POTW Participation in CECs Studies

White Paper

Bay Area Clean Water Agencies

Updated June 2020

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BACWA White Paper

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Introduction

The Bay Area Clean Water Agencies (BACWA) is a joint powers agency whose members own and operate Publicly-Owned Treatment Works (POTWs) throughout the SF Bay Region. Through the San Francisco Estuary Institute's Regional Monitoring Program (RMP), BACWA members participate in studies on unregulated Contaminants of Emerging Concern (CECs) on a voluntary basis. However, a Regional understanding of CECs in wastewater is skewed when studies only consider the handful of agencies who often volunteer to participate. This White Paper puts forth an approach to ensure that the Publicly Owned Treatment Works (POTW) who are requested to participate in future regional studies of CECs are generally representative of wastewater effluent quality from all Bay Area POTWs.

In the future, it is envisioned that the list of agencies participating in CECs studies, and the rationale for their selection for particular studies will be maintained as appendices to this White Paper. This approach will track participation over time and provide a historical record of which agencies have participated and how they were selected.

Background

The RMP forms the core of water quality, sediment quality, and tissue monitoring in the San Francisco Bay. Historically, each POTW was responsible for performing receiving water monitoring as part of its individual NPDES Permit. The RMP was created in 1993 through San Francisco Regional Water Quality Control Board (Regional Water Board) Resolution No. 92-043 that directed the Executive Officer to implement a Regional Monitoring Plan in collaboration with permitted dischargers pursuant to California Water Code, Sections 13267, 13383, 13268, and 13385. The goal was to replace individual receiving water monitoring requirements for dischargers with a comprehensive Regional Monitoring Program.

The Regional Monitoring Program's specific objectives are to:

- Describe the distribution and trends of pollutant concentrations in the Estuary;
- Project future contaminant status and trends using best understanding of ecosystem processes and human activities;
- Describe sources, pathways, and loading of pollutants entering the Estuary;
- Measure pollution exposure and effects on selected parts of the Estuary ecosystem (including humans);
- Compare monitoring information to relevant benchmarks, such as total maximum daily load (TMDL) targets, tissue screening levels, water quality objectives, and sediment quality objectives; and
- Effectively communicate information from a range of sources to present a more complete picture of the sources, distribution, fate, and effects of pollutants and beneficial use attainment or impairment in the Estuary ecosystem.

The RMP has been investigating CECs since 2001 and established a formal workgroup to address the issue in 2006. The RMP Emerging Contaminants Workgroup (ECWG) includes representatives from RMP stakeholder groups including POTWs, regional scientists, and an advisory panel of expert researchers that work together to address the Workgroup's guiding management questions:

- Which CECs have the potential to adversely impact beneficial uses in San Francisco Bay?
- What are the sources, pathways and loadings leading to the presence of individual CECs or groups of CECs in the Bay?
- What are the physical, chemical, and biological processes that may affect the transport and fate of individual CECs or groups of CECs in the Bay?
- Have the concentrations of individual CECs or groups of CECs increased or decreased in the Bay?
- Are they predicted to increase or decrease in the future?
- What are the effects of management actions?

The overarching goal of the ECWG is to develop cost-effective strategies to identify and monitor CECs to support management actions to minimize impacts to the Bay. The ECWG guides an annual process of contaminant evaluation and long-term planning and optimization to respond to new RMP data and the rapidly evolving body of science on CECs.

Following this process for over a decade, the RMP has generated one of the world's most comprehensive datasets for CECs in an estuarine ecosystem. While RMP stakeholders are the primary audience and user of RMP data and communications, the Program informs broader decision-making through outreach to state and federal agencies.

The RMP first published a formal CEC Strategy in 2013 as part of a continuous effort to refine approaches for supporting the management of CECs in San Francisco Bay. Periodic revision of the Strategy is essential given the rapid evolution of the science surrounding emerging contaminants; in 2017, the RMP completed its first revision of the RMP's CEC Strategy, which was then updated in 2018.

For CECs known to occur in the Bay, the RMP prioritizes CECs using a tiered risk-based framework, as illustrated in Figure 1. This prioritization framework guides future monitoring proposals for each of these contaminants, the results of which, in turn, provide key data to update evaluations of potential risk. The criteria listed below are used for placement in each tier.

Figure 1. RMP's Risk-based tiered framework

	RISK LEVEL DESCRIPTION	MONITORING STRATEGY	WATER QUALITY MANAGEMENT ACTIONS
HIGH CONCERN	Bay occurrence data suggest a high probability of a moderate or high level effect on Bay wildlife.	Studies to support TMDL or alternative management plan.	303(d) listing.* TMDL or alternative management plan.* Aggressive control/treatment actions for all controllable sources.
MODERATE CONCERN	Bay occurrence data suggest a high probability of a low level effect on Bay wildlife.	Consider including in Status and Trends monitoring. Special studies of fate, effects, sources, pathways, and loadings.	Action plan/strategy. Aggressive pollution prevention. Low-cost control/treatment actions.
LOW CONCERN	Bay occurrence data suggest a high probability of no effect on Bay wildlife.	Discontinue or conduct periodic screening level monitoring in water, sediment, or biota. For CECs previously considered moderate concern, maintain Status and Trends monitoring for at least two cycles. Periodic screening level monitoring for chemical(s) detected in wastewater or stormwater to track trends.	Low-cost source identification and control. Low-level pollution prevention. Track product use and market trends.
POSSIBLE CONCERN	Potential for concerns or uncertainty in measured Bay concentrations or toxicity thresholds suggest uncertainty in the level of effect on Bay wildlife.	Screening level monitoring to determine presence in water, sediment, or biota. Screening level monitoring for presence in wastewater or stormwater.	Maintain (ongoing/periodic) effort to identify and prioritize emerging contaminants of potential concern. Track international and national efforts to identify high priority CECs. Develop biological screening methods and identify available analytical methods.

Up to date information, including the most recent CEC Strategy, can be found at the RMP's Emerging Contaminants webpage[1].

Benefits of CECs Program Management through RMP

Different approaches have been discussed for monitoring CECs in aquatic ecosystems through the State of California, including requirements in individual NPDES permits, and a State-wide monitoring program. The San Francisco Bay Region is fortunate to have a mature and sustainable CECs program. The advantages of this program, over individual requirements include the following:

[1] https://www.sfei.org/programs/sf-bay-regional-monitoring-program#tab-1-4

- CEC science and strategy planning happens under one umbrella and is directed by scientists and stakeholders. We avoid competing or duplicative studies.
- CECs monitoring is tailored to the specific questions that need to be answered in the SF Bay while maximizing use of limited funds.
- Data quality control for CECs follows protocols established by the RMP science team. Data upload is managed through RMP staff who routinely upload data to the California Environmental Data Exchange Network (CEDEN) database.

POTW Participation in RMP CECs Program

POTWs are an important pathway for some CECs to the SF Bay. Sampling of CECs in wastewater effluent has been a component of many of the studies conducted through the RMP. Past studies have looked at POTWs as sources of pharmaceuticals, pesticides, and more recently, microplastics. Over the previous decade, as the need for effluent studies was identified by the RMP staff and ECWG, a call was put out to POTWs seeking volunteers in these studies.

BACWA, a joint powers agency whose members own and operate POTWs throughout the SF Bay Region, has worked with the RMP to ensure that there has been participation in these studies by the POTW community. Involvement in these studies has been on a volunteer basis. As the CECs program moves forward, there is interest in developing an approach to ensure that the POTWs participating in these studies are representative of wastewater effluent quality from all POTWs, and studies do not focus on the subset of agencies who repeatedly volunteer to participate.

Identifying Representative Facilities for future studies

It is not cost-effective nor particularly useful to sample effluent at every POTW when a smaller number of representative POTWs can yield the information that is being sought in a particular study. One of the purposes of this White Paper is to provide information about BACWA's member agencies that can be used to identify "representative" participants for future studies. The following characteristics were identified as pertinent because of their potential impacts on CECs in wastewater effluent. The information about each of the POTWs in the Region is included in the Appendices as listed below. It is important to note that the criteria used in various studies and the final selection of POTWs will vary based on the constituent(s) of interest and the scope of each study.

- Location by subembayment – Appendix 1[2]
- Number of connections – Appendix 2
- Population served – Appendix 2
- Average dry weather permitted flow – Appendix 2
- Discharge volume to Bay – Appendix 2
- Pretreatment Program Implementation – Appendix 2
- Type of Treatment – Appendix 3
    - Secondary

- [2] Subembayment boundaries may be reassigned in the future based on RMP modeling findings.

    - Advanced Secondary/Filtration
    - Disinfection type
- Source water – surface vs. groundwater, potential agricultural impacts – Appendix 4

Flow and population served are important criteria; depending on the study, small agencies may be a low priority for sampling due to limited staffing and because they represent a small portion of wastewater contributions to the Bay.

Industrial inputs to POTWs will also be important for some CECs. POTWs with effluent volumes over 5 million gallon per day (mgd) maintain pretreatment programs whereby they regulate industrial users that contribute significant flow or federally regulated pollutants to the collection system. However, many CECs may be discharged from commercial facilities that are not traditionally regulated, such as nursing homes, pet grooming facilities, hotels, and plant nurseries.

Keeping a comprehensive list of businesses that may be associated with CECs in each agency's jurisdiction is not feasible due to the changing identity and location of these businesses over time, and uncertainty regarding which CECs will be important in future studies. When an industrial use is associated with a CEC that is being studied, BACWA will work with the RMP to perform an online search for the businesses and industries of interest, then work to identify in which POTW's jurisdiction or sewershed they operate. To help in this effort, BACWA, in conjunction with the Region Water Board and SFEI, is developing a POTW sewershed map. Information on businesses presence in each service area may also be available from agencies' billing records; BACWA can work with agencies to obtain information from these records, when needed.

Some agencies have expressed concern that participating in CEC studies would lead to adverse impacts to their agencies, in terms of negative attention from regulators or the public. The Regional Water Board has made it clear that the intent of monitoring representative POTWs is to ensure that the results will be considered characteristic of all POTWs of types similar to those monitored and not simply attributed to a particular POTW. Monitoring results will not be considered representative of just those POTWs that participated, and participating POTWs will not be subject to any specific action(s) or regulatory consequence as a result of monitoring results.

To provide the State Water Board with the data it needs to avoid regulatory action on CEC monitoring, results from these studies will be entered into California Environmental Data Exchange Network (CEDEN) database. However, agencies that participate in the studies may request that their data be anonymized and that they not be mentioned by name when the studies are described in articles submitted to scientific journals or in communications with the press.

Case study – selecting a suite of representative POTWs to participate in CEC study

To illustrate the process of selecting representative POTW, a case study is presented below. In the summer of 2019, the RMP conducted a study of ethoxylated surfactants (ES). The goal for POTW selection was to recruit a selection of POTWs with the following characteristics:

- Geographical diversity to help interpret observed surface water concentrations

- Diversity of treatment technologies to understand impact of treatment processes on ES compounds
- Facilities with higher flow rates to capture a significant portion of the total wastewater loading of ES compounds to the Bay

In a literal sense, some of these criteria are mutually exclusive. For example, sampling at the EBDA outfall would allow capture of a greater portion of the loading to the Bay, but since the outfall discharge is made up of effluent from six different POTWs with different treatment trains, no information about individual treatment processes would be available from sampling at EBDA. Likewise, sampling at SFPUC's Southeast Plant would have allowed capture of more of the total load to the SF Bay, but SFPUC uses the same secondary treatment technology, high purity oxygen activated sludge, and discharges to the same subembayment as EBMUD, so smaller facilities with different treatment technologies that discharge to different subembayments were selected.

The final selection of treatment facilities is presented in Table 1.

In the future, it is envisioned that the list of agencies participating in CECs studies will be maintained as a new appendix for this White Paper. This will allow BACWA members, the Regional Water Board, and RMP staff to track participation over time, and provide a historical record of which agencies have participated and how they were selected.

Table 1. POTW sampling design for ethoxylated surfactants.

	Facility	Annual Average Daily Effluent Flows (mgd)	Subembayment	Secondary	Tertiary Treatment	Nitrification	Denitrification	Disinfection
1	**San Jose-Santa Clara**	87	LSB	Activated Sludge/Biological Nutrient Removal	Y	Y	Y	Liquid Chorine
2	**Palo Alto**	18.4	LSB	Trickling Filter/Nitrifying Activated Sludge	Y	Y		UV
3	**Hayward**	10.0 (discharge through EBDA outfall)	SB	Trickling Filter/Solids Contact				Sodium Hypochlorite
4	**EBMUD**	52.5	CB	High Purity Oxygen Activated Sludge				Sodium Hypochlorite
5	**CCCSD**	35.4	Suisun Bay	Activated Sludge with Anaerobic Selector				UV
6	**Fairfield Suisun**	13.4	Suisun Bay	Oxidation Tower/Activated Sludge	Y	Y		UV
7	**Vallejo**	9.2	San Pablo Bay	Trickling Filter/Solids contact				Sodium Hypochlorite
8	**San Mateo**	10.4	SB	Activated Sludge				Sodium Hypochlorite

POTWs funding for RMP CECs Program

The RMP participants, including dredgers, stormwater agencies, and municipal and industrial dischargers that hold Regional Water Board permits for waste discharge into the Estuary, fund the RMP as a requirement of their permits. Each year, a portion of this funding was allocated to CECs studies, but by 2016, as overall RMP funding was decreasing due to diminishing contribution from the dredgers, an alternative source of funding was sought.

In 2015, BACWA worked with the SF Regional Water Board to review the costs and benefits of the routine monitoring required by agencies' individual NPDES permits, and concluded that significant resources were being spent on monitoring for pollutants that were rarely detected. BACWA and the Regional Water Board reached an agreement to reallocate resources from low-value effluent testing to the RMP. The strategy reflected the need to shift our effort from contaminants that were of concern historically, largely due to industries that are no longer located in the region, to emerging priorities. In April 2016, the Regional Water Board adopted order R2-2016-0008, which establishes opt-in Alternative Monitoring and Reporting Requirements for municipal NPDES permittee, and which can raise a maximum of $289K per year for RMP studies.

Because of the limited funding available to the RMP for CECs studies, POTW effluent monitoring is not included in some RMP studies where it is a lower priority than monitoring other matrices. In the past, individual POTWs have volunteered to fund effluent monitoring for studies that are managed by RMP staff. A recent example of this approach is the 2017 *Screening of Pharmaceuticals in San Francisco Bay Wastewater* Study[3]. Because relying on agency volunteers to fund these special studies puts an unfair burden on those agencies who step up, when all agencies throughout the Region benefit, beginning in FY21 BACWA is considering providing a budget derived from member dues for POTW-specific CEC studies led by the RMP. Descriptions of POTW-funded studies will be included as an appendix in future updates to this White Paper.

CEC Management in SF Bay – Next Steps

As described in the Tiered Risk Framework, CECs in the "moderate" tier are subject to management plans and pollution prevention. While BACWA welcomes information about removal efficacy for CECs through different wastewater treatment trains, we view pollutant prevention as the most important strategy for reducing CEC loading to receiving waters.

BACWA's Bay Area Pollution Prevention Group (BAPPG) funds public outreach, and professional outreach and training for both traditional pollutants such as Fats, Oils, and Grease, mercury, and copper, as well emerging contaminants such as pharmaceuticals. In Fiscal Year 2021, microplastics and PFAS will be added to the list of prioritized pollutants. BAPPG's public facing website, baywise.org, contains public outreach materials that can be used by member and partner agencies.

[3] See full report:
https://www.sfei.org/sites/default/files/biblio_files/BACWA%20Pharmaceutical%20Report_103018.pdf

In addition to public outreach, BAPPG also supports regulatory advocacy for pollutants such as pesticides, including fipronil. POTWs don't have direct authority to regulate pesticides in their service area. However, over the past few years, BAPPG has partnered with the Regional Water Board to comment on EPA's pesticide re-registrations, to urge them to consider pathways to the sewer when doing risk assessments. The selection approach proposed in this White Paper can be used to support BAPPG's efforts; such as in collaborative studies with the California Department of Pesticides Regulation. More information about BAPPG's Pollution Prevention activities can be found in their most recent Annual Report[4].

DTSC's Safer Consumer Products initiative is another pathway to address the use of CECs of moderate or higher concern[5]. DTSC maintains this program to identify and develop a regulatory response for chemicals, formulations, or products that may pose a human health or ecological risk.

Finally, POTWs, either individually or through BAPPG, CASA, or other associations, support legislation to control products leading to CEC pollution. Support of pharmaceutical take-back programs is an example of effective advocacy in the past.

The RMP's CEC Program has been key to our understanding of emerging concerns in the San Francisco Bay. Moving into the future, the CEC program through the RMP will continue to inform BACWA's pollution prevention efforts, and BACWA is committed to its continued support.

[4] https://bacwa.org/wp-content/uploads/2020/01/2019-BAPPG-Annual-Report.pdf
[5] https://dtsc.ca.gov/scp/safer-consumer-products-program-overview/

Appendix 1: POTW Location

Figure A1. POTW Location by subembayment

Appendix 2: Population and Flows

Table A2: Population and flows

POTW	# connections served (2014)	Estimated Population[c]	Permitted ADWF (mgd)[d]	2018/19 Flow to Bay[e]	Pretreatment Program (y/n)
American Canyon	5,562	20,470	2.5	1.58	N
Benicia	9,569	28,000	4.5	2.23	N
Burlingame[a]	1,600	37,000	5.5	2.99	Y
CCCSD	115,109	482,000	53.8	38.6	Y
CMSA	52,161	105,000	10	12	Y
Delta Diablo	57,700	213,000	19.5	8.74	Y
DSRSD[b]	53,509	146,900	20.2	2.3 (2016)	Y
EBDA[b]			107.8	65	Y
EBMUD	160,000	650,000	120	58.0	Y
FSSD	38,800	144,000	23.7	15.4	Y
Hayward[b]	32,000	153,000	18.5	10.0 (2015)	Y
Las Gallinas	15,800	30,000	2.92	2.62	N
Livermore[b]	29,500	85,000	8.5	3.3 (2016)	Y
Millbrae[a]	6,550	22,000	3	1.73	Y
Mt. View SD	10,500	21,900	3.2	1.88	N
Napa SD	36,000	82,700	15.4	7.42	Y
Novato SD	28,700	60,000	7	4.78	Y
Oro Loma SD[b]	47,000	190,000	20	10.3 (2015)	Y
Palo Alto		217,000	39	21.9	Y
Petaluma	25,300	61,500 (2011)	6.7	4.02	Y
Pinole	11,215	42,500	4.06	2.78	N
Richmond [c]	20,000	70,000	16	5.1 (2017)	Y
Rodeo	2,967	8,700	1.14	0.680	N
San Jose-Santa Clara	483,667	1,500,000	167	93.8	Y
San Leandro[b]	15,300	60,000	7.6	4.3	Y
San Mateo	37,823	150,000	15.7	11.6	Y
Sewerage Agency of Southern Marin	14,800	29,000	3.6	2.67	N
SFO[a]	n/a	n/a	2.2	1.22	N
SFPUC Southeast	450,000	580,000 (2013)	85.4	55.5	Y

POTW	# connections served (2014)	Estimated Population[c]	Permitted ADWF (mgd)[d]	2018/19 Flow to Bay[e]	Pretreatment Program (y/n)
Sausalito Marin City SD	6,500	18,000	1.8	1.30	N
SSF[a]		113,500	13	8.55	Y
Sunnyvale	28,314	150,000	29.5	11.6	Y
Sonoma Valley County SD	17,200	28,000	3	1.48	N
Silicon Valley Clean Water		199,000	29	15.6	Y
Treasure Island		2,500	2	0.412	N
Union Sanitary District[b]	111,184	343,500	33	21.6 (2015)	Y
Vallejo	37,845	120,000	15.5	10.1	Y
West County WD[c]	32,300	100,000	12.5	8.3 (2017)	Y
West County Agency[c]		170,000	28.5	13.3	Y

[a] The cities of Burlingame, Millbrae, South San Francisco, and San Bruno, and the San Francisco International Airport form the North Bayside System Unit (NBSU), a joint powers authority, and discharge to a common outfall.

[b]EBDA provides the outfall to the SF Bay for the City of Hayward, Oro Loma Sanitary District, the City of San Leandro, and Union Sanitary District, as well as the Livermore Amador Valley Water Management Agency, which includes Livermore and Dublin San Ramon Services District.

[c]West County Agency provides the outfall to the SF Bay for the City of Richmond and West County Wastewater District.

[d]Unless noted otherwise, service area population and ADWF are from each POTW current NPDES permit.

[e]Flows are from the 2019 Nutrient Group Annual Report, unless noted and then the flows are from each POTW current NPDES permit.

Appendix 3: Treatment Technology

Treatment technology can impact the removal of CECs biodegradation and partitioning to solids. Disinfection technology will impact the formation of disinfection byproducts. Table 3 shows the treatment technologies used at each POTW.

Table A3. Treatment Technologies.

AS = Activated Sludge; TF = Trickling Filter; BNR = Biological Nutrient Removal; MBR = Biological Membrane Reactor

POTW	Secondary Treatment Type	Disinfection Type	Advanced secondary/filtration (y/n)
American Canyon	MBR	UV	y
Benicia	AS and Rotating Biological Contactor (RBC)	Liquid Chlorine	n
Burlingame	AS	Sodium Hypochlorite	n
CCCSD	AS	UV	n
CMSA	TF/AS	Liquid Chlorine	n
Delta Diablo	TF/Solids contact	Sodium Hypochlorite	n
DSRSD	AS	Liquid Chlorine	n
EBMUD	High Purity Oxygen	Sodium Hypochlorite	n
FSSD	Oxidation Towers/AS	UV	y
Hayward	TF/Solids contact	Sodium Hypochlorite	n
Las Gallinas	Rock TF, nitrification TF, deep bed granular filter	Liquid Chlorine	n
Livermore	AS	Sodium Hypochlorite	n
Millbrae	AS	Sodium Hypochlorite	n
Mt. View SD	TF, nitrification biotower	UV	y
Napa SD	AS	Sodium Hypochlorite	n
Novato SD	AS	UV	n
Oro Loma SD	AS	Sodium Hypochlorite	n
Palo Alto	TF/AS	UV	y
Petaluma	AS/BNR	UV/Sodium Hypochlorite	n
Pinole	AS	Liquid Chlorine	n

POTW	Secondary Treatment Type	Disinfection Type	Advanced secondary/filtration (y/n)
Richmond	AS	Sodium Hypochlorite	n
Rodeo	AS	Sodium Hypochlorite	n
San Jose	AS/BNR	Sodium Hypochlorite	y
San Leandro	TF/AS	Sodium Hypochlorite	n
San Mateo[a]	AS	Sodium Hypochlorite	n
Sewerage Agency of Southern Marin	TF	Liquid Chlorine	n
SFO	AS	Liquid Chlorine	n
SFPUC	High Purity Oxygen	Sodium Hypochlorite	n
Sausalito Marin City Sanitary district	TF	Liquid Chlorine	n
SSF	AS	Liquid Chlorine	n
Sunnyvale	TF/DAF/Dual Media Filtration	Chlorine Gas	y
Sonoma	AS	Sodium Hypochlorite	n
Silicon Valley Clean Water	TF/AS	Liquid Chlorine	n
Treasure Island	TF	Sodium Hypochlorite	n
Union Sanitary District	AS	Sodium Hypochlorite	n
Vallejo	TF/Solids Contact	sodium hypochlorite	n
West County WD	AS	Sodium Hypochlorite	n

[a] San Mateo is in the process of an upgrade to BNR/MBR

Appendix 4: Water sources

There are seven major water wholesalers and large retailers serving residents in the service area of Bay Area POTWs. These seven are highlighted below; see Table A4 for a complete list of water agencies and supplies in the Bay Area.

- Alameda County Water District (ACWD) – ACWD's primary sources for water supply are the State Water Project, SFPUC, and local groundwater.
- Contra Costa Water District (CCWD) - CCWD's primary source of water supply is the United States Bureau of Reclamation's Central Valley Project (CVP).
- East Bay Municipal Utilities District (EBMUD) - EBMUD delivers water from the Mokelumne River watershed, supplemented with water from East Bay watershed reservoirs. Water from the EBMUD is not expected to include groundwater, or be influenced by agricultural drainage.
- SFPUC Region Water System (RWS) – The SFPUC delivers water imported from the Hetch Hetchy reservoir, as well as reservoirs in the Alameda Watershed and Peninsula Watershed. Beginning in 2017, SFPUC began accessing local groundwater supplies. Water from the SFPUC is not expected to be influenced by agricultural drainage.
- Santa Clara Valley Water District – SCVWD – Sources of supply for the District include natural groundwater recharge, local surface water, imported surface water from the State Water Project (SWP) and CVP, and transfers. Imported water from the SWP and CVP is expected to have some impact from agricultural drainage at its source in the SF Delta.
- Sonoma County Water Agency (SCWA) – The Russian River provides most of the Water Agency's water supply with groundwater supply from the Santa Rosa Plain as a secondary source. Water from the Russian River is expected to have some impact from agricultural drainage.
- Zone 7 –The SWP is Zone 7's largest water supply, and is supplemented by local surface water and groundwater. Imported water from the SWP and CVP is expected to have some impact from agricultural drainage at its source in the SF Delta.

Information about the water supplies in the sewersheds of each POTW is presented in the Water Agencies' Urban Water Management Plans (UWMP), which are available on DWR's website[6]. The POTWs for each Water Agency are reported in Table 6.3 of each UWMP. For each POTW, Table A4 identifies the Water Agencies supplying their service area, the agencies' water sources, and whether there may be an agricultural influence on the source water supply, or if groundwater is a significant supply source. Most areas are served by smaller retailers who provide a combination of water purchased from wholesalers, and local surface or groundwater.

[6] https://wuedata.water.ca.gov/uwmp_plans.asp

Table A4: Source Water Supplies

WW Agencies	Water Agency	Sources	Groundwater supply (y/n)	Potential Agricultural Impacts (y/n)
American Canyon	American Canyon City Of	SWP, City of Vallejo (see below)	n	y
Benicia	City of Benicia	SWP, Sacramento River, Solano Project (Lake Baryessa), local surface water	n	y
Burlingame	Hillsborough Town Of	SFPUC RWS	n	n
	Burlingame City Of	SFPUC RWS	n	n
CCCSD	Martinez City Of	CCWD	n	y
	Contra Costa Water District	Central Valley Project, other Delta supplies	n	y
	East Bay Municipal Utility District	Mokelumne Watershed, local surface water	n	n
CMSA	Marin Municipal Water District	Local surface water	n	n
Delta Diablo	Contra Costa Water District	Central Valley Project, other Delta supplies	n	y
	Antioch City Of	Delta, and Contra Costa Canal (CCWD)	n	y
	Pittsburg City Of	CCWD, and local groundwater	y	y
	Golden State Water Company - Bay Point	CCWD, and local groundwater	y	y
DSRSD	Zone 7	State Water Project, Local surface Water, Local Groundwater, Imported Surface Water from Byron-Bethany Irrigation District	y	y
	Pleasanton City Of	Zone 7, and local groundwater	y	y
	Dublin San Ramon Services District	Zone 7	y	y
	East Bay Municipal Utility District	Mokelumne Watershed, local surface water	n	n
EBMUD	East Bay Municipal Utility District	Mokelumne Watershed, local surface water	n	n
Fairfield-Suisun Sewer District (FSSD)	Suisun - Solano Water Authority	SWP, Solano Project (Lake Barryessa)	n	y

WW Agencies	Water Agency	Sources	Groundwater supply (y/n)	Potential Agricultural Impacts (y/n)
Hayward	Hayward City Of	SFPUC RWS	n*	n
LGVSD	Marin Municipal Water District	Local surface water	n	n
Livermore	Zone 7	State Water Project, Local surface Water, Local Groundwater, Imported Surface Water from Byron-Bethany Irrigation District	y	y
	California Water Service Company Livermore	Zone 7 (SWP), and local groundwater	y	y
	Livermore City Of	Zone 7	y	y
	Pleasanton City Of	Zone 7, and local groundwater	y	y
Millbrae	Millbrae City Of	SFPUC RWS	n	n
Mt. View Sanitary District	Contra Costa Water District	Central Valley Project, other Delta supplies	n	y
	Martinez City Of	CCWD	n	y
Napa Sanitation District	American Canyon City Of	State Water Project, City of Vallejo (see below)	n	y
	Napa City Of	SWP, local surface water	n	y
Novato Sanitary District	North Marin Water District	SCWA, local surface water	y	y*
Oro Loma Sanitary District	East Bay Municipal Utility District	Mokelumne Watershed, local surface water	n	n
Palo Alto	California Water Service Company Los Altos/Suburban	SCVWD (State Water Project, Central Valley Project), Local Groundwater	y	y
	California Water Service Company Mid-Peninsula	SFPUC RWS	n	n
	East Palo Alto City Of	SFPUC RWS	n	n
	Mountain View City Of	SFPUC RWS, SCVWD, and local groundwater	y	y
Petaluma	City of Petaluma	SCWA, local groundwater	y	y
Pinole/Hercules	East Bay Municipal Utility District	Mokelumne Watershed, local surface water	n	n
Richmond	East Bay Municipal Utility District	Mokelumne Watershed, local surface water	n	n

WW Agencies	Water Agency	Sources	Groundwater supply (y/n)	Potential Agricultural Impacts (y/n)
Rodeo Sanitary District	East Bay Municipal Utility District	Mokelumne Watershed, local surface water	n	n
San Jose	Milpitas City Of	SFPUC RWS, and SCVWD (CVP and SWP, not GW)	n	y
	San Jose City Of	SFPUC RWS, SCVWD (surface), and local groundwater	y	y
	San Jose Water Company	SCVWD, and local groundwater	y	y
	Santa Clara City Of	SFPUC RWS, SCVWD (surface), and local groundwater	y	y
	Great Oaks Water Company Incorporated	Local groundwater	y	n
San Leandro	East Bay Municipal Utility District	Mokelumne Watershed, local surface water	n	n
San Mateo	California Water Service Company Mid-Peninsula	SFPUC RWS	n	n
	Hillsborough Town Of	SFPUC RWS	n	n
Sanitary District No. 5 (Tiburon)	Marin Municipal Water District	Local surface water	n	n
	SCWA	Russian River	n	y
Sewerage Agency of Southern Marin	Marin Municipal Water District	Local surface water	n	n
	SCWA	Russian River	n	y
Sausalito-Marin City Sanitary District	Marin Municipal Water District	Local surface water	n	n
	SCWA	Russian River	n	y
SFPUC	San Francisco Public Utilities Commission	SFPUC RWS (Hetch Hetchy, and local surface water, local groundwater)	y	n
SFO	SFO	SFPUC RWS	n	n
Silicon Valley Clean Water	California Water Service Company Bear Gulch	SFPUC RWS, local surface	n	n
	East Palo Alto City Of	SFPUC RWS	n	n

WW Agencies	Water Agency	Sources	Groundwater supply (y/n)	Potential Agricultural Impacts (y/n)
	Menlo Park City Of	SFPUC RWS	n	n
	Mid-Peninsula Water District	SFPUC RWS	n	n
Sonoma	Sonoma County Water Agency (SCWA)	Russian River, local groundwater	y	y
South San Francisco and San Bruno	California Water Service Company South San Francisco	SFPUC RWS, and local groundwater	y	n
Sunnyvale	California Water Service Company Los Altos/Suburban	SCVWD (State Water Project, Central Valley Project), Local Groundwater	y	y
	Sunnyvale City Of	SFPUC RWS, SCVWD (surface), and local groundwater	y	y
Treasure Island	Treasure Island Water System	SFPUC RWS	n	n
Union Sanitary District	Alameda County Water District	SWP, SFPUC RWS, local groundwater	y	y
Vallejo Flood & Wastewater District	Vallejo City Of	SWP, Solano Project (Lake Barryessa), local surface water	n	y
West County Wastewater District	East Bay Municipal Utility District	Mokelumne Watershed, local surface water	n	n