Proposed Amendment to the Water Quality Control Plan – Los Angeles Region

to Incorporate the

Total Maximum Daily Load for Metals and Selenium in the Calleguas Creek, its Tributaries and Mugu Lagoon

Proposed for adoption by the California Regional Water Quality Control Board, Los Angeles Region on June 8, 2006

Amendments

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Chapter 7. Total Maximum Daily Loads (TMDLs)
Calleguas Creek Watershed Metals and Selenium TMDL

This TMDL was adopted by:

The Regional Water Quality Control Board on [Insert date].

This TMDL was approved by:

The State Water Resources Control Board on [Insert date].
The Office of Administrative Law on [Insert date].
The U.S. Environmental Protection Agency on [Insert date].

The elements of the TMDL are presented in Table 7-19.1 and the Implementation Plan in Table 7-19.2

Table 7-19.1. Calleguas Creek Watershed Metals and Selenium TMDL: Elements

<table>
<tr><th>TMDL Element</th><th>Calleguas Creek Watershed Metals and Selenium TMDL</th></tr>
<tr><td>Problem Statement</td><td>Three of fourteen reaches in the Calleguas Creek Watershed (CCW) including Revolon Slough, Lower Calleguas Creek – Reach 2, and Mugu Lagoon are identified on the 2002 Clean Water Act Section 303(d) list of water-quality limited segments as impaired due to elevated levels of metals and selenium in water. The 303(d) listings, which were approved by the State Water Resources Control Board in February 2003, require the development of TMDLs to establish the maximum amount of pollutants a water body can receive without exceeding water quality standards. TMDLs for listed metals and selenium are presented herein in one document because, as a class of compounds, they possess similar physical and chemical properties that influence their persistence, fate, and transport in the environment.</td></tr>
<tr><td>Numeric Targets</td><td>This TMDL establishes four types of numeric targets: (1) CTR criteria in dissolved fraction for copper, nickel, and zinc, and in total recoverable form for mercury and selenium; (2) Fish tissue targets for mercury; (3) Bird egg targets for mercury and selenium ; and (4) Sediment quality guidelines for copper, nickel, and zinc for 303(d) listed reaches. Attainment of sediment quality targets will be evaluated in combination with sediment toxicity data, if available.

1. Copper Targets
<table>
<tr><th rowspan="2">Subwatershed</th><th colspan="2">Water Quality Target (ug dissolved Copper/L)</th><th rowspan="2">Sediment Target (SQuiRTs, ERL) (ppb)</th></tr>
<tr><th>Dry Weather CCC</th><th>Wet Weather CMC</th></tr>
<tr><td>Mugu Lagoon</td><td>3.1*WER[1]</td><td>4.8*WER[1]</td><td>34000</td></tr>
<tr><td>Calleguas Creek 2</td><td>3.1*WER[1]</td><td>4.8*WER[1]</td><td>34000</td></tr>
<tr><td>Calleguas Creek 3</td><td>25.9</td><td>26.3</td><td>NA[2]</td></tr>
<tr><td>Revolon/Beardsley</td><td>3.1*WER[1]</td><td>4.8*WER[1]</td><td>NA[2]</td></tr>
<tr><td>Conejo</td><td>27.9</td><td>41.6</td><td>NA[2]</td></tr>
<tr><td>Arroyo Simi/Las Posas</td><td>29.3</td><td>29.8</td><td>NA[2]</td></tr>
</table>
[1] The water quality targets for copper in the TMDL are expressed as the copper water quality criteria from the federal California Toxics Rule (CTR). Those criteria include a numerical threshold multiplied by a water-effect ratio (WER). The WER has a default value of 1.0 unless a site-specific WER is approved. To use a WER other than the default of 1.0, a study must be conducted consistent with USEPA's WER guidance and adopted by the Regional Board through the state's basin plan amendment process. A WER study for Mugu Lagoon (Reach 1), lower Calleguas Creek (Reach 2), Revolon Slough (Reach 4) and Beardsley Wash (Reach 5) has been submitted to the Regional Board. If the Regional Board approves site-specific WERs for copper in these waterbodies, the TMDL targets will be modified in accordance with all legal and regulatory requirements and implemented in accordance with the approved WERs using the equations set forth in Table 7-19.1 above.

[2] Sediment targets were not selected as alternative target for this reach as it is not on the 303(d) list.</td></tr>
</table>

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL

2. Mercury Targets

a) Fish Tissue (Human Health): 0.3 mg methylmercury/kg wet weight

b) Fish Tissue (Wildlife):

- Trophic Level (TL) 3[1] < 50 mm: 0.03 mg methylmercury/kg wet weight
- TL3 50-150mm: 0.05 mg methylmercury/kg wet weight
- TL3 150350mm: 0.1 mg methylmercury/kg wet weight

c) Bird Egg (Wildlife): less than 0.5 mg total mercury/kg wet weight

d) Water Column Target: 0.051 ug total mercury/L

[1] Tropic Level 3: Predators (e.g., minnows, sunfish) on tropic level 2 organism (e.g., copepods and water fleas)

3. Nickel Targets

Subwatershed	Water Quality Target (ug dissolved Nickel/L)		Sediment Target (SQuiRTs, ERL) (ppb)
	Dry Weather CCC	Wet Weather CMC	
Mugu Lagoon	8.2	74	20900
Calleguas Creek 2	8.2	74	NA[1]
Calleguas Creek 3	149	856	NA[1]
Revolon/Beardsley	8.2	74	NA[1]
Conejo	160	1292	NA[1]
Arroyo Simi/Las Posas	168	958	NA[1]

[1] Sediment targets were not selected as alternative target for this reach as it is not listed on the 303(d) list.

A study to support a SSO for nickel has been submitted to the Regional Board and is currently under reviewed by the Regional Board and U.S. EPA staff. If a SSO for nickel is approved, the Regional Board will consider revision to the numeric targets for nickel based on the approved SSO.

4. Selenium Targets

Subwatershed	Water Quality Target (ug Total Selenium/L)		Bird Egg (ug/g)
	Dry Weather CCC	Wet Weather CMC	
Mugu Lagoon	71	290	6
Calleguas Creek 2	5	290	6
Calleguas Creek 3	5	NA[1]	6
Revolon/Beardsley	5	290	6
Conejo	5	NA[1]	6
Arroyo Simi/Las Posas	5	NA[1]	6

[1] "NA" indicates that a target is not available for this constituent as criterion for fresh water is not defined in the CTR.

<table>
<tr><th>TMDL Element</th><th>Calleguas Creek Watershed Metals and Selenium TMDL</th></tr>
<tr><td></td><td>

5. Zinc Targets

<table>
<tr><th rowspan="2">Subwatershed</th><th colspan="2">Water Quality Target (ug dissolved Zinc/L)</th><th>Sediment Target (SQuiRTs, ERL)</th></tr>
<tr><th>Dry Weather CCC</th><th>Wet Weather CMC</th><th>(ppb)</th></tr>
<tr><td>Mugu Lagoon</td><td>81</td><td>90</td><td>150000</td></tr>
<tr><td>Calleguas Creek 2</td><td>81</td><td>90</td><td>NA[1]</td></tr>
<tr><td>Calleguas Creek 3</td><td>338</td><td>214</td><td>NA[1]</td></tr>
<tr><td>Revolon/Beardsley</td><td>81</td><td>90</td><td>NA[1]</td></tr>
<tr><td>Conejo</td><td>365</td><td>324</td><td>NA[1]</td></tr>
<tr><td>Arroyo Simi/Las Posas</td><td>382</td><td>240</td><td>NA[1]</td></tr>
</table>

[1] Sediment targets were not selected as alternative target for this reach as it is not on the 303(d) list.

</td></tr>
<tr><td>Source Analysis</td><td>Significant sources of metals and selenium include urban runoff, agricultural runoff, groundwater seepage, and POTW effluent. For mercury, open space was also a significant source. Sources were also analyzed as a function of wet and dry weather. Higher loads were delivered during wet weather for all constituents, due to the association between metals and particulate matter..

The source analysis indicates naturally occurring mercury in soil may be a significant source, naturally occurring nickel, copper, zinc, and selenium in soil may be a contributing source and naturally occurring selenium in groundwater may be a significant source. The TMDL Implementation Plan also includes special studies to address natural sources of metals in soil.</td></tr>
<tr><td>Linkage Analysis</td><td>Linkage between sources and instream pollutant concentrations was established through a dynamic water quality Hydrologic Simulation Program – FORTRAN (HSPF). The model output generally resulted in a conservative estimate of receiving water concentrations for metals. The model was used to calculate load reductions necessary to meet Numeric Targets. The load and waste load allocations were calculated based on the load reductions required to meet the numeric targets.</td></tr>
<tr><td>Waste Load Allocations</td><td>In the case of copper, nickel, and selenium, waste load allocations (WLAs) are developed for both wet and dry-weather. The dry-weather WLAs apply to days when flows in the stream are less than the 86th percentile flow rate for each reach. The wet-weather WLAs apply to days when flows in the stream exceed the 86th percentile flow rate for each reach. Annual mass loads of mercury in suspended sediment were developed according to low, medium, and high annual flow categories. A margin of safety of 15% was included in the WLAs for copper and nickel.</td></tr>
</table>

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL

POTWs

Concentration-based and mass-based WLAs are established for copper, nickel, and selenium in total recoverable forms, and are applied to POTWs during both wet and dry weather. Mass-based WLAs are developed for mercury for POTWs. Zinc allocations are not set because current information indicate that numeric targets for zinc are attained. The TMDL Implementation Plan includes a task to provide State Board data to support delisting of zinc. Waste load allocations for selenium are not set for POTWs because POTWs do not discharge to reaches listed for selenium. A margin of safety of 15% was included in the WLAs for copper and nickel. Interim limits are included to allow time for dischargers to put in place implementation measures necessary to achieve final waste load allocations. The daily maximum and monthly average interim limits are set equal to the 99th and 95th percentile of available discharge data respectively.

1. Interim and Final WLAs for Total Recoverable Copper in Water Column

POTW	Interim		Final[(e)]		
	Daily Maximum (ug/L)	Monthly Average (ug/L)	Daily Maximum (ug/L)**	Monthly Average (ug/L)**	lb/day
Hill Canyon WWTP	20.0	16.0	(a)	(a)	0.11*WER - 0.04
Simi Valley WQCP	(b)	(b)	31.0	30.5	(c)
Moorpark WTP	(b)	(b)	31.0	30.5	(d)
Camarillo WRP	57.0	20.0	(a)	(a)	0.12*WER - 0.04
Camrosa WRP	(b)	(b)	27.4	27.0	(d)

* If site-specific WERs are approved by the Regional Board, TMDL waste load allocations shall be implemented in accordance with the approved WERs using the equations set forth above. Regardless of the final WERs, total copper loading shall not exceed current loading. In addition, effluent concentrations shall not exceed the performance standards of current treatment technologies.

** Concentration-based targets have been converted to total recoverable allocations using the CTR default translator of 0.96

(a) Concentration-based final limits will be included in the permits in accordance with NPDES guidance and requirements, but are not calculated as part of the TMDL.

(b) Interim limits are not required because the discharger is meeting the final limits.

(c) Discharges from Simi Valley WQCP do not reach lower Calleguas Creek and Mugu lagoon during dry weather. Monitoring will be conducted and mass-based WLAs will be evaluated if targets are not met in Arroyo Simi/Las Posas or downstream reaches.

(d) Discharger does not contribute loading during dry weather. Concentration-based WLAs apply during wet weather when discharges occur. Monitoring will be conducted and mass-based WLAs will be evaluated if targets are not met in receiving water and/or downstream reaches.

2. Interim and Final WLAs for Total Recoverable Nickel in Water Column

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL

POTW	Interim		Final		
	Daily Maximum (ug/L)	Monthly Average (ug/L)	Daily Maximum (ug/L)*	Monthly Average (ug/L)**	lb/day
Hill Canyon WWTP	8.3	6.4	(a)	(a)	0.3
Simi Valley WQCP	(b)	(b)	960.0	169.0	(c)
Moorpark WTP	(b)	(b)	960.0	169.0	(d)
Camarillo WRP	16.0	6.2	(a)	(a)	0.2
Camrosa WRP	(b)	(b)	858.0	149.0	(d)

* Concentration-based targets have been converted to total recoverable allocations using the CTR default translator of 0.998.

** Concentration-based targets have been converted to total recoverable allocations using the CTR default translator of 0.997.

(a) Concentration-based final limits will be included in the permits in accordance with NPDES guidance and requirements, but are not calculated as part of the TMDL.

(b) Interim limits are not required because the discharger is meeting the final limits.

(c) Discharges from Simi Valley WQCP do not reach lower Calleguas Creek and Mugu lagoon during dry weather. Monitoring will be conducted and mass-based WLAs will be evaluated if targets are not met in Arroyo Simi/Las Posas or downstream reaches.

(d) Discharger does not contribute loading during dry weather. Concentration-based WLAs apply during wet weather when discharges occur. Monitoring will be conducted and mass-based WLAs will be evaluated if targets are not met in receiving water and/or downstream reaches.

A study to support a SSO for nickel has been submitted to the Regional Board and is currently under reviewed by the Regional Board and U.S. EPA staff. If a SSO for nickel is approved, the Regional Board will consider revision to the final WLAs for nickel based on the approved SSO.

3. Interims and Final WLAs for Mercury in Suspended Sediment:

Waste load allocations for POTWs are based on the median monthly mercury effluent concentrations which are currently more stringent than the numeric targets multiplied by the design flow where the total load in water is assumed equal to the suspended sediment load. Interim WLAs for are based on 90th percentile concentration observed in effluent discharge and design flow and apply to all flow conditions.

POTW	Interim (lb/month)	Final (lb/month)
Hill Canyon WWTP	0.23	0.022
Simi Valley WQCP	0.18	0.031
Moorpark WTP	N/A	N/A
Camarillo WRP	0.03	0.015
Camrosa WRP	N/A	N/A

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL

Urban Runoff

Mass-based WLAs are established for copper, nickel, and selenium in total recoverable forms. Mass-based WLAs are developed for mercury in suspended sediment. Interim limits are included to allow time for dischargers to put in place implementation measures necessary to achieve final waste load allocations. The daily maximum and monthly average interim limits are set equal to the 99th and 95th percentile of available discharge data.

I. Interim Limits and Final Waste Load Allocations for Total Recoverable Copper, Nickel, and Selenium

Interim limits and waste load allocations are applied in receiving water.

A. Interim Limits

Constituents	Calleguas and Conejo Creek			Revolon Slough		
	Dry Daily Maximum (ug/L)	Dry Monthly Average (ug/L)	Wet Daily Maximum (ug/L)	Dry Daily Maximum (ug/L)	Dry Monthly Average (ug/L)	Wet Daily Maximum (ug/L)
Copper	23	19	204	23	19	204
Nickel	15	13	(a)	15	13	(a)
Selenium	(b)	(b)	(b)	14 (c)	13 (c)	(a)

(a) The current loads do not exceed the TMDL under wet conditions, interim limits are not required.
(b) Selenium allocations have not been developed for this reach as it is not on the 303(d) list. Implementation actions includes consideration of watershed-wide selenium impacts.
(c) Attainment of interim limits will be evaluated in consideration of background loading data, if available.

B. Final WLAs

1. Dry-Weather WLAs in Water Column (lbs/day)

Flow Range	Calleguas and Conejo Creek			Revolon Slough		
	Low Flow	Average Flow	Elevated Flow	Low Flow	Average Flow	Elevated Flow
Copper[(b)]	0.04*WER - 0.02	0.12*WER - 0.02	0.18*WER - 0.03	0.03*WER - 0.01	0.06*WER - 0.03	0.13*WER - 0.02
Nickel	0.100	0.120	0.440	0.050	0.069	0.116
Selenium	(a)	(a)	(a)	0.004	0.003	0.004

* If site-specific WERs are approved by the Regional Board, TMDL waste load allocations shall be implemented in accordance with the approved WERs using the equations set forth above. Regardless of the final WERs, total copper loading shall not exceed current loading.

(a) Selenium allocations have not been developed for this reach as it is not on the 303(d) list. Implementation actions include consideration of the watershed-wide selenium impacts.

2. Wet-Weather WLAs in Water Column (lbs/day)

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL

Constituent	Calleguas Creek	Revolon Slough
Copper*	(0.00054*Q^2*0.032*Q - 0.17)*WER - 0.06	(0.0002*Q2+0.0005*Q)*WER
Nickel**	0.014*Q^2+0.82*Q	0.027*Q^2+0.47*Q
Selenium**	(a)	0.027*Q^2+0.47*Q

* If site-specific WERs are approved by the Regional Board, TMDL waste load allocations shall be implemented in accordance with the approved WERs using the equations set forth above. Regardless of the final WERs, total copper loading shall not exceed current loading.

** Current loads do not exceed loading capacity during wet weather. Sum of all loads cannot exceed loads presented in the table

(a) Selenium allocations have not been developed for this reach as it is not on the 303(d) list. Implementation actions include consideration of the watershed-wide selenium impacts.

Q: Daily storm volume.

II. Interim Limits and Final WLAs for Mercury in Suspended Sediment (lbs/yr)

Final WLAs are set at 80% reduction from HSPF load estimates. Interim limits for mercury in suspended sediment are set equal to the highest annual load within each flow category, based on HSPF output for the years 1993-2003.

Flow Range	Calleguas Creek		Revolon Slough	
	Interim (lbs/yr)	Final (lbs/yr)	Interim (lbs/yr)	Final (lbs/yr)
0-15,000 MGY	3.3	0.4	1.7	0.1
15,000-25,000 MGY	10.5	1.6	4	0.7
Above 25,000 MGY	64.6	9.3	10.2	1.8

MGY: million gallons per year.

Final WLAs for Other NPDES Dischargers

I. Final WLAs for Total Recoverable Copper, Nickel, and Selenium

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL

Reach	Copper*		Nickel		Selenium	
	Dry Monthly Everage (ug/L)**	Wet Daily Maximum (ug/L)**	Dry Monthly Average (ug/L)***	Wet Daily Maximum (ug/L)***	Dry Monthly Average (ug/L)	Wet Daily Maximum (ug/L)
1	3.7*WER	5.8*WER	8.2	74	(b)	(b)
2	3.7*WER	5.8*WER	8.2	74	(b)	(b)
3	27.0	27.4	149	859	(b)	(b)
4	3.7*WER	5.8*WER	8.3	75	5	290
5	3.7*WER	5.8*WER	8.3	75	5	290
6	(a)	31.0	(a)	958	(b)	(b)
7	(a)	31.0	(a)	958	(b)	(b)
8	(a)	31.0	(a)	958	(b)	(b)
9	29.1	43.3	160	1296	(b)	(b)
10	29.1	43.3	160	1296	(b)	(b)
11	29.1	43.3	160	1296	(b)	(b)
12	29.1	43.3	160	1296	(b)	(b)
13	29.1	43.3	160	1296	(b)	(b)

* If site-specific WERs are approved by the Regional Board, TMDL waste load allocations shall be implemented in accordance with the approved WERs using the equations set forth above. Regardless of the final WERs, total copper loading shall not exceed current loading. In addition, effluent concentrations shall not exceed the performance standards of current treatment technologies

** Concentration-based targets have been converted to total recoverable allocations using the CTR default translator of 0.96 for freshwater reaches and 0.83 for saltwater reaches.

*** Concentration-based targets have been converted to total recoverable allocations using the CTR default translator of 0.997 for freshwater reaches and 0.99 for saltwater reaches.

(a) Discharges from these reaches do not reach lower Calleguas Creek and Mugu Lagoon during dry weather. Allocations are not required for these reaches.

(b) Selenium waste load allocations have not been developed for this reach as it is not on the 303(d) list. Implementation actions include consideration of the watershed-wide selenium impacts.

II. Final WLAs for Mercury

There is insufficient information to assign mass based WLAs to these sources. Therefore concentration-based waste loads allocations are set equal to 0.051 (ug/L) for other NPDES dischargers based on the CTR water column target for protection of human health from consumption organism only.

Load Allocation	Mass-based load allocations (LAs) for agriculture, and open space are developed for copper, nickel, and selenium in total recoverable forms. Open space represents background loads from ambient sources (i.e. natural soil concentrations, atmospheric deposition, and natural groundwater seepage) discharged from undeveloped open space, but not ambient sources that are discharged from developed land, such as agricultural and urban areas. LAs are developed for both wet and dry-weather. The dry-weather LAs apply to days when flows in the stream are less than 86th percentile flow rate for each reach. The wet-weather LAs apply to days when flows in the stream exceed 86th percentile flow rate for each reach. Annual mass loads of mercury in suspended sediment were developed according to low, medium, and high annual flow categories. A margin of safety of 15% was included in the LAs for copper and nickel.

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL

I. Interims and Final Load Allocations for Total Recoverable Copper, Nickel, and Selenium

Interim limits are included to allow time for dischargers to put in place implementation measures necessary to achieve final load allocations. The daily maximum and monthly average interim limits are set equal to the 99th and 95th percentile of available discharge data. Interim limits and load allocations are applied in receiving water at the compliance points.

A. Interim Limits

Constituents	Calleguas and Conejo Creek			Revolon Slough		
	Dry Daily Maximum (ug/L)	Dry Monthly Average (ug/L)	Wet Daily Maximum (ug/L)	Dry Daily Maximum (ug/L)	Dry Monthly Average (ug/L)	Wet Daily Maximum (ug/L)
Copper	24	19	1390	24	19	1390
Nickel	43	42	(a)	43	42	(a)
Selenium	(b)	(b)	(b)	6.7 (c)	6 (c)	(a)

(a) The current loads do not exceed the TMDL under wet conditions, interim limits are not required.
(b) Selenium allocations have not been developed for this reach as it is not on the 303(d) list. Implementation actions includes consideration of watershed-wide selenium impacts.
(c) Attainment of interim limits will be evaluated in consideration of background loading data, if available.

B. Final Load Allocation

1. Dry Weather LAs in Water Column (lbs/day)

Constituent		Calleguas Creek			Revolon Slough		
		Low Flow	Average Flow	Elevated Flow	Low Flow	Average Flow	Elevated Flow
Copper*	Agriculture	0.07* WER-0.03	0.12* WER-0.02	0.31*WER 0.05	0.07*WER 0.03	0.14*WER-0.07	0.35*WER -0.07
	Open Space	0.150	0.080	0.130	0.050	0.120	0.110
Nickel	Agriculture	0.420	0.260	0.970	0.390	0.690	1.600
	Open Space	0.450	0.420	0.560	0.010	0.020	0.020
Selenium	Agriculture	(a)	(a)	(a)	0.008	0.007	0.018
	Open Space	(a)	(a)	(a)	0.180	0.310	0.490

* If site-specific WERs are approved by the Regional Board, TMDL load allocations shall be implemented in accordance with the approved WERs using the equations set forth above.
(a) Selenium allocations have not been developed for this reach as it is not on the 303(d) list. Implementation actions include consideration of the watershed-wide selenium impacts.

2. Wet Weather LAs in Water Column (lbs/day)

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL

Constituent		Calleguas Creek	Revolon Slough
Copper*	Agriculture	(0.00017*Q^2*0.01*Q - 0.05)*WER - 0.02	(0.00123*Q^2+0.0034*Q)* WER
	Open Space	0.0000537*Q^2+0.00321*Q	0.0000432*Q^2+0.000765*Q
Nickel**	Agriculture	0.014*Q^2+0.82*Q	0.027*Q^2+0.47*Q
	Open Space	0.014*Q^2+0.82*Q	0.027*Q^2+0.47*Q
Selenium **	Agriculture	(a)	0.1*Q^2+1.8*Q
	Open Space	(a)	0.027*Q^2+0.47*Q

* If site-specific WERs are approved by the Regional Board, TMDL load allocations shall be implemented in accordance with the approved WERs using the equations set forth above.

** Current loads do not exceed loading capacity during wet weather. Sum of all loads cannot exceed loads presented in the table

(a) Selenium allocations have not been developed for this reach as it is not on the 303(d) list. Implementation actions include consideration of the watershed-wide selenium impacts.

Q Daily storm volume

II. Interim and Final LAs for Mercury in Suspended Sediment (lbs/yr)

Final LAs are set at 80% reduction from HSPF load estimates. Interim limits for mercury in suspended sediment are set equal to the highest annual load within each flow category, based on HSPF output for the years 1993-2003

Flow Range	Calleguas Creek				Revolon Slough			
	Agriculture		Open Space		Agriculture		Open Space	
	Interim	Final	Interim	Final	Interim	Final	Interim	Final
0-15,000 MGY[1]	3.9	0.5	5.5	0.7	2	0.2	2.9	0.2
15,000-25,000 MGY	12.6	1.9	17.6	2 .7	4.8	0.8	6.7	1.1
Above 25,000 MGY	77.5	11.2	108.4	17.9	12.2	2.2	17.1	2

[1] MGY: million gallons per year.

Margin of Safety

A margin of safety (MOS) for the TMDL is designed to address any uncertainty in the analysis that could result in targets not being achieved in the water bodies. Both implicit and explicit MOS are included for this TMDL. The implicit MOS stems from the use of conservative assumptions made during development of multiple numeric targets to ensure sufficient protection under all conditions and conservative methods employed in developing the TMDL. Background loads are assigned to the TMDL and assumed to remain constant throughout implementation of the TMDL. This results in higher required reductions for the other sources. Calculation of allocations is based on never exceeding numeric target concentrations rather than the once in three years exceedance referenced in the CTR. Calculations of current loads and loading capacity for Mugu Lagoon are based on the combined discharges from Calleguas Creek and Revolon Slough (without any dilution provided by tidal flushing), which over predicts actual concentrations in the Lagoon. A 15% explicit MOS is also included for copper and nickel to account for the uncertainty resulting from the

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL
	calculation of the allowable load based on the median flow rate and translator of each flow category. The 15% explicit MOS is determined sufficient to address the elevated flow category, but still account for the more conservative nature of low and average category.
Future Growth	Ventura County accounts for slightly more than 2% of the state's residents with a population of 753,197 (US Census Bureau, 2000). GIS analysis of the 2000 census data yields a population estimate of 334,000 for the CCW, which equals about 44% of the county population. According to the Southern California Association of Governments (SCAG), growth in Ventura County averaged about 51% per decade from 1900-2000; with growth exceeding 70% in the 1920s, 1950s, and 1960s. Significant population growth is expected to occur within and near present city limits until at least 2020. Future growth may initially increase loadings as construction activities expose bare soil and increase erosion-related discharges to receiving water. However, once development has been completed the presence of impermeable land surface and landscaped areas may reduce the amount of natural soils that are eroded and carried to the stream. For copper, future growth could increase loadings from urban areas and POTWs due to increased traffic (i.e., brake pad residues), architectural copper use and corrosion of copper pipes. Selenium loading may increase if increase irrigation raises the groundwater table and increases high selenium groundwater seepage to surface waters. However, if increased growth results in increased water demand and high selenium groundwater is pumped and treated to supply this demand, the selenium could decrease.
Seasonal Variations and Critical Conditions	Seasonal variations are addressed for copper, nickel, and selenium by developing separate allocation for wet and dry weather. Critical conditions for copper, nickel, and selenium are developed using model results to calculate the maximum observed 4-day average dry weather concentration and the associated flow condition. Wet weather, as a whole, is defined as a critical condition. For mercury, there is no indication that mercury contamination in Mugu Lagoon is consistently exacerbated at any particular time of the year. Since the potential effects of mercury are related to bioaccumulation in the food chain over long period time, any other short term variations in concentration which might occur are not likely to cause significant impacts upon beneficial uses. Therefore, seasonal variations do not affect critical conditions for Calleguas Creek watershed mercury TMDL.
Special Studies and Monitoring Plan	**<u>Special Studies</u>** Several special studies are planned to improve understanding of key aspects related to achievement of WLAs and LAs for the Metals and

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL
	Selenium TMDL ***1. Special Study #1 (Optional) – Evaluation and Initiation of Natural Sources Exclusion*** The TMDL technical report has identified ambient sources as the primary significant selenium and mercury loadings in the watershed and as potentially significant sources of copper and nickel. The portion of all ambient sources associated with open space runoff and natural groundwater seepage is accounted for in this TMDL as "background load." This special study will evaluate whether or not background loads for each constituent qualify for natural source exclusion. This study will also consider whether or not any portion of the ambient source contribution for agricultural or urban runoff loads qualify for natural source exclusions and/or provide a basis for site specific objectives. The presence of natural sources makes achievement of selenium and mercury targets during all conditions unlikely. For copper, achievement of the CTR targets or the WER based targets (if approved) in Revolon Slough may not be feasible due to the magnitude of background loads. Completion of site specific objectives and/or a use attainability analysis shall be required to review any potential change to water quality objectives for these constituents. This special study will be used to develop the necessary information to revise the water quality objectives for selenium and mercury and possibly for copper and nickel. ***2. Special Study #2 (Optional) – Identification of selenium contaminated Groundwater Sources*** The purpose of this special study will be to identify groundwater with high concentrations of selenium that is either being discharged directly to the stream or used as irrigation water. The investigation will focus on areas where groundwater has a high probability of reaching the stream and identify practical actions to reduce the discharge of the groundwater to the stream. The analysis will include an assessment of the availability of alternative water supplies for irrigation water, the costs of the alternative water supplies and the costs of reducing groundwater discharges. ***3. Special Study #3 (Optional) – Investigation of Soil Concentrations and Identification of "Hot Spots"*** The purpose of this special study will be to identify terrestrial areas with high concentrations of metals and/or selenium, either due to anthropogenic sources or resulting from high natural concentrations in

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL
	soils. Use of detailed soil maps for the watershed in combination with field survey and soil sampling may lead to identification of areas important for reducing overall loads reaching the stream. Identification of any areas with elevated soil concentrations of metals and/or selenium would create an opportunity for efficient and targeted implementation actions, such as remediation or erosion control. ***4. Special Study #4 (Optional) – Determination of Water Effect Ratio for Copper in Revolon Slough*** The purpose of this optional special study would be to calculate a WER for copper that is specific to Revolon Slough. A WER was not previously developed for Revolon Slough because it was not listed for copper. Subsequent monitoring demonstrated that the saltwater copper CTR criterion was exceeded in the Revolon Slough. This Study would parallel the developed WER for Mugu Lagoon and Calleguas Creek. This is an optional special study to be conducted if desired by the stakeholders or determined necessary by the Executive Officer. ***5. Special Study #5 (Optional) – Determination of Site-Specific Objectives for Mercury and Selenium*** Special Study #1 will evaluate whether a natural source exclusion is appropriate for background loads of mercury and selenium or any portion of the ambient source contributions to non-background loads in the Calleguas Creek watershed. This special study will develop any SSOs deemed necessary to account for the background conditions and/or site-specific impacts of mercury and selenium (and possibly for copper and nickel) on wildlife and humans in the watershed. This is an optional special study to be conducted if desired by the stakeholders or determined necessary for establishing a natural source exclusion. **<u>Monitoring Plan</u>** The Calleguas Creek Watershed TMDL Monitoring Plan (CCWTMP) is designed to monitor and evaluate the implementation of this TMDL and refine the understanding of metal and selenium loads. CCWTMP is intended to parallel efforts of the Calleguas Creek Watershed Nutrients TMDL, Toxicity TMDL, and OC Pesticide, PCBs, and Sediment TMDL monitoring programs. The proposed CCWTMP shall be made available for public review before approval by the Executive Officer. The goals of the CCWTMP include: (1) to determine compliance with copper, mercury, nickel, and selenium numeric targets at receiving water monitoring stations and at POTWs discharges; (2) to determine

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL
	compliance with waste load and load allocations for copper, mercury, nickel, and selenium at receiving water monitoring stations and at POTWs discharges; (3) to monitor the effect of implementation action by urban, POTW, and agricultural dischargers on in-stream water quality; and (4) to implement the CCWTMP in a manner consistent with other TMDL implementation plans and regulatory actions within the Calleguas Creek watershed. Monitoring conducted through the Conditional Waiver Program may meet part of the needs of the CCWTMP. To the extent monitoring required by the Metals and Selenium TMDL Implementation Plan parallels monitoring required by the Conditional Waiver Program, it shall be coordinated with the Conditional Waiver Program monitoring conducted by individuals and groups subject to the term and conditions of the Conditional Waiver. Monitoring will begin within one year of the effective date of the TMDL. In-stream water column samples will be collected monthly for analysis of general water quality constituents (GWQC), copper, mercury, nickel, selenium, and zinc for the first year. After the first year, the Executive Officer will review the monitoring report and revise the monitoring frequency as appropriate. In-stream water column samples will be generally be collected at the base of Revolon Slough and Calleguas Creek, and in Mugu Lagoon (collection of flow-based samples will occur above the tidal prism). Additionally, sediment samples will be collected semi-annually in Mugu Lagoon and analyzed for sediment toxicity resulting from copper, mercury, nickel, selenium, and zinc. At such a time as numeric targets are consistently met at these points, an additional site or sites will be considered for monitoring to ensure numeric targets are met throughout the lower watershed. Additional samples will be collected concurrently at representative agricultural and urban runoff land use stations as well as at POTWs in each of the subwatersheds and analyzed for GWQCs, copper, mercury, nickel, selenium, and zinc. The location of the land use stations will be determined before initiation of the CCWTMP. Environmentally relevant detection limits will be used for metals and selenium (i.e. detection limits lower than applicable target), if available at a commercial laboratory. ***Compliance sampling station locations:***

<table>
<tr><th>TMDL Element</th><th>Calleguas Creek Watershed Metals and Selenium TMDL</th></tr>
<tr><td></td><td>
<table>
<tr><th>Subwatershed</th><th>Station ID</th><th>Station Location</th><th>Contituent</th></tr>
<tr><td rowspan="4">Mugu Lagoon</td><td rowspan="4">01-11-BR</td><td rowspan="4">11th Street Bridge</td><td>Water Column: Cu, Ni, Hg, Se, Zn</td></tr>
<tr><td>Bird Egg: Hg, Se</td></tr>
<tr><td>Fish Tisue: Hg, Se</td></tr>
<tr><td>Sediment: Cu, Ni, Hg, Se, Zn</td></tr>
<tr><td rowspan="2">Revolon Slough</td><td rowspan="2">04-WOOD</td><td rowspan="2">Revolon Slough East Side of Wood Road</td><td>Water Column: Cu, Ni, Hg, Se, Zn</td></tr>
<tr><td>Fish Tisue: Hg, Se</td></tr>
<tr><td rowspan="3">Calleguas Creek</td><td>03-CAMAR</td><td>Calleguas Creek at University Drive</td><td>Water Column: Cu, Ni, Hg, Se, Zn</td></tr>
<tr><td>03D-CAMR</td><td>Camrosa Water Reclamation Plant</td><td>Water Column: Cu, Ni, Hg, Se, Zn</td></tr>
<tr><td>9AD-CAMA</td><td>Camarillo Water Reclamation Plant</td><td>Water Column: Cu, Ni, Hg, Se, Zn</td></tr>
<tr><td>Conejo Creek</td><td>10D-HILL</td><td>Hill Canyon Wastewater Treatment Plant</td><td>Water Column: Cu, Ni, Hg, Se, Zn</td></tr>
</table>
</td></tr>
<tr><td>Implementation Plan</td><td>The final WLAs will be included for permitted stormwater discharges, POTWs, and other NPDES discharges in accordance with the compliance schedules provided in Table 7-19.2. The Regional Board may revise these WLAs based on additional information developed through special studies and/or monitoring conducted as part of this TMDL. In addition, the implementation schedule was developed with the assumption that a WER for copper and a SSO for nickel will proceed following the TMDL. Should adoption and approvals of the WER and SSO not proceed, additional implementation actions could be required. The implementation plan includes discussion of implementation actions to address these conditions.

WLAs established for the three major POTWs in this TMDL will be implemented through NPDES permit limits. Compliance will be determined through monitoring of final effluent discharge as defined in the NPDES permit. The Hill Canyon and Camarillo WRPs are working towards discontinuing the discharge of effluent to Conejo Creek. If this plan is implemented, the POTW allocations for the watershed will be achieved by reduction of effluent discharges to the stream. The implementation plan includes sufficient time for this plan to be implemented. However, if this plan is altered, the POTWs will need to meet allocations through other method such as source control activities. The Regional Board will need to ensure that permit conditions are consistent with the assumptions of the WLAs. Should federal, state, or regional guidance or practice for implementing WLAs into permits be revised, the Regional Board may reevaluate the TMDL to incorporate such guidance.

In accordance with current practice, a group concentration-based WLA has been developed for all permitted stormwater discharges, including municipal separate storm sewer systems (MS4s), Caltrans, general</td></tr>
</table>

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL
	industrial and construction stormwater permits, and Naval Air Weapons Station Point Mugu. MS4 WLAs will be incorporated into the NPDES permit as receiving water limits measured in-stream at the base of Revolon Slough and Calleguas Creek, and in Mugu Lagoon and will be achieved through the implementation of BMPs as outlined in the implementation plan. The Regional Board will need to ensure that permit conditions are consistent with the assumptions of the WLAs. If BMPs are to be used, the Regional Board will need to detail its findings and conclusions supporting the use of BMPs in the NPDES permit fact sheets. Should federal, state, or regional guidance or practice for implementing WLAs into permits be revised, the Regional Board may reevaluated the TMDL to incorporate such guidance. The Regional Board may revise these WLAs based on the collection of additional information developed through special studies and/or monitoring conducted as part of this TMDL. LAs will be implemented through the State's Nonpoint Source Pollution Control Program (NPSPCP) and Conditional Waiver for Discharges from Irrigated Lands adopted by the Los Angeles Regional Water Quality Control Board on November 3, 2005. Compliance with LAs will be measured in-stream at the base of Revolon Slough and Calleguas Creek and in Mugu Lagoon and will be achieved through the implementation of BMPs consistent with the NPSPCP and the Conditional Waiver Program. The Conditional Waiver Program requires the development of an agricultural water quality management plan (AWQMP) to address pollutants that are exceeding receiving water quality objectives as a result of agricultural discharges. Therefore, implementation of the load allocations will be through the development of an AWQMP for metals and selenium. Implementation of the load allocations will also include the coordination of BMPs being implemented under other required programs to ensure metal discharges are considered in the implementation. Additionally, agricultural dischargers will participate in educational seminars on the implementation of BMPs as required under the Conditional Program. Studies are currently being conducted to assess the extent of BMP implementation and provide information on the effectiveness of BMPs for agriculture. This information will be integrated into the AWQMP that will guide the implementation of agricultural BMPs in the Calleguas Creek watershed. After implementation of these actions, compliance with the allocations and TMDL will be evaluated and the allocations reconsidered if necessary based on the special studies and monitoring plan section of the implementation plan

TMDL Element	Calleguas Creek Watershed Metals and Selenium TMDL
	As shown in Table 7-19.2, implementation of LAs will be conducted over a period of time to allow for implementation of the BMPs, as well as coordination with special studies and implementation actions resulting from other TMDL Implementation Plans (Nutrient, Historic Pesticides and PCBs, Sediment, Metals, Bacteria, etc.). The Regional Board may revise the LAs based on the collection of additional information developed through special studies and/or monitoring conducted as part of this TMDL.

Table 7-19.2 Calleguas Creek Watershed Metals and Selenium TMDL: Implementation Schedule

Item	Implementation Action[1]	Responsible Party	Completion Date
1	Effective date of interim Metals and Selenium TMDL waste load allocation (WLAs)	POTWs, Permitted Stormwater Dischargers[2] (PSD)	Effective date of the amendment
2	Effective date of interim Metals and Selenium TMDL load allocation (LAs)	Agricultural Dischargers	Effective date of the amendment
3a	Submit Calleguas Creek Watershed Metals and Selenium Monitoring Program	POTWs, PSD, Agricultural Dischargers	Within 3 months after the effective date of the amendment
3b	Implement Calleguas Creek Watershed Metals and Selenium Monitoring Program	POTWs, PSD, Agricultural Dischargers	Within 3 months of Executive Officer approval of the monitoring program
4a	Conduct a source control study, develop and submit an Urban Water Quality Management Program (UWQMP) for copper, mercury, nickel, and selenium	MS4s	Within 2 years after the effective date of the amendment
4b	Conduct a source control study, develop and submit an UWQMP for copper, mercury, nickel, and selenium	Caltrans	Within 2 years after the effective date of the amendment
4c	Conduct a source control study, develop and submit an UWQMP for copper, mercury, nickel, and selenium	NAWS point Mugu (US Navy)	Within 2 years after the effective date of the amendment
5	Implement UWQMP	PSD	Within 1 year of approval of UWQMP by the Executive Officer
6	Develop and submit an Agricultural Water Quality Management Program (AWQMP) as described in the Conditional Waiver Program	Agricultural Dischargers	Within 2 years after the effective date of the amendment
7	Implement AWQMP	Agricultural Dischargers	Within 1 year of approval of AWQMP by the Executive Officer
8	Seek delisting of zinc from the 303(d) list for Reach 1, Mugu Lagoon (available data suggest zinc is not causing impairment in the CCW)	POTWs, PSD, Agricultural Dischargers	During comment period for next 303(d) Listing cycle
9	Submit progress report on salinity management plan, including status of reducing WRP effluent discharges to Conejo and Calleguas Creek reaches of the watershed	POTWs	Within 3 years after the effective date of the amendment
10	If progress report identifies the effluent discharges reduction is not progressing, develop and implement source control activities for copper, mercury, nickel, and selenium	POTWs	Within 4 years after the effective date of the amendment
11	Re-evaluation of POTW interim waste load allocations for copper, mercury, and nickel	POTWs	Within 5 years after the effective date of the amendment

[1] The Regional Board regulatory programs addressing all discharges in effect at the time this implementation task is due may contain requirements substantially similar to the requirements of these implementation tasks. If such requirements are in place in another regulatory program including other TMDLs, the Executive Officer may revise or eliminate this implementation task to coordinate this TMDL implementation plan with other regulatory programs.

[2] Permitted Stormwater Dischargers (PSD) include MS4s, Caltrans, the Naval Air Weapons Station at Point Mugu, and general industrial and construction permittees.

Item	Implementation Action[1]	Responsible Party	Completion Date
12a	Evaluate the results of the OCs TMDL, Special Study – Calculation of sediment transport rates in the Calleguas Creek watershed for applicability to the metals and selenium TMDL	Agricultural Dischargers, PSD	Within 6 months of completion of the study
12b	Include monitoring for copper, mercury, nickel, and selenium in the OC pesticides TMDL, special Study – Monitoring of sediment by source and land use type	Agricultural Dischargers, PSD	Within 2 years after the effective date of the amendment
12c	Expand scope of the OC Pesticide TMDL, Special Study – Examination of food webs and accumulation in the Calleguas Creek watershed to ensure protection of wildlife to include mercury	Interested parties	If necessary, prior to end of the implementation period
12d	Evaluate the results of the OC Pesticides TMDL, Special Study – Effects of BMPs on Sediment and Siltation to determine the impacts on metals and selenium	Agricultural Dischargers, PSD	Within 6 months of completion of the study
13a	Submit work plan for Special Study #1 (Optional) – Identification of Natural Sources Exclusion	Agricultural Dischargers, PSD	Within 1 year after the effective date of the amendment
13b	Submit results of Special Study #1 (Optional) – Identification of Natural Sources Exclusion	Agricultural Dischargers, PSD	Within 3 years of approval of workplan by Executive Officer
14a	Submit work plan for Special Study #2 (Optional) – Identification of selenium Contaminated Groundwater Sources	POTWs, PSD, and Agricultural Dischargers	Within 1 year after the effective date of the amendment
14b	Submit results of Special Study #2 (Optional) – Identification of selenium Contaminated Groundwater Sources	POTWs, PSD, and Agricultural Dischargers	Within 1 year of approval of workplan by Executive Officer
15a	Submit work plan for Special Study #3 (Optional) – Investigation of Metals' "Hot Spot" and Natural Soil	PSD and Agricultural Discharger	Within 1 year after the effective date of the amendment
15b	Submit results of Special Study #3 (Optional) – Investigation of metals' "Hot Spot" and Natural Soil	PSD and Agricultural Discharger	Within 2 years of approval of workplan by Executive Officer
16	Special Study #4 (Optional) – Determination of WER for copper in Revolon Slough	PSD and Agricultural Dischargers	If necessary, prior to end of the implementation period
17	Special Study #5 (Optional) – Determination of Site Specific Objective for Mercury and Selenium	PSD and Agricultural Dischargers	If necessary, prior to end of the implementation period
18	Evaluate effectiveness of BMPs implemented under the AWQMP and UWQMP in controlling metals and selenium discharges	PSD and Agricultural Dischargers	6 years after the effective date of the amendment
19	Evaluate the results of implementation actions 14 and 15 (Special Study #2 & #3) and implement actions identified by the studies	POTWs, PSD, and Agricultural Dischargers	Within 1 year after the completion of the studies
20	If needed, implement additional BMPs or revise existing BMPs to address any issues not covered by implementation efforts of related Calleguas Creek watershed TMDLs (Nutrients, Toxicity, OC Pesticides, PCBs, and Siltation) and the Conditional Waiver Program	Agricultural Dischargers	7 years after the effective date of the amendment
21	Consider nickel SSO proposed by stakeholders	Regional Board	1 years after the effective

Item	Implementation Action[1]	Responsible Party	Completion Date
			date of the amendment.
22	Prepare water effect ratios for copper based on study performed by stakeholders for Regional Board consideration	Regional Board staff	Within 4 months of Regional Board adoption of the amendment.
23	Based on the result from items 1-23, Regional Board will consider re-evaluation of the TMDLs, WLAs, and LAs if necessary	Regional Board	2 years form submittal of information necessary for re-evaluation
24	POTWs will be required to reduce loadings by 25%, 50%, and 100% of the difference between the current loading and the WLAs at 5, 8 , and 10 years after the effective date, respectively.	POTWs	5, 8, and 10 years after the effective date of the amendment
25	Re-evaluation of Agricultural and Urban load and waste load allocations for copper, mercury, nickel, and selenium based on the evaluation of BMP effectiveness. Agricultural and urban dischargers will have a required 25%, 50%, and 100% reduction in the difference between the current loadings and the load allocations at 5, 10, and 15 years after the effective date, respectively.	Agricultural and Urban Dischargers	5, 10, and 15 years after the effective date of the amendment
26	Stakeholders and Regional Board staff will provide information items to the Regional Board, including: progress toward meeting TMDL load reductions, water quality data, and a summary of implementation activities completed to date	Regional Board	2 years after the effective date, and every 2 years following
27	Achievement of Final WLAs and water quality standards for copper, mercury, nickel, and selenium	POTWs	Within 10 years after the effective date of the amendment[3]
28	Achievement of Final WLAs and LAs and water quality standards for copper, nickel, mercury and selenium	Agricultural Dischargers, PSD	Within 15 years after the effective date of the amendment[3]

[3] Date of achievement of WLAs and LAs based on the estimated timeframe for educational programs, special studies, and implementation of appropriate BMPs and associated monitoring. The Conditional Waiver Program will set timeframes for the BMP management plans.