Regulatory Compliance;
- Public Health and Emerging Contaminants;
- Source and Treated Water Quality;
- Distribution System Water Quality;
- Technological Advances;
- Water Quality at the Tap;
- Customer Communication and Satisfaction;
- Sustainability; and
- Extreme Events.

Table ES-1 summarizes recommendations received from the Expert Panel and CEC update, categorized in terms of WQ Planning Focus Areas. These recommendations are listed as activities that have either already been implemented, or represent potentially new activities.

WQD currently plans to conduct these periodic updates to the WQSP every six years (i.e., 2016, 2022, etc.) to be able to conduct some of the proposed work and evaluate new information obtained as a result of this work as well as technical information from the regulatory agencies and industry/research organizations.

Table ES-1 Summary of Recommendations from Water Quality Strategic Plan and Contaminants of Emerging Concern 2016 Updates

Water Quality Planning Focus Area	Recommendations	
	On-Going Activities	New Activities
Regulatory Compliance	<ul style="list-style-type: none"> • Implement Revised Total Coliform Rule. • Investigate alternatives to lower formation of disinfection by-products THMs and HAAs in East Bay blend of Hetch Hetchy and SVWTP treated waters. 	<ul style="list-style-type: none"> • Conduct USEPA Unregulated Contaminants Monitoring Rule (UCMR4) monitoring for algal toxins, haloacetic acids, pesticides, industrial chemicals, germanium, manganese, and indicator parameters.
Public Health and Emerging Contaminants	<ul style="list-style-type: none"> • Maintain collaboration between WQD and the San Francisco Department of Health (SFDPH). • Complete algal toxin monitoring in source water reservoirs. Develop follow-up monitoring, evaluation and response plan to algal toxins occurrence. • Maintain optimized treatment for nitrosamines control. Continue voluntary nitrosamines monitoring. • Track CEC information, peer-reviewed publications and regulatory developments. • Be prepared for emerging issues. Present facts in a way that customers can understand. 	<ul style="list-style-type: none"> • Consider collaboration with SFDPH to conduct <i>Legionella</i> follow-up study. • Benchmark through national or state surveys; e.g., for microbial CECs and nanomaterials, when appropriate. • Conduct periodic; e.g., every 6 years, survey for pharmaceuticals and personal care products (PPCPs) in source and treated waters. • Conduct CEC monitoring in local and regional groundwater wells.
Source and Treated Water Quality	<ul style="list-style-type: none"> • Maintain source water protection, especially in Priest and Moccasin Reservoirs. • Monitor types of fire retardants used in watersheds and application areas if applied. • Continue participation in Partnership for Safe Water (PSW) for water treatment plants. • Continue Chemical Quality Control Program at WTPs to minimize impurities in treatment chemicals; e.g., chlorate, metals. 	<ul style="list-style-type: none"> • Investigate new options to address algae issues in Moccasin and local reservoirs. • Investigate multi-utility/industry opportunity to improve treatment chemical purchasing specifications.
Distribution System Water Quality	<ul style="list-style-type: none"> • Maintain on-going cross-connection control program and update CCSF ordinance. • Collect information on remaining galvanized/lead goosenecks and/or swing check valves in the distribution system to designate proper management of those assets for lead control and develop options. • Continue to minimize detention time in distribution system. • Continue to ensure that only NSF61 materials are used in construction projects. Conduct soak tests as needed. 	<ul style="list-style-type: none"> • Monitor potential water quality changes from introduction of groundwater. • Investigate best management practices (BMPs) for pressure management and flushing. • Consider following the Partnership for Safe Water guidelines for distribution system management by balancing its challenges with the benefits; i.e., if not feasible, do not formally follow/enroll, but implement as much of the guidance as possible. • Further develop sanitary practices in new construction and main breaks.

Water Quality Planning Focus Area	Recommendations	
	On-Going Activities	New Activities
Technological Advances	<ul style="list-style-type: none"> Continue to participate in AWWA and WRF activities relevant to SFPUC. 	<ul style="list-style-type: none"> Evaluate new treatment technologies (e.g., ozone at SVWTP) and optimization (e.g., biofiltration at HTWTP).
Water Quality at the Tap	<ul style="list-style-type: none"> Educate customers on lead issues. Continue timely responses to customer complaints. 	<ul style="list-style-type: none"> Engage customers to determine their interest and willingness to pay for service beyond meter; e.g., hospital treatment facilities, customer point of use devices. When feasible, support beyond-the-meter activities, e.g., for large or green buildings.
Customer Communication and Satisfaction	<ul style="list-style-type: none"> Continue strategic planning discussion and information exchange with stakeholders, utilities, and regulatory agencies. Maintain positive relationship with wholesale customers. Continue sharing system data and publishing topical information for retail and wholesale customers. Remain in the forefront of releasing data and being transparent. Communicate quality of water to customers; bottled water is not better. Continue to use 311 program and analyze the data from those calls. 	<ul style="list-style-type: none"> Investigate centralized point of contact for wholesale customers. Consider new opportunities of sharing more data and information with wholesale customers; e.g., improve communication about algae control efforts. Perform internal staff training on the topic of how to communicate water quality issues to customers Consider conducting a survey to assess customer satisfaction.
Sustainability	<ul style="list-style-type: none"> Diversify water sources including Lower Cherry Aqueduct water from Upcountry Non-Hetch Hetchy sources and regional and local groundwater wells. Continue sanitary surveys. Continue staff training. 	<ul style="list-style-type: none"> Ensure cross-connection control in recycled water applications. Plan for succession of WQD staff.
Extreme Events	<ul style="list-style-type: none"> Continue to diversify water sources for drought, climate change, earthquakes and other extreme events. Continue water quality emergency response planning and training. 	<ul style="list-style-type: none"> N/A

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