

Attachment 2  
Dominguez Channel and Greater LA and LB Harbor Waters Toxics Pollutants TMDLs  
Revisions to Section 3.2 of the TMDL Staff Report

Modifications to Section 3.2. through 3.2.4 are provided below. Modifications are based upon incorporating Comment #s 100 through #103 of the Detailed Technical Comments Matrix (Attachment 1). Additions are noted in bold and deletions in strikeout text.

### 3.2. Sediment

Numeric targets are established in this TMDL for metals, organics, and ~~toxicity~~ **sediment quality (sediment chemistry, sediment toxicity, and benthic community effects) related to direct effects (toxic effects) and for organics related to indirect effects (bioaccumulation)**. Sediment targets are guided by the Basin Plan, the ~~State Board~~ Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality (SQO Part 1) and the sediment quality guidelines of Long and MacDonald (Long et al., 1995; MacDonald et al., 2000) which are ~~recommended by~~ **acceptable guidelines per** the State Listing Policy. **This TMDL anticipates revisions, additions, or deletions to specific sediment targets based upon the results of stressor identification and development of site-specific sediment quality values.**

#### 3.2.1 Sediment Quality – Aquatic Life (Direct Effects SOOs)

California recently adopted the Water Quality Control Plan

California recently adopted the Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality (SQO Part 1) which applies to sediments within enclosed bays and Estuaries. EPA approved the Sediment Quality Plan on September 25, 2009. Part 1 of the Sediment Quality Plan establishes ~~a method to assess sediment quality which integrates a~~ **narrative objective for the protection of aquatic life and a narrative objective for the protection of human health. This section describes the targets associated with the protection of aquatic life. The narrative objective for the protection of human health is described in Section 3.3.**

**The aquatic life objective establishes the methods and procedures to interpret the narrative objective. These methods and procedures assess sediment quality by integrating** chemical and biological measures to determine if aquatic life within ambient sediment are protected or degraded by exposure to toxic pollutants in sediment. ~~The Sediment Quality Plan establishes sediment quality objectives (SQO) based on~~ **The assessment of sediment quality consists of the measurement and integration of three lines of evidence (LOE): including** sediment chemistry, sediment toxicity, and benthic community conditions. ~~These three lines of evidence are referred to as the sediment triad.~~

~~The Sediment Quality Plan—Part 1 describes a method and of using the three lines of evidence~~ **The data from these three lines of evidence are integrated** to categorize a sediment as “Unimpacted,” “Likely Unimpacted,” “Inconclusive,” “Possibly Impacted,” “Likely Impacted,” or “Clearly Impacted.” The categories “Unimpacted” and “Likely Unimpacted” are considered as achieving the protective condition for aquatic life in ambient sediment; these categories integrate the three lines of evidence ~~to define the TMDL targets for impaired sediments and are~~ **the applicable numeric targets for sediment quality (see Table 1). The thresholds**

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**established in the SQO Part 1 are based on statistical significance and magnitude of the effect. Therefore, this TMDL includes sediment chemistry, sediment toxicity and benthic community targets by use of the SQO Part 1. Where sediment quality is determined to be Unimpacted or Likely Unimpacted by the integration of multiple lines of evidence as shown in Table 1, but sediment chemistry values exceed the numeric targets in Table 3-7, such sediments will be determined as meeting the TMDL numeric targets.**

**None of the individual LOEs are sufficiently reliable when used alone to assess sediment quality impacts due to toxic pollutants. Within a given site, the LOEs applied to assess exposure may underestimate or overestimate the risk to benthic communities and do not indicate causality of specific chemicals. The LOEs applied to assess biological effects can respond to stresses associated with natural or physical factors, such as sediment grain size, physical disturbance, or organic enrichment. Each LOE produces specific information that, when integrated with the other LOEs, provides a more confident assessment of sediment quality relative to the narrative objective. When the exposure and effects tools are integrated, the approach can quantify protection through effects measures and also provide predictive capability through the exposure assessment.**

~~Whereas these target conditions—“Unimpacted” and “Likely Unimpacted” are the goal conditions, TMDLs and allocations need to be numeric according to federal regulations. Both the narrative and numeric target and described in more detail below.~~

The SQOs for the protection of aquatic life ~~and human health~~ are described below:

a. Aquatic Life – Benthic Community Protection

Pollutants in sediments shall not be present in quantities that, alone or in combination, are toxic to benthic communities in bays and estuaries of California. This narrative objective shall be implemented using the integration of multiple lines of evidence. The assessment of sediment quality consists of the measurement and integration of three lines of evidence (LOE). The LOE are:

- **Sediment Toxicity:** Sediment toxicity is a measure of the response of invertebrates exposed to surficial sediments under controlled laboratory conditions. The sediment toxicity LOE is used to assess both pollutant related biological effects and exposure. Sediment toxicity tests are of short durations and may not duplicate exposure conditions in natural systems. This LOE provides a measure of exposure to all pollutants present, including non-traditional or unmeasured chemicals.
- **Benthic Community Condition:** Benthic community condition is a measure of the species composition, abundance and diversity of the sediment-dwelling invertebrates inhabiting surficial sediments. The benthic community LOE is used to assess impacts to the primary receptors targeted for protection of aquatic life. Benthic community composition is a measure of the biological effects of both natural and anthropogenic stressors.

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- **Sediment Chemistry:** Sediment chemistry is the measurement of the concentration of chemicals of concern in surficial sediments. The chemistry LOE is used to assess the potential risk to benthic organisms from toxic pollutants in surficial sediments. The sediment chemistry LOE is intended only to evaluate overall exposure risk from chemical pollutants. This LOE does not establish causality associated with specific chemicals.

Each line of evidence produces specific information that, when integrated with the other lines of evidence provides a more confident assessment of sediment quality relative to sediment chemistry alone. When the exposure (chemistry) and effects (toxicity and benthic community assessment) are integrated, the approach can quantify protection through effects measures and also provide predictive capability through the exposure measure.

**Table 1. Sediment Quality Numeric Targets**

<b>LOE Category Combination</b>	<b>Sediment Chemistry Exposure<sup>1</sup></b>	<b>Benthic Community Condition<sup>2</sup></b>	<b>Sediment Toxicity<sup>3</sup></b>	<b>Station Assessment<sup>4</sup></b>
1	Minimal	Reference	Nontoxic	Unimpacted
2	Minimal	Reference	Low	Unimpacted
3	Minimal	Reference	Moderate	Unimpacted
5	Minimal	Low	Nontoxic	Unimpacted
6	Minimal	Low	Low	Likely Unimpacted
7	Minimal	Low	Moderate	Likely Unimpacted
9	Minimal	Moderate	Nontoxic	Likely Unimpacted
10	Minimal	Moderate	Low	Likely Unimpacted
13	Minimal	High	Nontoxic	Likely Unimpacted
17	Low	Reference	Nontoxic	Unimpacted
18	Low	Reference	Low	Unimpacted
19	Low	Reference	Moderate	Likely Unimpacted
21	Low	Low	Nontoxic	Unimpacted
22	Low	Low	Low	Likely Unimpacted
25	Low	Moderate	Nontoxic	Likely Unimpacted
29	Low	High	Nontoxic	Likely Unimpacted
33	Moderate	Reference	Nontoxic	Unimpacted
34	Moderate	Reference	Low	Likely Unimpacted
35	Moderate	Reference	Moderate	Likely Unimpacted
37	Moderate	Low	Nontoxic	Unimpacted
49	High	Reference	Nontoxic	Likely Unimpacted
50	High	Reference	Low	Likely Unimpacted
53	High	Low	Nontoxic	Likely Unimpacted

1 = Assessed in Tables 6, 7, and 8 of the Part 1 SQOs

2 = Assessed in Table 5 of the Part 1 SQOs

3 = Assessed in Table 4 of the Part 1 SQOs

4 = In the situation where a site categorized as Possibly Impacted is determined through stressor identification to be degraded not as a result of toxic pollutants in sediments, in that instance, Possibly Impacted will also be considered an equivalent protective condition.

***Section 3.2.2 – Benthic Community Effects***

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[This section is deleted in its entirety].

**Section 3.2.3 Sediment Toxicity**

[This section is deleted in its entirety].

**Section 3.2.4 Sediment Chemistry: Metals and Organics**

~~Sediment targets are the desired surface sediment concentrations for specific toxic pollutants to protect human health, aquatic organisms and wildlife as well as to restore all beneficial uses. [See Comments #xx]. Sediment targets represent longer term goals than water quality targets. This TMDL establishes numeric targets that are protective of aquatic life beneficial uses for organochlorine pesticides, PCBs, PAHs, and metals in sediments that are protective of aquatic life beneficial uses. Sediment targets represent longer term goals than water quality targets. While chlordane, dieldrin, toxaphene, DDT, and PCB impairments have been documented in fish tissue only, sediment targets are necessary as these fish tissue contaminants are directly associated with sediments which are the transport mechanism of these compounds to the fish. [See Comment #x].~~

~~The Part 1 Sediment Quality Objectives (SQOs) established by the Sediment Quality Plan provide objectives are based on the integration of multiple lines of evidence. that can be applied to sediments but does not provide individual numeric targets for sediment chemistry. To develop a TMDL, it is necessary to translate the narrative objectives in the Basin Plan and the lines of evidences in the SQOs into numeric targets that identify the measurable endpoint or goal of the TMDL and represent attainment of applicable numeric and narrative sediment and water quality standards. The individual lines of evidence, including sediment chemistry, may not be used as individual guidelines or objectives. However, the Part 1 sediment quality objectives include procedures for (1) establishing causality from specific chemicals by conducting stressor identification (Part 1 SQOs, Section VII.F) and (2) developing site-specific sediment management guidelines (Part I SQOs, Section VII.H) as the process to estimate the level of pollutant stressor that will meet the narrative objective. This process is detailed in Section 7 (Implementation) but will not be completed prior to adoption of this TMDL.~~

~~Therefore, t~~The sediment quality guidelines of Effect Range Low (Long et al., 1995) and Threshold Effects Concentrations (MacDonald et al., 2000) are used to establish the numeric targets for freshwater sediment for Dominguez Channel, and marine sediment for the greater Los Angeles/Long Beach Harbor waters, as shown in Table 3-7. **Where sediment quality is determined to be Unimpacted or Likely Unimpacted by the integration of multiple lines of evidence as shown in Table 1, but sediment chemistry values exceed the numeric targets in Table 3-7, such sediments will be determined as meeting the TMDL numeric targets.**

No causality has been established for the chemicals identified in Table 3-7. ERLs are selected as the best available information at this time. Causality will be established

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**through the stressor identification process for areas identified as Clearly Impacted or Likely Impacted, as required in Section 7 (Implementation). This TMDL anticipates that revisions, additions, or deletions to specific sediment quality targets may be determined based upon the results of stressor identification and development of site-specific sediment quality values, including:**

- 1. the removal of specific chemicals – if chemicals identified in Table 3-7 are found not be causing or contributing to the impairment based on the stressor ID process, the targets for the specific chemicals will be removed from the TMDL.**
- 2. the addition of chemicals – if chemicals not identified in Table 3-7 are found to be causing or contributing to the impairment based on the stressor ID process, the targets for the specific chemicals will be added to the TMDL; and/or,**
- 3. revisions to targets for specific chemicals – if chemicals identified in Table 3-7 are found to be causing or contributing to the impairment based on the stressor ID process at a concentration higher or lower than the ERL-based target, the targets for the specific chemicals will be revised in the TMDL.**

The sediment quality guidelines of Long and MacDonald (Long et al., 1995; MacDonald et al., 2000) provide applicable numeric targets because the impairments and the 303(d) listings for PAHs, metals, toxicity and benthic community effects - are primarily based on sediment quality data for the Dominguez Channel estuary, Consolidated Slip, Fish Harbor, Inner and Outer Harbor, Cabrillo Beach-Inner, San Pedro Bay, and Los Angeles River Estuary. In addition, the pollutants being addressed have a high affinity for particles and the delivery of these pollutants is generally associated with the transport of suspended solids from the watershed or from sediments via porewater diffusion within the estuaries and greater Los Angeles/Long Beach Harbor waters.

~~The sediment quality guidelines of Effect Range Low (Long et al., 1995) and Threshold Effects Concentrations (MacDonald et al., 2000) are used to establish the numeric targets for freshwater sediment for Dominguez Channel, and marine sediment for the greater Los Angeles/Long Beach Harbor waters, as shown in Table 3-7.~~ The State Board listing policy recommends the use of the Effect Range Medians (ERMs), Probable Effect Levels (PELs), and other sediment quality guidelines as a threshold for 303d listing decisions. ERM and PEL values are interpreted as levels above which the adverse biological effects are expected, which make them applicable in the determination of impairment. The Threshold Effects Concentration (TEC) for freshwater sediment and Effect Range Low (ERL) for marine sediment values, on the other hand, represent the levels below which adverse biological effects are not expected to occur, and are more applicable to the prevention of impairment. The goal of the TMDL is to remove impairment and to restore beneficial uses; therefore, the TEC for freshwater sediment and ERLs for marine sediment are selected as numeric targets over the ERMs and PELs to limit adverse effects to aquatic life.

[See Comment #X regarding the next paragraph].

Table 3-7: Add the following footnote:

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Revisions, additions, and deletions to the ERL-based targets are anticipated based upon the results of stressor identification and development of site-specific sediment quality values.