

# **APPENDIX B**

## **PROPOSED BASIN PLAN AMENDMENT**

showing changes since July 24, 2015

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Changes to the July 24, 2015, version circulated for public comment are shown in underline and strike through mode. Underline text represents new text, and strike through text represents deleted text.

## PROPOSED BASIN PLAN AMENDMENT

*The following text is to be inserted into Chapter 7.2.*

### **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 ~~the~~ 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. ~~These targets are intended to be protective of all fish species.~~

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

Fish Tissue Targets	Water Column Target
<del>8.1</del> <b>8.0</b> µg/g whole-body dry weight	<b>0.5</b> µg/L (dissolved total Se)
<del>11.8</del> <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. ~~Attainment of Both~~ either the fish tissue ~~targets or~~ and the water column targets will be evaluated to assess protection of beneficial uses. ~~The whole-body fish tissue target is the basis for the water column target.~~ Attainment of the fish tissue targets will be ~~evaluated~~ assessed by comparing measured selenium concentrations in fish to the appropriate tissue. ~~whole-body target~~ Concentrations in sturgeon, ~~which~~ 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. ~~Because the water column target is derived from the whole-body fish tissue target, it represents longer term bioaccumulation in fish and is therefore considered to represent chronic conditions.~~ 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 ~~sample~~ 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 (~~416~~ **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</b> [kg total Se per year]
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	<u>56</u>
<b><i>Total TMDL</i></b>		<b><i>5300<sup>2</sup></i></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	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

<b>Permitted Entity</b>	<b>NPDES Permit</b>	<b>Allocation [kg/yr]</b>
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>		
<u>Eco Services Solvay</u> (formerly Solvay/Rhodia, Inc.)	CA0006165	<u>0.57</u>
USS-Posco Industries	CA0005002	4.5
<u>C&amp;H Sugar Company-Crockett WWTP</u>	<u>CA0005240</u>	<u>0.5</u>
<b>Total</b>		<b><u>16.17</u></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 other~~ 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 ~~will~~ shall be required to report their average annual load once per permit term to verify that selenium loading is consistent with ~~continues to be equal to or less than~~ 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 ~~is an exception because it~~ 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, specifically for example, from increased flows from the San Joaquin River but ~~these increases are not expected to be significant.~~ 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 ~~there are no load increases above~~ 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.