PSSEP
Partnership for Sound Science in Environmental Policy

December 6, 2017

Felicia Marcus, Hearing Officer
Tam Doduc, Hearing Officer
California WaterFix Change Petition
State Water Resources Control Board
1001 "I" Street
Sacramento, CA 95814

**Re: Petition Requesting Changes in Water Rights of the Department of Water Resources and US Bureau of Reclamation for the California WaterFix Project – Part 2;**
**Policy Statement on behalf of the Partnership for Sound Science in Environmental Policy**

Dear Madam Hearing Officers:

The Partnership for Sound Science in Environmental Policy (PSSEP) appreciates the opportunity to present these comments on the proposed "California WaterFix Change Petition – Part 2." PSSEP is an association of municipal, industrial, and trade association entities in California whose members are regulated by the State and Regional Water Boards under their joint, Federal Clean Water Act and Porter-Cologne Water Quality Control Act authorities. Some of PSSEP's members and/or affiliates are located in the San Francisco Bay Area and will be directly affected by the California WaterFix Project, and in turn, by the State Water Board's decision on the Change Petition.

As we have continuously stated, PSSEP emphasizes that our members take no position on the desirability of the California WaterFix and/or the underlying "alternative water conveyance facilities" being developed to support them. PSSEP's members simply ask that ***if*** the WaterFix Project Change Petition is approved by the State Water Board, adequate permit conditions are imposed to ensure that known or reasonably foreseeable impacts that are likely to accrue as a result of the Project will be formally recognized and fully mitigated. Our primary interest and concern about the WaterFix Project is that, when completed and being operated, it will directly cause an increase of selenium loading to the Delta and San Francisco Bay. This projected selenium increase will have direct, negative impacts on water quality and beneficial instream uses of Delta and San Francisco Bay waters, and specifically upon threatened and endangered species of those waters.

PSSEP has been involved in the BDCP/WaterFix process since its inception, and has provided hundreds of pages of comments on the potential impacts of its construction and future operation – primarily as relates to selenium. *See*, *PSSEP Comments on [July 2015] BDCP/California WaterFix and Supporting Revised Draft EIR/EIS – Focus on Selenium Impacts*, October 28, 2015, which was previously submitted to the State Water Board.

On July 21, 2017, the lead state and federal agencies approved the Final EIR/EIS for the WaterFix Project. PSSEP maintains that the approved Final EIR/EIS for the Project continues to understate the potential additional selenium loading impacts to the Delta that will result from construction and operation of the new water conveyance facilities, and further understates the potential impacts these additional selenium loads will have to San Francisco Bay. Specifically, and according to the Final EIR/EIS:

> "Changes in source water fraction and net Delta outflow under [the Preferred Alternative], relative to Existing Conditions, are projected to cause the total selenium load to the North Bay to increase by 6-11%..."[1]

However – and astonishingly – the Final EIR/EIS concludes that:

> ***"The estimated changes in selenium loads in Delta exports to San Francisco Bay due to [the Preferred Alternative] are not expected to result in adverse effects to beneficial uses or substantially degrade the water quality with regard to selenium, or make the existing CWA Section 303(d) impairment [for selenium] measurably worse."*** [2]

The San Francisco Regional Water Quality Control Board estimated the current annual selenium load attributable to the Central Valley Watershed is 4070 kg/year.[3] If one were to accept the estimates provided in the WaterFix Final EIR/EIS, that would mean those loads are expected to increase by as much as 447 kg/year if the WaterFix Project is constructed and operated. This anticipated ***increased*** loading of selenium to the Delta and San Francisco Bay is not trivial, contrary to what the WaterFix Final EIR/EIS claims. However, because the Final EIR/EIS concludes that these annual increased selenium loads to San Francisco Bay are "less than significant," there are no CEQA/NEPA-related mitigation or monitoring measures called for.

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[1] Final Environmental Impact Report/Environmental Impact Statement for the Bay Delta Conservation Plan/California WaterFix—Volume I, Chapter 8 – Water Quality, p. 8-582, lines 36-38.

[2] Final Environmental Impact Report/Environmental Impact Statement for the Bay Delta Conservation Plan/California WaterFix—Volume I, Chapter 8 – Water Quality, p. 8-583, lines 4-7.

[3] Draft Proposed Basin Plan Amendment for North San Francisco Bay Selenium TMDL, §7.2.4.3 and Table 7.2.4-2; Draft Staff Report for Proposed Basin Plan Amendment, Section 7, Table 24.

When PSSEP provided testimony on July 26, 2016 before the State Water Board on the present Change Petition application, we highlighted this deficiency and requested that any Change Petition approved by the Board include specific and adequate conditions to require the WaterFix Project proponents to mitigate the potential impacts associated with increased selenium loading caused by the construction and future operation of the WaterFix. At a minimum, we believe it reasonable to require the Project proponents to fund adequate pre-construction and post-operation monitoring for selenium to determine whether – and how much – additional selenium loading to the Delta and San Francisco Bay is occurring because of WaterFix operations.

Recently, selenium science experts from TetraTech were asked to propose a *Plan for Enhanced Selenium Monitoring in the Delta to Track Future Loading Changes Associated with the California WaterFix Project*, a copy of which is attached hereto and incorporated by this reference. As noted by TetraTech, comprehensive selenium monitoring throughout the Delta has only been episodic and, at this time, regular monitoring of selenium occurs ***only*** at the Freeport and Vernalis monitoring stations.

To remedy this lack of comprehensive selenium loading data, TetraTech has proposed seven locations for future selenium monitoring, to coincide with other, existing monitoring programs, thus maximizing cost-effectiveness. All of these selected selenium monitoring locations are within the Delta and "downstream" of the planned location of the WaterFix Project infrastructure, thereby enabling researchers to better assess whether the construction and future operation of the WaterFix Project is resulting in increased selenium loading, and by how much. Importantly, the TetraTech *Enhanced Selenium Monitoring Plan* recommends that sampling and analysis from the suggested stations begin as soon as reasonably possible, in order to establish pre-WaterFix Project, ***baseline*** water quality conditions at these stations.

PSSEP believes the *Enhanced Selenium Monitoring Plan* proposed by TetraTech is a reasonable and appropriate condition to include in the current Change Petition application, if the State Water Board decides to approve the WaterFix Project Change Petition. If, as WaterFix Project proponents maintain, there will be no significant increase in selenium loading to San Francisco Bay from the construction and future operation of the WaterFix Project, they should readily welcome the opportunity to demonstrate that by paying for the *Enhanced Selenium Monitoring Plan* suggested by TetraTech.

Sincerely,

Craig S.J. Johns
Program Manager

Enclosure: *Plan for Enhanced Selenium Monitoring in the Delta to Track Future Loading Changes Associated with the California WaterFix Project,* December 1, 2017.

# Proposed Plan for Enhanced Selenium Monitoring in the Delta to Track Future Loading Changes Associated with the California WaterFix Project

Prepared by Tetra Tech for the Western States Petroleum Association

December 1, 2017

## 1. Overview and Purpose

Water column selenium, through uptake and exchange with particulates, forms a pathway for bioaccumulation in biota, and has been an environmental concern in San Francisco Bay since the 1980s. In March 2016, the State Water Resources Control Board approved a selenium Total Maximum Daily Load (TMDL) for North San Francisco Bay, which established a total dissolved water column selenium target of 0.5 µg/l and a white sturgeon muscle tissue target of 11.3 µg/g (Baginska, 2015). Water column concentrations are generally well below the 0.5 µg/l target, although fish tissue concentrations are closer to the 11.3 µg/g target.

The Delta is a major source of selenium to San Francisco Bay (Baginska, 2015). There is a concern that proposed future changes in the Delta, due to the construction and operation of the California WaterFix Project[1] or through operations of related export facilities, may cause increased selenium loading to the Bay (Tetra Tech, 2014). This memorandum proposes a plan for enhanced selenium monitoring in the Delta to determine whether the construction and/or future operation of the California WaterFix Project results in the expected increase of selenium load to San Francisco Bay.

The sampling strategy described below summarizes existing sampling networks in the Bay-Delta, and utilizes a pre-existing sampling network for selecting stations at which selenium would also be sampled and analyzed. The proposed sampling assumes that water column selenium (dissolved and particulate selenium) responds to external loading and flow changes rapidly, is a driver of bioaccumulation, and therefore should be a key component of an early warning system in the Bay. To develop a capability for early warning of change, a regular monitoring program is proposed, and, given the system variability, estimates are provided of the level of change from current conditions that can be detected for typical sampling frequencies (6 to 12 times per year).

[1] https://www.californiawaterfix.com/

## 2. Background

Water column selenium, reacting with inert particulates, or upon uptake by living particulates, is taken up through the food chain, and is therefore of concern in the selenium TMDL. Changes in the "plumbing" of the Delta that modify the relative outflow of San Joaquin versus Sacramento River water are expected to have a deleterious impact on water column selenium concentrations (Tetra Tech, 2014). Potentially, this may result in changes to selenium in other trophic levels. The premise of this proposal is that any changes in selenium from upstream sources will first be exhibited in the form of water column concentrations (dissolved and particulate), and that these serve as a useful early indicator for early detection of change in the Bay.

Existing monitoring of selenium within the Delta is limited and temporally inconsistent, but monitoring of riverine inflows and modeling through the Delta provides a general understanding of individual riverine contributions. The Delta Simulation Model, DSM2, is a calibrated and well-tested one-dimensional mathematical model for simulating the Sacramento – San Joaquin Delta flows and water quality, and can be used to "fingerprint" sources of water at a given location in the Delta. For example, at a location integrating Delta flows, the fingerprint shows that the relative contribution of San Joaquin River flows (as a percent of total flow) is greatest during the wet months of wet and above normal years, and low in dry and critical years (Figure 1). This large seasonal variability, and the variability depending on water year type, suggests the need for continued sampling over multiple years to track changes in the system. Moreover, in order to determine whether the construction and/or operation of the California WaterFix Project will result in increased loading of selenium to the Bay over time, it is important that pre-construction monitoring occur, thereby establishing a baseline against which future sampling can be compared.

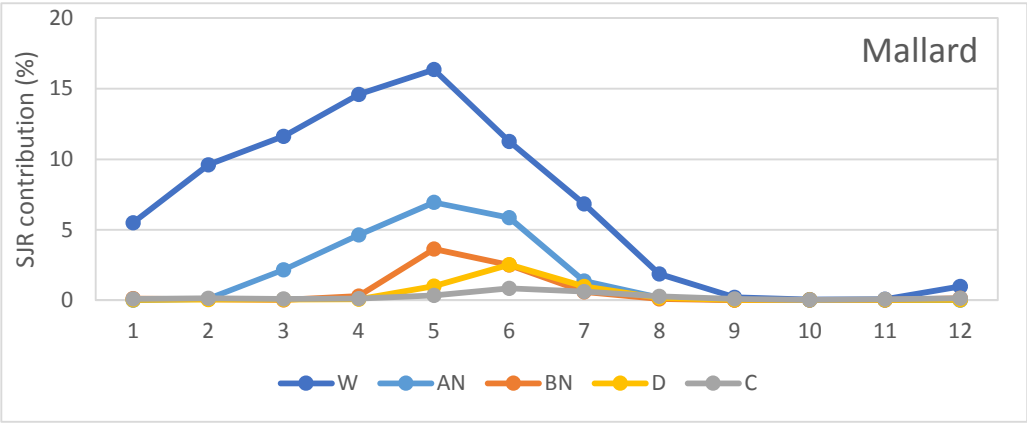


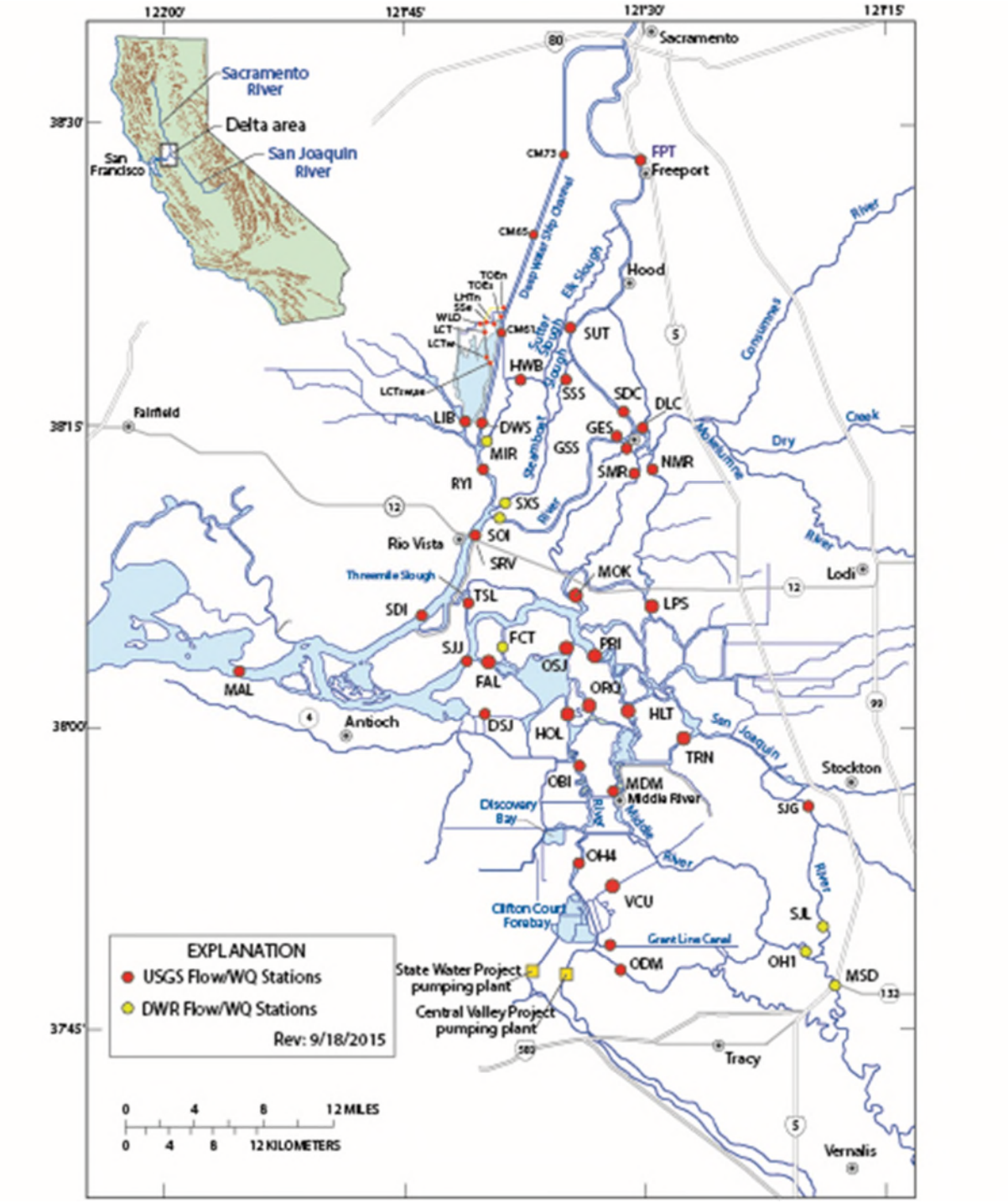

*Figure 1. DSM2 simulated volumetric contribution from San Joaquin River to Mallard Island (as a percent of flow volume by calendar month, from 1 through 12). The water year type classification is based on DWR's water year hydrologic classification for the San Joaquin Valley (cdec.water.ca.gov/cgi-progs/iodir/WSIHIST). W: Wet, AN: Above normal, BN: Below normal, D: Dry, C: Critical year. The greatest contributions from San Joaquin River occur during wet and above normal years.*

## 3. Existing Monitoring Networks in the Delta

The DWR Environmental Real Time Monitoring (RTM) section operates nine continuous water quality stations from Martinez in Suisun Bay to Sacramento River at Hood and San Joaquin River at Vernalis. The DWR-RTM water quality monitoring is conducted using YSI sensors that report parameters such as conductance (a surrogate for salinity) and temperature. Bottom salinity/conductance is collected at three locations, Martinez, Mallard Island, and Antioch, of the nine multi-parameter stations in support of X2 monitoring. Bottom conductance is also collected by the Bureau of Reclamation at 2 sites, Collinsville and Antioch. The primary DWR stations used for salinity/conductance monitoring are shown in Figure 2.

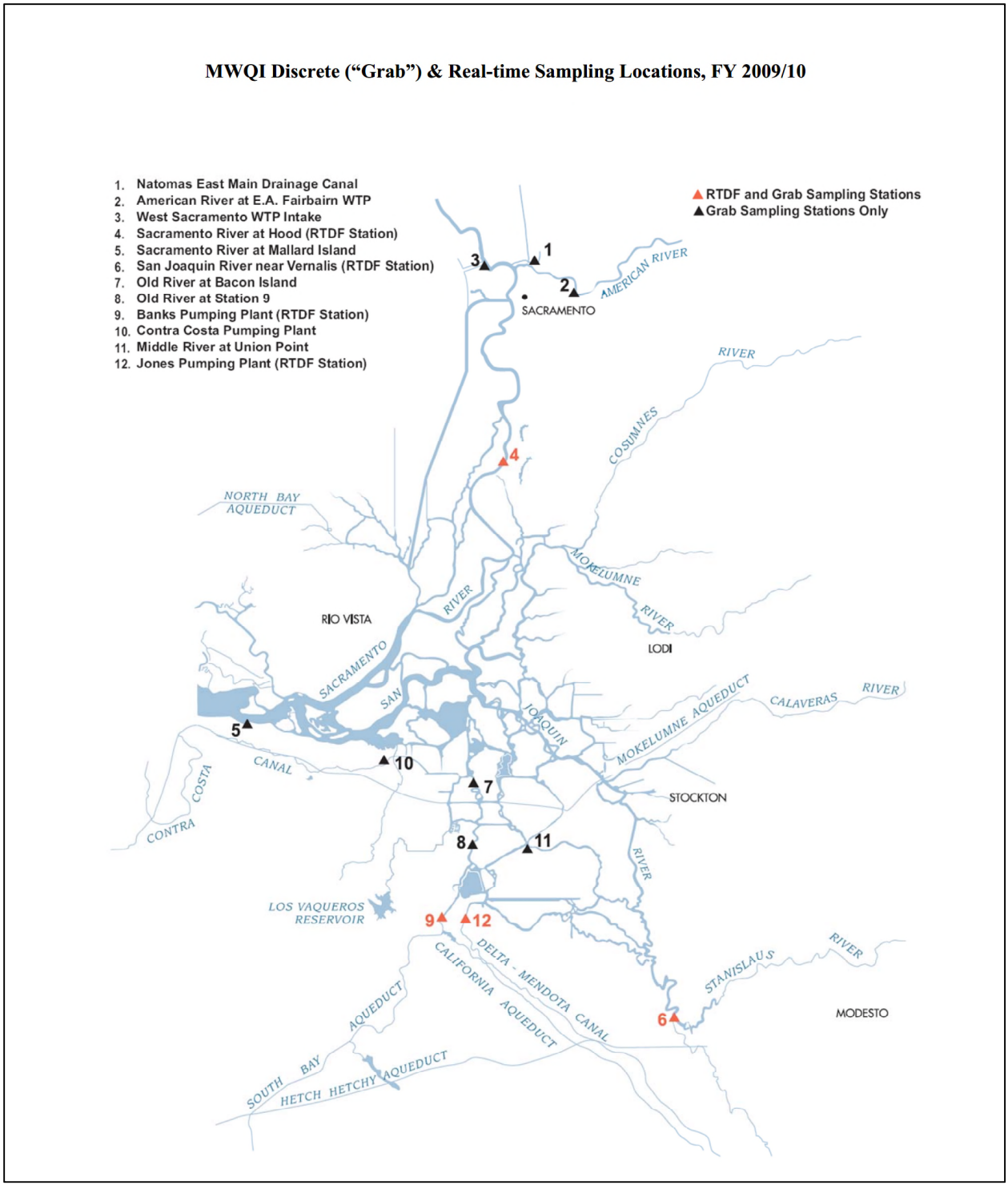
The USGS California Water Science Center (CAWSC), also conducts hydrodynamic and water quality monitoring in the Bay and Bay Delta. The USGS maintains a network of 38 flow and water quality stations across the Delta, as shown in Figure 3. (https://ca.water.usgs.gov/projects/baydelta/) The project monitors flow in the Delta since 1987. The monitoring network has been expanding to 21 continuously operating flow stations and 32 continuous water quality monitoring stations. Collection of salinity, temperature, and water level time series began in 1988. Collection of turbidity and suspended sediment concentration (SSC) time series began in 1991, and collection of dissolved oxygen time series began in 2012. The USGS CAWSC has standardized flow and water quality monitoring methods in the Bay and Delta for data collection instrumentation, equipment configuration, telemetry protocols, and data quality control and reporting.


*Figure 2. Location of salinity sampling stations across the Delta.*




- *Figure 3. Location of USGS sampling network, with some DWR stations shown.*

Another sampling program of interest is the Municipal Water Quality Program, with a focus on collecting parameters of interest for drinking water quality (Figure 4). While the program contains several stations in the Delta, and also includes stations outside the Delta, it is not as extensive as the USGS program, and was therefore not chosen as a framework for "piggybacking" the selenium sampling on to.




- *Figure 4. Location of Municipal Water Quality Investigations (MWQI) program grab sample stations.*

Although selenium has been characterized in the Delta in prior efforts (typically episodic special studies), at this time, regular monitoring of selenium is minimal. Two stations in the Delta that have the longest selenium records are BG20 (Sacramento River) and BG30 (San Joaquin River),

both measured by the San Francisco Bay Regional Monitoring Program. Lower concentrations have been observed at these two locations in recent years (after 2005); however, there are not enough data for detection of a trend. Furthermore, the frequency of sampling at these stations has decreased in recent years (to approximately 1-2 samples per year), which is insufficient to characterize changes in loading, particularly given the adoption of the Selenium TMDL in North San Francisco Bay by the San Francisco Bay Regional Water Board (Baginska, 2015).

In addition to the Delta stations, a continuing effort by the USGS reports total selenium at the Vernalis (San Joaquin River) and Freeport (Sacramento River) with low detection limits after 2007, at a monthly or bi-weekly frequency. This work is performed as part of routine monitoring and is expected to continue into the future. The Freeport and Vernalis stations are also used to characterize a large number of real-time and grab-sample parameters, as well as discharges that will be important in interpreting changes in inflows to the Delta over time.

## 4. Selenium Sampling Network Plan

The goal of this plan is to propose a sampling network that can detect early changes in selenium levels in the Delta due to upstream changes in flows and/or plumbing, potentially caused by the construction and/or future operation of the California WaterFix. Therefore, stations near the confluence of the major inflows before entering the Bay and stations that represent major pathways of water flow to the Bay are proposed. Possible changes in the Delta could lead to a greater proportion of Sacramento River being diverted compared to the San Joaquin River, with a potential impact on selenium loading. Stations that track contributions from the San Joaquin River are considered in the sampling plan below.

**Site Selection**

The existing water quality sampling network provides a strong basis for future selenium sampling as water quality data on ancillary parameters collected (such as suspended solids and chlorophyll a) may be used to correlate with selenium levels. The DWR RTM program monitors real-time salinity at surface and bottom of the water column. The USGS CAWSC maintains a network of sites for flow and water quality monitoring including salinity, nutrients, and suspended sediments, and therefore was used as a framework for site selection. Water quality data from these sites can be obtained from USGS WaterData website (waterdata.usgs.gov) and flow data from the California Data Exchange Center (CDEC).

For selenium sampling, stations are proposed at different locations in the Delta, identified by their codes in the CDEC database (Figure 5). Four sampling stations on tributaries/sloughs before entering the Bay are recommended. These stations include the Sacramento River at Rio Vista (RIO), San Joaquin River at Jersey Point (JER), Three Mile Slough (TMS), and Dutch Slough (DCH). These four rivers/sloughs represent major pathways entering the Bay before their

confluence at Mallard Island. Three Mile Slough connects between the Sacramento River and the San Joaquin River. Dutch Slough joins San Joaquin River upstream of San Joaquin River at Antioch. These stations contain existing water quality data such as temperature, specific conductance, nutrients, and suspended sediments.

The station that is most downstream of the Delta below the confluence of the Sacramento River and the San Joaquin River, Mallard Island (MAL), was also selected. Mallard Island represents results of mixing from all sources of selenium in the Delta.

Two stations in the interior Delta with extensive existing water quality data are also proposed to monitor contributions from the San Joaquin River to the Delta: Old River at Bacon (OLD) and Middle River at Holt (MRC). Fingerprint studies at these stations showed noticeable contributions from the San Joaquin River, particularly during wet months and wet years (Tetra Tech, 2017).

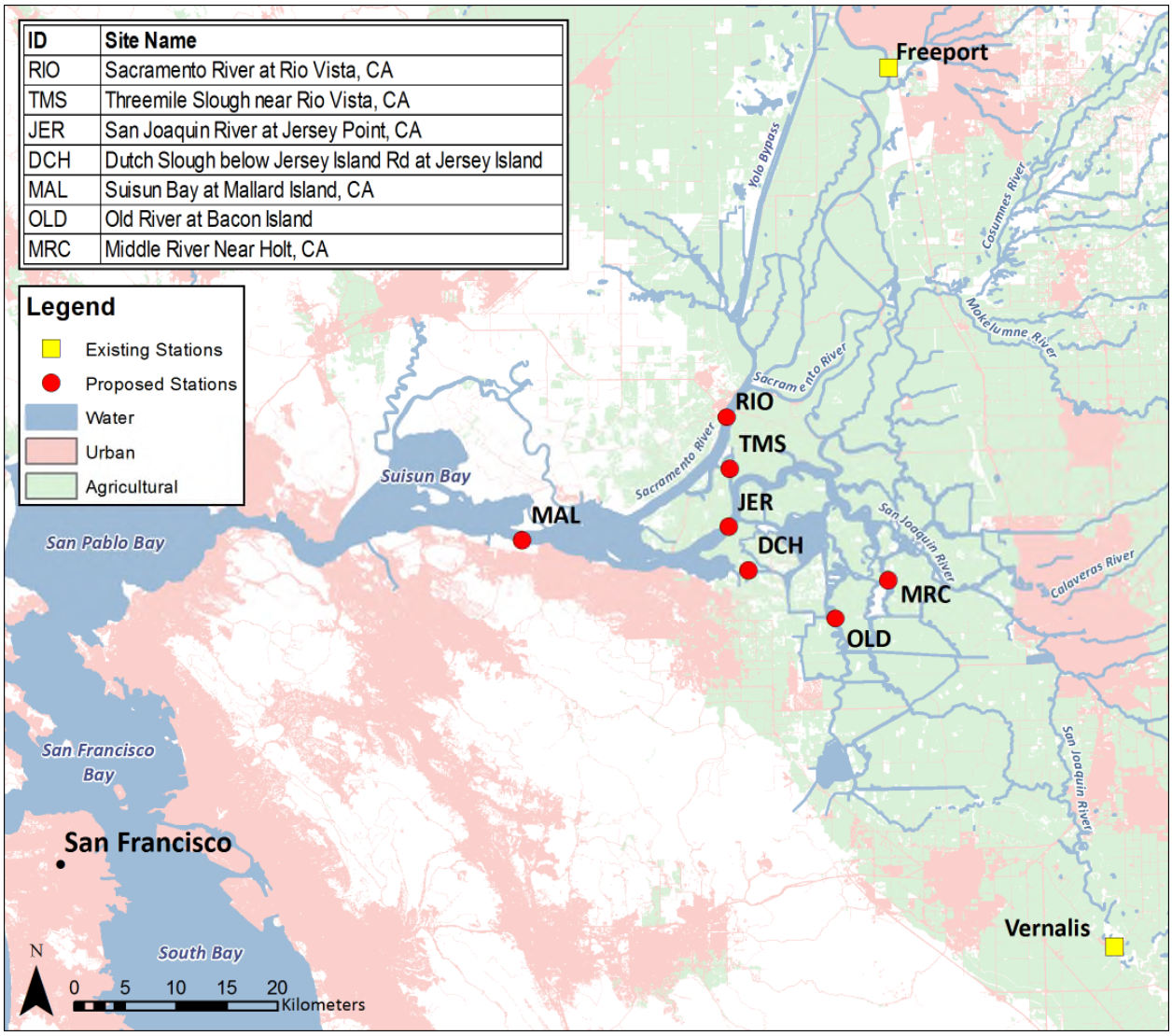
A summary of proposed sampling stations for selenium is presented in Table 1. Existing water quality data collected at these stations are summarized in Table 2.

**Sampling Frequency, Variables, and Commencement**

Because of variations that may exist in flow concentrations and observed selenium concentrations throughout the year and across different years, we propose 12 samples/year at each of the seven locations proposed. These are locations where the USGS has monitored flow water quality concentrations since the mid-1990s, and the sampling will support possible correlation of selenium data to the water quality variables. The sampling will include both dissolved and particulate selenium. Further, in order to establish baseline, pre-WaterFix Project, conditions relative to selenium at these sampling locations, we believe selenium sampling and analyses from these locations should begin as soon as reasonably possible.

**Laboratory Analysis**

Perform monthly sample collection and laboratory analysis for dissolved and filtered selenium. No further speciation of selenium (i.e., selenite, selenate, etc.) is envisioned, because of the additional cost of selenium speciation, and because the information gained from speciation does not provide additional insight into potential changes in loads from the Delta to the Bay. The filtered selenium concentrations are based on residue obtained on filters, and not through difference between filtered and unfiltered samples. Commercial laboratories are available that provide this analysis as a standard service, and with detection levels suitable for the concentrations encountered in the Delta.




- *Figure 5. Location of proposed stations for selenium sampling in the Delta, and existing riverine monitoring stations at San Joaquin River at Vernalis and Sacramento River at Freeport.*

*Table 1. Selected USGS stations for selenium sampling*

| Site Name | Site Number | Site Name | Latitude | Longitude | Water Quality Data |
|---|---|---|---|---|---|
| Rio | USGS 11455420 | Sacramento River at Rio Vista, CA | 38°08'57'' | 121°41'20'' | Yes |
| JER | USGS 11337190 | San Joaquin River at Jersey Point, CA | 38°03'08'' | 121°41'16'' | Yes |
| TMS | USGS 11337080 | Threemile Slough near Rio Vista, CA | 38 06'12'' | 121° 41'10'' | Yes |
| DCH | USGS 11313433 | Dutch Slough below Jersey Island Rd at Jersey Island | 38°00'49'' | 121°40'00" | Some |
| MAL | USGS11185185 | Suisun Bay at Mallard Island, CA | 38°02'34'' | 121°55'09'' | Yes |
| OLD | USGS 11313405 | Old River at Bacon Island | 37°58'12'' | 121°34'16' | Yes |
| MRC | USGS11312685 | Middle River Near Holt, CA | 38°00'11'' | 121°30'39'' | Yes |

*Table 2.Ongoing water quality sampling at selected locations*

| Site | Name | Sampled Variables | Sampling Period |
|---|---|---|---|
| RIO | Rio Vista | Depth, temperature, turbidity, specific conductance, dissolved oxygen, nutrients by species, suspended sediments, bed sediments, pesticides | 10/1980 – current |
| JER | San Joaquin River at Jersey Point | Depth, temperature, turbidity, specific conductance, nutrients, chlorophyll a, suspended sediments, bed sediments, pesticides | 09/2010 – current |
| TMS | Three Mile Slough | Depth, temperature, specific conductance, turbidity, bed sediments, suspended sediments | 09/2010 – current |
| DCH | Dutch Slough below Jersey Island | Depth, bed sediments, suspended sediments | 09/2010 – 05/2015 |
| MAL | Mallard Island | Depth, temperature, turbidity, specific conductance, dissolved oxygen, nutrients, chlorophyll a, bed sediments, suspended sediments, pesticides | 10/1998 – current |
| OLD | Old River at Bacon Island, CA | Depth, temperature, turbidity, specific conductance, dissolved oxygen, nutrients, chlorophyll a, bed sediments, suspended sediments | 06/1994 – current |
| MRC | Middle River Near Holt, CA | Depth, temperature, turbidity, specific conductance, dissolved oxygen, nutrients, chlorophyll a, bed sediments, suspended sediments | 06/1994 – current |

## 5. Sampling Plan Cost Estimate

The estimated annual budget for performing the work at the targeted level (7 stations with road access; 12 times per year) is $76,100 per year (Table 3). This budget is primarily for field work and selenium analysis, and does not assume reporting costs. It is assumed that the selenium analysis will benefit from existing sampling for other parameters at the selected locations.

*Table 3.Estimated annual budget*

| Task | Estimated Cost |
|---|---|
| ***Labor Costs*** | |
| Project Planning & Coordination (Annual) | $4,000 |
| Monitoring (12 times per year, 7 stations) | |
| Field Work (24 field days) | $48,000 |
| *Subtotal* | ***$52,000*** |
| ***Analysis*** | |
| Lab analysis (dissolved and particulate selenium), 90 samples | $22,500 |
| ***Other Direct Costs*** | |
| Sampling equipment (bottles, filters, cleaning supplies, etc.) | $500 |
| Shipping – 6 sampling events | $500 |
| Travel - 24 days of staff travel to field site | $600 |
| *Subtotal* | ***$1,600*** |
| ***Grand Total (Annual Cost)*** | **$76,100** |

## 6. References

Baginska, B. 2015. Total Maximum Daily Load Selenium in North San Francisco Bay: Staff Report for Proposed Basin Plan Amendment. Report prepared for the California Regional Water Resources Control Board, San Francisco Bay Region, November 2015. On the Internet at: http://www.waterboards.ca.gov/sanfranciscobay/board_info/agendas/2015/November/6_appendix_c.pdf

Tetra Tech, 2014. Review of Selenium Bioaccumulation Assessment in the Bay Delta Conservation Program Draft EIR/EIS, May 30.

Tetra Tech, 2017. Water Column Selenium Concentrations in the San Francisco Bay-Delta: Recent Data and Recommendations for Future Monitoring. Report prepared for San Francisco Estuary Institute, August 31.