

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION**

**RESOLUTION No. R2-2015-0048**

**Amending the Water Quality Control Plan for the San Francisco Bay Basin to Establish a Total Maximum Daily Load and Implementation Plan for Selenium in North San Francisco Bay**

**WHEREAS, the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board), finds that:**

1. The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives. The Basin Plan was duly adopted by the Water Board and approved by the State Water Resources Control Board (State Water Board), the State Office of Administrative Law (OAL), and the United States Environmental Protection Agency (U.S. EPA), where required.
2. The Basin Plan may be amended in accordance with Water Code section 13240, et seq. The proposed Basin Plan amendment complies with this section.
3. North San Francisco Bay segments, including the portion of the Sacramento/San Joaquin Delta within the San Francisco Bay region, Suisun Bay, Carquinez Strait, San Pablo Bay, and Central Bay, have been identified under federal Clean Water Act section 303(d) as impaired due to selenium.
4. Under Clean Water Act section 303(d), the Water Board is required and authorized to establish the total maximum daily load (TMDL) for those pollutants identified as causing impairment of waters on the 303(d) list. Additionally, under Water Code section 13242, the Water Board is authorized to develop an implementation program to achieve water quality objectives.
5. The Basin Plan amendment, including specifications on its physical placement in the Basin Plan, is set forth in Exhibit A. The Basin Plan amendment establishes: 1) a selenium TMDL that equals to the sum of loads from the existing major sources (5300 kg Se/year); b) fish tissue-based numeric targets expressed as concentrations in whole-body fish and muscle tissue; c) a water column target derived from the fish tissue targets and protective of aquatic life from chronic selenium exposure; d) wasteload and load allocations for the selenium source categories; and 4) an implementation plan to monitor and ensure that the water quality targets are met.
6. The scientific basis for the TMDL, described in Finding 5, was subjected to an independent, external peer review pursuant to the requirements of California Health and Safety Code section 57004. Water Board staff revised the proposed Basin Plan amendment in response to the comments provided by the reviewers. The peer reviewers' responses confirmed that

the rulemaking portions of the proposed TMDL and implementation plan are based on sound scientific knowledge, methods, and practices.

7. On July 24, 2015, Water Board staff publicly noticed and distributed for public review and comment the proposed Basin Plan amendment, supporting draft Staff Report, and Environmental Checklist, in accordance with applicable State and federal laws and regulations.
8. The process of basin planning has been certified by the State's Secretary for Resources as exempt from the requirements of the California Environmental Quality Act (CEQA) (Public Resources Code § 21000 et seq.) to prepare an Environmental Impact Report or Negative Declaration. The Basin Plan amendment, Environmental Checklist, Staff Report, and supporting documentation serve as a substitute environmental document under the Water Board's certified regulatory program.
9. The Water Board has duly considered the Environmental Checklist, Staff Report, and supporting documentation with respect to environmental impacts and finds that the proposed Basin Plan amendment will not have a significant impact on the environment. The Water Board further finds, based on consideration of the record as a whole, that there is no potential for adverse effect, either individually or cumulatively, on wildlife as a result of the proposed Basin Plan amendment.
10. The Water Board has also considered the environmental analysis in the Staff Report and the Environmental Checklist of the reasonably foreseeable methods of compliance with the Basin Plan amendment, including economic impacts.
11. The Water Board has carefully considered all comments and testimony received, including responses thereto, on the Basin Plan amendment, as well as all of the evidence in the administrative record.
12. The Basin Plan amendment must be submitted for review and approval by the State Water Board, OAL, and U.S. EPA. Once approved by the State Water Board, the amendment is submitted to OAL and U.S. EPA. The Basin Plan amendment will become effective upon approval by OAL and U.S. EPA.

**NOW, THEREFORE BE IT RESOLVED THAT:**

1. The Water Board adopts the Basin Plan amendment as set forth in Exhibit A hereto.
2. The Executive Officer is directed to forward copies of the Basin Plan amendment to the State Water Board in accordance with the requirements of Water Code section 13245.
3. The Water Board requests that the State Water Board approve the Basin Plan amendment in accordance with the requirements of Water Code sections 13245 and 13246 and forward it to OAL and U.S. EPA for approval.
4. If, during the approval process, Water Board staff, the State Water Board, or OAL determines that minor, non-substantive corrections to the language of the amendment are needed for clarity or consistency, the Executive Officer may make such changes and shall inform the Water Board of any such changes.
5. Since the Basin Plan amendment will involve no potential for adverse effect, either individually or cumulatively, on wildlife, the Executive Officer is directed to sign a CEQA Filing Fee No Effect Determination Form and to submit the exemption in lieu of payment of the Department of Fish and Wildlife CEQA filing fee.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on November 18, 2015.

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BRUCE H. WOLFE  
Executive Officer

Attachment

EXHIBIT A – BASIN PLAN AMENDMENT TO ESTABLISH A TOTAL MAXIMUM DAILY LOAD AND IMPLEMENTATION PLAN FOR SELENIUM IN NORTH SAN FRANCISCO BAY

# Exhibit A

PROPOSED BASIN PLAN AMENDMENT

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# PROPOSED BASIN PLAN AMENDMENT

*The following text is to be inserted into Chapter 7.2. Water Quality Attainment Strategies and TMDLs for San Francisco Bay and Bay Segments*

## **7.2.4 North San Francisco Bay Selenium Total Maximum Daily Load (TMDL)**

The following sections establish the TMDL for selenium in North San Francisco Bay segments (North Bay) including the portion of the Sacramento/San Joaquin Delta (within the San Francisco Bay region), Suisun Bay, Carquinez Strait, San Pablo Bay, and Central Bay. The associated numeric targets, allocations, and implementation plan are designed to ensure attainment of selenium water quality standards, including beneficial uses in the North Bay.

### **7.2.4.1 Problem Statement**

This TMDL addresses selenium impairment in North San Francisco Bay segments. Selenium is an essential and naturally-occurring micronutrient but in high quantities can cause reproductive impairment. Dietary uptake of particulate selenium is the most important exposure pathway for aquatic organisms, especially predators, and some types of food webs bioaccumulate selenium more efficiently than others. In the North Bay, selenium bioaccumulation at levels of concern has been detected only in clam-eating bottom feeders, such as white sturgeon and Sacramento splittail. Sturgeon feed predominantly on benthic organisms, including invasive, non-native clams (i.e., *Potamocorbula amurensis*) that are very efficient selenium bioaccumulators, which makes sturgeon susceptible to bioaccumulation of selenium to toxic levels. This TMDL is intended to ensure protection of the estuarine habitat beneficial uses, and to the extent that other beneficial uses are affected by selenium, the TMDL will also ensure protection of other beneficial uses, specifically, preservation of rare and endangered species, wildlife, and commercial and sport fishing beneficial uses.

#### 7.2.4.2 Numeric Targets

The numeric targets for the North Bay are listed in Table 7.2.4-1.

**Table 7.2.4-1 Numeric Targets for Selenium**

<b>Fish Tissue Targets</b>	<b>Water Column Target</b>
<b>8.0</b> µg/g whole-body dry weight	<b>0.5</b> µg/L (dissolved total Se)
<b>11.3</b> µg/g muscle tissue dry weight	

The whole-body fish tissue target protects against long-term chronic effects of selenium in fish and forms the basis for the water column target. Both the fish tissue and the water column targets will be evaluated to assess protection of beneficial uses. Attainment of the fish tissue targets will be assessed by comparing measured selenium concentrations in fish to the appropriate tissue. Concentrations in sturgeon will be compared to the muscle tissue target, because sturgeon are too large a fish to be analyzed whole and, therefore, comparison to the whole-body numeric target is not feasible. Use of nonlethal sampling methods, i.e., sampling of tissue plugs, in lieu of muscle tissue sampling for sturgeon, is allowed, if there is documentation that the nonlethal method provides data comparable to muscle tissue data.

#### 7.2.4.3 Sources

The main inputs of selenium into the North Bay include contributions from the Sacramento and San Joaquin Rivers as Central Valley watershed load (4070 kg/yr), local tributaries (520 kg/yr), atmospheric deposition (<30 kg/yr), discharges from petroleum refineries (571 kg/yr), and municipal and industrial wastewater dischargers (117 kg/yr). While loads from the Sacramento River, local tributaries, including urban runoff, and atmospheric deposition represent natural background, the San Joaquin River loads include an anthropogenic source, agricultural drainage, generated by irrigation of seleniferous soils.

#### 7.2.4.4 Total Maximum Daily Load and Allocations

The TMDL for selenium is 5300 kg/year and represents the sum of loads from the existing major sources (Table 7.2.4-2). Because selenium bioaccumulation is a long-term process,

there is no evidence that selenium bioaccumulation is notably higher at any particular time of year, despite the strong seasonal variability in loads reaching the North Bay.

The TMDL is based on long-term estimates of loads from major sources; therefore the TMDL and allocations are expressed as annual loads.

Load allocations for major source categories are presented in Table 7.2.4-2. Individual wasteload allocations for petroleum refineries and municipal and industrial wastewater dischargers are presented in Table 7.2.4-3 and Table 7.2.4-4.

**Table 7.2.4-2 Selenium Load Allocations**

<b>Load Category</b>	<b>Load Source</b>	<b>Allocations [kg total Se per year]</b>
Load Allocations	Central Valley Watershed	4070
	Local Tributaries <sup>1</sup>	520
	Atmospheric deposition	<30
Wasteload Allocations	Petroleum Refineries	571
	Municipal Wastewater Dischargers	111
	Industrial Wastewater Dischargers	6
<b>Total TMDL</b>		<b>5300<sup>2</sup></b>

<sup>1</sup> An insignificant portion of this load is from urban runoff and therefore there is no allocation

<sup>2</sup> Total TMDL load differs from column sum due to rounding

**Table 7.2.4-3 Individual wasteload allocations for petroleum refineries**

<b>Permitted Entity</b>	<b>NPDES Permit</b>	<b>Allocation [kg/yr]</b>
Chevron Products Company	CA0005134	111
Phillips66 ( <i>formerly ConocoPhillips</i> )	CA0005053	93
Shell Oil Products US	CA0005789	244
Tesoro Refining and Marketing Company	CA0004961	60
Valero Refining Company	CA0005550	63
<b>Total</b>		<b>571</b>

**Table 7.2.4-4 Individual wasteload allocations for municipal and industrial dischargers**

<b>Permitted Entity</b>	<b>NPDES Permit</b>	<b>Allocation [kg/yr]</b>
<b>Municipal</b>		
City of American Canyon	CA0038768	1.6
City of Benicia	CA0038091	1.1
City of Calistoga	CA0037966	0.3
Central Contra Costa Sanitation District	CA0037648	17.4
Central Marin Sanitation Agency	CA0038628	4.0
Contra Costa Co. Sanitary District No.5	CA0037885	0.1
Delta Diablo Sanitary District	CA0038547	8.1
East Bay Municipal Utility District	CA0037702	30.0
Fairfield-Suisun Sewer District	CA0038024	9.7
Las Gallinas Valley Sanitary District	CA0037851	1.2
Marin County S.D. No 5	CA0037427	0.5
Mt. View Sanitary District	CA0037770	1.1
Napa Sanitation District	CA0037575	6.7
Novato Sanitary District	CA0037958	2.5
City of Petaluma	CA0037810	3.4
City of Pinole	CA0037796	2.2
Rodeo Sanitary District	CA0037826	0.4
Sausalito-Marin City Sanitary District	CA0038067	1.9
Sewerage Agency of Southern Marin	CA0037711	1.4
Sonoma Valley County Sanitary District	CA0037800	2.1
City of St. Helena	CA0038016	0.4
Treasure Island	CA0037810	0.1
Vallejo Sanitation & Flood Control District	CA0037699	6.7
West County Agency	CA0038539	7.9
Town of Yountville	CA0038121	0.2
<b>Industrial</b>		
Eco Services (formerly Solvay/Rhodia, Inc.)	CA0006165	0.7
USS-Posco Industries	CA0005002	4.5

<b>Permitted Entity</b>	<b>NPDES Permit</b>	<b>Allocation [kg/yr]</b>
C&H Sugar Company-Crockett WWTP	CA0005240	0.5
<b><i>Total</i></b>		<b><i>117</i></b>

Total load differs from column sum due to rounding

#### **7.2.4.5 Implementation Plan**

The intent of this implementation plan is to ensure attainment of selenium water quality standards. Existing selenium concentrations in the water column are below the TMDL target. Concentrations in sturgeon have been gradually decreasing since the late 1990s. For these reasons, it is appropriate to base the TMDL on current loading and focus the implementation plan on maintaining the current load into the future.

The main goal of the implementation plan is to prevent increases of selenium concentrations in North Bay waters and attain safe levels of selenium in fish, specifically sturgeon. This will be accomplished through:

- performance-based effluent limits for petroleum refineries;
- maintaining control actions to reduce loads from the San Joaquin River watershed; and
- continuation of ambient water quality monitoring in the North Bay and monitoring of flow and selenium concentrations in the lower San Joaquin River.

Because loads from the Sacramento River, local tributaries, and atmospheric deposition are representative of natural background, no implementation actions are necessary.

#### ***Petroleum Refineries***

Wasteload allocations for the five North Bay petroleum refineries shall be implemented through NPDES permits with performance-based mass limits expressed as kg/day. The mass limit shall be calculated as the 95<sup>th</sup> percentile of the daily loads based on representative effluent data collected during the period of 2000 through 2012. Establishing mass limits as the 95<sup>th</sup> percentile of daily loads is consistent with the calculation of annual loads and the wasteload allocations. Petroleum refineries shall report their average annual load once per permit term. Compliance with the mass limits shall be determined on a

monthly basis. The monthly average of daily loads should not exceed the mass limit. Permits shall also require the petroleum refineries to conduct or cause to be conducted monitoring to demonstrate attainment of the numeric targets.

### ***Municipal and Industrial Wastewater Dischargers***

NPDES permits for municipal and industrial wastewater dischargers are not required to have numeric effluent limits for selenium because these discharges have an insignificant impact on North Bay water quality, and no further selenium reductions are required to ensure attainment of the TMDL. To ensure ongoing protection of North Bay water quality, municipal and industrial wastewater dischargers shall be required to report their average annual load once per permit term to verify that selenium loading is consistent with the wasteload allocations identified in Table 7.2.4-4. Permits shall also require the dischargers to conduct or cause to be conducted monitoring to ensure the numeric targets are being attained in the North Bay.

### ***Central Valley Watershed (San Joaquin River)***

Selenium loads in the Sacramento River watershed are from naturally-occurring sources and are expected to remain at current levels or less. The San Joaquin River system conveys selenium-enriched agricultural drainage and runoff to the Delta and the North Bay.

Attainment of the Central Valley watershed load allocation relies on continued efforts to manage and reduce discharges of agricultural subsurface drainage in the San Joaquin River watershed. The Central Valley Regional Water Quality Control Board has established three TMDLs for selenium in San Joaquin River system water bodies receiving agricultural drainage. These TMDLs are implemented through the Grasslands Bypass Project, and implementation actions have gradually reduced the load of selenium discharged to these water bodies. Full attainment of the TMDLs is expected by 2019. Changes to the State Water or Central Valley Projects' operations, other upstream diversions, or flow modifications may cause increases of selenium loading into the North Bay, for example, from increased flows from the San Joaquin River but the magnitude and potential impacts of these changes are uncertain at this time. It is the intention of this Water Board to work

with the State and the Central Valley Water Boards to ensure the current load allocation for the Central Valley watershed in the TMDL is attained.

***Monitoring***

Monitoring to demonstrate attainment of the TMDL targets shall be conducted by maintaining discharger-funded RMP monitoring of selenium in fish and water at a spatial scale and frequency to determine whether concentrations in fish, specifically sturgeon, remain low and water column and fish tissue targets are met.

Monitoring of loads to demonstrate that they are consistent with the wasteload allocations shall be conducted by petroleum refineries and municipal and industrial wastewater dischargers.

The Water Board will work with the State Water Board and Central Valley Water Board through their planning and regulatory processes to ensure that monitoring is conducted to evaluate changes in selenium concentrations and loads from the Central Valley Watershed and San Joaquin River and to ensure that any increases in selenium upstream are addressed through the State Water Board's or Central Valley Water Board's regulatory processes.