Revision of the Total Maximum Daily Load for Metals for the Los Angeles River and its Tributaries – Second Revision

Staff Report

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1. Introduction

This staff report provides a brief overview of the scientific and regulatory basis for a proposed Basin Plan amendment to adopt site-specific objectives for lead and copper in the Los Angeles River Watershed and to revise the Los Angeles River and Tributaries Metals Total Maximum Daily Load (TMDL). The proposed amendment (1) adopts site-specific objectives for copper based on water-effect ratios, (2) adopts site-specific objectives for lead based on recalculated lead criteria, and (3) makes corresponding revisions to the TMDL to adjust the copper and lead numeric targets, loading capacities, and allocations in Reaches 1-4 of the river and six tributaries. The detailed rationale for the proposed amendment is included in Attachments A, B, and C to this staff report, entitled "Final Report Copper Water-Effect Ratio Study to Support Implementation of the Los Angeles River and Tributaries Metals TMDL," "Final Lead Recalculation Report to Support Implementation of the Los Angeles River and Tributaries Metals TMDL," and "Implementation of Results of the Los Angeles River Copper Water-Effect Ratio and Lead Recalculation Studies" (Implementation Report), respectively.

2. History of the TMDL

The Los Angeles Water Board adopted the Los Angeles River and Tributaries Metals TMDL on June 2, 2005 under Resolution No. R05-006. The TMDL was subsequently approved by the State Water Resources Control Board (State Board), the Office of Administrative Law (OAL), and USEPA. The effective date of the TMDL was January 11, 2006, when the Certificate of Fee Exemption was filed with the California Department of Fish and Wildlife.

The Los Angeles Water Board re-adopted the TMDL on September 6, 2007 by Resolution No. R07-014 in compliance with a writ of mandate issued by the Los Angeles County Superior Court in the matter of *Cities of Bellflower et al. v. State Water Resources Control Board et al.* (Los Angeles Superior Court # BS101732). The re-adopted TMDL was subsequently approved by State Board, OAL, and USEPA. The effective date of the re-adopted TMDL was October 29, 2008.

The TMDL allows for voluntary special studies, to evaluate the uncertainties and assumptions made during TMDL development. The original TMDL included a scheduled reconsideration of January 11, 2011 to re-evaluate the waste load allocations (WLAs) and the implementation schedule based on the results of special studies. However, the Los Angeles Water Board can reconsider the TMDL at any time in light of new information or studies.

The TMDL was revised in 2010 by Resolution No. R10-003 to adjust the copper targets for Reaches 1-4 of the River and the Burbank Western Channel and the copper WLAs for the Donald C. Tillman (Tillman), Los Angeles-Glendale (LA-Glendale), and Burbank water reclamation plants (WRPs) based on the results of a water-effect ratio (WER) special study performed by the cities of Los Angeles and Burbank. The TMDL was subsequently approved by State Board, OAL, and USEPA. The effective date of the revised TMDL is November 3, 2011.

The technical basis for the TMDL adopted by Resolution No. R05-006 and re-adopted by Resolution No. R07-014 is contained in the June 2005 staff report entitled "Total Maximum Daily Loads for Metals – Los Angeles River and Tributaries." The technical basis for the TMDL revision by Resolution No. R10-003 is contained in the March 2010 staff report entitled "Revision of the Total Maximum Daily Load for Metals for the Los Angeles River and its Tributaries."

3. Summary of Existing TMDL

The following is a summary of the existing TMDL as modified by the 2010 revision adopted by Resolution No. R10-003.

3.1 TMDL Numeric Targets

The TMDL includes numeric targets for cadmium, copper, lead, and zinc based on federally promulgated criteria in the California Toxics Rule (CTR)[1]. These criteria are the State's water quality objectives for these pollutants. The targets are expressed in terms of total recoverable metals and are adjusted using site-specific hardness values. There are separate targets for dry and wet weather because hardness values and flow conditions in the Los Angeles River and tributaries vary between dry and wet weather. The dry- weather targets are based on the chronic (4-day average) water quality objectives, while the wet-weather targets are based on the acute (short-term) water quality objectives. There are reach-specific dry-weather targets for several reaches and tributaries in the watershed, while the wet-weather targets only apply in Reach 1.

The CTR allows for the adjustment of certain metals criteria through the use of a water-effect ratio (WER) that accounts for site-specific chemical conditions. A WER is a ratio calculated by dividing an appropriate measure of toxicity of a material, such as the EC50[2], in site water by the same measure of toxicity of the same material in laboratory dilution water. A WER greater than 1.0 means that the site water reduces the toxic effects of the pollutant being tested. A WER less than 1.0 means that the site water increases the toxic effects of the pollutant being tested. No site-specific WERs had been developed for the Los Angeles River at the time the TMDL was adopted in 2005. Therefore, for those metals criteria containing a WER multiplier, a WER default value of 1.0 was assumed, as directed in the CTR, when setting the TMDL numeric targets and allocations.

However, on June 3, 2008, the City of Los Angeles Regulatory Affairs Division and the City of Burbank submitted the "Final Report for the Los Angeles River Copper WER Study." The study collected data from August 2005 to April 2006 in Reaches 1-4 of the Los Angeles River and the Burbank Western Channel. The study calculated WERs of 3.96 for Reaches 1-3 of the Los Angeles River and 5.87 for Reach 4 and the Burbank Western Channel.

[1] 40 C.F.R. § 131.38

[2] EC50 is the 50% effect concentration, or the concentration of a pollutant that adversely affects 50% of the test species

The TMDL was revised in 2010 to incorporate the results of the 2008 WER Study. Given the absence at the time of a sufficient analysis to demonstrate the protectiveness of adopting WERs for upstream reaches and tributaries that are greater than WERs in the river downstream, the most protective downstream WER of 3.96 was selected for all of the reaches and tributaries included in the study to ensure that water quality standards were attained downstream. The dry- and wet-weather numeric targets, as revised by Resolution No. R10-003, are presented in Table 1 and Table 2.

Table 1. Dry-weather numeric targets (µg total recoverable metals/L)

Reach	Copper	Lead	Zinc	Selenium
Reach 5, 6 and Bell Creek	WER[1] x 30	WER[1] x 19		5
Reach 4	WER[2] x 26	WER[1] x 10		
Reach 3 above LA-Glendale	WER[2] x 23	WER[1] x 12		
Reach 3 below LA-Glendale WRP	WER[2] x 26	WER[1] x 12		
Burbank Western Channel (above WRP)	WER[2] x 26	WER[1] x 14		
Burbank Western Channel (below WRP)	WER[2] x 19	WER[1] x 9.1		
Reach 2	WER[2] x 22	WER[1] x 11		
Reach 1	WER[2] x 23	WER[1] x 12		
Arroyo Seco	WER[1] x 22	WER[1] x 11		
Compton Creek	WER[1] x 19	WER[1] x 8.9		
Rio Hondo Reach 1	WER[1] x 13	WER[1] x 5.0	WER[1] x 131	

[1] WER(s) have a default value of 1.0 unless site-specific WER(s) are approved.

[2] The WER for this constituent in this reach is 3.96.

Table 2. Reach 1 Wet-weather numeric targets (µg total recoverable metals/L)

Cadmium	Copper	Lead	Zinc	Selenium
WER[1] x 3.1	WER[2] x 17	WER[1] x 62	WER[1] x 159	5

[1] WER(s) have a default value of 1.0 unless site-specific WER(s) are approved.

[2] The WER for this constituent in this reach is 3.96.

3.2 TMDL Source Assessment, Loading Capacity, and Allocations

There are significant differences in the sources of metals loadings during dry weather and wet weather. During dry weather, the three major publicly owned treatment works (POTWs) that discharge to the river (the Tillman, LA-Glendale, and Burbank WRPs) constitute the majority of the flow and metals loadings. During wet weather, most of the metals loadings are associated with stormwater.

The TMDL includes WLAs for point sources and load allocations (LAs) for nonpoint sources. The WLAs and LAs are interdependent and are represented by the following equation:

TMDL (Loading Capacity) = Σ (POTW WLAs) + Σ (Stormwater Sources WLAs) + Direct Air Deposition LA + Open Space LA

There are separate loading capacities, WLAs, and LAs for dry and wet weather based on the numeric targets in Tables 1 and 2. For dry weather, loading capacities are equal to reach-specific numeric targets multiplied by reach-specific critical dry-weather flows. There are allocations for upstream reaches and tributaries to meet TMDLs in downstream reaches. For wet weather, loading capacities are equal to the product of the daily storm volume and the Reach 1 wet-weather numeric target for each metal. The resulting curves identify the allowable load for a given flow. There are allocations for upstream reaches and tributaries to meet TMDLs in Reach 1.

The copper WERs developed in the 2008 study were used to adjust the copper loading capacities for Reaches 1-4 and the Burbank Western Channel and the WLAs for the Tillman, LA-Glendale, and Burbank WRPs. The Los Angeles Water Board found that it was necessary to wait for the completion of a watershed-wide copper WER study, as well as any other special studies, before revising all of the final copper WLAs and LAs for all sources.

4. Recent Special Studies

Two recently completed studies are the basis for the proposed Basin Plan amendments to (1) adopt site-specific objectives for copper based on water-effect ratios, (2) adopt site-specific objectives for lead based on recalculated lead criteria, and (3) make corresponding revisions to the TMDL to adjust the copper and lead numeric targets, loading capacities, and allocations in Reaches 1-4 of the river and six tributaries. The two studies are entitled "Final Report Copper Water-Effect Ratio Study to Support Implementation of the Los Angeles River and Tributaries Metals TMDL," included as Attachment A to this staff report, and "Final Lead Recalculation Report to Support Implementation of the Los Angeles River and Tributaries Metals TMDL," included as Attachment B.

On May 5, 2010, the Los Angeles River Metals TMDL Special Studies Steering Committee (representing the County of Los Angeles, the California Department of Transportation, and 34 cities located within the Los Angeles River watershed) submitted The "Work Plan for Recalculation and Water-Effect Ratio to Support Implementation of the Los Angeles River and Tributaries Metals TMDL" (Work Plan) to support special studies to evaluate the targets for copper and lead. The Executive Officer approved the 2010 Work Plan on February 24, 2011. The Work Plan detailed the approach to developing a copper WER and a recalculation of the lead criteria. The Work Plan included a public participation plan. As part of the plan, a technical advisory committee (TAC) and a stakeholder committee reviewed the work plan, work progress, and the final study reports. The TAC included experts not affiliated with the project and the stakeholder committee included Los Angeles Water Board staff, other state and federal agency staff and other interested parties. Public participation and comments were also solicited through comments on draft reports and public workshops.

4.1 2014 Copper WER Study

On May 13, 2014, the Los Angeles River Metals TMDL Special Studies Steering Committee submitted the results of a watershed-wide WER study entitled "Final Report Copper Water-Effect Ratio Study to Support Implementation of the Los Angeles River and Tributaries Metals TMDL" (Attachment A) in accordance with the 2010 Work Plan. The purpose of the study was to determine WERs for copper that would apply to all sources in Reaches 1, 2, 3, and 4 of the LA River, as well as select tributaries: Compton Creek, Rio Hondo, Arroyo Seco, Verdugo Wash, Burbank Western Channel and Tujunga Wash.

The WER Study approach was based on USEPA's 1994 Interim Guidance on Determination and Use of Water-Effect Ratios for Metals (Interim Guidance) and considered USEPA's 2001 Streamlined Water-Effect Ratio Procedure for Discharges of Copper (Streamlined Procedure).

A total of 83 dry weather and 20 wet weather samples were collected at 14 and 10 sites, respectively, during the WER Study. Sample processing and toxicity testing procedures conformed to the requirements of USEPA guidance documents, except that the study used a single species for toxicity testing, *C. dubia*, which was approved by the TAC. Sample WERs (sWERs) for each site were calculated following the USEPA's Interim Guidance and Streamlined Procedure WER calculation methods. Following the calculation of the sWERs, three distinct hydrologic conditions (summer dry weather, winter dry weather, and wet weather) were analyzed to determine the critical condition. The critical condition was determined to be dry weather, regardless of season; thus, a dry-weather WER would be protective during both dry and wet weather.

Final WERs (fWERs) were calculated from the geometric mean of six sWERs for each site during the critical condition except for Rio Hondo (five sWERs). The protectiveness of the Interim Guidance- and Streamlined Procedure-based fWERs was then evaluated, and it was determined that the Interim Guidance-based fWERs were not consistently protective, while the more conservative Streamlined Procedure-based fWERs were consistently protective. Therefore, the calculated fWERs are the Streamlined Procedure-based fWERs. In addition, the calculated fWER for the mainstem of the river is based on combining all the data for Reaches 1, 2, 3, and 4 because no significant differences were detected among the individual sites. The resulting fWER of 3.971 is very similar to the fWER found in the 2008 study (3.960). The calculated fWERs for the tributary sites were calculated separately due to significant differences between tributary sites.

The calculated final WERs for Reaches 1-4 and Compton Creek, Rio Hondo, Arroyo Seco, Verdugo Wash, Burbank Western Channel, and Tujunga Wash are presented in Table 3.

Table 3. Calculated WERs based on 2014 WER Study

Waterbody	Calculated fWER
LAR Reaches 1 through 4	3.971
Compton Creek	3.364
Rio Hondo	9.691
Arroyo Seco	1.324
Verdugo Wash	2.176
Burbank Western Channel below Burbank WRP	4.746
Burbank Western Channel above Burbank WRP	5.441
Tujunga Wash	8.279

4.2 Lead Recalculation Study

On May 13, 2014, the Los Angeles River Metals TMDL Special Studies Steering Committee also submitted a recalculation of lead criteria using USEPA's Recalculation Procedure entitled "Final Lead Recalculation Report to Support Implementation of the Los Angeles River and Tributaries Metals TMDL" (Attachment B) in accordance with the 2010 Work Plan. The purpose of the study was to recalculate lead criteria based on new data collected since USEPA's 1984 lead water quality criteria were developed, which were the basis of the CTR lead criteria and the lead numeric targets in the Los Angeles River Metals TMDL.

The report followed USEPA's Recalculation Procedure contained in Appendix B of the Interim Guidance and USEPA's *A Change in the Recalculation Procedure and Optional Consideration of Life Stage When the Recalculation Procedure is Used* (USEPA 1997). This method is intended to take into account relevant differences between the sensitivity of species in the national dataset and those at a site. However, the Recalculation Procedure can also consist of any updates or revisions in the data set (not necessarily site-specific updates). An internal USEPA draft dataset that met the minimum data requirements and water quality criterion calculation data requirements was provided by USEPA (USEPA 2008). Using this dataset, the study calculated updated final acute value and final chronic value equations:

$$\text{Acute (short-term) Equation} = (1.46203 - \ln(\text{hardness}) * 0.145712) * e^{1.466*\ln(\text{hardness})-1.882}$$

$$\text{Chronic (4-day) Equation}^{\text{Dissolved}}{}_{\text{Dissolved}} = (1.46203 - \ln(\text{hardness}) * 0.145712) * e^{1.466*\ln(\text{hardness})-3.649}$$

Species of interest were identified for the Los Angeles River Watershed, and based on the available data, the recalculated acute and chronic objectives are protective of those species. The dissolved objectives were then converted to numeric targets expressed as total recoverable metals based on CTR default translators and the hardness values used in the development of the original TMDL. This results in a calculated wet-weather target equal to 94 µg/L and the dry-weather numeric targets shown in Table 4.

Table 4. Calculated Dry-weather Lead Numeric Targets based on 2014 Lead Recalculation Study

Waterbody	Calculated Numeric Target
LAR Reach 5, 6, and Bell Creek	170
LAR Reach 4	83
LAR Reach 3 above LA-Glendale WRP	102
LAR Reach 3 below LA-Glendale WRP	100
LAR Reach 2	94
LAR Reach 1	102
Tujunga Wash	83
Burbank Western Channel above Burbank WRP	126
Burbank Western Channel below Burbank WRP	75
Verdugo Wash	102
Arroyo Seco	94
Rio Hondo	37
Compton Creek	73
Monrovia Canyon Creek	66

5. Proposed Basin Plan Amendments

The proposed amendments revise the water quality objectives for copper using WERs and recalculate the lead acute and chronic water quality objectives using an expanded national dataset, and correspondingly revise the Los Angeles River Metals TMDL in accordance with the revised water quality objectives.

5.1 Amendment of Water Quality Objectives for Copper to include WERs

The 2014 WER study proposed applying site-specific copper WERs throughout the Los Angeles River Watershed (Appendix A). The Implementation Report (Appendix C) recommended Basin Plan revisions that would incorporate the proposed copper WERs into site-specific water quality objectives. In some cases, the calculated WERs for tributaries are greater than the WERs for the reaches to which they discharge.

Attachment A to the Implementation Report contains an analysis of the protectiveness of applying calculated WERs for tributaries that are greater than the WERs for the reaches to

which they discharge. The analysis consisted of a mass-balance model using flow and concentration data for the tributaries and upstream reaches to predict concentrations in downstream reaches. The model used data collected from 2003 to 2013. Monte-Carlo simulations were run to predict downstream concentrations based on random selections from distributions of copper concentrations (adjusted such that WER- adjusted objectives for tributaries and reaches were met) and distributions of the upstream tributary flow proportion. Monte-Carlo simulations were run to generate daily downstream copper concentrations for a three-year period. These simulations were iterated 1000 times, generating 1000 3-year periods of predicted downstream daily maximum copper concentrations. The number of exceedances of the downstream objective for all runs was calculated, as was the median of the maximum concentrations for each 3-year period.

- For Rio Hondo, where the calculated WER is 9.691 and the calculated WER for Reach 2 is 3.97, the number of exceedances in Reach 2 below Rio Hondo is expected to be zero in 91% of the 1000 model runs and one in 9% of the 1000 model runs. In other words, in 88 out of 1000 of the simulated 3-year periods, it is predicted that there will be an exceedance of the downstream WER-adjusted objective; however, none of these 88 predicted exceedances occurred under circumstances where concentrations in the tributary and upstream LA River met their higher WER-adjusted targets. The median of the maximum concentrations for each 3-year period was 47 µg/L. The 90 percent confidence level of the estimate was 62 µg/L.

- For Tujunga Wash, where the calculated WER is 8.279 and the calculated WER for Reach 4 is 3.97, the number of exceedances in Reach 4 below Tujunga Wash is expected to be zero in 91% of the 1000 model runs and one in 9% of the 1000 model runs. In 89 out of 1000 of the simulated 3-year periods, it is predicted that there will be an exceedance of the downstream WER-adjusted objective; however, only 2 of these 89 predicted exceedances occurred under circumstances where concentrations in the tributary and upstream LA River met their higher WER-adjusted targets. The median of the maximum concentrations for each 3-year period was 60 µg/L. The 90 percent confidence level of the estimate was 90 µg/L.

- For Burbank Western Channel, where the calculated WER is 4.746 and the calculated WER for Reach 3 is 3.97, the number of exceedances in Reach 3 below Burbank Western Channel is expected to be zero in 96% of the 1000 model runs and one in 4% of the 1000 model runs. In other words, in 41 out of 1000 of the simulated 3-year periods, it is predicted that there will be an exceedance of the downstream WER-adjusted objective; however, none of these 41 predicted exceedances occurred under circumstances where concentrations in the tributary and upstream LA River met their higher WER-adjusted targets. The median of the maximum concentrations for each 3-year period was 54 µg/L. The 90 percent confidence level of the estimate was 74 µg/L.

Based on the analysis in Attachment A to the Implementation Report, the calculated WERs for Tujunga Wash, Rio Hondo, and Burbank Western Channel, are protective of

water quality downstream. The WERs in Table 5 are proposed for addition to Chapter 3 of the Basin Plan.

Table 5. Proposed WERs to be added to Water Quality Objectives in the Basin Plan

Waterbody	WER
Los Angeles River Reaches 1-4	3.97
Tujunga Wash	8.28
Verdugo Wash	2.18
Burbank Western Channel	4.75
Arroyo Seco	1.32
Compton Creek	3.36
Rio Hondo Reach 1	9.69

5.2 Amendment of Water Quality Objectives for Lead Based on Recalculated Objectives

For lead, the site-specific objectives are based on an updated toxicity dataset and the recalculation of the water quality objectives follows USEPA guidelines (Appendix B). The lead water quality objectives in the Basin Plan will be updated to reflect the recalculation, as follows:

Acute (short-term) Lead Water Quality Objective Equation $_{Dissolved}$ = (1.46203 – ln(hardness) * 0.145712) * e$^{1.466*ln(hardness)-1.882}$

Chronic (4-day average) Lead Water Quality Objective Equation $_{Dissolved}$ = (1.46203 – ln(hardness) * 0.145712) * e$^{1.466*ln(hardness)-3.649}$

5.3 Amendment to Los Angeles River Metals TMDL

The proposed amendments revise the TMDL by updating the numeric targets, loading capacity, and load and waste load allocations to be consistent with the revised copper and lead water quality objectives. The proposed amendments are largely based on the Implementation Report, with a few exceptions. For example, in dry weather, all of the reach-specific copper WERs in Table 5 are used to modify the dry-weather numeric targets. However, in wet weather, because the existing TMDL only includes numeric targets for Reach 1, the wet-weather TMDL is revised to adjust the Reach 1 numeric target for copper with the WER of 3.97. In addition, the Implementation Report recommends the application of separate WERs in the Burbank Western Channel upstream and downstream of the Burbank WRP. However, staff finds that revising the loading capacity and allocations in the TMDL by applying two separate WERs for the Burbank Western Channel would require an adjustment of the critical flows contemplated in the original TMDL, which is beyond the scope of this reconsideration.

The proposed revisions to the TMDL include monitoring to ensure ongoing protectiveness of the WERs. The Tillman, LA-Glendale, and Burbank POTWs, and the Caltrans, Los Angeles County MS4 and Long Beach MS4 permittees shall conduct additional receiving water monitoring to verify that water quality conditions are similar to those of the 2008 and 2014 copper WER study periods. Monitoring is also required to confirm that the WER-based copper WLAs will achieve downstream water quality standards. This additional monitoring shall be required through the POTWs' NPDES permit monitoring and reporting programs and the Los Angeles County and Long Beach MS4 Permits' monitoring and reporting programs (which may include the Integrated Monitoring Programs and/or Coordinated Integrated Monitoring Programs developed under these permits, where approved by the Executive Officer of the Los Angeles Water Board, or other Los Angeles Water Board required monitoring programs. Copper WER evaluation monitoring will consist of receiving water monitoring for key chemical parameters needed for estimates of WERs utilizing the Biotic Ligand Model (BLM). The Los Angeles Water Board will evaluate the WER-based copper WLAs based on potential changes in the chemical characteristics of the water body that could impact the calculation or application of the WER and will revise the WERs and copper WLAs, if necessary, to ensure protection of beneficial uses in the waterbodies to which the WERs apply and in downstream waterbodies.

The proposed TMDL revisions also include footnotes to the waste load allocations that require permit compliance with anti-degradation and anti-backsliding requirements. The MS4 Permittees are required to track trends in water quality, and where increasing trends are observed, evaluate the cause and identify additional watershed control measures to arrest the increasing trends. For other NPDES Permittees assigned waste load allocations, effluent concentrations may not exceed the levels of water quality that can be reliably maintained by the facility's applicable treatment technologies unless anti-backsliding requirements in Clean Water Act section 402(o) and anti-degradation requirements are met.

Additional revisions are proposed to correct minor errors in the calculation of dry- weather loading capacity in the existing TMDL. For Reaches 2 and 3, incorrect critical flows, not equal to the flows presented in the loading capacity table in the Basin Plan language and supporting staff report, were used to calculate the copper and lead loading capacities. The

revised loading capacities are consistent with the critical flows presented in the existing tables. The corrected loading capacities are shown in Table 6.

Table 6. Corrected Dry-weather Loading Capacities for Reaches 2 and 3

Waterbody	Critical Flow (cfs)	Copper (kg/day)	Lead (kg/day)
LA River Reach 3	39.14	WER[1] x 2.5	WER[2] x 9.6
LA River Reach 2	4.44	WER[1] x 0.24	WER[2] x 1.02

[1] The WER for this constituent in this reach is 3.97.

[2] WER(s) have a default value of 1.0 unless site-specific WER(s) are approved.

Finally, minor changes are proposed to remove implementation actions that have already been completed or to update permit information that has been revised since the original adoption of the TMDL. Text regarding reconsideration of the TMDL based on special studies has been deleted. Updated order numbers and descriptions have been provided for the statewide general industrial and construction stormwater permits. Certain implementation actions for the general construction stormwater permittees have been deleted such that default implementation actions apply, based on the fact that studies have not been completed that would have allowed the conditional implementation actions to apply.

6. Water Code Section 13241 Analysis

The Implementation Report contained a consideration of the factors set forth in Water Code section 13241. Water Code section 13241 requires the Regional Water Board to consider the following when establishing a water quality objective:

1. The past, present, and probable future beneficial uses of water,
2. The environmental characteristics of the hydrographic unit under consideration,
3. Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area,
4. Economic considerations,
5. The need for developing housing within the region, and
6. The need to develop and use recycled water.

The report considered all beneficial uses assigned to the Los Angeles River and its tributaries and determined that aquatic life beneficial uses are the most sensitive to copper and lead. As a result, the proposed SSOs for copper and lead, which are protective of aquatic life beneficial uses, will also be protective of all other beneficial uses in the watershed. The proposed SSOs take into account site-specific conditions in the Los Angeles River and its tributaries and modify the water quality objectives for copper and lead based on USEPA procedures such that the objectives will still be fully protective of the aquatic life in these waterbodies.

The environmental characteristics of the relevant hydrographic units were considered, as well as the effect of site-specific physical and chemical properties on the toxicity of copper and lead. Because of the potential for site-specific conditions to vary from the conditions used to derive the national aquatic life criteria, USEPA provided guidance to modify

national criteria to account for site-specific characteristics and specifically provided for the adjustment of water quality for metals through the application WERs.

The report considered existing water quality objectives as the baseline or benchmark for water quality conditions that could reasonably be achieved through the coordinated control of all factors that affect water quality in the affected waters. The proposed SSOs are designed to protect the most sensitive beneficial uses. The proposed SSOs can be attained through the implementation of existing treatment technologies at POTWs and best management practices to reduce copper and lead loading from storm water and non-storm water discharges to the Los Angeles River and its tributaries.

The report found that municipalities and Caltrans are expected to be the primary dischargers involved in achieving compliance with the newly proposed SSOs. Implementation of the SSOs is not expected to require additional management or control for stormwater management agencies beyond what is currently required and, in fact, will reduce the necessary management and control actions (see section 7). Additional monitoring, in addition to currently required monitoring under stormwater permits, will be necessary, but is relatively minor in comparison to the reduced costs associated with the reduction in necessary management or control measures.

The report found that adoption and implementation of the proposed SSOs are not expected to affect the development of housing in the region because they would not require additional treatment of wastewater or additional management of stormwater that could result in increased county or municipal costs that would in turn be transferred as increased cost to homeowners.

Finally, the report found that the difference in the allowable copper and lead concentrations with or without a SSO is not significant relative to potential impacts on the development or use of recycled water because the concentrations required by CTR objectives and the proposed SSOs are both acceptable for application of the specified treatment technologies for recycled water.

7. Antidegradation Analysis

The purpose of this section is to evaluate whether the implementation of the recommended SSOs is consistent with the State's Antidegradation Policy as contained in State Water Resources Control Board Resolution 68-16, as well as the federal antidegradation policy (40 C.F.R. § 131.12). Anti-degradation policies adopted at both the Federal and State levels are intended to protect and maintain existing water quality. The proposed Basin Plan amendments have the potential to degrade water quality and, in order to comply with Federal and State antidegradation policies, an antidegradation analysis must be completed for the proposal. This analysis must show:

a) That the strategy is necessary to accommodate important economic or social development;
b) Any reduction in water quality will be consistent with maximum benefit to people of the State;

c) Reduction in water quality will not unreasonably affect actual or potential beneficial uses; and
d) Water quality will not fall below water quality objectives set to protect beneficial uses as prescribed in the Basin Plan.

An analysis of each of these criteria is discussed below.

Regarding criteria (a) and (b), the implementation of the SSOs as compared to the existing water quality objectives will accommodate important economic or social development and will be consistent with the maximum benefit to the people of the State. This assessment is based on the following findings:

- There will be reduced costs and associated impacts due to implementation of the SSOs as compared to the existing water quality objectives. Compliance with the TMDL and underlying SSOs will be achieved in the urbanized portion of the watershed under a phased implementation approach, comprised of various structural and non-structural BMPs. The reduced scope of these measures upon application of the SSOs will substantially lessen economic impacts of the TMDL implementation. The projected costs of TMDL implementation with and without the proposed SSOs were compared. The anticipated range of watershed-wide implementation costs associated with the implementation requirements of the TMDL (without the SSO adjustment) is on the order of $1.7 billion to $5.7 billion (in 2014 dollars). The total estimated savings (in 2014 dollars) associated with capital costs for implementing the Los Angeles River and Tributaries Metals TMDL with SSOs is between $340 million and $1.3 billion (Los Angeles River Metals TMDL Special Studies Steering committee, 2015).

- There are other planned water quality improvement projects that would benefit from the money saved by applying the SSOs. The proposed SSOs provide a level of protection equivalent to the original TMDL WLAs at a reduced level of water quality improvement project implementation. Because of this, public funds can be spent on other water quality improvement projects. A decrease in water quality improvement project implementation costs will reduce the burden on local economy, and money that would have been spent on copper and/or lead control measures may be able to be shifted to other water quality priorities and/or may reduce the significant funding obligations public agencies will face in meeting water quality requirements.

  A significant number of the watershed's communities and census tracts are designated by the State of California as "disadvantaged communities." (See Cal/EnviroScreen 2.0) This includes the entire communities of Bell, Bell Gardens, Commerce, Compton, Cudahy, Huntington Park, Maywood, Paramount, South Gate and Vernon. Several of the watershed's communities contain qualifying census tracts, including Alhambra, Downey, Glendale, El Monte, Montebello, Pico Rivera, Rosemead, South El Monte, Los Angeles and several unincorporated areas in Los Angeles County. The decrease in costs due to the application of the SSOs will help reduce costs that these communities would face from the implementation of BMPs to comply with the existing TMDL WLAs.

However, water quality improvement projects will move forward to address other issues in the watershed. Such projects that may benefit from the money saved by applying the SSOs include projects targeting bacteria during dry and wet weather. Additionally, a number of cities and the County are in multiple watersheds. Reduced costs associated with implementing projects to meet WER-based copper WLAs and recalculated lead WLAs in the Los Angeles River may provide the opportunity to utilize those resources to address water quality priorities in other waterbodies, as necessary and if appropriate.

- There will be reduced environmental impacts resulting from the construction of fewer structural BMPs as a result of applying the SSOs, including reduced energy use and greenhouse gas emissions, which will support reduction goals for greenhouse gases outlined in AB32. As recognized in the substitute environmental documents for the 2005 and 2010 TMDLs, implementation of water quality improvement projects has potential adverse impacts to the environment arising from the installation, operation, and maintenance of structural BMPs and ongoing activities related to non-structural BMPs. Adverse environmental impacts that are likely to occur during the installation of structural BMPs include increased traffic, noise, air pollution, and land disturbance.

  On a regional and global scale, the energy needs and greenhouse gas emissions associated with the construction and ongoing operation of BMPs contribute to potential environmental impacts related to climate change. The California Global Warming Solutions Act (AB 32) seeks to reduce greenhouse gas emissions and any reduction in new sources will support attainment of the goal.

  Implementation of the TMDL with SSOs will reduce the number and size of BMPs required to meet the TMDL and, given the significant or potentially significant effect on the environment associated with BMP implementation, reduced levels of BMP implementation will also reduce potential adverse environmental impacts.

Regarding criteria (c) and (d), the reduction in water quality caused by application of the SSOs will not unreasonably affect actual or potential beneficial uses nor will water quality fall below water quality objectives set to protect beneficial uses as prescribed in the Basin Plan. While the proposed SSOs allow for an increase in copper and lead loading and higher in-stream concentrations above existing water quality objectives, the increased concentrations and loading will not adversely affect existing or potential beneficial uses of the Los Angeles River and its tributaries. The WER and Recalculation procedures, developed by USEPA and used as the basis for the proposed modifications, are designed to result in SSOs that are equally protective of aquatic life (and as a result equally protective of all other beneficial uses) as intended for the national criteria.

8. References

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