

CHAPTER 6

TOTAL MAXIMUM DAILY LOADS (TMDLS)

INTRODUCTION

The Federal Clean Water Act (CWA) Section 303(d) requires that States identify waters that do not or are not expected to meet water quality standards (beneficial uses, water quality objectives and the antidegradation policy) with the implementation of technology-based controls. Once a waterbody has been placed on the 303(d) list of impaired waters, states are required to develop a Total Maximum Daily Load (TMDL) to address each pollutant causing impairment. A TMDL defines how much of a pollutant a waterbody can tolerate and still meet water quality standards. Each TMDL must account for all sources of the pollutant, including: discharges from wastewater treatment facilities; runoff from homes, forested lands, agriculture, and streets or highways; contaminated soils/sediments, legacy contaminants such as DDT and PCBs, on-site disposal systems (septic systems) and deposits from the air. Federal regulations require that the TMDL, at a minimum, account for contributions from point sources (permitted discharges) and contributions from nonpoint sources, including natural background. In addition to accounting for past and current activities, TMDLs may consider projected growth that could increase pollutant levels. TMDLs establish numeric targets that, when attained, are expected to correct impairment and achieve water quality standards. To meet those targets, TMDLs allocate allowable pollutant loads to each of the identified sources.

In 2013, USEPA announced a new collaborative framework for implementing the CWA Section 303(d) Program with states.¹ This new “Vision Framework” encourages states to consider alternatives to the development and implementation of TMDLs as the first response to correct water quality impairment. USEPA recognized that alternative approaches, such as the Non-TMDL Action Plans (Action Plans) identified for certain metals in Newport Bay incorporated in this Chapter (see 6.1 Zinc (Zn), Mercury (Hg), Arsenic (As), Chromium (Cr): Zn, Hg, As and Cr Non-TMDL Action Plans (Action Plans) for Newport Bay) may be a more efficient yet equally effective way to address impaired waters. Where such alternative restoration approaches are implemented but prove to be ineffective, TMDLs must be developed to assure that water quality standards are achieved.

California state law (Porter-Cologne Water Quality Control Act, California Water Code Section 13000 et. seq.) requires regional boards to formulate and adopt water quality control plans, or Basin Plans, for all areas within their jurisdiction. The Basin Plans must include an implementation plan that describes how the water quality standards established in the Basin Plans will be met. TMDLs are typically adopted into the Basin Plans through the Basin Planning process and, pursuant to state law, must

¹ USEPA. A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program. 2013.

include implementation plans. The TMDLs incorporated in this Chapter include implementation plans and, where appropriate, compliance schedules.

Newport Bay Watershed

Water quality problems in Newport Bay were described in detail in reports prepared in response to Senate Concurrent Resolutions 38 and 88 [Ref. 16, 17]. These problems are essentially nonpoint source problems and fall into four major categories: 1) siltation; 2) bacterial contamination; 3) eutrophication and 4) toxic substances contamination. Because of these problems, the Bay and, in some cases, certain tributaries have been identified as being water quality limited, pursuant to the requirements of Section 303 (d) of the Clean Water Act. (See Water Quality Assessment, Page 6-17.) Section 303(d) requires that Total Maximum Daily Loads (TMDLs) be established for each pollutant causing water quality impairment. The TMDL must: 1) identify the maximum load of pollutant which can be discharged while ensuring compliance with water quality standards; 2) allocate necessary reductions in the pollutant load among contributing sources; and, 3) establish a plan and schedule to meet the target pollutant load. The following sections describe the major nonpoint source problems and will include the TMDLs and Load Allocations for each category and an Implementation Plan and Schedule for the TMDLs and Load Allocations, after each TMDL is adopted. Each TMDL includes a proposed target for the reduction of pollutant discharge, together with an implementation plan and schedule for requiring compliance with the water quality objectives in the Basin Plan for each pollutant.

1. Siltation (The following was added or modified under Resolution No. 98-101)

Erosion in the watershed and the resultant siltation in the Bay are a continual threat to the Bay's designated uses. Sediment loads result from erosion of open space lands in foothill areas and from man's activities in the watershed, including: 1) extensive grading for development; 2) increased runoff and channel erosion due to urbanization; and 3) erosion of agricultural lands. San Diego Creek, the largest drainage system in the watershed, accounts for approximately 94 percent of the sediment delivered to the Bay. Most deposition occurs during major storm events, although low-level transport occurs year-round.

In 1982, the Southern California Association of Governments (SCAG) completed the "San Diego Creek Comprehensive Stormwater Sedimentation Control Plan" (Plan) as part of an areawide planning process conducted pursuant to Section 208 of the Clean Water Act. The Plan recommended a two-part approach to management of the erosion-siltation problem. The first part is the reduction of erosion at the source through the implementation of agricultural and construction best management practices (BMPs) and resource conservation plans (RCPs). The second part of the Plan is to intercept as much of the remaining sediment as possible in sediment traps in San Diego Creek and in excavated basins in the upper Bay.

Intensive and well-coordinated efforts to implement the recommendations of the 208 Plan have been and are being made by the state, local agencies and The Irvine Company, the largest private landowner in the watershed. In the past, construction and maintenance of the in-channel and in-bay basins was achieved through cooperative agreements among the California Department of Fish and Game, the County of Orange, the Cities of Newport Beach, Irvine and Tustin, and The Irvine Company (collectively known as the Sediment Executive Committee). Between 1982 and 1988, about 2.4 million cubic years of sediments were removed from the Bay, at a cost of about \$13 million. The location and design of the in-bay basins are carefully coordinated with the Department of Fish and Game's management plan for the Upper Newport Bay Ecological Reserve, so that the basins serve not only to trap sediment but also to preserve habitat for many rare and endangered species.

Congress and the U.S. Army Corps of Engineers (Corps) have determined there is a federal interest in sediment removal in the Upper Bay. The Corps also has the primary responsibility for the dredging necessary to maintain navigable channels in the Lower Bay which are impacted by the accumulation of sediment in the Upper Bay. The Corps is currently involved in conducting a Feasibility Study of potential environmental restoration projects in the Upper Bay and has received congressional authorization of initiate a "Fast Track Recon" Study of the San Diego Creek watershed to determine if there are federal interests sufficient to warrant conduct of a Watershed Management Study. The Feasibility Study and Fast Track Recon Study are in the planning stages.

To minimize sediment transport to the Bay, programs have been implemented to control erosion resulting from grading operations at construction sites, and to prevent erosion of agricultural lands. The cities of Irvine, Costa Mesa, Santa Ana, and Newport Beach have grading ordinances which require erosion/siltation control plans for construction projects within their boundaries. The focus of these plans is on the implementation of BMPs. Compliance with the area wide stormwater permit for Orange County and the State Water Resources Control Board's general construction activity stormwater permit, will necessitate additional coordinated efforts to control sediment inputs from construction activities. With technical assistance from the Regional Board, Orange County oversees a program to ensure development and implementation of resource conservation plans (RCPs) by agricultural landowners, principally the Irvine Company.

1.a. Phase 1 of the TMDL for Sediment

The Total Maximum Daily Load for sediment in the Newport Bay/San Diego Creek Watershed includes the following quantifiable targets and Load Allocations that shall be implemented by the Cities (Irvine, Tustin, Lake Forest, Costa Mesa, Santa Ana and Newport Beach) and County responsible for the sediment discharged into stormwater and flood control conveyances under their control which discharge into San Diego Creek and/or Newport Bay.

1. Sediment control measures shall be implemented and maintained to ensure that sediment discharges into Newport Bay will not significantly change the existing

acreages of aquatic, wildlife, and rare and endangered species habitat, and to maintain the navigational and non-contact recreational beneficial uses of the bay. The existing aquatic and wildlife habitat of the Upper Bay, which is comprised of approximately 210 acres of marine aquatic habitat, 214 acres of mudflat habitat, 277 acres of salt marsh, and 31 acres of riparian habitat within, and adjacent to, the 700 acre Upper Newport Bay Ecological Reserve and the existing navigational and recreational uses of Newport Bay, will be used by the Regional Board as a performance standard of the effectiveness of the sediment TMDL. If these acreages are changed by more than 1% as the result of sediment deposition, if the in-bay sediment basins or the in-channel sediment basins are not maintained, or if there are impacts to navigational and recreational uses, this will indicate that the local sediment control measures are not adequate to protect the beneficial uses provided by these areas, and the Board will reevaluate the sediment TMDL for Newport Bay and San Diego Creek. Since the intent of the sediment TMDL is to protect these beneficial uses, this quantifiable target will be used as the primary measurement of the success of the TMDL. In order to maintain the marine aquatic habitat of the Unit 1 and 2 Sediment Basins in Upper Newport Bay, a minimum depth of 7 feet below mean sea level shall be maintained. The Cities and County, acting through cooperative agreements under the Newport Bay Watershed Executive Committee, shall conduct bathymetric and vegetation surveys of Newport Bay no less than once every three years or as agreed upon by the Executive Officer. This information will be used to evaluate compliance with the acreage and depth targets. If these acreages are changed by more than 1% as the result of sediment deposition, if the minimum depth is not maintained, and if the 50% target sediment reduction described below is not achieved, the Regional Board may consider appropriate enforcement action.

2. It is recognized that the Department of Fish and Game, which is responsible for the management of the Reserve, may wish to modify the habitat composition and acreages of the Reserve to address wildlife needs. The habitat acreages identified above will be revised accordingly through the Basin Plan Amendment process.

3. The second quantifiable target is to reduce the annual average sediment load in the watershed from a total of approximately 250,000 tons per year to 125,000 tons per year, thereby reducing the sediment load to Newport Bay to approximately 62,500 tons per year and limiting sediment deposition in the drainages to approximately 62,500 tons per year. Sediment control measures shall be implemented and maintained to result in a 50% reduction in the current load of sediment in the Newport Bay/San Diego Creek Watershed within 10 years. The Regional Board will determine compliance with this target by calculating the annual average amount of suspended solids measured in San Diego Creek at Jamboree Boulevard and Campus Drive over a ten year period, and by evaluating the scour studies of the creek channels and topographic surveys of all the sediment control basins in the watershed to estimate the amount of deposition. Given that annual sediment deposition can vary widely based on weather and other conditions, it is appropriate to evaluate compliance with the sediment

reduction target as a 10 year running annual average of the suspended solids load measured in San Diego Creek at Jamboree Boulevard and Campus Drive. The Regional Board will compare this information to the bathymetric and scour studies information to determine if the monitoring data accurately reflects sediment deposition in the bay and creek channels and to determine compliance with this target.

4. Sediment control measures shall be implemented and maintained to comply with the following Load Allocations (implemented as 10-year running annual averages) for discharges of sediment to Newport Bay: 1) no more than 28,000 tons per year of sediment shall be discharged to Newport Bay from open space areas within the watershed, 2) no more than 19,000 tons per year shall be from agricultural land, 3) no more than 13,000 tons per year from construction sites, 4) no more than 2,500 tons per year discharged from urban areas. The Cities and County, acting through cooperative agreements under the Newport Bay Watershed Executive Committee, shall be required to provide a proposal for evaluating compliance with these individual land use type load allocations that is subject to the approval of the Executive Officer. This proposal shall be implemented upon approval of the Executive Officer.

5. Sediment control measures shall be implemented and maintained to comply with the following Load Allocations (implemented as 10-year running annual averages) in addition to the load allocations specified above for Newport Bay for discharges of sediment to tributaries of Newport Bay: 1) no more than 28,000 tons per year of sediment shall be discharged to San Diego Creek and its tributaries from open space areas within the watershed, 2) no more than 19,000 tons per year shall be discharged to San Diego Creek and its tributaries from agricultural land, 3) no more than 13,000 tons per year discharged to San Diego Creek and its tributaries from construction sites, 4) no more than 2,500 tons per year discharged to San Diego Creek and its tributaries from urban areas. The Cities and County, acting through cooperative agreements under the Newport Bay Watershed Executive Committee, shall be required to provide a proposal for evaluating compliance with these individual land use type load allocations that is subject to the approval of the Executive Officer. This proposal shall be implemented upon approval of the Executive Officer.

6. Sediment control measures shall be implemented such that Upper Newport Bay, including In-Bay Sediment Basins 1 and 2, need not be dredged more frequently than about once every 10 years, and the long-term goal of Phase 1 of the TMDL for sediment is to reduce the frequency of dredging to once every 20 to 30 years. It is recognized that extreme rainfall conditions may necessitate more frequent dredging of the in-bay basins. The Regional Board will adopt waste discharge requirements for such dredging projects as the means of recommending Clean Water Act Section 401 Water Quality Certification for the dredging, and to ensure proper disposal of the dredged sediment.

7. Waste Discharge Requirements will be waived for maintenance dredging of flood control channels and drainages throughout the watershed in order to maintain flood control capacity, under the following conditions; 1) any vegetation removal or earthwork conducted between March 1 and September 1 shall be supervised by a qualified biologist, approved by the Department of Fish and Game, to ensure compliance with the Endangered Species Act and Migratory Bird Treaty Act (this monitor shall have the authority to stop or divert work to avoid impacts as necessary); and 2) the information in a complete application (report of waste discharge) demonstrates that the waiver criteria specified herein and in Regional Board Resolution No. 96-9, Waiver of Waste Discharge Requirements for Certain Types of Discharges, are met.

8. All in-channel and foothill sediment control basins throughout the drainages in the watershed shall be maintained to have at least 50% of design capacity available prior to November 15 of each year. Waste Discharge Requirements will be waived for sediment control basin maintenance activities under the following conditions: 1) any vegetation removal or earthwork conducted between March 1 and September 1 shall be supervised by a qualified biologist, approved by the Department of Fish and Game, to ensure compliance with the Endangered Species Act and Migratory Bird Treaty Act (this monitor shall have the authority to stop or divert work to avoid impacts as necessary); 2) the use of herbicides for the control of vegetation within channels shall be avoided to the greatest extent practicable; and 3) the information in a complete application (report of waste discharge) demonstrates that the waiver criteria specified herein and in Regional Board Resolution No. 96-9, Waiver of Waste Discharge Requirements for Certain Types of Discharges, are met.

9. Waste Discharge Requirements will be waived for drainage channelization and stabilization projects on drainages within the watershed between the foothill sediment basins and Upper Newport Bay, under the following conditions: 1) while modifying the channels, no native riparian wetland vegetation shall be removed from within the basins or adjacent to the basins during the period between April 1 and September 1 of each year, in order to protect the federally listed least Bell's vireo, unless one to one mitigation is provided for the loss of the riparian and aquatic habitat; 2) any vegetation removal or earthwork conducted between March 1 and September 1 shall be supervised by a qualified biologist, approved by the Department of Fish and Game, to ensure compliance with the Endangered Species Act and Migratory Bird Treaty Acts (this monitor shall have the authority to stop or divert work to avoid impacts as necessary); and 3) the information in a complete application (report of waste discharge) demonstrates that the waiver criteria specified herein and in Regional Board Resolution No. 96-9, Waiver of Waste Discharge Requirements for Certain Types of Discharges, are met. The Regional Board will continue to work with the U.S. Army Corps of Engineers and other appropriate agencies towards the adoption of a Special Area Management Plan (or comparable plan) and General Permit for channel stabilization and flood control projects in accordance with Section 404 and 401 of the Clean Water Act. If

a plan for completing the Special Area Management Plan by June 1, 1999 is not submitted to the Executive Officer by January 1, 1999, then the Executive Officer is directed to require, as an additional condition for obtaining a waiver, the completion of a comprehensive delineation of all the wetlands in the watershed and an evaluation of the cumulative impacts of projects to control sediment and the build-out of the watershed on the beneficial uses of these waters of the State. This evaluation of the cumulative impacts must be completed, according to a plan acceptable to the Executive Officer, by June 1, 1999. Staff intends to use the delineation to propose a general permit to the Regional Board that will cover the kind of activities described in the amendment. Until the SAMP, or, alternatively, the comprehensive delineation described above, is completed, staff will continue to process individual permit applications for each project.

10. The Cities and County, acting through cooperative agreements under the Newport Bay Watershed Executive Committee, shall evaluate: 1) the amount of sediment being discharged from areas that contribute sediment to the total load discharged to Newport Bay; and 2) the effectiveness of the local sediment control plan (the 208 Plan). Where areas that contribute sediment are not under the jurisdiction of entities that are currently part of the Newport Bay Watershed Executive Committee, the Cities and County shall recommend to the Regional Board, if necessary, a new formula for allocating sediment loads and sharing of the costs of implementing the sediment control measures that will provide a 50% reduction in the current load of sediment. This evaluation shall, at a minimum, address the sediment loads from the Santa Ana-Delhi Channel, Bonita Creek, the federal lands within the watershed, and the City of Lake Forest.

These conditions shall not supersede more restrictive conditions of other agencies, such as the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, the State Department of Fish and Game, or other local agencies.

1.b. Phase 2 of the TMDL for Sediment: Monitoring and Reassessment

The Newport Bay Watershed Executive Committee has developed an agreement whereby the County of Orange conducts the monitoring of sediment discharge within the watershed, with the costs shared by all parties, except the Department of Fish and Game. There has been no site specific monitoring of the various sources of sediment, so it is impossible to determine the effectiveness of specific BMPs. It is also too soon to reach any conclusions about the overall effectiveness of the local sediment control measures. Since 1983, the County has monitored flow and total suspended solids at three locations and conducts periodic scour studies to evaluate sediment transport and deposition in the drainages within the watershed. In addition, the County has conducted two topographic surveys of the Upper Bay to determine sediment accumulation in the Upper Bay. The County intends to continue this monitoring program on behalf of the Newport Bay Watershed Executive Committee.

In addition, the Newport Bay Watershed Executive Committee shall:

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January 24, 1995
Updated June 2019 to
include approved amendments

1. Propose monitoring stations and schedules to be established to monitor the discharge of sediment from the Santa Ana-Delhi Channel and Bonita Canyon Creek into the Upper Bay and to evaluate the effectiveness of the BMPs being implemented in the watershed. This monitoring plan shall also propose monitoring to evaluate compliance with the Load Allocations for various land use types. This monitoring plan will not become effective until approved by the Regional Board at a duly noticed public hearing as specified in Chapter 1.5, Division 3, Title 23 of the California Code of Regulations (Section 647 et seq.).
2. Propose monitoring stations and schedules to conduct the scour studies for the drainages in the watershed to be conducted annually. These surveys shall determine the amount of sediment accumulated in San Diego Creek and its tributaries, the in-channel sediment basins, the foothill sediment basins, and any other sediment basins in the watershed. The survey report shall be used to demonstrate whether the sediment basins have at least 50% capacity prior to November 15 of each year. This monitoring plan will not become effective until approved by the Regional Board at a duly noticed public hearing as specified in Chapter 1.5, Division 3, Title 23 of the California Code of Regulations (Section 647 et seq.).
3. Conduct topographic and vegetation surveys of Upper Newport Bay at least every three years, or as agreed upon by the Executive Officer, and after any year in which the monitoring for total suspended solids at Campus Drive shows that more than 250,000 tons of sediment were discharged to the Bay. In any year in which these surveys are required, the surveys shall be conducted by July 1. The results of these surveys shall be submitted as part of an annual report by December 31 of each year. The topographic and vegetation surveys shall be conducted to determine the amount of sediment deposition in the two In-Bay basins and the other marine aquatic habitat areas and to determine changes in the areal extent of the existing aquatic, wildlife and endangered species habitat areas.
4. Submit an annual report by December 31 of each year providing the monitoring data and information collected by the Newport Bay Watershed Executive Committee, including the flow and suspended solids monitoring data, the scour studies, the bathymetric and vegetation surveys, (and any additional information collected by the Committee). The monitoring shall be completed prior to July 1 of each year and this information shall be used to determine the maintenance requirements of all sediment basins in the watershed. Additionally, the Newport Bay Watershed Executive Committee shall submit a report by November 15 of each year certifying whether the sediment basins in the watershed have at least 50% capacity. The Regional Board will use the information collected by this monitoring program to evaluate the effectiveness of the sediment TMDL and will reevaluate the sediment TMDL as part of the Regional Board's Basin Planning process.

5. The monitoring data and information collected by the Newport Bay Watershed Executive Committee, including the flow and suspended solids monitoring data, the scour studies, the bathymetric surveys and the vegetation surveys, (and any additional information collected by the Newport Bay Watershed Executive Committee) shall be submitted in an annual report by December 31 of each year. The monitoring shall be completed prior to July 1 of each year and this information shall be used to determine the maintenance requirements of all sediment basins in the watershed. Additionally, the Newport Bay Watershed Executive Committee shall submit a report by November 15 of each year certifying whether the sediment basins in the watershed have at least 50% capacity. The Regional Board will use the information collected by this monitoring program to evaluate the effectiveness of the sediment TMDL and will reevaluate the sediment TMDL as part of the Board's Basin Planning process.

(End of amendment adopted under Resolution 99-101)

2. Eutrophication (The following was added under Resolution No. 98-100)

Nutrient loading to the Bay, particularly from the San Diego Creek watershed, contributes to seasonal algal blooms which can create a recreational and aesthetic nuisance. These algal blooms may also adversely affect wildlife.

The nutrient TMDL for the Newport Bay/San Diego Creek Watershed distributes the portions of the waterbody's assimilative capacity to various pollution sources so that the waterbody achieves its water quality standards. The Regional Board supports the trading of pollutant allocations among sources where appropriate. Trading can take place between point/point, point/nonpoint, and nonpoint/nonpoint pollutant sources. Optimizing alternative point and nonpoint control strategies through allocation tradeoffs may be a cost effective way to achieve pollution reduction benefits.

While there are a number of sources of nutrient input, tailwaters from the irrigation of agricultural crops and from several commercial nurseries in the watershed has been the predominant source. The Regional Board issued Waste Discharge Requirements to the three nurseries, requiring substantial reductions in their nutrient loads. Significant improvements have been achieved by these nurseries, largely due to the implementation of drip irrigation systems (which greatly reduce the amount of tailwater) and/or recycle systems. Installation of drip irrigation systems for other agricultural crops has also significantly reduced the volume of nutrient-laden tailwaters. These improvements, coupled with the increased tidal flushing caused by the in-bay basins, appears to have resulted in a substantial downward trend in nitrate concentrations in the Bay. However, algal blooms are still occurring in Newport Bay and San Diego Creek. As a result, Newport Bay and San Diego Creek are listed as water quality impaired due to nutrients pursuant to Section 303(d) of the Clean Water Act. A nutrient TMDL to address this problem for Newport Bay and San Diego Creek is described in the following sections.

The hydrodynamic, sediment transport, and water quality models of Newport Bay being jointly developed by the U.S. Army Corps of Engineers and the Regional Board will be used in the future to further refine the algae and nutrient relationships in the Bay. These refinements will be considered in future reviews and revisions of the nutrient TMDL.

2.a. Quantifiable Nutrient Targets

The annual loading to total nitrogen and phosphorus to Newport Bay shall be reduced by 50% by 2012. The seasonal and annual loading targets are listed in Table 6-1a.

Table 6-1a Summary of Loading Targets and Compliance Time Schedules.

TMDL	December 31, 2002 ⁵	December 31, 2007 ⁵	December 31, 2012 ⁵
Newport Bay Watershed Total Nitrogen - Summer Load ¹	200,097 lbs.	153,861 lbs.	
Newport Bay Watershed Total Nitrogen - Winter Load ²			144,364 lbs.
Newport Bay Watershed Total Phosphorus - Annual Load ³	86,912 lbs.	62,080 lbs.	
San Diego Creek, Reach 2 Total Nitrogen - Daily Load ⁴			14 lbs.

¹ Total nitrogen summer loading limit applies between April 1 and September 30.

² Total nitrogen winter loading limit applies between October 1 and March 31 when the mean daily flow rate at San Diego Creek at Campus Drive is below 50 cubic feet per second (cfs), and when the mean daily flow rate in San Diego Creek at Campus Drive is above 50 cubic feet per second (cfs), but not as the result of precipitation.

³ Total phosphorus annual loading is the sum of summer and winter loading during all daily flow rates.

⁴ Total nitrogen daily loading limit applies when the mean daily flow rate at San Diego Creek at Culver Drive is below 25 cubic feet per second (cfs), and when the mean daily flow rate in San Diego Creek at Culver Drive is above 25 cubic feet per second (cfs), but not as the result of precipitation.

⁵ Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is feasible and reasonable.

The margin of safety of the nutrient TMDL is implicit through the use of conservative assumptions. These conservative assumptions include controlling all forms of nitrogen and phosphorus and controlling seasonal and annual loading.

Load Allocations

The 5, 10, and 15 year seasonal load allocations of total nitrogen for the Newport Bay Watershed are presented in Table 6-1b. The 5 and 10-year annual total phosphorus load allocations for the Newport Bay Watershed are presented in Table 6-1c. The 15 year daily total nitrogen load allocations for San Diego Creek, Reach 2 are presented in Table 6-1d. The nutrient load reduction targets will be incorporated into waste discharge requirements as effluent limits, load allocations, and waste load allocations as necessary to ensure that:

- a. The total inorganic nitrogen and narrative water quality objectives for Newport Bay and San Diego Creek are achieved
- b. Clean Water Act requirements for the implementation of a TMDL are satisfied.

Table 6-1b Seasonal Load Allocations of Total Nitrogen for the Newport Bay Watershed.

Nutrient TMDL	1990-1997 Loading	2002 Allocation ⁸	2002 Summer Allocation (April-Sept) ⁸	2007 Allocation ⁸	2007 Summer Allocation (April-Sept) ⁸	2012 Allocation ⁸	2012 Winter Allocation (Oct-Mar) ^{7, 8, 11}
Newport Bay Watershed	lbs/year TN ²	lbs/day TN ¹⁰	lbs/season TN	lbs/day TN ¹⁰	lbs/season TN	lbs/day TN ¹⁰	lbs/season TN
Wasteload Allocation							
Hines Nurseries	96,360 TIN ¹	224	40,992	211	38,613	211	14,227
Bordiers Nursery	30,660 TIN	71	12,993	67	12,261	67	4,518
El Modeno Gardens	18,250 TIN	43	7,869	40	7,320	40	2,697
Unpermitted nurseries	----- ³	30	5,490	24	4,392	24	1,618
Nursery subtotal			67,344		62,586		23,060
IRWD WWSP (permanent discharge) ⁹	0	62		62		62	4,181
Silverado Constructors ETC ⁴	0	141	25,671	141	25,671	141	9,459
Urban runoff	277,131 ⁶		20,785		16,628		55,442
Wasteload Allocation			113,800		104,885		92,142
Load Allocation							
Agricultural discharges	328,040 ⁶		22,963		11,481		38,283
Undefined sources (Open space, atmospheric deposition, rising groundwater, groundwater cleanup/dewatering, in-bay nitrogen)	----- ³		63,334		37,495		13,939
Load Allocation			86,297		48,976		52,222
Total	1,087,000 ⁵		200,097		153,861		144,364
			5 year target		10 year target		15 year target

¹ TIN = (NO₃+NH₃).

² TN = (TIN + Organic N).

³ Unknown.

⁴ Wasteload allocation of a 50% reduction in nitrogen concentration upon commencement of discharge

⁵ 1990-1997 annual average (summer loading and winter loading).

⁶ Estimated annual average (summer and winter loading).

⁷ Total nitrogen winter loading limit applies between October 1 and March 31 when the mean daily flow rate at San Diego Creek at Campus Drive is below 50 cubic feet per second (cfs), and when the mean daily flow rate in San Diego Creek at Campus Drive is above 50 cubic feet per second (cfs), but not as the result of precipitation.

⁸ Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is feasible and reasonable.

⁹ Daily load limit applies upon commencement of discharge.

¹⁰ Lbs/day TN (monthly average).

¹¹ Assumes 67 non-storm days.

Table 6-1c Annual Total Phosphorous Load Allocations For The Newport Bay Watershed.

	2002 Allocation lbs/year TP¹	2007 Allocation lbs/year TP¹
TMDL	86,912	62,080
Urban areas	4,102	2,960
Construction sites	17,974	12,810
Waste Load Allocation	22,076	15,770
Agricultural areas	26,196	18,720
Open space	38,640	27,590
Load Allocation	64,836	46,310

¹ Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is feasible and reasonable.

Table 6-1d Annual Total Nitrogen Load Allocations For San Diego Creek, Reach 2 During Non-Storm Conditions.¹

	2012 Allocation lbs/day TN²
TMDL	14 lbs/day (TN)
Waste Load Allocation (Urban runoff)	5.5 lbs/day (TN)
Load Allocation (Nurseries, agriculture, undefined sources)	8.5 lbs/day (TN)

¹ Total nitrogen loading limit applies when the mean daily flow rate at San Diego Creek at Culver Drive is below 25 cubic feet per second (cfs), and when the mean daily flow rate in San Diego Creek at Culver Drive is above 25 cubic feet per second (cfs), but not as the result of precipitation.

² Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is feasible and reasonable.

2.b. Phase I of the Nutrient TMDL

1. Review and Revision of Water Quality Objectives

By December 31, 2000, the Regional Board shall review, and revise as necessary, the numeric water quality objectives for total inorganic nitrogen for San Diego Creek, Reaches 1 and 2. The Regional Board shall also examine the appropriateness of establishing numeric water quality objectives for phosphorus for San Diego Creek, Reaches 1 and 2.

2. Establish New Waste Discharge Requirements

By December 31, 1999, the Regional Board shall issue new Waste Discharge Requirements (WDRs) to nursery operations of 5 acres or greater which currently are not regulated by WDRs (as of the effective date of this amendment) but discharge nutrients in excess of 1 mg/L TIN to storm channels which are tributary to Newport Bay.

The new WDRs shall incorporate the appropriate wasteload, load, and margin of safety allocations identified in the nutrient load targets for the Newport Bay Watershed. Appropriate monitoring programs to evaluate compliance with load targets and allocations shall be required and incorporated into the WDRs

3. Revision of Existing Waste Discharge Requirements

- a. By December 31, 1998, the Regional Board shall revise existing WDRs for nursery operations which currently (as of the effective date of this amendment) discharge nutrients in excess of 1 mg/L TIN to drainages which are tributary to Newport Bay. The revised WDRs shall incorporate the appropriate wasteload, load, and margin of safety allocations identified in the nutrient load reduction targets for the Newport Bay Watershed. Appropriate monitoring programs to evaluate compliance with load targets and allocations shall be required and incorporated into the WDRs.
- b. By December 31, 1998, the Regional Board shall revise existing NPDES permits for discharges which currently (as of the effective date of this amendment) discharge nutrients in excess of 1 mg/L TIN to drainages which are tributary to Newport Bay. The revised NPDES permits shall incorporate the appropriate wasteload, load, and margin of safety allocations identified in the nutrient load reduction targets for the Newport Bay Watershed. Appropriate monitoring programs to evaluate compliance with load targets and allocations shall be required and incorporated into the NPDES permits.
- c. By March 31, 1999, the Regional Board shall revise the Monitoring and Reporting Programs of existing NPDES permits and WDRs for groundwater dewatering and cleanup operations which discharge to drainages which are tributary to Newport Bay to include requirements for phosphorus and total nitrogen sampling and analysis. This monitoring will generate the data necessary to develop appropriate wasteload allocations for these discharges

4. Agricultural Activities

A watershed-wide nutrient management program for agricultural activities shall be developed by the Orange County Farm Bureau, University of California Cooperative Extension, and the affected growers, in conjunction with Regional Board staff. The proposed management program shall be submitted by July 1, 1999. The nutrient management program will not become effective until approved by the Regional Water Quality Control Board at a duly noticed public meeting as specified in Chapter 1.5, Division 3, Title 23 of the California Code of Regulations (Section 647 et seq.).

5. Urban Stormwater

Co-permittees of the Orange County Areawide Urban Stormwater Permit (Order No. 96-31) shall be required to submit for approval by the Regional Board's Executive Officer

an analysis of appropriate Best Management Practices which will be additionally implemented through the Drainage Area Management Plan (DAMP) to achieve the short term (5-year) interim targets and final nutrient load reduction targets for the Newport Bay Watershed. The co-permittees shall also be required to provide a proposal for 1) evaluating the effectiveness of control actions implemented and 2) evaluating compliance with the nutrient load allocation. The proposal and analysis shall be submitted by July 1, 1999, and shall be implemented upon approval of the Executive Officer as specified by Section IV.1.a.ii.A of Order No. 96-31.

6. Phosphorus

The primary reduction of phosphorus loading is expected to be achieved by the implementation of the total maximum daily load for sediment in the Newport Bay/San Diego Creek watershed. The sediment TMDL is incorporated into the nutrient TMDL for the Newport Bay/San Diego Creek watershed by reference (Note - the sediment TMDL will be appropriately referenced once it is approved by OAL). Limits on phosphorus discharges shall be incorporated into the new and revised Waste Discharge Requirements previously listed, as necessary.

2.c. Phase II of the Nutrient TMDL

1. Monitoring

The Regional Board will establish and oversee a regional monitoring program (RMP) for the Newport Bay watershed. The new and revised WDRs, NPDES permits, DAMP, and agricultural nutrient management plans shall have include requirements to conduct self-monitoring, or in lieu of self-monitoring, to participate in the RMP. Participation in the RMP could result in the reduction of self-monitoring requirements. The RMP will not become effective until approved by the Regional Water Quality Control Board at a duly noticed public meeting as specified in Chapter 1.5, Division 3, Title 23 of the California Code of Regulations (Section 647 et seq.).

The RMP shall be designed by the Regional Board to assess the attainment of the goals of the nutrient TMDL. The objectives of the monitoring program shall be the quantification of the three endpoints of the nutrient TMDL: (1) the seasonal nutrient loading from the watershed; (2) the nutrient concentration in San Diego Creek, Reaches 1 and 2; and (3) the extent, magnitude, and duration of algal blooms in San Diego Creek and Newport Bay. The monitoring plan shall be implemented by March 1999.

The Regional Board will initiate investigations into the currently unknown sources of nutrients in the Newport Bay Watershed. The Regional Board, in cooperation with other agencies and entities, will investigate the occurrence of rising shallow groundwater in the Newport Bay Watershed. The study will focus on the contributions of rising groundwater to the loading of nutrients to drainage channels which are tributary to Newport Bay. Additionally, the study of the nutrient and algae processes of Newport Bay and San Diego Creek will be encouraged and supported by the Regional Board.

Regional Board support could include financial resources, personnel, agency coordination, and scientific review.

2. Actions and Schedule to Achieve Water Quality Objectives

The actions and schedule to achieve water quality objectives is outlined in Table 6-1e. Meeting load reduction targets is highly dependent upon the effectiveness of individual actions; therefore, the Regional Board will review the TMDL, WDRs and compliance schedule at least once every 3 years. Any or all of these may be revised in order to meet water quality standards.

2.d. Estimated Costs of Agricultural Water Quality Control Programs and Potential Sources of Financing

The estimates of capital and operational costs to achieve the nutrient targets of the nutrient TMDL for the San Diego Creek/Newport Bay watershed range from \$0.69 million/year to \$4.73 million/year.

Potential funding sources include:

1. Private financing by individual sources.
2. Bonded indebtedness or loans from governmental institutions.
3. Surcharge on water deliveries to lands contributing to the drainage problem.
4. Ad Valorem tax on lands contributing to the drainage problem.
5. State or federal grants or low-interest loan programs.
6. Single-purpose appropriations from federal or State legislative bodies (including land retirement programs)

Table 6-1e Schedule of Actions to Achieve Water Quality Objectives.

Program Actions	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Review and revision of water quality objectives			X													
New nursery permits		X														
Revise existing permits	X															
Nurseries	X															
NPDES permit	X															
Groundwater cleanup/dewatering		X														
Agricultural nutrient management plans		X														
Urban runoff BMP plan		X														
Sediment TMDL implementation	X		_____													
Monitoring		X	_____													
Newport Bay Watershed total nitrogen - summer TMDL targets					X					X						
Newport Bay Watershed total nitrogen - winter TMDL target															X	
Newport Bay Watershed total phosphorus - annual TMDL targets					X					X						
San Diego Creek, Reach 2 total nitrogen - daily target															X	
Evaluation of TMDL			X			X			X		X			X		X

(End of amendment adopted under Resolution No. 98-100)

3. Bacterial Contamination (The following was added under Resolution No. 99-10 and amendment under Resolution 2017-0019)

Bacterial contamination of the waters of Newport Bay can directly affect two designated beneficial uses: water-contact recreation (**REC-1**) and shellfish harvesting (**SHEL**). The Orange County Health Care Agency (OCHCA) conducts routine bacteriological monitoring and more detailed sanitary surveys as necessary, and is responsible for closure of areas to recreational and shellfish harvesting uses if warranted by the results.

Because of consistently high levels of total coliform bacteria, the upper portion of Upper Newport Bay (Upper Bay) has been closed to these uses since 1974. In 1978, the shellfish harvesting prohibition area was expanded to include all of the Upper Bay, and the OCHCA generally advises against the consumption of shellfish harvested anywhere in the Bay. Bacterial objectives established to protect shellfish harvesting activities are rarely met in the Bay. (Fecal coliform objectives for the protection of shellfish harvesting and water-contact recreation are shown in Chapter 4, "Enclosed Bays and Estuaries". The OCHCA has relied on total coliform standards specified in the California Health and Safety Code. Fecal coliform are a subset of total coliform.). Certain areas in the lower parts of the Upper Bay and in Lower Newport Bay (Lower Bay) are also closed to water-contact recreation on a temporary basis, generally in response to storms. In these areas, there is generally good compliance with water-contact recreation bacterial objectives in the summer.

Data collected by the OCHCA demonstrate that tributary inflows, composed of urban and agricultural runoff, including stormwater, are the principal sources of coliform input to the Bay. As expected, there are more violations of bacterial standards in the Bay during wet weather, when tributary flows are higher, than in dry weather. There are few data on the exact sources of the coliform in this runoff. Coliform has diverse origins, including: manure fertilizers which may be applied to agricultural crops and to commercial and residential landscaping; the fecal wastes of humans, household pets and wildlife; and other sources. Special investigations by OCHCA have demonstrated that food wastes are a significant source of coliform. Many restaurants wash down equipment and floor mats into storm drains tributary to the Bay and may improperly dispose of food waste such that it eventually washes into the Bay. Such discharges likely contribute to the chronic bacterial quality problems in certain parts of the Bay.

Another source of bacterial input to the Bay is the discharge of vessel sanitary wastes. Newport Bay has been designated a no-discharge harbor for vessel sanitary wastes since 1976. Despite this prohibition, discharges of these wastes have continued to occur. Since these wastes are of human origin, they pose a potentially significant public health threat.

The Regional Board, the City of Newport Beach (City), the County of Orange, the City of Newport Beach Harbor Quality Committee, and other parties have taken or stimulated actions to enforce the vessel waste discharge prohibition. The principal focus of these efforts has been to make compliance with the prohibition convenient and therefore more likely.

Vessel waste pumpouts have been installed at key locations around the Bay and are inspected routinely by the OCHCA. A City ordinance addresses people-intensive boating activities to ensure proper disposal of sanitary wastes. The ordinance requires that sailing clubs, harbor tour, and boat charter operations install pumpouts for their vessels. Another City ordinance addresses vessel waste disposal by persons living on their boats. Efforts have also been made to ensure that there are adequate public rest rooms onshore. The City also sponsors an extensive public education campaign designed to advise both residents and visitors of the discharge prohibition, the significance of violations, and of the location of pumpouts and rest room facilities. The effectiveness of these extensive vessel waste control efforts is not known.

As noted, the fecal waste of wildlife, including waterfowl that inhabit the Bay and its environs, is a source of coliform input. The fecal coliform from these natural sources may contribute to the violations of water quality objectives and the loss of beneficial uses, but it is currently unknown to what extent these natural sources contribute to, or cause, the violations of bacterial quality objectives in Newport Bay.

Reports prepared by Regional Board staff describe the bacterial quality problems in the Bay in greater detail and discuss the technical basis for the fecal coliform TMDL that follows (Ref. 21, 22). Implementation of this TMDL is expected to address these bacterial quality problems and to assure attainment of water quality standards, that is, compliance with water quality objectives and protection of beneficial uses.

3.a. Fecal Coliform TMDL

A prioritized, phased approach to the control of pathogen indicator bacterial quality in the Bay is specified in this TMDL. This approach is appropriate, given the complexity of the problem, the paucity of relevant data on bacterial sources and fate, the expected difficulties in identifying and implementing appropriate control measures, and uncertainty regarding the nature and attainability of the SHEL use in the Bay. The phased approach is intended to allow for additional monitoring and assessment to address areas of uncertainty and for future revision and refinement of the TMDL as warranted by these studies.

Table 6-1f summarizes the TMDL, Waste Load Allocations (WLAs) for point sources of fecal coliform inputs and Load Allocations (LAs) for nonpoint source inputs. As shown, the TMDL, WLAs and LAs are established to assure compliance with water contact recreation standards no later than December 30, 2014 and with shellfish standards no later than December 31, 2022. WLAs are specified for vessel waste and urban runoff, including stormwater, the quality of which is regulated under a County-wide NPDES permit issued by the Regional Board. This runoff is thus regulated as a point source, even though it is diffuse in origin. LAs are specified for fecal coliform inputs from agricultural runoff, including stormwater, and natural sources. The TMDL is to be adjusted, as appropriate, based upon completion of the studies contained in Table 6-1g. Upon completion of these studies, an updated TMDL report will be prepared summarizing the results of the studies and making recommendations regarding

implementation of the TMDL. The results of the studies may lead to recommendations for changes to the TMDL specified in Table 6-1f to assure compliance with existing Basin Plan standards (objectives and beneficial uses). The study results may also lead to recommendations for changes to the Basin Plan objectives and/or beneficial uses. If such standards changes are approved through the Basin Plan amendment process, then appropriate changes to the TMDL would be required to assure attainment of the revised standards. Revision of the TMDL, if appropriate, would also be considered through the Basin Plan amendment process.

Upon completion and consideration of the studies and any appropriate Basin Plan amendments, a plan for compliance with the TMDL specified in Table 6-1f, or with an approved amended TMDL, will be established. It is expected that this plan will specify a phased compliance approach, based on consideration of such factors as geographic location, the priority assigned by the Regional Board to specific locations for control actions (see Section 3.a.ii, "Beneficial Use Assessment"), season, etc. Interim WLAs, LAs and compliance dates that lead to ultimate compliance with the TMDL will be established.

The TMDL and its allocations contain a significant margin of safety. The margin of safety can be either incorporated implicitly through analytical approaches and assumptions used to develop the TMDL or added explicitly as a separate component of the TMDL. A substantial margin of safety is implicitly incorporated in the TMDL in the fact that the TMDL does not apply criteria for dilution, natural die-off, and tidal flushing. The TMDL, WLAs, and LAs are established at concentrations equivalent to the water quality objectives.

(The following table was updated under Resolution R8-2017.0019)

Table 6-1f: Total Maximum Daily Load, Waste Load Allocations, and Load Allocations for Fecal Coliform in Newport Bay

Total Maximum Daily Load for Fecal Coliform In Newport Bay	Waste Load Allocations for Fecal Coliform in Urban Runoff, including stormwater, Discharges to Newport Bay	Load Allocations for Fecal Coliform in Agricultural Runoff, including stormwater, Discharges to Newport Bay	Load Allocations for Fecal Coliform from Natural Sources in all Discharges to Newport Bay	Waste Load Allocations for Vessel Waste
As soon as possible but no later than December 30, 2013			In Effect	In Effect
5-Sample/30-days Geometric Mean less than 200 organisms/100 mL, and not more than 10% of the samples exceed 400 organisms/ 100 mL for any 30-day period.	5-Sample/30-days Geometric Mean less than 200 organisms/100 mL, and not more than 10% of the samples exceed 400 organisms/ 100 mL for any 30-day period.	5-Sample/30-days Geometric Mean less than 200 organisms/ 100 mL, and not more than 10% of the samples exceed 400 organisms/ 100 mL for any 30-day period.	5-Sample/30-days Geometric Mean less than 200 organisms/100 mL, and not more than 10% of the samples exceed 400 organisms/ 100 mL for any 30-day period.	0 MPN/100 mL No discharge.
As soon as possible but no later than December 31, 2022				In Effect
Monthly Median less than 14 MPN/100 mL, and not more than 10% of the samples exceed 43 MPN/100 mL.	Monthly Median less than 14 MPN/100 mL, and not more than 10% of the samples exceed 43 MPN/100 mL.	Monthly Median less than 14 MPN/100 mL, and not more than 10% of the samples exceed 43 MPN/100 mL.	Monthly Median less than 14 MPN/100 mL, and not more than 10% of the samples exceed 43 MPN/100 mL.	0 MPN/100 mL No discharge.

Table 6-1g: Fecal Coliform Implementation Plan/Schedule Report Due Dates

Task	Description	Compliance Date-As soon As Possible but No Later Than
Task 1	Routine Monitoring Program (Section 3.a.ii.a) a) Submit Proposed Routine Monitoring Plan(s) ¹ b) Implement Routine Monitoring Plan(s) c) Submit Monthly and Annual Reports (Reporting Period: April 1-March 31)	a) (Within 30 days) ² b) Upon Regional Board Approval of Plan(s) c) Monthly within 30 days, Annual Report by September 1
Task 2	Water Quality Model for Bacterial Indicators (Section 3.a.ii.b) a) Submit Proposed Model Development Plan b) Submit Calibrated Model and Model Documentation	a) (Within 30 days) ² b) 13 months after Regional Board approval of plan(s)
Task 3	Beneficial Use Assessment Plan (Section 3.a.ii.c) Submit Proposed Assessment Plan for: a) REC-1 b) SHEL	a) (Within 30 days) ² b) (Within 13 months) ²
Task 4	Beneficial Use Assessment Report (3.a.ii.c) Submit Beneficial Use Assessment Report for: a) REC-1 b) SHEL	a) 13 months after Regional Board approval of plan(s) b) 13 months after Regional Board approval of plan(s)
Task 5	Source Identification and Characterization Plan(s) (Section 3.a.ii.d) Submit Proposed Source Identification Plans for: a) The Dunes Resort b) Urban Runoff (including stormwater) c) Agriculture (including stormwater) d) Natural Sources	a) (Within 60 days) ² b) (Within 60 days) ² c) (Within 3 months) ² d) (Within 3 months) ²

Table 6-1g: Fecal Coliform Implementation Plan/Schedule Report Due Dates

Task	Description	Compliance Date-As Soon As Possible but No Later Than
Task 6	Source Identification and Characterization Reports (Section 3.a.ii.d) Submit Source Identification and Characterization Reports for: a) The Dunes Resort b) Urban Runoff (including stormwater) c) Agriculture (including stormwater) d) Natural Sources	a) 7 months after Regional Board approval of plan(s) b) 13 months after Regional Board approval of plan(s) c) 16 months after Regional Board approval of plan(s) d) 16 months after Regional Board approval of plan(s)
Task 7	Evaluation of Vessel Waste Program (Section 3.a.ii.e) a) Submit Proposed Plan for Evaluating the Current Vessel Waste Program b) Submit Report on the Evaluation of the Vessel Waste Program	a) (Within 3 months) ² b) 12 months after Regional Board approval of plan
Task 8	TMDL, WLA, and LA Evaluation and Source Monitoring Program (Section 3.a.ii.f) a) Submit Proposed Evaluation and Source Monitoring Program Plan(s) b) Implement Evaluation and Source Monitoring Plan(s) c) Submit Monthly and Annual Reports (Reporting Period: April 1-March 31)	a) 3 months after completion of Tasks 2, 4a, and 6 b) Upon Regional Board approval of plan(s) c) Monthly within 30 days, Annual Report by September 1
Task 9	Updated TMDL Report Submit updated TMDL report for: a) REC-1 b) SHEL	a) 6 months after completion of Tasks 2, 4a, 6, and 7 b) 6 months after completion of Tasks 2, 4b, 6, and 7

Table 6-1g: Fecal Coliform Implementation Plan/Schedule Report Due Dates

Task	Description	Compliance Date-As Soon As Possible but No Later Than
Task 10	Adjust TMDL, if necessary; adopt interim WLAs, LAs, and Compliance Dates (Section 3.a.ii.h) a) REC-1 b) SHEL	a) 12 months after completion of Updated TMDL Report for REC-1 (Task 9.a) b) 12 months after completion of Updated TMDL Report for SHEL (Task 9.b)
¹ Note: Provided that the monitoring program plan(s) fulfills the minimum requirements specified in this TMDL, approval of the TMDL shall constitute Regional Board approval of the monitoring program plan(s).		
² Note: Within specified time periods of State TMDL approval (i.e., approval by the Regional Board, the State Water Resources Control Board, and the Office of Administrative Law). Upon State TMDL approval, this parenthetical "formula" will be replaced by the date certain, based upon the date of approval.		

3.a.i. TMDL Implementation

As soon as possible but no later than the dates specified in Table 6-1g, the County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach and agricultural operators in the Newport Bay watershed shall submit the plans and schedules shown in Table 6-1g and described in Section 3.a.ii. Subsequent phases of TMDL implementation shall take into account the results of the monitoring and assessment efforts required by the initial study phase of the TMDL implementation plan and other relevant studies.

The following sections describe the requirements for the submittal of plans by dischargers in the Newport Bay watershed to complete specific monitoring, investigations and analyses. In each and every case, the plans submitted by the named dischargers will be considered for approval by the Regional Board at a duly noticed public hearing as specified in Chapter 1.5, Division 3, Title 23 of the California Code of Regulations (Section 647 et seq.). The plans are to be implemented upon Regional Board approval and completed as specified in Table 6-1g.

3.a.ii. Monitoring and Assessment

Routine monitoring and special investigations and analyses are an important part of this phased TMDL. Routine monitoring is necessary to assess compliance with the bacterial quality objectives in the Bay and with the WLAs and LAs specified in the TMDL. Special investigations and analyses are needed to identify and characterize sources of fecal coliform input and to determine their fate in the Bay so that appropriate control measures can be developed and implemented. The effectiveness of current and future bacterial control measures needs to be evaluated. The results of these studies may warrant future changes to this TMDL.

3.a.ii.a. Routine Monitoring

By January 30, 2000, the County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach, and the agricultural operators in the Newport Bay watershed shall propose a plan for routine monitoring to determine compliance with the bacterial quality objectives in the Bay.

At a minimum, the proposed plan shall include the collection of five (5) samples/30-days at the stations specified in Table 6-1h and shown in Figure 6-1 and analysis of the samples for total and fecal coliform and enterococci. Reports of the collected data shall be submitted monthly. An annual report summarizing the data collected for the year and evaluating compliance with the water quality objectives shall be submitted by September 1 of each year.

In lieu of this coordinated, regional monitoring plan, one or more of the parties identified in the preceding paragraph may submit an individual or group plan to

conduct routine monitoring in areas solely within their jurisdiction to determine compliance with the bacterial objectives in the Bay (if appropriate). Any such individual or group plans shall also be submitted by January 30, 2000. Reports of the data collected pursuant to approved individual/group plan(s) shall be submitted monthly and an annual report summarizing the data and evaluating compliance with water quality objectives shall be submitted by September 1 of each year.

The monitoring plan(s) shall be implemented upon Regional Board approval.

Table 6-1h

Newport Bay Sampling Stations for Routine Compliance Monitoring with Bacterial Quality Objectives (see Figure 6-1 for Station Locations)

Ski Zone	33rd Street	Park Avenue
Vaughns Launch	Rhine Channel	Via Genoa
Northstar Beach	De Anza	Alvarado/Bay Is.
Abalone Avenue	Promontory Pt.	10th Street
Dunes East	Bayshore Beach	15th Street
Dunes Middle	Onyx Avenue	19th Street
Dunes West	Garnet Avenue	Lido Island Yacht Club
Dunes North	Ruby Avenue	Harbor Patrol
43rd Street	Sapphire Avenue	N Street Beach
38th Street	Newport Blvd. Bridge	Rocky Point
San Diego Creek @ Campus Dr.	Santa Ana Delhi Channel	Big Canyon Wash
Backbay Dr. Drain		

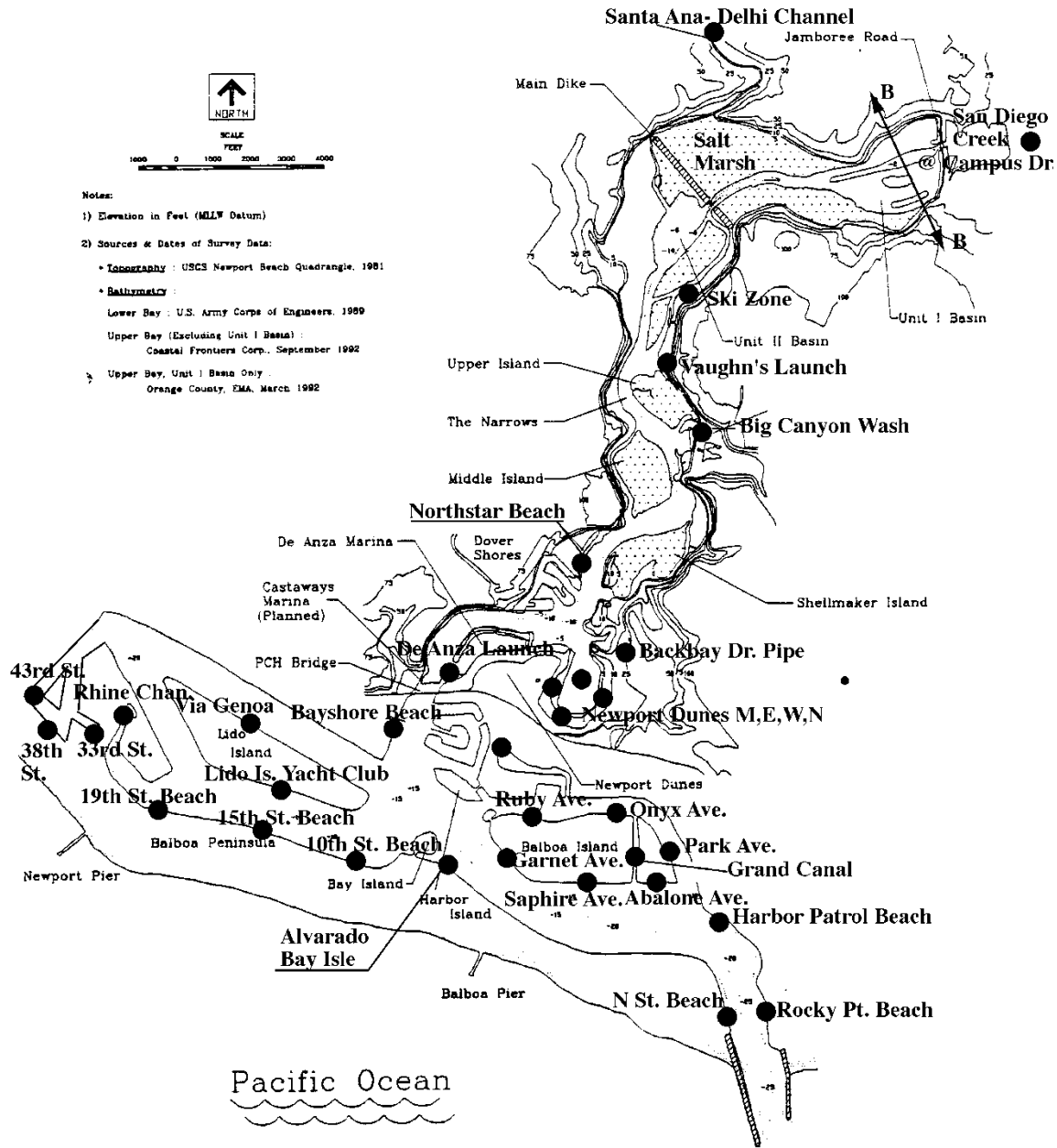


Figure 6-1: Newport Bay Bacterial Quality Monitoring Stations

3.a.ii.b. Fate of Bacteria Inputs

By January 30, 2000, the County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest, and Newport Beach and the agricultural operators in the Newport Bay watershed shall submit a plan for the development and submittal of a water quality model to be completed by 13 months after Regional Board approval of the plan. The model shall be capable of analysis of fecal coliform inputs to Newport Bay, the fate of those inputs, and the effect of those inputs on compliance with bacterial quality objectives in the Bay.

3.a.ii.c. Beneficial Use Assessment

By January 30, 2000, the County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach shall submit a plan to complete, by 13 months after Regional Board approval of the plan, a beneficial use assessment to identify and quantify water contact recreation activities in Newport Bay. By 13 months after Regional Board approval of the beneficial use assessment plan, these parties shall submit a report of the results of the water contact recreation beneficial use assessment.

By March 1, 2001, the County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach shall submit a plan to complete, by 13 months after Regional Board approval of the plan, a beneficial use assessment to identify and quantify shellfish harvesting activities in Newport Bay. By 13 months after Regional Board approval of the beneficial use assessment plan, these parties shall submit a report of the results of the shellfish harvesting beneficial use assessment.

The beneficial use assessment reports shall contain recommendations for prioritizing areas within Newport Bay for purposes of evaluation and implementation of cost-effective and reasonable control actions as part of the TMDL process. The Regional Board will consider these recommendations and make its determinations regarding high priority water contact recreation and shellfish harvesting areas at a duly noticed public hearing. These determinations will be considered in establishing interim WLAs and LAs and compliance dates (Task 10, Table 6-1g).

3.a.ii.d. Source Identification and Characterization

By March 1, 2000 the County of Orange and the City of Newport Beach shall submit a proposed plan for a program, to be completed within 7 months after Regional Board approval of the plan to identify and characterize fecal coliform inputs to The Dunes Resort. In lieu of this coordinated plan, each of these parties may submit an individual plan to identify and characterize fecal coliform inputs to The Dunes Resort. Any such individual plan shall also be submitted by March 1, 2000 and completed within 7 months after Regional Board approval of the plan(s).

By March 1, 2000 the County of Orange and the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest, and Newport Beach shall submit a proposed plan for a program, to be completed within 13 months after Regional Board approval of the plan to identify and characterize fecal coliform inputs to Newport Bay from urban runoff, including stormwater. In lieu of this coordinated, regional plan, one or more of these parties may submit an individual or group plan to identify and characterize fecal coliform inputs to the Bay from urban runoff from areas within its jurisdiction. Any such individual or group plan shall also be submitted by (60 days after State TMDL approval) * and completed within 13 months after Regional Board approval of the plan(s).

By April 1, 2000, the agricultural operators in the Newport Bay watershed shall submit a proposed plan for a program, to be completed within 16 months after Regional Board approval of the plan, to identify and characterize fecal coliform inputs to Newport Bay from agricultural runoff, including stormwater. In lieu of this coordinated plan, one or more of the agricultural operators may submit an individual or group plan to identify and characterize fecal coliform inputs to the Bay from agricultural runoff from areas within their jurisdiction. Any such individual or group plan shall also be submitted by April 1, 2000, and completed within 16 months after Regional Board approval of the plan(s).

By April 1, 2000, the County of Orange and the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest, and Newport Beach shall submit a proposed plan for a program, to be completed within 16 months after Regional Board approval of the plan, to identify and characterize fecal coliform inputs to Newport Bay from natural sources. In lieu of this coordinated, regional plan, one or more of these parties may submit an individual or group plan to identify and characterize fecal coliform inputs to the Bay from natural sources from areas within its jurisdiction. Any such individual or group plan shall also be submitted by April 1, 2000 and completed within 16 months after Regional Board approval of the plan(s).

3.a.ii.e. Evaluation of Vessel Waste Control Program

By April 1, 2000 the County of Orange and the City of Newport Beach shall submit a plan to complete, by one year after Regional Board approval of the plan, an assessment of the effectiveness of the vessel waste control program implemented by those agencies in Newport Bay. The plan shall be implemented upon approval by the Regional Board. A report of the study results shall be submitted, together with recommendations for changes to the vessel waste program necessary to ensure compliance with this TMDL.

The Regional Board will consider appropriate changes to the vessel waste control program. These changes shall be implemented in accordance with a schedule to be established by the Regional Board.

3.a.ii.f. TMDL, WLA and LA Evaluation and Source Monitoring Program

By (3 months after completion of Tasks 2, 4a, and 6 as shown in Table 6-1g)* the County of Orange, the Cities of Tustin, Irvine, Costa Mesa Santa Ana, Orange, Lake Forest and Newport Beach, and the agricultural operators in the Newport Bay watershed shall propose a plan for evaluation and source monitoring to determine compliance with the WLAs and LAs specified in Table 6-1f. In lieu of this coordinated, regional plan, one or more of these parties may submit an individual or group plan to conduct TMDL, WLA, LA and Source Evaluation monitoring from areas solely within their jurisdiction. Any such individual or group plan shall also be submitted by (3 months after completion of Tasks 2, 4a, and 6 as shown in Table 6-1g).* Reports of the data collected pursuant to approved individual/group plan(s) shall be submitted monthly and an annual report summarizing the data and evaluating compliance with WLAs and LAs shall be submitted by September 1 of each year. The annual report shall also include an evaluation of the effectiveness of control measures implemented to control sources of fecal coliform, and recommendations for any changes to the control measures needed to ensure compliance with the TMDL, WLAs, and LAs.

The evaluation and source monitoring plan(s) shall be implemented upon Regional Board approval.

3.a.ii.g. Updated TMDL Report

The County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach, and the agricultural operators in the Newport Bay watershed shall submit Updated TMDL Reports as specified in Table 6-1g. These updated TMDL reports shall, at a minimum, integrate and evaluate the results of the studies required in Table 6-1g (Task 1 – 7). The reports shall include recommendations for revisions to the TMDL, if appropriate and for interim WLAs, LAs and compliance schedules.

3.a.ii.h. Adjust TMDL; Adopt Interim WLA, LAs and Compliance Dates

Based on the results of the studies required by Table 6-1g and recommendations made in the Updated TMDL Reports, changes to the TMDL for fecal coliform may be warranted. Such changes would be considered through the Basin Plan Amendment process. Upon completion and consideration of the studies and any appropriate Basin Plan amendments, interim WLAs and LAs that lead to ultimate compliance with the TMDL specified in Table 6-1f, or with an approved amended TMDL, will be established with interim compliance dates. Schedules will also be established for submittal of implementation plans for control measures to achieve compliance with these WLAs, LAs, and compliance dates. These

implementation plans will be considered by the Regional Board at a duly noticed public hearing.

The Regional Board is committed to the review of this TMDL every three years or more frequently if warranted by these or other studies.

(End of amendment adopted under Resolution No. 2017-0019.)

4. Toxic Substance Contamination (The following was added under Resolution No. R8-2003-0039)

San Diego Creek and Newport Bay are not attaining water quality standards with respect to certain classes of toxic pollutants. On June 14, 2002, USEPA established Total Maximum Daily Loads (TMDLs) for selenium, heavy metals (cadmium, copper, lead, and zinc), organochlorine pesticides (chlordane, dieldrin, DDT, and toxaphene), PCBs, and organophosphate pesticides (diazinon and chlorpyrifos). In addition, USEPA established a separate TMDL for the Rhine Channel in Lower Newport Bay. Table 6-1i shows these TMDLs, the constituents addressed, and the waterbodies affected.

USEPA's TMDLs do not specify implementation plans, which are the responsibility of the Regional Board. The Regional Board has adopted or will adopt Basin Plan amendments to incorporate the USEPA TMDLs, revised if and as appropriate, into the Basin Plan. These amendments will include implementation plans. The anticipated schedule for these Basin Plan amendments is also shown in Table 6-1i.

Table 6-1i. USEPA TMDLs Established June 14, 2002

TMDL	Basin Plan Schedule	Location	Constituents
Organophosphate Pesticides	2003	SDC	Diazinon, chlorpyrifos
		UNB	Chlorpyrifos
Selenium	2007	SDC, UNB LNB	Selenium
Metals	2007	SDC	Cd, Cu, Pb, Zn
		UNB	Cd, Cu, Pb, Zn
		LNB	Cu, Pb, Zn
Organochlorine Compounds	2007	SDC	Chlordane, dieldrin, DDT, PCBs, toxaphene
		UNB	Chlordane, DDT, PCBs
		LNB	Chlordane, dieldrin, DDT, PCBs
Rhine Channel	2007	Rhine Channel	Se, Cr, Hg, Cu, Pb, Zn Chlordane, dieldrin, DDT, PCBs

SDC= San Diego Creek; UNB=Upper Newport Bay; LNB=Lower Newport Bay

4.a Diazinon and Chlorpyrifos TMDL

Aquatic toxicity in San Diego Creek and Upper Newport Bay causes adverse impacts to the established beneficial uses of those waterbodies.

A report prepared by Regional Board staff describes the aquatic life toxicity problems in San Diego Creek and Upper Newport Bay in greater detail and discusses the technical basis for the TMDL that follows². This TMDL is the same as that promulgated by the USEPA on June 14, 2002, but an implementation plan is also specified (see Section 4.a.i.). The USEPA TMDL was, in fact, based on a draft TMDL prepared by Regional Board staff. The TMDL addresses toxicity due to diazinon and chlorpyrifos in San Diego Creek and chlorpyrifos in Upper Newport Bay. Implementation of this TMDL is expected to address, to a significant extent, the occurrence of aquatic life toxicity in these waterbodies. Reduction in aquatic life toxicity will help assure attainment of water quality standards; that is, compliance with water quality objectives and protection of beneficial uses.

Table 6-1j shows the TMDL and the allocations for diazinon and chlorpyrifos in San Diego Creek.

Table 6-1j. Diazinon and Chlorpyrifos Allocations for San Diego Creek

Category	Diazinon (ng/L)		Chlorpyrifos (ng/L)	
	Acute	Chronic	Acute	Chronic
Wasteload Allocation	72	45	18	12.6
Load allocation	72	45	18	12.6
MOS	8	5	2	1.4
TMDL	80	50	20	14

MOS = Margin of Safety; Chronic means 4-consecutive day average

Table 6-1k shows the TMDL and the allocations for chlorpyrifos in Upper Newport Bay.

Table 6-1k. Chlorpyrifos Allocations for Upper Newport Bay

Category	Acute (ng/L)	Chronic (ng/L)
Wasteload allocation	18	8.1
Load allocation	18	8.1
MOS	2	0.9
TMDL	20	9

MOS = Margin of Safety; Chronic means 4-consecutive day average

The TMDL and its allocations contain an explicit 10% margin of safety. In addition, a substantial margin of safety is implicitly incorporated in the TMDL through use of conservative assumptions.

² Diazinon and Chlorpyrifos TMDL, Upper Newport Bay and San Diego Creek, April 4, 2003

4.a.i TMDL Implementation

Table 6-11 outlines the tasks and schedules to implement the TMDL.

Table 6-11. TMDL Task Schedule

Task No.	Task	Schedule	Description
1	USEPA Re-Registration Agreements	12/2001 to 12/2006	Phase-out of uses specified in the re-registration agreements. Should end over 90% of usage ¹ .
2	Revise Discharge Permits	2005	WDR and NPDES permits will be revised to include the TMDL allocations, as appropriate.
3	Pesticide Runoff Management Plan	2004	A pesticide runoff management plan will be developed
4	Monitoring	2003	Modify existing regional monitoring program to include analysis for organophosphate pesticides and toxicity
	Special Studies		
5a	Atmospheric deposition	2003	Quantify atmospheric deposition of chlorpyrifos loading to Upper Newport Bay
5b	Mixing volumes in Upper Newport Bay	2003	Model mixing and stratification of chlorpyrifos in Upper Newport Bay during storm events

¹ This task is not within the purview of the Regional Board, but is nevertheless of critical significance for implementation of the TMDL.

Task 1: USEPA Re-Registration Agreements

The re-registration agreements negotiated by USEPA with the manufacturers of diazinon and chlorpyrifos are the most significant factor affecting the implementation plan. Usage of both diazinon and chlorpyrifos in the Newport Bay Watershed is expected to be reduced by over 90 percent.

Task 2: Revise Discharge Permits

The TMDL allocates wasteloads to all dischargers in the watershed. Since the TMDL is concentration-based, these wasteloads are concentration limits. The concentration limits will be incorporated into existing and future discharge permits in the watershed. Compliance schedules would be included in permits only if they are demonstrated to be necessary. Compliance would be required as soon as possible, but no later than December 1, 2007.

Task 3: Pesticide Runoff Management Plan

A pesticide runoff management plan will be developed for the watershed as a cooperative project between the Regional Board and stakeholders.

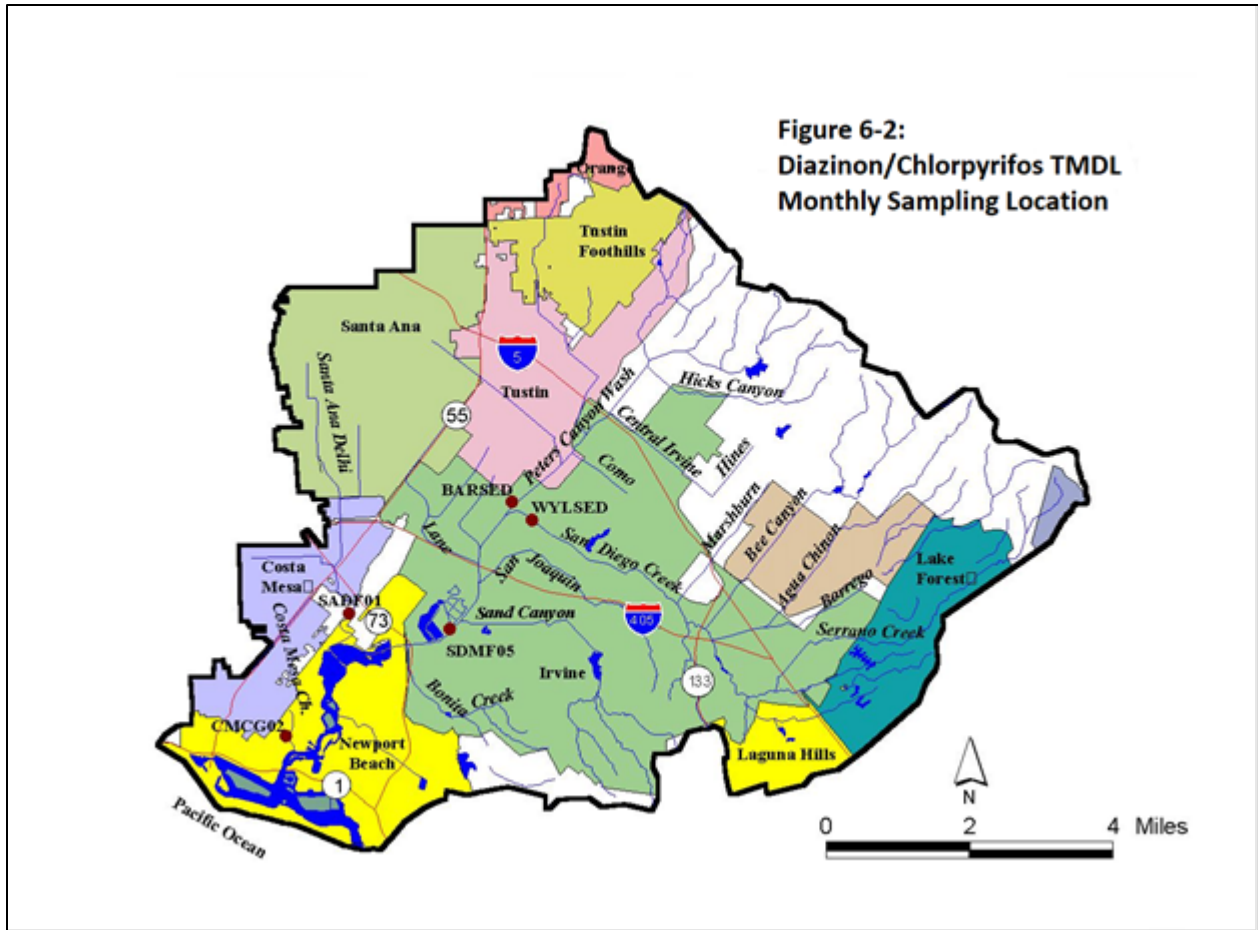
Task 4: Monitoring

Routine monitoring is necessary to assess compliance with the allocations specified in the TMDL. The County of Orange, the Cities of Tustin, Irvine, Costa

Mesa, Santa Ana, Orange, Lake Forest and Newport Beach, and the agricultural operators in the Newport Bay watershed will be required to propose a plan by January 30, 2004 for routine monitoring to determine compliance with the TMDL allocations for diazinon and chlorpyrifos. At a minimum, the proposed plan must include the collection of monthly samples at the stations specified in Table 6-1m and shown in Figure 6-2 and analysis of the samples for diazinon and chlorpyrifos. Monthly toxicity tests should also be conducted at several locations in the watershed. Data summaries will be required monthly. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL will be required to be submitted by November 30 of each year.

Table 6-1m. Minimum Required Monthly Sampling Stations

Station Code	Location
BARSED	Peters Canyon Wash
WYLSED	San Diego Creek at Harvard Dr.
SDMF05	San Diego Creek at Campus Dr.
SADF01, or CMCG02	Santa Ana Delhi Channel, or Costa Mesa Channel



**Figure 6-2:
Diazinon/Chlorpyrifos TMDL
Monthly Sampling Location**

In lieu of this coordinated monitoring plan, one or more of the parties identified in the preceding paragraph may submit an individual or group plan to conduct routine monitoring in areas solely within their jurisdiction to determine compliance with the TMDL. Any such individual or group plans must also be submitted by January 30, 2004. Reports of the data collected pursuant to approved individual/group plans(s) will be required to be submitted monthly, and an annual report summarizing the data and evaluating compliance with the TMDL will be required to be submitted by November 30 of each year.

It is likely that implementation of these requirements will be through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

Task 5: Special Studies

With the anticipated assistance of stakeholders in the watershed, the Regional Board will conduct investigations to (1) quantify the significance of atmospheric

deposition of chlorpyrifos to Upper Newport Bay, and (2) determine the adequacy of the freshwater allocations for chlorpyrifos in the tributaries to Upper Newport Bay in achieving the lower saltwater allocations. The existing hydrodynamic model for Newport Bay is being used to perform simulations that predict contaminant concentrations in the Bay based on various flow and management scenarios. The model results will be used to verify whether the TMDL allocations for chlorpyrifos in the watershed will be sufficient to achieve the TMDL allocations in Upper Newport Bay. One of the questions to be addressed is the magnitude of toxic exposure that could result from development of a freshwater lens associated with the discharge of stormwater to Upper Newport Bay.

4.a.ii Adjust TMDL

Based on the results of the special studies and recommendations made in the Pesticide Runoff Monitoring reports, changes to the TMDL may be warranted. Such changes would be considered through the Basin Plan Amendment process. The Regional Board is committed to the review of this TMDL every three years, or more frequently if warranted by these or other studies.

(End of amendment adopted under Resolution No. R8-2003-0039)

4.b Organochlorine Compounds TMDLs (The following was added under Resolution No. R8-2011-0037)

Organochlorine compounds, including DDT, PCBs, toxaphene and chlordane, possess unique physical and chemical properties that influence their persistence, fate and transport in the environment. While these characteristics vary among the organochlorine compounds, they all exhibit an ability to resist degradation, partition into sediment, and to accumulate in the tissue of organisms, including invertebrates, fish, birds and mammals. The bioaccumulation of these compounds can adversely affect the health and reproductive success of aquatic organisms and their predators, and can pose a health threat to human consumers.

A TMDL technical report prepared by Regional Board staff [Ref. # 1] describes organochlorine-related problems in Newport Bay and its watershed and delineates the technical basis for the TMDLs that follow.

The waterbody-pollutant combinations for which organochlorine compounds TMDLs were established by the Regional Board are listed in Table NB-OCs-1. These TMDLs differ from those established by USEPA in 2002 in several respects:

First, based on an updated impairment assessment that utilized new data and applied the State Water Board's "Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List" (2004) [Ref. # 2], the Regional Board established TMDLs for a list of organochlorine compound-waterbody combinations different from that of USEPA. As shown in Table NB-OCs-2, USEPA also established TMDLs for dieldrin, chlordane, and PCBs in San Diego Creek and

for dieldrin in Lower Newport Bay. In contrast, the Regional Board found no impairment as the result of dieldrin in any of these waters, nor was impairment due to chlordane or PCBs found in San Diego Creek and its tributaries.

As described in the TMDL technical report, Regional Board staff also found no impairment due to DDT in San Diego Creek or its tributaries. However, in adopting the 2006 Section 303(d) list (October 25, 2006, Resolution No. 2006-0079), the State Water Board found impairment due to DDT in Peter's Canyon Channel. In response, the Regional Board established a TMDL for DDT in San Diego Creek and its tributaries, including Peters Canyon Channel.

Second, corrections and modifications were made to loading capacities and existing loads identified in USEPA's TMDLs. Finally, an implementation plan is specified (see Section 4.b.3).

While the Regional Board did not establish TMDLs for chlordane and PCBs for San Diego Creek and tributaries, the Board did develop informational TMDLs for these substances in these waters, pursuant to Clean Water Act Section 303(d)(3). These informational TMDLs are shown in Table NB-OCs-3. This action was taken in light of several factors. First, the largest source of organochlorine compounds to Newport Bay is San Diego Creek. Second, the data suggest that the existing loading of chlordane to the Creek is greater than the loading capacity. This suggests that the lack of finding of impairment due to chlordane may be simply a reflection of a lack of data with which to assess impairment. Finally, these informational TMDLs may forward action to address organochlorine compound problems in the watershed. These informational TMDLs have no regulatory effect but may be used as the basis for further investigation of the relative contributions of the various sources of organochlorine compound inputs to San Diego Creek and thence the Bay. In the long-term, this would be expected to help assure proper apportionment of responsibility for implementation of the TMDLs identified in Table NB-OCs-1.

Table NB-OCs-1. Waterbody-pollutant combinations for which Organochlorine Compound TMDLs are established

<i>Waterbody</i>	<i>Pollutant</i>
San Diego Creek and tributaries	DDT, Toxaphene
Upper Newport Bay	Chlordane, DDT, PCBs
Lower Newport Bay	Chlordane, DDT, PCBs

Table NB-OCs-2. Waterbody-pollutant combinations for which Organochlorine Compounds TMDLs were established by USEPA (2002) and Regional Board (2007)

<i>Waterbody</i>	<i>TMDLs</i>	
	USEPA	Regional Board
San Diego Creek and tributaries*	Chlordane, dieldrin, DDT, PCBs, Toxaphene	DDT, Toxaphene
Upper Newport Bay	Chlordane, DDT, PCBs	Chlordane, DDT, PCBs
Lower Newport Bay	Chlordane, dieldrin, DDT, PCBs	Chlordane, DDT, PCBs

*TMDLs are established for San Diego Creek and tributaries, even if impairment was only found in particular reaches (e.g., SWRCB found DDT impairment in Peter's Canyon Channel, a primary tributary to San Diego Creek Reach 1, but the TMDL includes all of San Diego Creek and tributaries).

Table NB-OCs-3. Informational TMDLs

<i>Waterbody</i>	<i>Informational TMDLs</i>
San Diego Creek and tributaries	Chlordane, PCBs

4.b.1 Numeric Targets used in Organochlorine Compounds TMDLs

Numeric targets identify specific endpoints in sediment, water column or tissue that equate to attainment of water quality standards, which is the purpose of TMDLs. Multiple targets may be appropriate where a single indicator is insufficient to protect all beneficial uses and/or attain all applicable water quality objectives. The range of beneficial uses identified in this Basin Plan (see Chapter 3) for the waters addressed by the organochlorine compounds TMDLs makes clear that the targets must address the protection of aquatic organisms, wildlife (including federally listed threatened and endangered species) and human consumers of recreationally and commercially caught fish.

Sediment, water column and fish tissue targets are identified for these TMDLs, as shown in Table NB-OCs-4. The sediment and water column targets are identical to those selected by USEPA in the development of their organochlorine compounds TMDLs (2002). Fish tissue targets are added for the protection of aquatic life and wildlife.

The targets employed in the development of informational TMDLs for chlordane and PCBs in San Diego Creek and its tributaries are shown in Table NB-OCs-5.

Table NB-OCs-4. Numeric Sediment, Fish Tissue, and Water Column TMDL Targets

	Total DDT	Chlordane	Total PCBs	Toxaphene
Sediment Targets¹; units are □g/kg dry weight				
San Diego Creek and tributaries	6.98			0.1
Upper & Lower Newport Bay	3.89	2.26	21.5	
Fish Tissue Targets for Protection of Human Health²; units are □g/kg wet weight				
San Diego Creek and tributaries	100			30
Upper & Lower Newport Bay	100	30	20	
Fish Tissue Targets for Protection of Aquatic Life and Wildlife³; units are □g/kg wet weight				
San Diego Creek and tributaries	1000			100
Upper & Lower Newport Bay	50	50	500	
Water Column Targets for Protection of Aquatic Life, Wildlife & Human Health⁴ (□g/L)				
San Diego Creek and tributaries				
<i>Acute Criterion (CMC^a)</i>	1.1			0.73
<i>Chronic Criterion (CCC^b)</i>	0.001			0.0002
<i>Human Health Criterion</i>	0.00059			0.00075
Upper & Lower Newport Bay				
<i>Acute Criterion (CMC^a)</i>	0.13	0.09		
<i>Chronic Criterion (CCC^b)</i>	0.001	0.004	0.03	
<i>Human Health Criterion</i>	0.00059	0.00059	0.00017	

¹ Freshwater and marine sediment targets, except toxaphene, are Threshold Effect Levels (TELs) from Buchman, M.F. 1999. NOAA Screening Quick Reference Tables, NOAA HAZMAT Report 99-1, Seattle WA, Coastal Protection and Restoration Division, National Oceanic and Atmospheric Administration, 12 pp. Toxaphene target is from N.Y. Dept. of Environmental Conservation.

² Freshwater and marine fish tissue targets for protection of human health are Office of Environmental Health Hazard Assessment (OEHHA) Screening Values (SVs).

³ Freshwater and marine fish tissue targets for protection of aquatic life and wildlife are from Water Quality Criteria 1972. A report of the Committee on Water Quality Criteria, Environmental Studies Board, National Academy of Sciences, National Academy of Engineering. Washington, D.C., 1972.

⁴ Freshwater and marine targets are from California Toxics Rule (2000).

^a CMC: Criteria Maximum Concentration

^b CCC: Continuous Criteria Concentration

Table NB-OCs-5. Numeric Sediment, Fish Tissue, and Water Column Targets used in Informational TMDLs

	Chlordane	Total PCBs
Sediment Targets¹; units are □g/kg dry weight		
San Diego Creek and tributaries	4.5	34.1
Fish Tissue Targets for Protection of Human Health²; units are □g/kg wet weight		
San Diego Creek and tributaries	30	20
Fish Tissue Targets for Protection of Aquatic Life and Wildlife³; units are □g/kg wet weight		
San Diego Creek and tributaries	100	500
Water Column Targets for Protection of Aquatic Life, Wildlife & Human Health⁴ (□g/L)		
San Diego Creek and tributaries		
<i>Acute Criterion (CMC^a)</i>	2.4	
<i>Chronic Criterion (CCC^b)</i>	0.0043	0.014
<i>Human Health Criterion</i>	0.00059	0.00017

¹ Freshwater sediment targets are Threshold Effect Levels (TELs) from Buchman, M.F. 1999. NOAA Screening Quick Reference Tables, NOAA HAZMAT Report 99-1, Seattle WA, Coastal Protection and Restoration Division, National Oceanic and Atmospheric Administration, 12 pp.

² Freshwater fish tissue targets for protection of human health are Office of Environmental Health Hazard Assessment (OEHHA) Screening Values (SVs).

³ Freshwater fish tissue targets for protection of aquatic life and wildlife are from Water Quality Criteria 1972. A report of the Committee on Water Quality Criteria, Environmental Studies Board, National Academy of Sciences, National Academy of Engineering. Washington, D.C., 1972.

⁴ Freshwater targets are from California Toxics Rule (2000).

^a CMC: Criteria Maximum Concentration

^b CCC: Continuous Criteria Concentration

The linkage between adverse effects in sensitive wildlife species and concentrations of the organochlorine pollutants in sediments, prey organisms and water is not well understood at the present time, although work is underway to better understand ecological risk in Newport Bay. In addition, the State is in the process of developing sediment quality objectives that should provide guidance for assessing adverse effects due to pollutant bioaccumulation. Reducing contaminant loads in the sediment will result in progress toward reducing risk to aquatic life and wildlife. During implementation of these TMDLs, additional and/or modified wildlife or other targets will be identified as risk assessment information becomes available. These TMDLs will be revisited (see 4.b.3) and revised as appropriate.

4.b.2. Organochlorine Compounds TMDLs, Wasteload Allocations, Load Allocations and Compliance Dates

The organochlorine compounds TMDLs for San Diego Creek and its tributaries, Upper Newport Bay and Lower Newport Bay are shown in Tables NB-OCs-6 and NB-OCs-7. The TMDLs are expressed on a daily basis (average grams per day) in Table NB-OCs-6, and on an annual basis (grams per year) in Table NB-OCs-7. Expression of the TMDLs on a daily basis is intended to comply with a relevant court decision. However, because of the strong seasonality associated with the loading of organochlorine compounds during storm events, it is appropriate for implementation to occur based on average annual loadings. The TMDLs are to be achieved as soon as possible but no later than December 31, 2020.

Table NB-OCs-6. TMDLs for San Diego Creek, Upper and Lower Newport Bay (expressed on a “daily” basis to be consistent with the D.C. Circuit Court of Appeals decision in Friends of the Earth, Inc. v. EPA, et al., No. 05-5015 [D.C. Cir.2006])

Water Body	Pollutant	TMDL (average grams per day)^a
San Diego Creek and Tributaries	Total DDT	1.08
	Toxaphene	0.02
Upper Newport Bay	Total DDT	0.44
	Chlordane	0.25
	Total PCBs	0.25
Lower Newport Bay	Total DDT	0.16
	Chlordane	0.09
	Total PCBs	0.66

^a Compliance to be achieved as soon as possible but no later than December 31, 2020.

Table NB-OCs-7. TMDLs for San Diego Creek, Upper and Lower Newport Bay (expressed on annual basis for implementation purposes)

Water Body	Pollutant	TMDL (grams per year)^a
San Diego Creek and Tributaries	Total DDT	396
	Toxaphene	6
Upper Newport Bay	Total DDT	160
	Chlordane	93
	Total PCBs	92
Lower Newport Bay	Total DDT	59
	Chlordane	34
	Total PCBs	241

^a Compliance to be achieved as soon as possible but no later than December 31, 2020.

Informational TMDLs for San Diego Creek and its tributaries for chlordane and total PCBs are shown in Table NB-OCs-8. Again, these informational TMDLs are expressed on average daily and annual bases.

Table NB-OCs-8. Informational TMDLs for San Diego Creek and Tributaries (expressed on average daily and annual bases)

Water Body	Pollutant	TMDL (average grams per day)
San Diego Creek and Tributaries	Chlordane	0.70
	Total PCBs	0.34
		TMDL (grams per year)
San Diego Creek and Tributaries	Chlordane	255
	Total PCBs	125

Wasteload and load allocations to achieve the TMDLs specified in Tables NB-OCs-6 and NB-OCs-7 are shown in Tables NB-OCs-9 and NB-OCs-10, respectively. Like the TMDLs, the allocations are expressed in terms of both average daily and annual loads. An explicit margin of safety (MOS) of ten percent was applied in calculating the allocations. Consistent with the TMDL compliance schedule, these allocations are to be achieved as soon as possible but no later than December 31, 2020.

Wasteload and load allocations necessary to meet the informational TMDLs shown in Table NB-OCs-8 are identified in Tables NB-OCs-11 (expressed as average daily loads) and NB-OCs-12 (expressed as annual loads). These allocations are identified only for informational purposes.

Table NB-OCs-9. TMDLs and Allocations for San Diego Creek, Upper and Lower Newport Bay (expressed on a “daily” basis to be consistent with the recent D.C. Circuit Court of Appeals decision in Friends of the Earth, Inc. v. EPA, et al., No. 05-5015 [D.C. Cir.2006]).^{a,b}

	Type	Total DDT	Chlordane	Total PCBs	Toxaphene
		(average grams/day)			
<i>San Diego Creek</i>					
WLA	Urban Runoff – County MS4 (36%)	0.35			0.005
	Construction (28%)	0.27			0.004
	Commercial Nurseries (4%)	0.04			0.001
	Caltrans MS4 (11%)	0.11			0.002
	Subtotal – WLA (79%)	0.77			0.01
LA	Agriculture (5%) (excludes nurseries under WDRs)	0.05			0.001
	Open Space (9%)	0.09			0.001
	Streams & Channels (2%)	0.02			0.0003
	Undefined (5%)	0.05			0.001
	Subtotal – LA (21%)	0.21			0.003
MOS (10% of total TMDL)		0.11			0.002
Total TMDL		1.08			0.02
<i>Upper Newport Bay</i>					
WLA	Urban Runoff - County MS4 (36%)	0.14	0.08	0.08	
	Construction (28%)	0.11	0.06	0.06	
	Commercial Nurseries (4%)	0.02	0.01	0.01	
	Caltrans MS4 (11%)	0.04	0.03	0.02	
	Subtotal – WLA (79%)	0.31	0.18	0.18	
LA	Agriculture (5%) (excludes nurseries under WDRs)	0.02	0.01	0.01	
	Open Space (9%)	0.04	0.02	0.02	
	Streams & Channels (2%)	0.01	0.005	0.005	
	Undefined (5%)	0.02	0.01	0.01	
	Subtotal – LA (21%)	0.08	0.05	0.05	
MOS (10% of Total TMDL)		0.04	0.03	0.03	
Total TMDL		0.44	0.25	0.25	

Lower Newport Bay					
WLA	Urban Runoff – County MS4 (36%)	0.05	0.03	0.21	
	Construction (28%)	0.04	0.02	0.17	
	Commercial Nurseries (4%)	0.01	0.003	0.02	
	Caltrans MS4 (11%)	0.02	0.01	0.07	
	Subtotal – WLA (79%)	0.11	0.07	0.47	
LA	Agriculture (5%) (excludes nurseries under WDRs)	0.01	0.004	0.03	
	Open Space (9%)	0.01	0.01	0.05	
	Streams & Channels (2%)	0.003	0.002	0.01	
	Undefined (5%)	0.01	0.004	0.03	
	Subtotal – LA (21%)	0.03	0.02	0.12	
MOS (10% of Total TMDL)		0.02	0.01	0.07	
Total TMDL		0.16	0.09	0.66	

^a Percentages for WLA (79%) and LA (21%) are applied to the TMDL, after subtracting the 10% MOS from the Total TMDL. Percent WLA and Percent LA add to 100%.

^b Compliance to be achieved as soon as possible but no later than December 31, 2020.

Table NB-OCs-10. TMDLs and Allocations for San Diego Creek, Upper and Lower Newport Bay (expressed on an “annual” basis for implementation purposes).^{a, b}

		Total DDT	Chlordane	Total PCBs	Toxaphene
	Type	(grams per year)			
San Diego Creek					
WLA	Urban Runoff – County MS4 (36%)	128.3			1.9
	Construction (28%)	99.8			1.5
	Commercial Nurseries (4%)	14.3			0.2
	Caltrans MS4 (11%)	39.2			0.6
	Subtotal – WLA (79%)	281.6			4.3
LA	Agriculture (5%) (excludes nurseries under WDRs)	17.8			0.3
	Open Space (9%)	32.1			0.5
	Streams & Channels (2%)	7.1			0.1
	Undefined (5%)	17.8			0.3
	Subtotal – LA (21%)	74.8			1.1
MOS (10% of Total TMDL)		40			0.6
Total TMDL		396			6

<i>Upper Newport Bay</i>					
WLA	Urban Runoff – County MS4 (36%)	51.8	30.1	29.8	
		40.3	23.4	23.2	
	Construction (28%)	5.8	3.3	3.3	
	Commercial Nurseries (4%)	15.8	9.2	9.1	
	Caltrans MS4 (11%)	113.8	66.1	65.4	
	Subtotal – WLA (79%)				
LA	Agriculture (5%) (excludes nurseries under WDRs)	7.2	8	7	
	Open Space (9%)	13.0	7.6	7.5	
	Streams & Channels (2%)	2.9	1.7	1.7	
	Undefined (5%)	7.2	4.2	4.2	
		Subtotal – LA (21%)	30.2	21.4	20.3
MOS (10% of Total TMDL)		16	9	9	
Total TMDL		160	93	92	
<i>Lower Newport Bay</i>					
WLA	Urban Runoff – County MS4 (36%)	19.1	11.0	78.1	
		14.9	8.6	60.7	
	Construction (28%)	2.1	1.2	8.7	
	Commercial Nurseries (4%)	5.8	3.4	23.9	
	Caltrans MS4 (11%)	41.9	24.2	171.4	
	Subtotal – WLA (79%)				
LA	Agriculture (5%) (excludes nurseries under WDRs)	2.7	1.5	10.8	
	Open Space (9%)	4.8	2.8	19.5	
	Streams & Channels (2%)	1.1	0.6	4.3	
	Undefined (5%)	2.7	1.5	10.8	
		Subtotal – LA (21%)	11.2	6.4	45.5
MOS (10% of Total TMDL)		5.9	3.4	24	
Total TMDL		59	34	241	

^a Percentages for WLA (79%) and LA (21%) are applied to the TMDL, after subtracting the 10% MOS from the total TMDL. Percent WLA and Percent LA add to 100%.

^b Compliance to be achieved as soon as possible but no later than December 31, 2020.

Table NB-OCs-11. Informational TMDLs and Allocations for San Diego Creek (expressed on a “daily” basis)^a

Category	Type	Chlordane	Total PCBs
		(average grams per day)	
San Diego Creek			
WLA	Urban Runoff – County MS4 (36%)	0.23	0.11
	Construction (28%)	0.18	0.09
	Commercial Nurseries (4%)	0.03	0.01
	Caltrans MS4 (11%)	0.07	0.03
	Subtotal – WLA (79%)	0.50	0.24
LA	Agriculture (5%) (excludes nurseries under WDRs)	0.03	0.02
	Open Space (9%)	0.06	0.03
	Streams & Channels (2%)	0.01	0.01
	Undefined (5%)	0.03	0.02
	Subtotal – LA (21%)	0.13	0.08
MOS (10% of total TMDL)		0.07	0.03
Total TMDL		0.70	0.34

^a Percentages for WLA (79%) and LA (21%) are applied to the TMDL, after subtracting the 10% MOS from the Total TMDL. Percent WLA and Percent LA add to 100%.

Table NB-OCs-12. Informational TMDLs and Allocations for San Diego Creek (expressed on an “annual” basis)^a

Category	Type	Chlordane	Total PCBs
		(grams per year)	
San Diego Creek			
WLA	Urban Runoff – County MS4 (36%)	82.6	40.5
	Construction (28%)	64.3	31.5
	Commercial Nurseries (4%)	9.2	4.5
	Caltrans MS4 (11%)	25.2	12.4
	Subtotal – WLA (79%)	181.3	88.9
LA	Agriculture (5%) (excludes nurseries under WDRs)	11.5	5.6
	Open Space (9%)	20.7	10.1
	Streams & Channels (2%)	4.6	2.3
	Undefined (5%)	11.5	5.6
	Subtotal – LA (21%)	48.2	23.6
MOS (10% of total TMDL)		26	13
Total TMDL		255	125

^a Percentages for WLA (79%) and LA (21%) are applied to the TMDL, after subtracting the 10% MOS from the total TMDL. Percent WLA and Percent LA add to 100%.

4.b.3. Implementation of Organochlorine Compounds TMDLs

These TMDLs are to be implemented within an adaptive management framework, with compliance monitoring, special studies, and stakeholder interaction guiding the process over time. Information obtained from compliance monitoring will measure progress towards achievement of WLAs and LAs, potentially leading to changes to TMDL allocations; ongoing investigations and recommended special studies, if implemented, may provide information that leads to revisions of the TMDLs, adjustments to the implementation schedule, and/or improved implementation strategies. Thus, implementation of the TMDLs is expected to be an ongoing and dynamic process.

The implementation plan identified in this section reflects the adaptive management, phased approach to the organochlorine compound TMDLs adopted by the Regional Board. The Board found a phased approach, with compliance schedules, appropriate in light of the following considerations. First, it was recognized that additional monitoring and special studies were either already underway or would be needed to address data limitations and significant uncertainty associated with the TMDL calculations, and that changes to the TMDLs might be appropriate based on the results of those investigations. Second, it was also understood that these data limitations and uncertainties pertained to the impairment assessment itself and the determination of the specific organochlorine compounds for which TMDLs are required. Third, the natural attenuation of these compounds over time is expected to affect significantly the selection, development and implementation of BMPs. As described in the TMDL technical report [Ref.1], use of the organochlorine compounds addressed by these TMDLs has been banned for many years and trend analyses indicate declining concentrations of these substances in fish tissue over time. Natural attenuation should eventually reduce organochlorine pollutant levels to concentrations that pose no threat to beneficial uses in San Diego Creek or Newport Bay. While natural degradation of these compounds is likely the principal cause of the observed decline in fish tissue concentrations, the implementation of erosion and sediment controls and other Best Management Practices to address compliance with the sediment and nutrient TMDLs for Newport Bay and its watershed (see discussions of these TMDLs elsewhere in this Basin Plan) is a probable factor. In any case, the observed trends suggest that as monitoring continues in the watershed and pollutant levels decline, some or all of the organochlorine compounds may warrant delisting from the Clean Water Act Section 303(d) list of impaired waters. Again, these TMDLs would need to be revisited accordingly.

This implementation plan also reflects recommendations by regulated stakeholders in the Newport Bay watershed to convene a Working Group to develop and implement a comprehensive Work Plan to: address, as an early action item, the technical uncertainties in these TMDLs and make recommendations for revisions, as appropriate; identify and prioritize tasks

necessary to implement the TMDLs; integrate TMDL implementation tasks with those already being conducted in response to other programs (e.g., permits, other TMDLs); and, investigate other pollutants of concern in the watershed.

Table NB-OCs-13 lists the tasks and schedules needed to implement the organochlorine TMDLs. This implementation plan is aimed at identifying actions to accelerate the decline in organochlorine compound concentrations in the watershed, and to augment their natural attenuation. The implementation plan is focused to a large extent on the monitoring and, where necessary, enhanced implementation of Best Management Practices (BMPs) to reduce the erosion and transport to surface waters of fine sediment to which the organochlorine compounds tend to adhere. Many of these BMPs are already in place as the result of existing permits issued by the Regional Board or State Water Resources Control Board for stormwater and construction activities, and/or in response to established TMDLs. The intent is to assure that source control activities are implemented to reduce any active sources of the organochlorine compounds, and in other areas where such actions will be most effective in meeting the TMDL goals. Monitoring and special study requirements are included to provide for TMDL compliance assessment and refinement.

In response to the recommendation by watershed stakeholders, this implementation plan provides an opportunity for dischargers to participate in the development and implementation of a comprehensive Work Plan. The implementation tasks identified in Table NB-OCs-13 (except Tasks 1 and 4; see discussion of Task 7, below) will be considered in the development of the Work Plan and incorporated, as appropriate. Implementation of the Work Plan, which will be approved by the Regional Board at a public hearing, will obviate the need for individual actions on the tasks in Table NB-OCs-13 by members of the Working Group. Completion of the Work Plan will result, in part, in recommendations for revisions to these TMDLs based on review by an Independent Advisory Panel and the results of ongoing or requisite monitoring and investigations, and in the development of a comprehensive plan for BMPs and other actions needed to assure compliance with the TMDLs, wasteload allocations and load allocations as soon as possible after completion of execution of the Work Plan but no later than December 31, 2020³. Dischargers who elect not to participate in the Work Plan approach will be required to implement the tasks shown in Table NB-OCs-13, as appropriate.

Each of the task identified in Table NB-OCs-13 is described below.

³ This compliance schedule and/or the organochlorine compounds TMDLs may be modified, through the Basin Planning process, in response to information provided by implementation of the Work Plan tasks and/or other investigations.

Table NB-OCs-13 Organochlorine Compounds TMDLs Implementation Task and Schedule

Task	Description	Compliance Date – As Soon As Possible But No Later Than ^{b,c}
PHASE I IMPLEMENTATION		
1	Revise existing WDRs and NPDES permits: <i>Commercial Nursery WDRs, MS4 Permit, Other NPDES Permits</i>	Upon OAL approval of BPA and permit renewal
2 ^a	a. Develop proposed agricultural BMP and monitoring program to assess and control OCs discharges. b. Implement program	a. October 26, 2013 b. Upon Regional Board approval
3 ^a	a. Identify responsible parties for open space areas b. Develop proposed monitoring program to assess OCs inputs from open space areas c. Implement proposed monitoring program d. Develop plan to implement effective erosion and sediment control BMPs for management of fine particulates (if found necessary based on monitoring results) e. Implement BMP plan	a. August 26, 2013 b. 2 months after notification of responsible parties c. Upon Regional Board approval d. Within 6 months of notification of need to develop plan e. Upon Regional Board approval
4 ^a	Implement effective sediment and erosion control BMPs for management of fine particulates on construction sites: Regional Board: a. Develop SWPPP Improvement Program MS4 permittees: b. Revise planning processes as necessary to assure proper communication of SWPPP requirements c. Evaluate/implement BMPs effective in reducing/eliminating organochlorine discharges: i. Submit proposed plan and schedule for BMP studies and implement plan ii. Submit studies report; including plan and schedule to implement BMPs/include in Guidance Manual iii. Implement BMPs/include in Guidance Manual	a. July 26, 2013 b. Within 3 months of appropriate revision of the MS4 permit c. i. Submit plan within 3 months of 13267 letter issuance/MS4 permit revision and implement upon Executive Officer approval; ii. Within 6 months of completion of studies plan; iii. Upon Executive Officer approval

5 ^a	Evaluate sources of OCs; develop and implement BMPs accordingly: a. Submit proposed plan and schedule for source area investigations b. Implement investigation plan c. Submit report of investigation findings and plan/schedule for implementation of BMPs d. Implement BMP plan	a. Submit plan within 3 months of 13267 letter issuance/appropriate revision of the MS4 permit b. Upon Executive Officer approval c. Within 6 months of completion of investigation plan d. Upon Executive Officer approval
6 ^a	Evaluate feasibility and mechanisms to fund future dredging operations within San Diego Creek, Upper and Lower Newport Bay	Submit feasibility/funding report by July 26, 2016
7	Develop comprehensive Work Plan to meet TMDL implementation requirements, consistent with an adaptive management approach a. Convene Working Group b. Submit proposed Work Plan c. Implement Work Plan d. Complete execution of Work Plan	a. 08/26/2013 b. 10/26/2013 c. Upon Regional Board approval d. Within 5 years of Work Plan approval
8 ^a	Revise regional monitoring program	October 26, 2013; Annual Reports due November 15
9	Conduct special studies	As funding allows, and in order of priority identified in comprehensive Work Plan (Task 7), if applicable
PHASE II IMPLEMENTATION		
10	Review TMDLs, including numeric targets, WLAs and LAs; delist or revise TMDLs pursuant to established Sediment Quality Objectives, new data, and results of special studies	No later than July 26, 2018

- a. The tasks and schedules identified in the Regional Board approved Work Plan developed by the Working Group shall govern implementation activities by members of the Working Group.
- b. Final compliance with the TMDLs to be achieved no later than December 31, 2020.
- c. The Regional Board may, after a public hearing, and without need for a Basin Plan amendment, revise the schedules in this table, except for the final compliance date of December 31, 2020, if it determines good cause exists for such revisions.

Table NB-OCs-14. Existing NPDES Permits and WDRs Regulating Discharges in the Newport Bay Watershed

No.	Permit Title	Order No.	NPDES No.
1	Waste Discharge Requirements for the United States Department of the Navy, Former Marine Corps Air Station Tustin, Discharge to Peters Canyon Wash in the San Diego Creek/Newport Bay Watershed	R8-2006-0017	CA8000404
2	Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the Incorporated Cities of Orange County within the Santa Ana Region - Areawide Urban Storm Water Runoff - Orange County (MS4 permit)	R8-2002-0010	CAS618030
3	National Pollutant Discharge Elimination System (NPDES) Permit Statewide Storm Water Permit and Waste Discharge Requirements (WDRs) for the State of California, Department of Transportation (Caltrans)	99-06-DWQ	CAS000003
4	General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant (de minimus) Threat to Water Quality	R8-2003-0061 as amended by R8-2005-0041 and R8-2006-0004	CAG998001
5	General Waste Discharge Requirements for Short-term Groundwater-Related Dischargers and De Minimus Wastewater Discharges to Surface Waters Within the San Diego Creek/Newport Bay Watershed	R8-2004-0021	CAG998002
6	General Groundwater Cleanup Permit for Discharges to Surface Waters of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Petroleum Hydrocarbons, Solvents and/or Petroleum Hydrocarbons mixed with Lead and/or Solvents	R8-2002-0007, as amended by R8-2003-0085 and R8-2005-0110	CAG918001
7	Waste Discharge Requirements for City of Tustin's 17th Street Desalter	R8-2002-0005	CA8000305
8	Waste Discharge Requirements for City of Irvine, Groundwater Dewatering Facilities, Irvine, Orange County,	R8-2005-0079	CA8000406
9	Waste Discharge Requirements for Bordiers Nursery, Inc.	R8-2003-0028	
10	Waste Discharge Requirements Hines Nurseries, Inc.	R8-2004-0060	
11	Waste Discharge Requirements for El Modeno Gardens, Inc., Orange County	R8-2005-0009	
12	Waste Discharge Requirements for Nakase Bros. Wholesale Nursery, Orange County	R8-2005-0006	

Phase I Implementation

Task 1: WDRs and NPDES Permits

The Regional Board shall review and revise, as necessary, existing NPDES permits and/or WDRs to incorporate the appropriate TMDL WLAs, compliance schedules, and monitoring program requirements. These permits are identified in Table NB-OCs-14. The appropriate TMDL WLAs, compliance schedules and monitoring program requirements shall be included in new NPDES permits/WDRs. The NPDES permits/WDRs shall specify TMDL-related provisions that apply provided that: (1) the dischargers are and remain members of the Working Group (see Task 7); and (2) the approved Work Plan developed by the Working Group is implemented in a timely and effective manner. The NPDES permit/WDRs shall also include TMDL-related provisions that apply if the discharger(s) do not participate or discontinue participation in the Working Group and/or if the approved Work Plan is not implemented effectively or in a timely manner.

Compliance with the TMDLs and wasteload allocations is to be achieved as soon as possible, but no later than December 31, 2020. The way that this deadline applies to a particular discharger differs depending on whether the discharger is participating in the Working Group:

1. Working Group Participants. Provisions in NPDES permits/WDRs issued during implementation of the Work Plan will specify the following for Working Group members:
 - (a) Interim effluent limitations. Participation in the Working Group and timely and effective implementation of the Regional Board-approved Work Plan will constitute interim, performance-based effluent limitations to implement the wasteload allocations. Adhering to these interim effluent limitations satisfies the requirement, during the Work Plan implementation period, to achieve compliance with the TMDLs and wasteload allocations “as soon as possible.”
 - (b) Final effluent limitations. Final effluent limitations based on the wasteload allocations will also be specified, with a schedule requiring compliance as soon as possible but no later than December 31, 2020.⁴ Compliance with the interim, performance-based limitations will fulfill the “as soon as possible” requirement. The NPDES permits/WDRs will specify further that the status of compliance with the final effluent limitations based on the wasteload allocations will be reviewed on an annual basis. Compliance with these limitations will be required prior to the completion of the Work Plan tasks, in accordance with a schedule approved by the Regional Board’s Executive Officer, if it is demonstrated to the satisfaction of the Executive Officer that such earlier compliance is reasonably feasible.

² It is recognized that this schedule may exceed the five-year terms of NPDES permits. This schedule will be reflected in subsequent renewals of these NPDES permits.

Following the completion of the Work Plan tasks, NPDES permits/WDRs will require dischargers to comply with wasteload allocations in the shortest practicable time, but in no event later than December 31, 2020.

2. Non-Working Group Dischargers. For dischargers not participating in the Working Group, NPDES permit/WDR provisions will require compliance with the wasteload allocations as soon as possible after adoption of NPDES permits/WDRs that implement the TMDLs, but no later than December 31, 2020. In this case, the determination of what constitutes "as soon as possible" will be at the discretion of the Regional Board's Executive Officer.

Completion of the Work Plan and/or other investigations conducted by the Regional Board or others may result in modification of the TMDLs, wasteload allocations and the compliance schedule through the Basin Planning process. Subsequent issuance/revision of NPDES permit/WDRs will implement any such changes.

Ultimate compliance with permit limitations based on wasteload allocations is expected to be based upon iterative implementation of effective BMPs to manage the discharge of fine sediments containing organochlorine compounds, along with monitoring to measure BMP effectiveness.

Permit revisions shall be accomplished as soon as possible upon approval of these TMDLs. Given Regional Board resource constraints and the need to consider other program priorities, permit revisions are likely to be tied to renewal schedules.

For commercial nurseries covered under existing WDRs, revisions of these WDRs shall address the following identified needs:

- (1) Evaluation of sites to determine/verify potential storm water and nonstorm water discharge locations;
- (2) Evaluation of current monitoring programs and methods of sampling and analysis for consistency with other monitoring efforts in the watershed;
- (3) In cooperation with U.C. Cooperative Extension, evaluation of BMPs for adequacy and implementation of the most effective BMPs to reduce/eliminate the discharge of potentially-contaminated fine sediments in both storm water and non-storm water discharges;
- (4) Monitoring to better quantify nursery runoff as a potential source of organochlorine compounds and to assure that load reductions are achieved; and
- (5) Based on the results of the preceding tasks, development of a workplan to be submitted within one month of the effective date of these TMDLs that identifies:

- (a) the BMPs implemented to date and their effectiveness in reducing fine sediment and organochlorine compound discharges;
- (b) the adequacy and consistency of monitoring efforts, and proposed improvements;
- (c) a plan and schedule for implementation of revised BMPs and monitoring protocols, where appropriate. It is recognized that most nursery operations are likely to be of very limited duration due to the expiration of land leases. The workplan shall identify recommendations for BMP and monitoring improvements that are effective, reasonable and practicable, taking this consideration into account. This workplan shall be implemented upon approval by the Regional Board Executive Officer.

Revisions to the Municipal Separate Storm Sewer System (MS4) permit (R8-2002-0010, NPDES No. CAS618030), including the monitoring program shall address the monitoring and BMP-related tasks identified below, as appropriate. The Regional Board will coordinate also with the State Water Resources Control Board regarding revision of the Caltrans permit to address these monitoring and BMP-related tasks. These include: oversight and implementation of construction BMPs (Task 4); organochlorine compound source evaluations (Task 5); assessment of dredging feasibility and identification of a funding mechanism (Task 6); and, revision of the regional monitoring program (Task 8).

NPDES permits that regulate discharges of ground water to San Diego Creek or its tributaries shall be reviewed and revised as necessary to require annual (at a minimum) monitoring, using the most sensitive analytical techniques practicable, to analyze for organochlorine compounds in the discharges. If organochlorine compounds are found to be present, the dischargers shall be required to evaluate whether and to what extent the discharges would cause or contribute to an exceedance of wasteload allocations and to implement appropriate measures to reduce or eliminate organochlorine compounds in the discharges. New NPDES permits issued for these types of discharges shall incorporate the same requirements.

These dischargers (nurseries, MS4 permittees, Caltrans, ground water dischargers) may address the specific requirements identified above through their participation in the development and implementation of an appropriate Regional Board approved Work Plan (see Task 7).

Task 2: Develop and Implement an Agricultural BMP and Monitoring Program

Apart from certain nurseries, agricultural operations in the watershed are not currently regulated pursuant to waste discharge requirements. The SWRCB's "Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program" (Nonpoint Source Policy) (2004) requires that all nonpoint source dischargers be regulated under WDRs, waivers of WDRs, Basin Plan prohibitions, or some combination

of these three administrative tools. Board staff is developing recommendations for an appropriate regulatory approach to address agricultural discharges. It is expected that the Regional Board will be asked to consider these recommendations and to approve a regulatory approach in late 2007. Appropriate load allocations to implement these TMDLs will be included in WDRs or a waiver of WDRs, if and when issued by the Regional Board to address discharges from agricultural operations.

In the interim, agricultural operators shall identify and implement a monitoring program to assess OCs discharges from their facilities, and identify and implement a BMP program designed to reduce or eliminate those discharges. The proposed monitoring and BMP program shall be submitted as soon as possible but no later than October 26, 2013. These monitoring and BMP programs will be components of the waste discharge requirements or conditional waiver of waste discharge requirements that Board staff will recommend to implement the Nonpoint Source Policy. Load allocations identified in these TMDLs will also be specified in the WDRs/waiver, with a schedule of compliance.

It is recognized that most agricultural operations are expected to be of very limited duration due to the expiration of land leases. The monitoring and BMP programs proposed by the agricultural operators should include recommendations that are effective, reasonable and practicable, taking this consideration into account. The BMP and monitoring programs shall be implemented upon approval by the Regional Board. The BMP and monitoring programs may be implemented individually or by a group or groups of agricultural operators.

In addition, responsible parties may address these BMP/monitoring program requirements through their participation in the development and implementation of an appropriate, Regional Board approved Work Plan (see Task 7). WDRs or conditional waivers of WDRs issued to agricultural operators pursuant to the Nonpoint Source Policy shall specify that for those operators who participate in the development and implementation of a Regional Board approved Work Plan, compliance with the TMDLs and load allocations is to be achieved as soon as possible, but no later than December 31, 2020. The way that this deadline applies to a particular agricultural operator differs depending on whether the operator is participating in the Working Group:

1. Working Group Participants. Provisions in WDRs or conditional waivers of WDRs issued during implementation of the Work Plan will specify the following for Working Group members:
 - (a) Interim limitations: Participation in the Working Group and timely and effective implementation of the Regional Board-approved Work Plan will constitute interim, performance-based limitations to implement the load allocations. Adherence to these interim limitations satisfies the requirement, during the Work Plan implementation period, to achieve compliance with the TMDLs and load allocations “as soon as possible.”
 - (b) Final limitations: Final limitations based on the load allocations will also be

specified in the WDRs/waivers, with a schedule requiring compliance as soon as possible but no later than December 31, 2020. Compliance with the interim, performance-based limitations will fulfill the “as soon as possible” requirement. The WDRs/waivers will specify further that the status of compliance with the final limitations based on the load allocations will be reviewed on an annual basis. Compliance with these limitations will be required prior to the completion of the Work Plan tasks, in accordance with a schedule approved by the Regional Board’s Executive Officer, if it is demonstrated to the satisfaction of the Executive Officer that such earlier compliance is reasonably feasible.

Following the completion of the Work Plan tasks, WDRs/waivers will require agricultural operators to comply with load allocations in the shortest practicable time, but in no event later than December 31, 2020.

2. Non-Working Group Dischargers. For agricultural operators not participating in the Working Group, provisions in WDR/waivers of WDRs will require compliance with the load allocations as soon as possible after adoption of WDRs/waivers of WDRs that implement the TMDLs, but no later than December 31, 2020. In this case, the determination of what constitutes “as soon as possible” will be at the discretion of the Regional Board’s Executive Officer.

Completion of the Work Plan and/or other investigations conducted by the Regional Board or others may result in modification of the TMDLs, load allocations and the compliance schedule through the Basin Planning process. Subsequent issuance/revision of WDRs/conditional waivers of WDRs will implement any such changes.

Task 3: Identify Parties Responsible for Open Space Areas; Develop and Implement an OCs Monitoring Program to Assess Open Space Discharges; Develop and Implement an OCs BMP Program, if Necessary

Nonpoint source discharges from open space are also subject to State regulation. During Phase I of these TMDLs, sufficient data shall be collected by the responsible parties to determine whether discharges of OCs from designated open space, as well as discharges resulting from erosion in and adjacent to unmodified streams, are causing or contributing to exceedances of water quality objectives and/or impairment of beneficial uses of San Diego Creek and Newport Bay. With the assistance of the stakeholders, Regional Board staff will identify the responsible parties as soon as possible but no later than August 26, 2013. Board staff will notify the identified responsible parties of their obligation to propose an organochlorine compound monitoring program within two months of notification. The monitoring program shall be implemented upon Regional Board approval.

Based on the results of this monitoring program, the responsible parties shall develop a BMP implementation plan within 6 months of notification by the Regional Board’s

Executive Officer of the need to do so. The responsible parties shall implement that plan upon Regional Board approval.

The responsible parties may address these monitoring and BMP implementation program requirements through their participation in the development and implementation of an appropriate Regional Board approved Work Plan (see Task 7).

The Regional Board will consider whether WDRs or a WDR waiver is necessary and appropriate for responsible parties not currently regulated, based on the monitoring results. WDRs or a WDR waiver, if issued, will include appropriate load allocations to implement these TMDLs. For responsible parties compliance with the TMDLs and load allocations is to be achieved as soon as possible, but no later than December 31, 2020. The way that this deadline applies to a particular responsible party differs depending on whether that responsible party is participating in the Working Group:

1. Working Group Participants. Provisions in WDRs or conditional waivers of WDRs issued during implementation of the Work Plan will specify the following for Working Group members:
 - (a) Interim limitations: Participation in the Working Group and timely and effective implementation of the Regional Board-approved Work Plan will constitute interim, performance-based limitations to implement the load allocations. Adherence to the interim, performance-based limitations satisfies the requirement, during the Work Plan implementation period, to achieve compliance with the TMDLs and load allocations “as soon as possible.”
 - (b) Final limitations: Final limitations based on the load allocations will also be specified in the WDRs/waivers, with a schedule requiring compliance as soon as possible but no later than December 31, 2020. Compliance with the interim, performance-based limitations will fulfill the “as soon as possible” requirement. The WDRs/waivers will specify further that the status of compliance with the final limitations based on the load allocations will be reviewed on an annual basis. Compliance with the final limitations will be required prior to the completion of the Work Plan tasks, in accordance with a schedule approved by the Regional Board’s Executive Officer, if it is demonstrated to the satisfaction of the Executive Officer that such earlier compliance is reasonably feasible.

Following the completion of the Work Plan tasks, WDRs/waivers will require responsible parties to comply with load allocations in the shortest practicable time, but in no event later than December 31, 2020.

2. Non-Working Group Dischargers. For responsible parties not participating in the Working Group, compliance with the load allocations will be as soon as possible after TMDLs adoption and approval, but no later than December 31, 2020. In this

case, the determination of what constitutes “as soon as possible” will be at the discretion of the Regional Board’s Executive Officer.

Completion of the Work Plan and/or other investigations conducted by the Regional Board or others may result in modification of the TMDLs, load allocations and the compliance schedule through the Basin Planning process. Subsequent issuance/revision of WDRs/conditional waivers of WDRs will implement any such changes.

Task 4: Develop and Implement Appropriate BMPs for Construction Activities

Currently, all construction activities in the watershed are regulated under the State Water Resource Control Board’s (SWRCB) General Permit for Discharge of Storm Water Runoff Associated with Construction Activity (Order No. 99-08-DWQ, NPDES No. CAS000002; the “General Construction Permit”), SWRCB National Pollutant Discharge Elimination System (NPDES) Permit Statewide Storm Water Permit and Waste Discharge Requirements (WDRs) for the State of California, Department of Transportation (Caltrans) (Order No. 99-06-DWQ, NPDES No. CAS000003; the Caltrans MS4 permit), and/or the Orange County MS4 NPDES permit. The requirements of these permits and an iterative, adaptive-management BMP approach, coupled with monitoring, are the foundation for meeting the TMDL WLAs for construction. The General Construction Permit, and the Orange County and Caltrans MS4 permits are expected to be revised over time. The specific tasks identified below may be addressed by revisions to one or more of these permits. In that case, the Regional Board will integrate requirements for implementation of this Task with the requirements of the Orange County and Caltrans MS4/General Construction permits so as to prevent conflict and/or duplication of effort.

To assure that effective construction BMPs are identified and implemented, program improvements are needed in the following areas: (a) Storm Water Pollution Prevention Plans (SWPPPs) prepared in response to the General Construction Permit must include supporting documentation and assumptions for selection of sediment and erosion control BMPs, and must state why the selected BMPs will meet the Construction WLAs for the organochlorine compounds; (b) SWPPP provisions must be rigorously implemented on construction sites; (c) sampling and analysis for the organochlorine pesticides and PCBs in storm and nonstorm discharges containing sediment from construction sites is necessary to determine the efficacy of BMPs, as well as compliance with the construction WLAs; sampling and analysis plans must be included in SWPPPs; (d) additional BMPs, including enhanced BMPs, must be evaluated to determine those that may be appropriate for reducing or eliminating organochlorine compound discharges from construction sites (e.g., BMPs effective in control of fine particulates) without significant adverse environmental effects (e.g., toxicity that might result from improper storage and/or application of polymers); (e) outreach is necessary to assure the effective implementation of these SWPPP requirements; and (f) enforcement of the SWPPP requirements is necessary.

To address these program improvements, Regional Board staff shall develop a SWPPP Improvement Program that identifies the Regional Board's expectations with respect to the content of SWPPPs, including documentation regarding the selection and implementation of BMPs, and a sampling and analysis plan. The Improvement Program shall include specific guidance regarding the development and implementation of monitoring plans, including the constituents to be monitored, sampling frequency and analytical protocols. The SWPPP Improvement Program shall be completed by July 26, 2013. No later than two months from completion of the Improvement Program, Board staff shall assure that the requirements of the Program are communicated to interested parties, including dischargers with existing authorizations under the General Construction Permit. Existing, authorized dischargers shall revise their project SWPPPs as needed to address the Program requirements as soon as possible but no later than October 26, 2013. Applicable SWPPPs that do not adequately address the Program requirements shall be considered inadequate and enforcement by the Regional Board shall proceed accordingly. The Caltrans and Orange County MS4 permits shall be revised as needed to assure that the permittees communicate the Regional Board's SWPPP expectations, based on the SWPPP Improvement Program, with the Standard Conditions of Approval.

The MS4 permittees shall conduct studies to evaluate BMPs that are most appropriate for reducing or eliminating organochlorine compound discharges from construction sites (e.g., fine particulates), including advanced treatment BMPs. The evaluation shall consider the potential for adverse environmental effects associated with implementation of each of the BMPs identified. MS4 Permittees shall include these BMPs in the Orange County Stormwater Program Construction Runoff Guidance Manual and the Caltrans Storm Water Management Plan (SWMP). Implementation of these MS4 permittee requirements shall commence upon issuance of appropriate Water Code Section 13267 letters or renewal of the MS4 permits, whichever occurs first. The Section 13267 letters/revised permits shall require the permittees to: (a) submit a proposed plan and schedule for studies to evaluate appropriate BMPs, as described above, within three months of issuance of the 13267 letter or permit revision; (b) implement the plan and schedule upon approval by the Regional Board's Executive Officer; (c) submit a report of the BMP investigations within 6 months of approval of the study plan, provided that sufficient storms, as defined in the study plan, have occurred within that period. If the number of storms does not conform to the study plan, then the report shall be submitted in accordance with a schedule approved by the Executive Officer once the requisite number of storms has occurred. The report shall include a proposed plan and schedule for implementation of the BMPs, as appropriate, and inclusion of the BMPs in the Orange County Guidance Manual and in the Caltrans SWMP and related guidance documents; (d) implement the BMP plan upon approval by the Executive Officer.

The MS4 permittees may address these SWPPP and construction site BMP-related requirements through their participation in the development and implementation of an appropriate, Regional Board approved Work Plan (see Task 7).

Task 5: Evaluate Sources of OCs to San Diego Creek and Newport Bay; Identify and Implement Effective BMPs to Reduce/Eliminate Sources

Based on the regional monitoring program being implemented by the Orange County MS4 permittees and/or on the results of other monitoring and investigations, all MS4 permittees shall conduct source analyses in areas tributary to the MS4 system demonstrating elevated concentrations of OCs. Based on mass emissions monitoring (described below) and source analysis, the permittees shall implement additional/enhanced BMPs as necessary to ensure that organochlorine discharges from significant land use sources to surface waters are reduced or eliminated. As part of the investigation task, if the results indicate that additional OCs soil remediation is necessary on MCAS Tustin and MCAS El Toro, the responsible parties for such remediation will be identified. The responsible party will be tasked to implement those portions of the BMP plan identified for the responsible party for MCAS Tustin and MCAS El Toro.

The permittees shall develop and implement a collection program for all banned OC pesticides and PCBs. This type of program has had demonstrated success in other geographic areas in collecting and disposing of banned pesticides. Residents and businesses in the watershed may have stored legacy pesticides that could be collected through such a program; if this is the case, this task would prevent future use and improper disposal of these banned pesticides.

Implementation of these requirements shall commence upon issuance of appropriate Water Code Section 13267 letters or approval of an appropriately revised MS4 permits, whichever occurs first. Revisions to the Orange County MS4 permit and Caltrans SWMP shall implement requirements specified in applicable Section 13267 letters, if used to implement TMDL-related requirements. The 13267 letters/revised permit shall specify require the permittees to: (a) submit a proposed plan and schedule for source analyses of MS4 tributary areas with elevated OCs concentrations within 3 months of issuance of the 13267 letters or permit revision; (b) implement the proposed plan upon approval by the Regional Board's Executive Officer; (c) submit a report within 6 months of completion of the approved study plan. The report shall provide the study results and include a proposed plan and schedule for prioritized implementation of BMPs in OCs source areas; (d) implement the BMP plan upon Executive Officer approval.

The permittees may address these requirements through their participation in the development and implementation of an appropriate, Regional Board approved Work Plan (Task 7).

Task 6: Evaluate Feasibility and Mechanisms to Fund Future Dredging Operations

Because large-scale erosion and sedimentation primarily occurs during large storm events, traditional BMPs may have limited success in reducing/eliminating the discharge of potentially-contaminated sediments to receiving waters during wet weather. In such

cases, dredging within Newport Bay and/or San Diego Creek may be the most feasible and appropriate method of reducing OCs loads in these waters. However, the feasibility and effectiveness of dredging projects in removing OCs would require careful consideration, since dredging may or may not expose sediments with higher concentrations of OCs. Financing of such projects is also a significant consideration.

Entities discharging potentially contaminated sediment in the watershed shall analyze the feasibility of dredging to achieve water quality standards, and shall identify funding mechanisms for ensuring that future dredging operations can be performed, as necessary, within San Diego Creek, Upper and Lower Newport Bay. A report that presents the results of this effort shall be submitted no later than July 26, 2016. It is recognized that dredging activities are likely to be an integral part of efforts to comply with other established TMDLs, particularly the sediment TMDL. Ideally, dredging feasibility and funding investigations would be integrated with implementation and review of the sediment TMDL through the comprehensive Work Plan (Task 7). The responsible parties may address this Task requirement through their participation in the development and implementation of an appropriate, Regional Board approved Work Plan.

Task 7: Develop a Comprehensive Work Plan to Meet TMDL Implementation Requirements, Consistent with the Adaptive Management Approach

During the development of these organochlorine compounds TMDLs, regulated stakeholders in the Newport Bay watershed expressed concerns that the numeric targets used to develop the TMDLs, wasteload allocations and load allocations were flawed and that scientific review by an independent panel of experts was necessary. Further, these stakeholders suggested that pollutants other than the organochlorine compounds, such as metals, pyrethrins or other, emerging pollutants may pose the more real or significant threat to beneficial uses in the watershed. Finally, it was recommended that an integrated approach to TMDL implementation, and to the development of pending TMDLs and refinement of established TMDLs, would be a more effective and efficient approach.

Substantial efforts are already being made by many stakeholders in the watershed to address established permit and/or TMDL requirements for BMP implementation and monitoring and to conduct special investigations to understand and improve water quality conditions in the watershed. Thus, the framework exists to develop a comprehensive watershed plan for addressing water quality, not only as it relates to the organochlorine compounds, but on a larger scale that encompasses all sources of water quality impairment.

This implementation plan provides the opportunity for regulated stakeholders to form a Working Group and to participate in the development and implementation of a comprehensive Work Plan to evaluate the scientific basis of these organochlorine TMDLs, to prioritize TMDL implementation tasks, to integrate implementation with other TMDL and/or permit requirements, and to investigate unknown sources of toxicity in the

watershed. As noted in the previous Task descriptions, participation by responsible parties in the Working Group and the development and implementation of a Regional Board Work Plan would address the responsible parties' obligations pursuant to the Tasks in Table NB-OCs-13. Dischargers who elect not to participate in the Working Group/Work Plan will be required to implement these Tasks, as described above.

Dischargers interested in participating in a Working Group to develop and implement a comprehensive Work Plan must commit to do so by August 26, 2013. Submittal of a draft Work Plan is required no later than October 26, 2013. The schedules for implementation of the tasks identified in the Work Plan must reflect the shortest practicable time necessary to complete the tasks. Implementation of the Work Plan will commence upon approval of the Work Plan by the Regional Board at a properly noticed public hearing. Execution of the Work Plan must be complete within five years of Regional Board approval. Substantive changes to the tasks and schedules included in the approved Work Plan are contingent on Regional Board approval at a subsequent, properly noticed public hearing(s). However, the Regional Board's Executive Officer is authorized to revise the approved tasks and schedules if no significant comments are received during the public notice period.

At a minimum, the expected result of the execution of the Work Plan is a comprehensive, watershed plan for BMP implementation, monitoring, special investigations and other actions that will assure compliance with the OCs TMDLs, as they may be amended, as soon as possible after completion of execution of the Work Plan but no later than December 31, 2020⁵.

The specific detailed Work Plan tasks and schedules will be determined as the Work Plan is developed. Regional Board staff will work with the Working Group to identify a suitable Work Plan. Key initial tasks are expected to include the following:

1. Convene an Independent Advisory Panel (IAP) of experts with relevant expertise. To avoid questions of objectivity, the panel shall be convened by a neutral third party organization such as the National Water Research Institute. The Working Group and Regional Board staff will work together to define the desired qualifications needed for IAP participants, define the scope and authority of the IAP, and identify and describe the primary issues that will require guidance, recommendations, or specific actions from the IAP.

2. Re-evaluate OCs TMDLs Numeric Targets and Loads

With input and recommendations from the IAP, and using data being generated through ongoing scientific investigations in the watershed, the Work Plan should assess the current OCs TMDLs numeric targets, evaluate potential alternative numeric targets, and determine if the current targets should be revised, or whether targets based on site-specific data can be developed. If site-specific targets can be developed, the process or methods

⁵ This compliance date is subject to change through the Basin Planning process.

that will be used to develop targets should be determined, such as risk assessments or re-calculation of targets using accepted, peer-reviewed scientific methodologies.

It is recognized that there is a need for flexibility to respond to unanticipated findings and events, and to changes that may be recommended by the Independent Advisory Panel (see below). However, at a minimum, each of the Tasks identified in Table NB-OCs-13 (except Task 1, which requires action by the Regional Board, and Task 4, which requires action by the Regional Board and the MS4 permittees based on established MS4 permit requirements) must be considered in Work Plan development and implementation. If one or more of these tasks is not proposed for inclusion in the Work Plan, or where modifications of these tasks/schedules are recommended, a written description and justification must be provided with the draft Work Plan submittal. In addition, consideration shall be given to the following:

Develop conceptual models

Data interpretation and monitoring must be organized around a systematic conceptual view of the sources of the different organochlorine compounds and their distribution and behavior in the watershed. Development of conceptual models for these compounds would significantly enhance our understanding of their sources and impacts and would help to structure hypothesis development, monitoring design, and data interpretation. Development of the conceptual models should be based on a review of available data and information about the OCs in the watershed, and the models should be updated as new information accumulates. Characterization of sources and of habitats at risk should be based on a review of available data, framed in terms of the conceptual models and supported with the collection of new data as needed. It is expected that the IAP would provide critical review and recommendations in this process.

Develop Information Management System

Different types of data – water column, sediment, fish or bird egg tissue, infaunal surveys, hydrology, etc. – are being or will be collected throughout the Newport Bay watershed through a variety of studies, monitoring programs, or other projects. Since these data are often collected for different purposes (e.g., in response to various TMDLs and/or permits), at different times and in different areas, much of the data may be in non-comparable formats, redundant, or not spatially or temporally compatible. In order to determine what data are useful or significant, where data gaps may still occur, or where current data needs are sufficient, a comprehensive information management system should be developed that (1) establishes clear procedures for assessing data quality for data acquisition and transfer and for control of evolving versions of datasets; (2) is a relational database that can manage the variety of data types and has appropriate mechanisms for ensuring and maintaining data quality; (3) can conduct quality control checks and needed reformatting to ensure needed

consistency across all data types and sources as data from other sources are obtained; (4) provides for straightforward query and data sub-setting routines to streamline access to the data; and (5) ensures that GIS capability is available for analysis, modeling, and presentation purposes. Development of a comprehensive information management system will allow for the identification of significant data gaps that need to be addressed and will provide a vehicle for establishing monitoring guidelines and preventing redundant or superfluous data collection.

To the extent that there are any conflicts between the individual tasks and schedules identified in Table NB-OCs-13, and the prioritized plan and schedule identified in the Work Plan, the Work Plan would govern implementation activities with respect to the stakeholders responsible for Work Plan development and implementation as part of the Working Group.

Task 8: Revise Regional Monitoring Program

The County of Orange, as Principal Permittee under the County's MS4 permit, oversees the countywide monitoring program. Implementation of the monitoring program is supported by funds shared proportionally by each of the Permittees named in the Orange County MS4 permit. Some monitoring requirements identified in this implementation plan are already reflected in the current program.

By October 26, 2013, the Orange County MS4 permittees shall: (1) document each of the current monitoring program elements that address the monitoring requirements identified in the preceding tasks; and, (2) revise the monitoring program as necessary to assure compliance with these monitoring requirements.

Review of/revisions to the monitoring program shall address:

- (1) Estimation of mass emissions of chlordane, DDT, PCBs and toxaphene.
- (2) Determination of compliance with MS4 wasteload allocations for Upper and Lower Newport Bay, and of status of achievement with the informational wasteload allocations for San Diego Creek for chlordane and PCBs.
- (3) Assessment of temporal and spatial trends in organochlorine compound concentrations in water, sediment and tissue samples.
- (4) Semi-annual sediment monitoring in San Diego Creek and Newport Bay. Measurements of sediment chemistry in these waters should be evaluated with respect to evidence of biological effects, such as toxicity and benthic community degradation.
- (5) Evaluation of organochlorine bioaccumulation and food web biomagnification

- (6) Assessment of the degree to which natural attenuation is occurring in the watershed.

Accurately quantifying the very small mass loads that are allowable under these TMDLs will be very challenging; analytical strategies for quantifying loads of the organochlorine compounds must be carefully explored.

Revisions to the monitoring program shall take into consideration the following recommendations provided by members of the Organochlorine Compounds TMDL Technical Advisory Committee (TAC):

- (1) The analytical parameters measured need to be established for each matrix of interest (e.g., sediment, tissue, ambient water). The representative list of compounds to be measured needs to be identified (e.g., what chlordane compounds will be measured and summed to represent "total chlordane;" will PCB congeners be measured and summed or will Aroclors?).
- (2) Data quality will need to be consistent with the State's Surface Water Ambient Monitoring Program (SWAMP). Detection limits, accuracy and precision of analytical methods should be adequate to assure the goals of the monitoring efforts can be achieved.
- (3) Bioaccumulation/biomagnification in high trophic level predators may not immediately respond to load reductions; appropriate time scales and schedules for monitoring that are supported by empirical data and/or modeling should be established.
- (4) Sentinel fish and wildlife species should be selected for monitoring based on home range, life history, size and age.

MS4 permittees may address the requirements specified herein by participation in the Working Group and development and implementation of an appropriate, Regional Board approved Work Plan (see Task 7).

Task 9: Conduct Special Studies

The following special studies should be conducted, in addition to the studies already underway in the watershed. This list is based, in part, on recommendations of the technical advisory committee for the organochlorine compounds TMDLs. These studies will be implemented as resources become available, and the results will be used to review and revise these TMDLs. Stakeholder contributions to these investigations are encouraged and would facilitate review of the TMDLs.

- (1) Evaluation of sediment toxicity in San Diego Creek and tributaries, and Upper and Lower Newport Bay.

Previous studies have included Toxicity Identification Evaluations (TIEs) that

have yielded inconclusive results as to the cause of toxicity in Newport Bay. Sediment toxicity within San Diego Creek is not well-documented or well-understood. There is evidence that pyrethroid compounds may be a significant contributor. In determining the extent to which nonpolar organic compounds are causing or contributing to sediment toxicity, the differential contribution of both the organochlorine compounds and pyrethroids should be determined to assure that control actions are properly identified and implemented. Monitoring should be performed year-round at multiple locations within San Diego Creek and Newport Bay (to encompass spatial and temporal variability) and should include various land use types in order to quantify the relative contributions from various sources.

(2) Refinement of sediment and tissue targets.

A study is being conducted by the San Francisco Estuary Institute to develop indicators and a framework for assessing the indirect effects of sediment contaminants. The objective is to provide methodology that will assist in evaluating indirect adverse biological effects for bioaccumulative pollutants (e.g. due to food web biomagnification), as part of the overall goal of developing statewide sediment quality objectives. Newport Bay is being used as a case study to show how the proposed methodology could be implemented on a screening level. Multiple lines of evidence will be evaluated to determine impacts of organochlorine pesticides and PCBs to humans and wildlife. A conceptual foodweb model will be developed, and sensitive wildlife receptors will be identified. Empirical field data and a steady-state food web model will be used to calculate bioaccumulation factors for the organochlorine compounds. The bioaccumulation factors will be combined with effects thresholds to identify sediment concentrations that are protective of target wildlife and humans.

Once completed by SFEI, a thorough evaluation of the Newport Bay case study needs to be initiated, and any additional analyses required for a more in-depth risk analysis should be identified and completed. Protective sediment and tissue targets for indirect effects to humans and wildlife should be developed by the time the TMDLs are re-opened. Furthermore, once TIEs have identified the likely toxicant(s) responsible for sediment toxicity in San Diego Creek and Newport Bay (direct effects), field and laboratory studies should be conducted in order to determine bioavailability and the dose-response relationship between sediment concentrations and biologic effects.

(3) Evaluation of regional BMPs (e.g., constructed wetlands and sediment detention basins) for mitigating potential adverse water quality impacts of sediment-associated pollutants (e.g., OCs, pyrethroids).

Large-scale, centralized BMPs such as constructed wetlands and storm water retention basins may be more effective than project-level BMPs in reducing adverse environmental impacts of sediment-borne pollutants. Regional BMPs are

either being planned or are in place within the watershed (e.g., IRWD NTS). Their potential effectiveness for capturing the organochlorine compounds and mitigating impacts needs to be evaluated.

- (4) Improvement in linkage between toxaphene measured in fish tissue and toxaphene in bed sediments.

The toxaphene impairment listing for San Diego Creek is based on fish tissue exceedances that have no measured linkage with toxaphene in sediments. While sediment is the primary TMDL target for these TMDLs, toxaphene is usually not detected in sediment. Because of its chemical complexity, there is a large degree of analytical uncertainty with measurements of toxaphene in environmental samples that use standard methods (e.g., EPA Method 8081a), especially at low levels. Confirmations of toxaphene in fish and sediment samples in San Diego Creek (and possibly Newport Bay) using other techniques (e.g., GC-ECNI-MS or MS/MS) is recommended.

- (5) Evaluation of relative importance of continuing OCs discharges to receiving waters through erosion and sedimentation processes, versus recirculation of existing contaminated bed sediments, in causing beneficial use impairment in San Diego Creek and Newport Bay.

This study should allow for determination of the most effective implementation strategies to reduce organochlorine compounds in the MS4 and other receiving waters.

Phase II Implementation

Task 10: TMDL Reopener

These TMDLs will be reopened no later than July 26, 2018 in order to evaluate the effectiveness of Phase I implementation. At that time, all new data will be evaluated and used to reassess impairment, BMP effectiveness, and whether modifications to the TMDLs are warranted. If BMPs implemented during Phase I have been shown to be ineffective in reducing levels of organochlorine compounds, then more stringent BMPs may be necessary during Phase II implementation.

Implementation of these TMDLs and the schedule for implementation are very closely tied with other TMDLs that are currently being implemented in the watershed. The sediment TMDL allowable load for San Diego Creek was the basis for calculating organochlorine compound loading capacities. The sediment TMDL is scheduled for revision in 2007; changes to the sediment TMDLs will likely necessitate changes to these organochlorine compounds TMDLs as well.

(End of amendment adopted under Resolution No. R8-2011-0037)

4.c. Se TMDLs for Selenium in Freshwater, Newport Bay Watershed

These TMDLs were adopted by the Regional Water Quality Control Board, Santa Ana Region on August 4, 2017 (**Resolution No. R8-2017-0014**).

These TMDLs were approved by:

- The State Water Resources Control Board on September 20, 2018 (Resolution No. 2018-0041).
- The Office of Administrative Law on April 19, 2019.
- The U.S. Environmental Protection Agency on June 20, 2019.

The elements of the TMDLs are presented in Table 4.c.Se.1 and the Implementation Tasks and Compliance Schedule are presented in Table 4.c.Se.2. The documentation prepared to support the adoption of these TMDLs can be found at the Regional Board's website:

http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/Se_tmdl.shtml

Table 4.c.Se.1: Total Maximum Daily Load (TMDL) Summary - Newport Bay Watershed Selenium TMDLs

Phasing of the Selenium TMDLs
<p>These selenium TMDLs are being established and implemented as phased TMDLs, consistent with USEPA guidance (USEPA, 2006b) and based upon a three-part structure:</p> <ul style="list-style-type: none">• Phase I – Completion as soon as possible, but no later than 6 years from the effective date of the proposed selenium TMDLs⁶.• TMDL Reconsideration – Completion as soon as possible, but no later than 2 years after Phase I. Reconsideration of the proposed selenium TMDLs will be no later than 8 years from the effective date of the proposed selenium TMDLs.• Phase II – Completion as soon as possible, but no later than 30 years from the effective date of the reconsidered selenium TMDLs⁷. If reconsidered selenium TMDLs are not in effect 8 years after the effective date of the original proposed selenium TMDLs, Phase II actions will commence at this time. In this circumstance, changes in the reconsidered selenium TMDLs will be incorporated into Phase II at the time they become effective.

⁶ Each individual action will be scheduled as a specific number of years/months from the effective date of the proposed selenium TMDL/reconsidered selenium TMDL (as applicable).

⁷ *Ibid.*

Phased TMDL Structure. Phase I and Phase II must be completed as soon as possible, but no later than, the specified timeframes.

Problem Statement

Selenium is a naturally occurring element that may bioaccumulate through the food chain to levels that can cause adverse effects on higher-level aquatic life and wildlife, including fish and birds that prey on fish and invertebrates.

The beneficial uses most at risk from selenium bioaccumulation include warm freshwater habitat (WARM), estuarine habitat (EST), marine habitat (MAR), preservation of biological habitats of special significance (BIOL), wildlife habitat (WILD), rare, threatened, or endangered species (RARE), and spawning, reproduction, and development (SPWN).

The applicable narrative water quality objectives for toxic substances specify:

“Toxic substances shall not be discharged at levels that will bioaccumulate in aquatic resources to levels which are harmful to human health.

The concentrations of toxic substances in the water column, sediments or biota shall not adversely affect beneficial uses.”

The 2000 California Toxics Rule (CTR) establishes criteria for the protection of aquatic life for selenium for freshwater and enclosed bays and estuaries as follows:

- a chronic criterion for total recoverable selenium in freshwater of 5 µg/L;
- a chronic criterion for total dissolved selenium in saltwater (including enclosed bays and estuaries) of 71 µg/L; and
 - an acute criterion for total dissolved selenium in saltwater (including enclosed bays and estuaries) of 290 µg/L.

San Diego Creek Reach 1 is the only waterbody in the Newport Bay watershed listed as impaired for selenium on the 2010 303(d) list⁸ (the most recent 303(d) list). This listing was based on water column data. Other areas of the Newport Bay watershed were not identified

⁸http://www.waterboards.ca.gov/water_issues/programs/tmdl/2010state_ir_reports/category5_report.shtml

as impaired. The impairment assessment for these selenium TMDLs evaluated water and tissue data from 2001 – 2013 for several key areas within the Newport Bay watershed:

- San Diego Creek (SDC) Subwatershed
- Santa Ana-Delhi Channel (SADC) Subwatershed⁹
- Big Canyon Wash (BCW) Subwatershed¹⁰
- Other Freshwater Drainages Tributary to Upper Newport Bay (Costa Mesa and Santa Isabel Channels)¹¹
- Salt Water / Estuarine

Since the primary route for selenium bioaccumulation is through diet, not water, the impairment assessment was completed using the numeric targets selected for these TMDLs for both freshwater fish tissue and bird egg tissue to assess conformance with the applicable narrative objective (see Numeric Targets section for the applicable tissue-based numeric targets). Selenium concentrations in fish tissue, bird egg tissue, and water were compared to the applicable tissue-based and water column-based concentrations as presented in the following table. This approach is consistent with Section 6.1.3 of the Listing Policy¹². However, since the CTR criteria are the currently applicable numeric objectives, this impairment assessment also relies on the comparison of water column data for the freshwater and saltwater bodies in the watershed to the appropriate CTR criteria.

In addition, given that the approach to selenium at the local, state, and federal levels has evolved to focus more on tissue-based ecological risk rather than water column exceedances, and, as the SSOs under development for the watershed are based solely on bird egg and fish tissue, the impairment assessment includes a two-tiered approach. This approach is consistent with the structure of the numeric targets and includes:

- Tissue-based impairment: impairment based upon exceedances of the fish tissue and/or bird egg tissue numeric targets, which are established in these TMDLs to interpret the narrative water quality objective;
- Water column-based impairment: impairment based *solely* on exceedances of the CTR water column-based numeric targets (no evidence of exceedances of

⁹http://www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/docs/rec_standards/SWRCB/20140121_Attachment%202.pdf

Attachment 1 to Resolution No. R8-2012-0001

The State Water Resources Control Board approved amendments to the Basin Plan that revise recreational standards for inland fresh surface waters in the Region, as well as adding the Santa Ana-Delhi Channel as a named waterbody with designated beneficial uses. The Regional Board adopted these amendments in 2012 and they were partially approved by USEPA Region IX on April 8, 2015. USEPA Region IX issued a letter clarifying the April 8, 2015 decision letter on August 3, 2015.

¹⁰ Big Canyon Wash is not a named waterbody within this Basin Plan with directly assigned beneficial uses.

¹¹ There are no freshwater drainages tributary to Lower Newport Bay

¹² *Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List*

the tissue-based numeric targets). If and when the current selenium water quality objectives in the CTR cease to apply to these waters (e.g., if site-specific objectives are adopted for the waters) then waterbodies categorized as impaired solely due to CTR exceedances will no longer be considered to be impaired.

Concentrations Used to Assess Selenium Impairment in Tissue and Water

Media	Basis for Tissue-Based Impairment Ecological Risk		Basis for Water Column-Based Impairment CTR Ambient Water Quality Chronic Criteria	
	Freshwater (µg Se/g dw)	Saltwater (µg Se/g dw)	Freshwater (µg Se/L)	Saltwater (µg Se/L)
Water	--	--	5	71
Fish tissue	5 and 8.1 ¹	--	--	--
Egg tissue	8	8	--	--

¹ There are two applicable fish tissue numeric targets: (1) as a dietary item for the protection of birds (5 µg Se/g dw); and, (2) for the protection of fish (8.1 µg Se/g dw). The 5 µg Se/g dw fish tissue numeric target applies where bird eggs are not attaining the 8 µg Se/g dw bird egg tissue numeric target. The 8.1 µg Se/g dw fish tissue numeric target applies where birds are attaining the 8 µg Se/g dw bird egg tissue numeric target.

The assessment confirmed the impairment in San Diego Creek Reach 1 and for the San Diego Creek subwatershed as a whole, including Peters Canyon Wash, and identified additional impairments for selenium in the Big Canyon Wash subwatershed and the Santa Ana-Delhi Channel. Through the end of 2013 (the assessment period for these TMDLs), no nesting birds have been found and therefore, no bird egg tissue samples have been collected from the Santa Ana-Delhi Channel. Two composite mosquitofish tissue samples were collected from the Santa Ana-Delhi Channel in 2014, but as these data were collected after the data cutoff date of 2013, they were not included in the impairment assessment. These data will be considered during future impairment assessments. Future monitoring efforts will continue to attempt to collect tissue samples from this subwatershed.

Veeh Creek is a small tributary drainage that is located at the extreme southeastern end of the San Diego Creek subwatershed and is hydrologically isolated from the lower San Diego Creek subwatershed assessment area. Though water column impairment based on the CTR chronic criterion for freshwater was found at three locations in Veeh Creek, no fish or bird egg tissue data are yet available to assess whether and to what degree these or other organisms are or may be impacted by selenium. (As discussed above, selenium is primarily accumulated in organisms through diet and in a highly site-specific manner; the CTR freshwater chronic criterion for selenium is, therefore, not a suitable indicator of the potential threat to organisms.). For these reasons, additional investigations are needed to determine the extent and any associated potential impacts to fish, birds or other organisms that may be occurring in this small tributary drainage as a result of selenium. Therefore, the implementation strategy for Veeh Creek during Phase I of these TMDLs will be to collect more data so that the area

can be better evaluated. Once that information is available, it can be used during the TMDL reconsideration to determine what, if any, management actions would be feasible and appropriate to address selenium concentrations in that area. Those management actions would then be implemented during Phase II of the TMDLs.

Ambient selenium concentrations in Upper and Lower Newport Bay are orders of magnitude below the CTR saltwater chronic criterion of 71 µg Se/L. In addition, the tissue samples collected in Upper and Lower Newport Bay did not meet the listing criteria, were not available (e.g., no bird eggs have been collected from Lower Newport Bay¹³), or could not be assessed due to the lack of an appropriate screening value¹⁴. Thus, TMDLs for selenium do not need to be developed for Upper and Lower Newport Bay. It is also important to note that the primary sources of selenium to Newport Bay are the freshwater tributary drainages. Any reductions in selenium concentrations in the freshwater tributaries will also reduce selenium concentrations in the Bay.

Additionally, selenium concentrations in the Other Freshwater Drainages Tributary to Upper Newport Bay (Costa Mesa and Santa Isabel Channels) did not exceed the CTR freshwater chronic criterion of 5 µg Se/L. Although tissue samples have not been collected from these drainages, given their small areal extent, limited suitable habitat, and low selenium concentrations, it is not likely that fish or birds that may live or forage in these drainages are at risk from selenium. For these reasons, TMDLs do not need to be developed for these other freshwater drainages tributary to Upper Newport Bay.

Numeric Targets

As selenium is primarily accumulated in organisms through diet, and because bioaccumulation is highly site-specific, water column concentration-based criteria are not as suitable, especially for predicting chronic effects, as tissue-based targets. Recent efforts at revising selenium criteria at the federal, state, and local level have recognized that a tissue standard may be a more appropriate way to regulate selenium. For these reasons, tissue-based numeric targets for fish tissue and bird eggs are established in these selenium TMDLs. These targets are an interpretation of the narrative toxic substance objective (identified in the Problem Statement section). Since the CTR water column criteria are currently applicable numeric objectives, unless and until replaced by revised objectives (which could include SSOs), a water column numeric target consistent with the CTR is also included. However, SSOs for selenium, expressed as numeric concentrations in fish tissue and bird egg tissue, are currently under development and are expected to be proposed for adoption within one to two years after the effective date of these selenium TMDLs. The selenium SSOs are expected to be consistent with the fish tissue and bird egg tissue numeric targets in these TMDLs. If the revised objectives are approved and replace the current CTR freshwater chronic criterion for the Newport Bay watershed, the numeric water column-based target will no longer be in effect and numeric targets for these selenium TMDLs will consist only of the recommended fish tissue and bird egg tissue concentrations.

¹³ No nesting aquatic-dependent birds have been found in Lower Newport Bay, likely as a result of the lack of available nesting habitat in this highly urbanized area.

¹⁴ The fish tissue numeric targets apply only to freshwater fish.

The following table provides the bird egg tissue, fish tissue, and freshwater water column numeric targets for the selenium TMDLs in the Newport Bay Watershed. The numeric targets address beneficial uses related to aquatic life and aquatic-dependent wildlife, the most sensitive beneficial uses in the watershed. The applicable fish tissue numeric target depends upon the attainment of the bird egg target. Where the bird egg target is attained, the fish tissue target of 8.1 µg/Se g dry weight (dw) applies. This target serves as a protective target for fish as a separate endpoint. Where the bird egg tissue target is not attained, the fish tissue target of 5 µg Se/g dw applies¹⁵. This target serves as a protective dietary target for aquatic-dependent shorebirds and only applies if the bird egg tissue target is not being attained at a fish tissue concentration of 8.1 µg Se/g dw.

Numeric Targets for Selenium in the Newport Bay Watershed

Tissue-based Numeric Targets Where Bird Egg Tissue Targets <u>Not Attained</u>^{1,2}		Water Column-based Numeric Target³
Bird Egg⁴ Tissue	Fish Tissue	Freshwater Water Column
8 µg Se/g dw	5 µg Se/g dw OR site-specific fish tissue concentration at which the bird egg target is met	5 µg Se/L
Tissue-based Numeric Targets Where Bird Egg Tissue Targets <u>Attained</u>^{1,2}		Water Column-based Numeric Target³
Bird Egg⁴ Tissue	Fish Tissue	Freshwater Water Column
8 µg Se/g dw	8.1 µg Se/g dw	5 µg Se/L

- ¹ The tissue-based targets are subject to revision upon adoption and approval of revised objectives (e.g., site-specific objectives). Such revisions would require a Basin Plan Amendment.
- ² The applicable fish tissue numeric target depends upon the attainment of the bird egg target.
 - a. Where the bird egg target is attained, the fish tissue target of 8.1 µg Se/g dw applies. This target serves as a protective target for fish as a separate endpoint.
 - b. Where the bird egg tissue target is not attained, the fish tissue target of 5 µg Se/g dw, or a site-specific fish tissue concentration at which the bird egg target is met, applies. This target serves as a protective dietary target for aquatic-dependent shorebirds and only applies if the bird egg tissue target is not being attained at a fish tissue concentration of 8.1 µg Se/g dw.
- ³ Target is based on CTR criterion for freshwater. This target will no longer be in effect once the CTR freshwater criterion has been replaced by revised objectives (e.g., SSOs).
- ⁴ Aquatic-dependent shorebirds

¹⁵ If the bird egg tissue target is attained at a fish tissue concentration other than 5 µg Se/g dw (i.e., at a concentration less than 5 µg Se/g dw or between 5 and 8.1 µg Se/g dw), then that fish tissue concentration becomes the site-specific fish tissue numeric target for that area.

Source Analysis

Inputs of selenium to surface waters in the Newport Bay watershed come from both point and non-point sources. Point sources include urban runoff, groundwater dewatering, groundwater dewatering and cleanup, and nursery operations. Non-point sources include agriculture discharges, atmospheric deposition, open space, and rising groundwater¹⁶.

Selenium sources were evaluated based upon an estimate of the total load and water column concentrations. The analysis was not broken out by flow condition (dry vs. wet weather), but was evaluated seasonally (summer season (April 1 – September 30) and winter season (October 1 – March 31)). Consideration of the critical conditions (e.g., breeding seasons, dry weather vs. wet weather) and seasonal variations is reflected in the TMDLs and the wasteload allocations (WLA) and load allocations (LAs).

The source analysis evaluated total selenium loads to provide the potential magnitude of each source. Concentrations were also analyzed in order to provide a sense of the particular biological risk from a source (since concentrations tend to be a more biologically significant indicator of ecological risk from selenium than load). As data allowed, source categories were evaluated for the entire Newport Bay watershed as well as each of the three subwatersheds (San Diego Creek, Santa Ana-Delhi Channel, and Big Canyon Wash). However, due to data limitations, not all sources could be evaluated at the subwatershed scale.

Based on the Source Analysis, the following key conclusions can be made:

- Groundwater is the predominant source of selenium in the Newport Bay watershed. It enters surface waters either through point source discharges (e.g., dewatering operations) or more commonly through non-point source (NPS) rising groundwater. Of these sources, NPS rising groundwater is the major source of selenium inputs into surface waters in the watershed.
- Urban runoff is not a significant source of selenium. From a load perspective, urban runoff generates a relatively high load. However, this load is driven by volume, not concentration. Urban runoff concentrations are well below the CTR freshwater chronic criterion, with an annual median concentration of 0.90 µg/L, and a maximum concentration of 3.1 µg/L.
- Discharges from the City of Irvine's dewatering operations contain moderate concentrations of selenium (annual median concentration of 29 µg/L), but generate a relatively minor annual load of 14 lbs/year, which has been drastically reduced in recent years.¹⁷

¹⁶ Throughout this TMDL document, the term 'rising groundwater' is used to describe groundwater intercepted by channels (i.e., lateral groundwater inflows, shallow groundwater, or shallow exfiltrating groundwater), as well as an actively rising water table with artesian conditions. In most areas of the Newport Bay watershed, "rising groundwater" refers to the condition where groundwater is intercepted by channels; however, the artesian conditions typically associated with the term "rising groundwater" exist in the Newport Bay watershed in localized areas.

¹⁷ The BMP Strategic Plans detail projects which are in development to address these discharges, and these loads are anticipated to be removed from the system. See Implementation Plan for additional details regarding the BMP Strategic Plans.

- General dewatering discharges are highly variable from year to year. Caltrans and Irvine Ranch Water District have consistent dewatering activities, with the Caltrans dewatering accounting for an estimated annual load averaging 51 lbs in the winter season and 52 lbs in the summer season. Caltrans currently sewers the groundwater, but it would otherwise represent both a significant source from a concentration, as well as load perspective, if discharged to surface waters. However, Caltrans is unlikely to discharge to receiving waters in the future except under exceptional circumstances.
- Other than Caltrans loads, which are sewered, the groundwater dewatering and cleanup selenium loads were not consistent from year to year during the period of record because many are short-term discharges and their loads can be highly variable.
- Atmospheric deposition, agricultural runoff, open space runoff, and nursery discharges are all considered relatively insignificant sources of selenium.

Linkage Analysis

The biodynamic model developed by the United States Geological Survey (USGS) staff (hereinafter referred to as the biodynamic model) was adapted for use in the Newport Bay watershed and used to calculate water column concentrations for fish and bird eggs in Newport Bay. The biodynamic model links waterborne concentrations of selenium to the selenium concentrations in particulates. From there, the model then follows selenium concentrations up through the food web, taking into account specific transfer factors between different trophic level organisms. This biodynamic model can be used to predict the probable selenium concentration in water that would correspond with a specific tissue concentration, such as a guideline or numeric target, or it can take a water column selenium concentration and use it to predict the probable selenium concentration in a target organism, such as fish or birds. To apply the biodynamic model to the Newport Bay watershed, USGS staff used available site-specific data on seasonal concentrations of selenium in water, waterborne particulates, algae, surficial bed sediment, aquatic invertebrates, fish, and bird eggs as input values into the model.

The Presser-Luoma model upon which the Newport Bay watershed biodynamic model is based is a mechanistic model that considers geochemical influences and biological differences empirically. For selenium, it provides a means to model site-specific food web structures by quantifying selenium transformation from the dissolved phase to the particulate phase (as determined by the partitioning coefficient, K_d) and to biota (via diet and tissue trophic transfer factors, TTFs).

The biodynamic model was used to predict probable selenium water column concentrations from the tissue-based numeric targets for the different food webs and hydrologic compartments in the watershed using the following steps:

1. Calculate the K_d using Equation 1:

$$K_d = \frac{Se_{particulate} \text{ (ppm dry weight)}}{Se_{water} \text{ (ppb)}} \times 1,000$$

2. Calculate the TTF for particulates to invertebrates using Equation 2:

$$TTF_{invertebrate} = \frac{C_{invertebrate}}{C_{particulate}}$$

3. Calculate the TTF for invertebrates to fish¹⁸ (Equation 2):

$$TTF_{fish} = \frac{C_{fish}}{C_{invertebrate}}$$

4. Calculate the TTF for fish to bird eggs¹⁹ (Equation 2):

$$TTF_{bird} = \frac{C_{bird}}{C_{fish}}$$

Then:

5a. Translate the target fish tissue concentration to a water column concentration (μg dissolved Se/L):

Piscivorous fish food web

$$C_{water} \text{ (}\mu\text{g Se/L)} = \frac{C_{fish \text{ target}}/TTF_{fish}}{TTF_{fish} \times TTF_{invertebrate} \times K_d} \times 1000$$

Invertivorous fish food web

$$C_{water} \text{ (}\mu\text{g Se/L)} = \frac{C_{fish \text{ target}}/TTF_{fish}}{TTF_{invertebrate} \times K_d} \times 1000$$

Or:

5b. Translate the target bird egg tissue concentration to a water column concentration (μg dissolved Se/L):

Piscivorous bird food web

$$C_{water} \text{ (}\mu\text{g Se/L)} = \frac{C_{bird \text{ target}}/TTF_{bird}}{TTF_{fish} \times TTF_{invertebrate} \times K_d} \times 1000$$

Invertivorous bird food web

$$C_{water} \text{ (}\mu\text{g Se/L)} = \frac{C_{bird \text{ target}}/TTF_{bird}}{TTF_{invertebrate} \times K_d} \times 1000$$

¹⁸ For piscivorous fish, a second step is needed for calculating the TTF from prey fish to predator fish:

$$TTF_{fish} = \frac{C_{predatory \text{ fish}}}{C_{prey \text{ fish}}}$$

¹⁹ For non-piscivorous birds, calculate the TTF from invertebrates:

$$TTF_{bird} = \frac{C_{bird}}{C_{invertebrate}}$$

The following table provides the input parameters used in the biodynamic model:

Input Parameters for the Biodynamic Model

Numeric Targets	
Bird egg	8 µg Se/g dw
Fish (whole body as a dietary target for protection of birds) ¹	5 µg Se/g dw
Fish (whole body, as a low effect concentration for the protection of fish)	8.1 µg Se/g dw
K _d s (Fish Tissue Targets)	
Peters Canyon Wash (mean)	98
Peters Canyon Wash (85 th percentile)	161
Lower San Diego Creek ³ (75 th percentile)	163
Lower San Diego Creek ³ (85 th percentile)	272
IRWD Constructed Treatment Wetlands (75 th percentile)	273
IRWD Constructed Treatment Wetlands (85 th percentile)	320
San Joaquin Marsh Reserve (UCI wetlands) (mean)	1440
San Joaquin Marsh Reserve (UCI wetlands) (75 th percentile)	1341
Combined Lower SDC and IRWD Constructed Treatment Wetlands (75 th percentile)	218
Combined Lower San Diego Creek and IRWD Constructed Treatment Wetlands (85 th percentile)	296
Santa Ana-Delhi Channel (85 th percentile)	165
Big Canyon Wash (lower stream and pond areas) (mean)	3308
Big Canyon Wash (lower stream and pond areas) (median)	2992
K _d s (Bird Egg Target)	
Peters Canyon Wash ⁴	NA
Lower San Diego Creek (75 th percentile)	65
Lower San Diego Creek (85 th percentile)	108
Lower San Diego Creek (median)	95
IRWD Constructed Treatment Wetlands (mean)	213
IRWD Constructed Treatment Wetlands (median)	171

San Joaquin Marsh Reserve (UCI wetlands) (median)	688
Combined Lower SDC and IRWD Constructed Treatment Wetlands (75 th percentile)	139
Combined Lower San Diego Creek and IRWD Constructed Treatment Wetlands (85 th percentile)	139.5
Santa Ana-Delhi Channel ⁴	NA
Big Canyon Wash (lower stream and pond areas) (mean)	3308
Big Canyon Wash (lower stream and pond areas) (median)	2992
TTFs (equation 2)	
Fish or invertebrate to bird eggs (TTF _{bird})	1.8
Prey fish to predator fish (TTF _{piscivorous fish})	1.1
Invertebrate or particulate to fish (TTF _{invertivorous fish} or TTF _{detritivorous fish})	1.1
Particulate to freshwater (generic) invertebrate (TTF _{invertebrate})	2.8
Lower San Diego Creek field-derived particulate to freshwater invertebrate (TTF _{invertebrate})	3.7

- ¹ Both as a protective concentration for fish reproduction and as a dietary value for aquatic-dependent birds.
- ² Suspended particulate data were only available for Big Canyon Wash K_ds were calculated based on sediment concentrations for the remaining sites.
- ³ Smaller particle sizes typically have higher Se concentrations than coarser particles. Selenium concentrations in the silt/clay fractions collected from SDC Basin 2 sediments in 2004 were compared with whole sediment Se concentrations in sediments collected from SDC Basin 2 sediments in 2003. The mean concentrations in the silt/clay fractions were (on average) 2.52 times higher in the 2004 silt/clay fractions than in the 2003 whole sediments (Appendix O). Therefore, for this location, this ratio was applied to all selenium concentrations in whole sediments from Lower SDC to estimate the particulate selenium concentration that is accessible to organisms. None of the other assessment areas had data that could be used to determine selenium concentrations in the silt/clay fraction of the sediments.
- ⁴ The model was not run for the bird egg tissue target in this location. In Peters Canyon Wash, there was difficulty validating the model for bird eggs. In Santa Ana-Delhi Channel, no bird egg data were available.

The model used the species of fish or birds for which the most data were available, which included:

- Sediment or invertebrates→fish (for lower trophic level fish such as mosquito fish)
- Invertebrates→fish (for intermediate trophic level fish such as bluegill or similar fish that ingest invertebrates)
- Invertebrates→birds (for shorebirds such as black-neck stilts).

The following table shows the predicted probable dissolved selenium water column concentrations generated by the biodynamic model for the different hydrologic units and TMDL numeric tissue targets:

Ambient Selenium Water Column Concentrations ($\mu\text{g/L}$) Compared to the Range in Probable Selenium Water Column Concentrations ($\mu\text{g/L}$) Predicted by the Biodynamic Model (predicted water column concentrations are rounded to the nearest whole number)

	<i>San Diego Creek Subwatershed¹</i>					Santa Ana-Delhi Channel	Big Canyon Wash Sub-watershed
	Lower San Diego Creek	Peters Canyon Wash	IRWD Constructed Treatment Wetlands	Combined Lower SDC & IRWD Wetlands	San Joaquin Marsh Reserve (UCI Wetlands)		
	Ambient Water Column Concentrations \pm 95% confidence interval						
	13.8 \pm 0.4	30 \pm 1.3	14.4 \pm 1.5	14.2	2.3 \pm 0.7	10.7 \pm 0.5	15 \pm 1.9
Tissue Target	Predicted Probable Selenium Water Column Concentrations						
8.1 $\mu\text{g Se/g dw}^2$	6 – 10	16 – 27	8 - 10	8 - 10	2	16	2 – 3
8 $\mu\text{g Se/g dw}^3$	11 – 19		7 - 9	10	2		1
5 $\mu\text{g Se/g dw}^4$							1 - 2

1. For purposes of these proposed selenium TMDLs, allocations are established at the subwatershed or channel scale. The San Diego Creek subwatershed was modeled at a more refined scale to guide management actions.
2. Numeric Target for protection of fish. Highest confidence in terms of best fit validation.
3. Numeric Target for the protection of birds. Poorest fit to model because of variable bird species, diets, foraging ranges, and uncertainty in trophic transfer factor from invertebrates to birds to their eggs. Water values are least certain for this target. Probable selenium water column concentrations were not predicted for Santa Ana-Delhi Channel based on the absence of bird data from this area. Probable selenium concentrations were not predicted for Peters Canyon Wash because there is less certainty in establishing a justifiable water column concentration based upon modeling for bird eggs because of the difficulty in validating the model for bird eggs.
4. Numeric Target for fish – as a dietary item for the protection of aquatic-dependent birds, particularly shorebirds. Where birds meet the bird egg tissue target, the fish tissue-based dietary target is not applicable. Therefore, based upon current data, only the areas where the bird egg tissue target is not being met include probable water concentrations to meet the fish tissue target of 5 $\mu\text{g Se/g dw}$.

The K_d values used for the different hydrologic compartments in the Newport Bay watershed result in a range in possible water column concentrations for each hydrologic unit. Because of this variability, the predicted probable dissolved selenium water column concentrations may change as additional data are collected during implementation of these selenium TMDLs.

TMDLs and Allocations

For these selenium TMDLs, the loading capacities for the freshwater waterbodies in the watershed are established based on 1) the CTR, and 2) the water column concentrations predicted from the tissue-based numeric targets, as described in the Linkage Analysis. If and when revised selenium objectives (e.g., SSOs) are established, and the current CTR criterion is depromulgated for the Newport Bay watershed, the CTR water column-based loading capacities will no longer be in effect for these selenium TMDLs.

As there is inherent uncertainty with any model, including the biodynamic model, the actual water column concentrations at which the tissue-based targets are attained may differ from the predicted concentrations derived in the Linkage Analysis. Therefore, once the tissue-based numeric targets are attained, the tissue-based loading capacity/TMDL is equivalent to the water column concentrations that achieve those tissue-based concentrations.

Protection of beneficial uses requires consideration of both the periods of highest selenium exposure (dry weather flows) and the periods of greatest potential harm to the beneficial uses (breeding season and periods of embryonic and/or juvenile development). Dry weather conditions with flows occur year-round, and therefore, present potential periods of high selenium exposure all year. The period of potential greatest harm due to selenium exposure occurs seasonally (spring and early summer). As a result, consideration of seasonal variations could result in the development of different allocations for different periods of the year or the application of the allocations only during the breeding season. However, to ensure protection of beneficial uses both during the sensitive period and from the higher selenium concentrations that occur during dry weather, a year-round application of the TMDLs and allocations during dry weather conditions is the most protective approach.

Further, to evaluate the influence of seasonality and to provide the most protective assessment of beneficial uses, an averaging period for the WLAs and LAs is appropriate. Averaging periods for the allocations are based on the potential impacts from selenium exposure and variability in observed receiving water data. Since the protection of beneficial uses is linked to chronic not acute selenium conditions, a semi-annual averaging period utilizing an arithmetic mean is appropriate for these TMDLs and allocations. The semi-annual averaging periods are defined as April 1 through September 30 and October 1 through March 31 each year.²⁰

For purposes of these selenium TMDLs, wet and dry weather are defined as follows:

- Wet weather: Any day with 0.1 inches of rain or more, as measured at the Tustin-Irvine Ranch²¹ Rain Gauge Station, and the following three days (72 hours).
- Dry weather: Any non-wet weather day.

²⁰ Note that this averaging period specifically applies to the concentration-based WLAs and LAs. As specifically noted in these selenium TMDLs, where the tissue-based numeric targets are attained, the WLAs/LAs shall be deemed to be attained. In evaluating the tissue-based numeric targets, an annual averaging period is more appropriate since bird eggs are only available during a very limited time of the year, and fish tissue and other biota should also be collected during the same timeframe that the birds are breeding since they constitute a likely source of selenium input. Because selenium concentrations in fish and bird egg tissue are expected to be much more variable than those in water, a geometric mean statistical approach should be employed for evaluating tissue data.

²¹ Tustin-Irvine Ranch #61. Latitude = 33.719984, Longitude = -117.723111, Elevation = 507 feet.

These selenium TMDLs establish WLAs and LAs based upon the following:

- **Tissue-Based Water Column WLAs and LAs.** Ranges of water column concentrations necessary to achieve the tissue-based numeric targets were predicted for the freshwater areas of the watershed using the biodynamic model. These tissue-based water column concentrations, as opposed to the CTR-based water column concentration, provide a direct link to protection of beneficial uses (as they are derived from the tissue-based targets) and are, therefore, established as WLAs and LAs for these selenium TMDLs. These tissue-based allocations consider the following:
- **Phase I²² of the Selenium TMDLs: Selection of Protective Water Column Concentrations.** A range of loading capacities was derived from the biodynamic model for the three subwatershed areas. The range of results reflects the heterogeneity of the watershed, as well as the complexity in the pathways of selenium accumulation in the local foodweb. All of the results are deemed equally valid for predictive purposes (i.e., there is not a single “most appropriate” number that results from running the biodynamic model that definitively corresponds with the protection of beneficial uses). Further, there are several endpoints that are modeled (bird eggs for the protection of birds, fish tissue as a dietary component for protection of birds, fish tissue for the protection of fish). Therefore, the establishment of WLAs and LAs necessitates selection of a particular water column concentration from these ranges for each of the subwatershed areas as a starting point, with adjustments made if and as necessary based on monitoring and/or refined modeling. This initial selection is based upon concentrations that are expected to result in protection of beneficial uses, but is not intended to be considered the only concentration that is appropriate (e.g., tissue-based targets may be attained at higher or lower concentrations).

For each subwatershed, the upper end of the applicable predicted range of probable selenium concentrations has been selected for the establishment of allocations during Phase I of these selenium TMDLs. As noted above, while the model results in a range of possible concentrations, all modeled concentrations are considered equally predictive of what is needed to protect beneficial uses since the range results from various pathways of potential accumulation in various foodwebs. This approach supports the adaptive management component of these selenium TMDLs that requires iterative BMP implementation, focused on reductions in selenium concentrations until the tissue-based targets (and CTR water column-based targets, to the extent they remain in effect) are achieved. Further, as these selenium TMDLs will be incorporated into regulatory mechanisms, including NPDES permits, decreasing rather than increasing the WLAs over time, if necessary and appropriate, will comply with the general prohibition on anti-backsliding. However, as previously noted, the water column concentrations predicted from

²² As described in the Implementation Plan, these selenium TMDLs are being established and implemented as phased TMDLs, consistent with USEPA guidance and based upon a three-part structure: Phase I, TMDL Reconsideration, and Phase II.

the tissue-based numeric targets are expected to result in protection of beneficial uses, but are not intended to be considered the only concentrations that are appropriate. As a result, consistent with the general prohibition on anti-backsliding, the WLAs may be adjusted up over time if new information is available that was not available at the time of adoption of these selenium TMDLs justifies a higher WLA.

- **Phase II of these Selenium TMDLs: Selection of Protective Water Column Concentrations.** During TMDL reconsideration, water column concentrations will be re-evaluated to determine if adjustments to the allocations are necessary to attain the tissue-based numeric targets (and CTR water column-based targets, to the extent they remain in effect) during Phase II of these selenium TMDLs. This evaluation will likely entail running the biodynamic model with new data that have been collected through Phase I. The re-evaluation will include an assessment of additional tissue data collected pursuant to the required monitoring program for these selenium TMDLs to assess progress toward achieving the targets and to reassess the most sensitive endpoint for the selection of appropriate allocations.

Further, during the implementation of Phase II, a more robust process to periodically reassess the allocations will be implemented by the Regional Board. During this process, allocations will be adjusted, as needed, over time to result in attainment of the tissue-based targets.

This approach, as well as the rationale for the approach, is the same as that described above for Phase I of these selenium TMDLs.

- **CTR Water Column-Based WLAs and LAs.** Until tissue-based objectives are approved, the CTR chronic criterion for selenium in freshwater must serve as the final numeric target for selenium for the freshwater areas in the Newport Bay watershed. As a result, water column-based allocations based on the CTR are also included in these selenium TMDLs. However, the CTR water column-based allocations will no longer be in effect if and when the CTR freshwater criterion has been replaced by revised objectives (e.g., SSOs).
- **Conditional Mass-Based WLAs.** Recognizing the lack of reasonable and feasible BMPs in the watershed, and that allowing certain discharges to be offset rather than prohibited may provide a greater net environmental benefit, conditional mass-based WLAs are included as an alternative to the concentration-based WLAs. As a requirement of the offset and trading program, discharges allowed pursuant to the offset and trading program cannot result in downstream impacts. Therefore, these conditional mass-based WLAs will result in attainment of the loading capacity and thereby attainment of the selenium TMDLs.
- **Attainment of Tissue-Based Numeric Targets.** While the tissue-based water column WLAs and LAs are expected to result in attainment of the tissue-based numeric targets, bioaccumulation in the various foodwebs in the watershed may be different than what was modeled with the biodynamic model as part of

the Linkage Analysis. Therefore, where tissue-based numeric targets are attained, the corresponding WLAs/LAs will also be deemed to be attained, regardless of the actual measured water column concentration. This approach emphasizes that the water column concentrations are only surrogate measures, while the tissue-based targets provide for the direct assessment and protection of beneficial uses.

- **Direct Incorporation of the Biodynamic Model into the Tissue-Based WLAs and LAs.** The biodynamic model is directly incorporated into the tissue-based WLAs and LAs. As many assumptions and factors were utilized in developing the initial allocations, future data may warrant revising these assumptions and factors, thereby modifying the allocations. By incorporating the model directly into the allocations, it becomes part of the assumptions and requirements of the allocations and can be modified by the Regional Board²³ without necessitating a Basin Plan Amendment. Any such modification to the allocations will be subject to a public review process. However, if future data indicate that a revised modeling approach is warranted (e.g., a bioaccumulation factor (BAF) approach in lieu of the biodynamic model), such a revision would necessitate a Basin Plan Amendment.
- **Assignment of WLAs and LAs at the Subwatershed Scale.** As the selenium TMDLs are based upon a determination of impairment for three subwatersheds (San Diego Creek, Santa Ana-Delhi Channel, and Big Canyon Wash), corresponding WLAs and LAs are also established for each subwatershed. While the San Diego Creek subwatershed contains various areas, the water column concentration selected for the WLAs is based upon the Lower San Diego Creek analysis in the Linkage Analysis. Attainment of the allocations in Lower San Diego Creek is expected to result in reductions in both the San Joaquin Marsh Reserve (UCI Wetlands) and the IRWD Constructed Treatment Wetlands such that the tissue targets will be achieved; therefore, no separate allocations for these areas are established at this time.
- **Compliance Options.** To aid in ensuring permitting consistency with the intent of these selenium TMDLs, the WLAs include compliance options as part of the assumptions and requirements of the WLAs.

Wasteload Allocations

WLAs are assigned to the following point source dischargers: Municipal separate storm sewer system (MS4) Permittees and all other NPDES permitted discharges that discharge groundwater to surface water as part of dewatering, treatment, or similar operations in the watershed (the latter referred to herein as “Other NPDES Permittees”).

Final WLAs as a Semi-Annual Arithmetic Mean¹ (for Implementation Purposes)

²³ Per the Regional Board’s delegation of authority, the Executive Officer may approve such modifications, subject to a public review and comment process. Upon request, such modifications may be considered directly by the Regional Board.

WLA's	Tissue-based Water Column WLAs 2,3,4,5,6,7,8 (Based upon Biodynamic Model) (µg Se/L)			CTR-based Water Column WLAs 2,8,14,16 (µg Se/L)	Conditional Mass-based WLAs ^{15,16} (lbs)
	San Diego Creek Subwatershed 9,12,13,16	Santa Ana-Delhi Channel 10,12,13,16	Big Canyon Wash Subwatershed 11,12,13,16		
MS4 Permittees	10	11	1	5	Optional. Applies when discharger meets the following conditions: Participates in approved Offset and Trading Program Sets entirety of discharge (concentration x flow), including any specified offset ratio
Other NPDES Permittees					

(1) Semi-annual arithmetic mean: April 1 through September 30 and October 1 through March 31.
(2) Allocations apply year-round during non-wet weather (i.e. dry) conditions. Wet weather conditions are any day with 0.1 inches of rain or more, as measured at the Tustin-Irvine Ranch Rain Gauge Station, and the following three days (72 hours).
(3) The tissue-based WLAs are based on probable water column concentrations derived from the biodynamic model, as detailed in the Linkage Analysis of these selenium TMDLs. The biodynamic model is directly incorporated herein to these WLAs and is represented by the following equations:
(1) Fish tissue target of 8.1 or 5 µg Se/g dw (piscivorous fish): $C_{water} (\mu\text{g Se/L}) = [((C_{fish\ target} / TTF_{piscivorous\ fish}) / TTF_{invertivorous\ fish}) / TTF_{invertebrate}] / K_d * 1000$;
(2) Fish tissue target of 8.1 or 5 µg Se/g dw (invertivorous fish): $C_{water} (\mu\text{g Se/L}) = [((C_{fish\ target} / TTF_{invertivorous\ fish}) / TTF_{invertebrate}) / K_d] * 1000$;
(3) Fish tissue target of 8.1 or 5 µg Se/g dw (detritivorous fish): $C_{water} (\mu\text{g Se/L}) = [(C_{fish\ target} / TTF_{detritivorous\ fish}) / K_d] * 1000$;
(4) Bird egg target of 8.0 µg Se/g dw (piscivorous bird): $C_{water} (\mu\text{g Se/L}) = [((C_{bird\ target} / TTF_{bird}) / TTF_{invertivorous\ fish}) / TTF_{invertebrate}] / K_d * 1000$;
(5) Bird egg target of 8.0 µg Se/g dw (invertivorous bird): $C_{water} (\mu\text{g Se/L}) = [((C_{bird\ target} / TTF_{bird}) / TTF_{invertivorous\ fish}) / TTF_{invertebrate}] / K_d * 1000$
(4) TTF_{bird} = trophic transfer factor from fish or invertebrates to bird egg, $TTF_{piscivorous\ fish}$ = trophic transfer factor from small fish to predatory fish, $TTF_{invertivorous\ fish}$ = trophic transfer factor from invertebrates to fish, $TTF_{detritivorous\ fish}$ = trophic transfer factor from particulates to fish, $TTF_{invertebrate}$ = trophic transfer factor from particulates to invertebrates, K_d = partitioning coefficient from dissolved selenium in water to particulates.
(5) Initial values for all TTFs and K_d s are specified in the Linkage Analysis of these selenium TMDLs. TTF values may vary by specific water body. In water bodies where predatory fish are not present, the $TTF_{predatory\ fish}$ value should equal 1 to represent that one less step is occurring in the food chain.
(6) During the development of the selenium TMDLs, a range of probable water column concentrations was derived from the tissue-based numeric targets, based on the values assumed for the variables in the equation. The initial WLA values selected are based upon consideration of the most sensitive endpoint in the watershed and existing tissue data. During Phase I of these selenium TMDLs, that endpoint has been identified as fish tissue for the protection of fish (numeric target of 8.1 µg Se/g dw) for the SDC and SADC subwatersheds and as bird egg tissue for the protection of birds (8.0 µg Se/g dw) in BCW.
(7) During the TMDL Reconsideration and during Phase II of these selenium TMDLs, the biodynamic model inputs and resulting probable water column concentrations will be reevaluated and updated as necessary and per the schedule included in **Table 4.c. Se.2**. Subject to review and written comment via a public participation process, if updates are determined to be appropriate, such revised values will then replace the initial values in the biodynamic model equations, resulting in revised allocations. Such revisions can be made via approval by the Executive Officer, per delegated authority by the Regional Board, unless during the public review process a request is made to bring the modification before the Regional Board for consideration.
(8) The final allocations are to be achieved as soon as possible, but no later than 30 years from the effective date of the reconsidered TMDLs, as discussed in the Implementation Plan.
(9) Assessed in the receiving water at San Diego Creek at Campus Drive for Regulated Parties (as defined in the Implementation Plan other than MS4 Permittees) that opt to implement a BMP Strategic Plan consistent with the Implementation Plan.
(10) Assessed in the receiving water at Santa Ana-Delhi Channel at Irvine Avenue for Regulated Parties (as defined in the Implementation Plan other than MS4 Permittees) that opt to implement a BMP Strategic Plan consistent with the Implementation Plan.
(11) Assessed in the receiving water at Big Canyon Wash at Back Bay Drive for Regulated Parties (as defined in the Implementation Plan other than MS4 Permittees) that opt to implement a BMP Strategic Plan consistent with the Implementation Plan.

(12) Assessed at 'end of pipe' for Individual Action Plan point sources that elect not to pursue an offset. Compliance with allocations will be determined pursuant to the compliance options outlined under the heading "Compliance with WLAs". Such compliance options are directly incorporated herein as part of the assumptions and requirements of these WLAs.

(13) Assessment location for the MS4 permittees (urban runoff) is the Costa Mesa Channel. This location was selected as a surrogate urban runoff site because the subwatershed is approximately 1 square mile in area, it has predominantly urban land uses, and it is outside of the areas impacted by rising groundwater.

(14) The CTR-based water column WLAs will no longer apply to these selenium TMDLs if and when revised objectives (e.g., SSOs) have been approved and are in effect and the current CTR chronic criterion for selenium in freshwater is de-promulgated.

(15) The Offset and Trading Program and any applicable offset ratios, described in the Implementation Plan, is incorporated herein to these conditional mass-based WLAs.

(16) Compliance with allocations will be determined pursuant to the compliance options outlined under the heading "Compliance with WLAs". Such compliance options are directly incorporated herein as part of the assumptions and requirements of these WLAs.

Compliance with WLAs

The following compliance options are included to clearly indicate how compliance with the WLAs, incorporated as effluent limitations into the applicable NPDES Permit, will be determined. These compliance options are part of the assumptions and requirements of the WLAs and will be explicitly incorporated in the applicable NPDES Permit to the extent permitted by law.

MS4 Permittees

Compliance with final WLAs (incorporated as effluent limits) may be demonstrated through any one of the following means:

1. For MS4 Permittees who opt to implement a BMP Strategic Plan consistent with requirements specified in the Implementation Plan:

- A. Implementation of an approved BMP Strategic Plan (consistent with the approved Plan and schedule) for all areas where the MS4 Permittee is identified as a Regulated Party²⁴ OR
- B. Attainment of tissue-based numeric targets over the specified averaging period, as measured in the Assessment Area^{25 26} OR
- C. Attainment of dry weather WLAs over the specified averaging period in the receiving water, as measured at the Assessment Point²⁷ OR
- D. Attainment of conditional mass-based WLAs, consistent with all requirements of the conditional mass-based WLAs²⁸ OR
- E. Attainment of dry weather WLAs over the specified averaging period at the point of discharge OR

²⁴ As defined in the Implementation Plan.

²⁵ *Ibid.*

²⁶ Compliance with final WLAs may not be demonstrated through attainment of tissue-based numeric targets over the specified averaging period, as measured in the Assessment Area, until revised tissue-based objectives (e.g., SSOs) are adopted.

²⁷ As defined in the Implementation Plan.

²⁸ Attainment requires that the discharger meets the following conditions: (1) Participates in approved Offset and Trading Program and (2) Offsets entirety of discharge (concentration x flow) at the applicable ratio.

F. Attainment of a water column concentration at the point of discharge which is calculated to attain the water quality objective OR

G. No discharge.

2. Where the BMP Strategic Plan is not implemented consistent with the approved plan and schedule, MS4 Permittees must demonstrate compliance through one option in 1.B through 1.G.

Other NPDES Permittees

Option 1:

Compliance with final WLAs may be demonstrated through any one of the means identified in Part 1 below:

1. For a Regulated Party who opts to implement a BMP Strategic Plan:

A. Implementation of an approved BMP Strategic Plan (consistent with the approved Plan and schedule) for all areas where the Permittee is identified as a Regulated Party²⁹ OR

B. Attainment of tissue-based numeric targets over the specified averaging period, as measured in the Assessment Area³⁰ defined for the applicable Monitoring Plan³¹ OR

C. Attainment of dry weather WLAs over the specified averaging period in the receiving water, as measured at the Assessment Point³² defined for the applicable Monitoring Plan OR

D. Attainment of conditional mass-based WLAs, consistent with all requirements of the conditional mass-based WLAs³³ OR

E. Attainment of dry weather WLAs over the specified averaging period at the point of discharge OR

F. Attainment of a water column concentration at the point of discharge which is calculated to attain the water quality objective OR

G. No discharge.

2. Where the BMP Strategic Plan is not implemented consistent with the approved plan and schedule, a Regulated Party must demonstrate compliance through one option in 1.B through 1.G.

²⁹ As defined in the Implementation Plan.

³⁰ *Ibid.*

³¹ Compliance with final WLAs may not be demonstrated through attainment of tissue-based numeric targets over the specified averaging period, as measured in the Assessment Area, until revised objectives (e.g., SSOs) are adopted.

³² As defined in the Implementation Plan.

³³ Attainment requires that the discharger meets the following conditions: (1) Participates in approved Offset and Trading Program and (2) Offsets entirety of discharge (concentration x flow) at the applicable ratio.

Option 2:

For a Regulated Party who opts to implement an Individual Action Plan (IAP), compliance with final WLAs may be demonstrated through any one of the means identified below:

- A. Participation in an approved Offset and Trading Program OR
- B. Attainment of WLAs over the specified averaging period at the point of discharge OR
- C. No discharge.

Load Allocations

LAs are assigned to the following non-point sources of selenium within the Newport Bay watershed: agricultural discharges, open space, and rising groundwater. Atmospheric deposition has not been assigned a separate load allocation since most of the atmospheric deposition is accounted for in allocations for runoff from the various land uses and direct atmospheric deposition on to waterbodies accounts for less than one percent of the total non-point source load.

Final LAs as a Semi-Annual Arithmetic Mean¹ (For Implementation Purposes)

LAs	Tissue-based Water Column LAs ^{2,3,4,5,6,7,8} (Based upon Biodynamic Model) (µg Se/L)			CTR-based Water Column LAs ^{2,8,12} (µg Se/L)
	San Diego Creek Subwatershed ⁹	Santa Ana-Delhi Channel ¹⁰	Big Canyon Wash Subwatershed ¹¹	
Agricultural Discharges	10	11	1	5
Open Space				
Rising Groundwater				

(1) For semi-annual arithmetic mean: April 1 through September 30 and October 1 through March 31.
 (2) Allocations apply year-round during non-wet weather (i.e. dry) conditions. Wet weather conditions are any day with 0.1 inches of rain or more, as measured at the Tustin-Irvine Ranch Rain Gauge Station, and the following three days (72 hours).
 (3) The tissue-based final LAs are based on probable water column concentrations derived from the biodynamic model, as detailed in the Linkage Analysis of these selenium TMDLs. The biodynamic model is directly incorporated herein to these LAs and is represented by the following equations:
 (1) Fish tissue target of 8.1 or 5 µg Se/g dw (piscivorous fish): $C_{water} (\mu\text{g Se/L}) = [((C_{fish\ target}/ TTF_{piscivorous\ fish})/ TTF_{invertivorous\ fish})/TTF_{invertebrate})/K_d]*1000$;
 (2) Fish tissue target of 8.1 or 5 µg Se/g dw (invertivorous fish): $C_{water} (\mu\text{g Se/L}) = [((C_{fish\ target}/ TTF_{invertivorous\ fish})/TTF_{invertebrate})/K_d]*1000$;
 (3) Fish tissue target of 8.1 or 5 µg Se/g dw (detritivorous fish): $C_{water} (\mu\text{g Se/L}) = [(C_{fish\ target}/ TTF_{detritivorous\ fish})/K_d]*1000$;
 (4) Bird egg target of 8.0 µg Se/g dw (piscivorous bird): $C_{water} (\mu\text{g Se/L}) = [((C_{bird\ target}/TTF_{bird})/ TTF_{invertivorous\ fish})/TTF_{invertebrate})/K_d]*1000$;
 (5) Bird egg target of 8.0 µg Se/g dw (invertivorous bird): $C_{water} (\mu\text{g Se/L}) = [((C_{bird\ target}/TTF_{bird})/TTF_{invertebrate})/K_d]*1000$
 (4) TTF_{bird} = trophic transfer factor from fish or invertebrates to bird egg, $TTF_{piscivorous\ fish}$ = trophic transfer factor from small fish to predatory fish, $TTF_{invertivorous\ fish}$ = trophic transfer factor from invertebrates to fish, $TTF_{detritivorous\ fish}$ = trophic transfer factor from particulates to fish, $TTF_{invertebrate}$ = trophic transfer factor from particulates to invertebrates, K_d = partitioning coefficient from dissolved selenium in water to particulates.
 (5) Initial values for all TTFs and K_d s are specified in the Linkage Analysis of these selenium TMDLs. TTF values may vary by specific water body. In water bodies where predatory fish are not present, the $TTF_{predatory\ fish}$ value should equal 1 to represent that one less step is occurring in the food chain.

- (6) During the development of the proposed selenium TMDLs, a range of probable water column concentrations was derived from the tissue-based numeric targets, based on the values assumed for the variables in the equation. The initial LA values selected are based upon consideration of the most sensitive endpoint in the watershed and existing tissue data. During Phase I of these proposed selenium TMDLs, that endpoint has been identified as fish tissue for the protection of fish (numeric target of 8.1 µg Se/g dw) for the San Diego Creek and Santa Ana-Delhi Channel subwatersheds, and bird egg tissue for the protection of birds (numeric target of 8.0 µg Se/g dw) for the Big Canyon Wash subwatershed.
- (7) During the TMDL Reconsideration and during Phase II of these selenium TMDLs, the biodynamic model inputs and resulting probable water column concentrations will be reevaluated and updated as necessary and per the schedule included in **Table 4.c. Se.2**. Subject to review and written comment via a public participation process, if updates are determined to be appropriate, such revised values will then replace the initial values in the biodynamic model equations, resulting in revised allocations. Such revisions can be made via approval by the Executive Officer, per delegated authority by the Regional Board, unless during the public review process a request is made to bring the modification before the Regional Board for consideration.
- (8) The final allocations are to be achieved as soon as possible, but no later than 30 years from the effective date of the reconsidered TMDLs, as discussed in the Implementation Plan.
- (9) Assessed in the receiving water at San Diego Creek at Campus.
- (10) Assessed in the receiving water at Santa Ana-Delhi Channel at Irvine Ave.
- (11) Assessed in the receiving water at Big Canyon Wash at Back Bay Drive.
- (12) The CTR-based water column LAs will no longer apply to these selenium TMDLs if and when revised objectives (e.g., SSOs) have been approved and are in effect and the current CTR chronic criterion for selenium in freshwater is de-promulgated.

Margin of Safety

A margin of safety (MOS) for a TMDL addresses uncertainties associated with the analyses that may result in targets not being achieved. The MOS may be explicit, implicit, or both. For these selenium TMDLs, an implicit MOS is used.

There remains scientific and regulatory agency disagreement concerning the adequacy of the CTR criteria for the protection of aquatic life and aquatic-dependent wildlife, principally because selenium is bioaccumulated primarily via diet, not water. For the selenium TMDLs, the tissue-based numeric targets were recommended by USEPA³⁴ and USFWS staff³⁵ to ensure protection of the bird and fish species that inhabit or forage in the Newport Bay watershed. The selenium tissue concentrations recommended by USFWS are considered to be either no effect concentration for birds or no to very low effect concentrations for fish and for fish as a dietary concentration for birds, and as such are conservative objectives that provide an implicit MOS for the selenium TMDLs. The selenium tissue concentration for the protection of fish (as a whole body tissue concentration of 8.1 µg Se/g dw) that has been proposed by USEPA as one element of their draft aquatic life criterion for selenium in freshwater (2014) is a low effect (EC10) concentration that is considered protective of 90% of the freshwater fish population present in the freshwater areas in the Newport Bay watershed. By selecting numeric targets that are tissue-based and designed to be protective of aquatic life and aquatic-dependent wildlife, these selenium TMDLs are expected to be more protective of the beneficial uses in the watershed than TMDLs based solely on the current CTR criteria, which may be over- or under-protective of those uses.

Implementation Plan

³⁴ Recommendation from the *External Peer Review Draft Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater* 2014 (USEPA, 2014) for fish tissue target for the protection of fish.

³⁵ Recommendation for fish tissue target as a dietary item for birds and the bird egg tissue target (J. Skorupa, USFWS, electronic communication, October 20, 2008).

TMDL implementation will be carried out in the three areas by the following Regulated Parties³⁶:

San Diego Creek Subwatershed

- MS4 Permittees:
 - County of Orange
 - Orange County Flood Control District
 - City of Irvine
 - City of Laguna Hills
 - City of Laguna Woods
 - City of Lake Forest
 - City of Newport Beach
 - City of Orange
 - City of Tustin
 - City of Santa Ana
- Other NPDES Permittees
 - General Groundwater Cleanup Permittees
 - Individual Groundwater Cleanup Permittees
 - General Groundwater Dewatering Permittees
 - Individual Groundwater Dewatering Permittees
- IRWD (owner/operator of the IRWD Constructed Treatment Wetlands)³⁷

³⁶ Regulated Parties include MS4 Permittees, Other NPDES Permittees, and the owner/operators of the IRWD Constructed Treatment Wetlands, the San Joaquin Marsh Reserve (UCI Wetlands), and the Big Canyon Nature Preserve. Certain Regulated Parties may be subject to multiple, separate NPDES permits and; therefore, may have implementation responsibilities under more than one category (e.g., City of Irvine is an MS4 Permittee and also is regulated separately by an individual dewatering NPDES permit).

³⁷ IRWD is not assigned a WLA or LA at this time as owner/operator of the IRWD Constructed Treatment Wetlands (it is, however, separately a Groundwater Dewatering Permittee). IRWD is required to participate in the implementation of these proposed TMDLs by coordinating with the Regulated Parties in the development of the BMP Strategic Plan and Regional Monitoring Program for San Diego Creek. As part of the adaptive management process, the BMP Strategic Plan will assess the need to manage and reduce selenium bioaccumulation in the IRWD Constructed Treatment Wetlands, if reductions in San Diego Creek are not in and of themselves sufficient for the TMDL numeric targets to be met in the wetlands. The need to implement additional measures will be assessed during the TMDL reconsideration process and/or as a part of Phase II.

- UCI (owner/operator of the San Joaquin Marsh Reserve (UCI Wetlands))³⁸

Santa Ana-Delhi Channel

- MS4 Permittees:
 - County of Orange
 - Orange County Flood Control District
 - City of Costa Mesa
 - City of Santa Ana
 - City of Newport Beach
- Other NPDES Permittees
 - General Groundwater Cleanup Permittees
 - Individual Groundwater Cleanup Permittees
 - General Groundwater Dewatering Permittees
 - Individual Groundwater Dewatering Permittees

Big Canyon Wash Subwatershed

- MS4 Permittees:
 - City of Newport Beach
- Other NPDES Permittees
 - General Groundwater Cleanup Permittees
 - Individual Groundwater Cleanup Permittees
 - General Groundwater Dewatering Permittees
 - Individual Groundwater Dewatering Permittees
- California Department of Fish and Wildlife (DFW) (owner/operator of a mitigation area located at the downstream end of the Big Canyon Nature Park). DFW's mitigation

³⁸ UCI is not assigned a WLA or LA at this time. However, as the owner/operator of the San Joaquin Marsh Reserve (UCI Wetlands), UCI is required to participate in the implementation of these proposed TMDLs by coordinating with the Regulated Parties in the development of the BMP Strategic Plan and Regional Monitoring Program for San Diego Creek. As part of the adaptive management process, the BMP Strategic Plan will assess the need to manage and reduce selenium bioaccumulation in the San Joaquin Marsh Reserve (UCI Wetlands), if reductions in San Diego Creek or the IRWD Constructed Treatment Wetlands are not in and of themselves sufficient for the TMDL numeric targets to be met in the reserve. The need to implement additional measures will be assessed during the TMDL reconsideration process and/or as a part of Phase II.

area, which includes a pond and riparian habitat, lies within the boundaries of the Upper Newport Bay Ecological Reserve.³⁹

These selenium TMDLs are being established and implemented as phased TMDLs, consistent with USEPA guidance and based upon a three-part structure:

- Phase I – Completion as soon as possible, but no later than 6 years from the effective date of the selenium TMDLs⁴⁰.
- TMDL Reconsideration – Completion as soon as possible, but no later than 2 years after Phase I. Reconsideration of the selenium TMDLs will be no later than 8 years from the effective date of the selenium TMDLs.
- Phase II – Completion as soon as possible, but no later than 30 years from the effective date of the reconsidered selenium TMDLs⁴¹. If reconsidered selenium TMDLs are not in effect 8 years after the effective date of the original selenium TMDLs, Phase II actions will commence at this time. In this circumstance, changes in the reconsidered selenium TMDLs will be incorporated into Phase II at the time they become effective.

In addition, each phase of TMDL implementation will be guided by adaptive management. This adaptive management approach is a required element of the BMP Strategic Plans described below.

Phase I: LA Implementation

For the implementation of the LAs, these selenium TMDLs will rely upon the State of California *Nonpoint Source Program Strategy and Implementation Plan* (SWRCB, 2000) and the *Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program* (SWRCB, 2004c). It is anticipated that the implementation measures for the WLAs will not only address the controllable sources of selenium (e.g., groundwater dewatering and clean-up discharges), but will also result in a substantial reduction in the NPS load as well. Therefore, the need for an NPS strategy and the development of the strategy will be part of the TMDL Reconsideration and will therefore be implemented during Phase II.

Phase I: WLA Implementation

The Phase I implementation actions required of MS4 Permittees includes the development and implementation of the following plans/programs for each subwatershed where the MS4 Permittee is identified as a Regulated Party:

³⁹ DFW is not assigned a WLA or LA at this time. However, as the owner/operator of the restoration areas within BCNP, DFW is required to participate in the implementation of these proposed TMDLs by coordinating with the Regulated Parties in the development of the BMP Strategic Plan and Regional Monitoring Program for Big Canyon Wash. The BMP Strategic Plan for Big Canyon Wash must include a task to develop a contingency strategy to manage and reduce selenium bioaccumulation in the wetlands in the BCNP, if reductions in selenium upstream of the wetlands are not in and of themselves sufficient for the TMDL numeric targets to be met in the wetlands. The need to develop the contingency strategy will be assessed during the TMDL reconsideration process and/or as a part of Phase II.

⁴⁰ Each individual action will be scheduled as a specific number of years/months from the effective date of the proposed selenium TMDL/reconsidered selenium TMDL (as applicable).

⁴¹ *Ibid.*

- BMP Strategic Plan
- Offset/Trading Program (participation in the program by individual Regulated Parties is optional)
- Monitoring Program
- Reporting

The Phase I implementation actions required of Other NPDES Permittees includes the development and implementation of the following plans/programs for each subwatershed where the Permittee is identified in these TMDLs as a Regulated Party:

- BMP Strategic Plan OR Individual Action Plan as described below
- Participation in the Offset and Trading Program (participation in the program by individual Regulated Parties is optional)
- Participation in Regional Monitoring Program OR development of monitoring program within Individual Action Plan
- Reporting

Other NPDES Permittees who elect not to participate in a BMP Strategic Plan(s) must develop and implement an Individual Action Plan that identifies an acceptable means to attain the WLAs. MS4 Permittees must participate in the BMP Strategic Plans while Other NPDES Permittees have the option of participating in a BMP Strategic Plan or implementing an Individual Action Plan. This alternative approach is provided for Other NPDES Permittees recognizing that groundwater dewatering discharges may be short-term in nature and a tailored, individual approach may be more appropriate. Requirements for Individual Action Plans are detailed below.

BMP Strategic Plan Requirements

BMP Strategic Plans must be developed for each area (San Diego Creek, Santa Ana-Delhi Channel, and Big Canyon Wash). The plans can be developed individually for each area or combined to address multiple areas (resulting in a minimum of one (1) and a maximum of three (3) plans). Each BMP Strategic Plan must be submitted to the Executive Officer for approval by the date specified in **Table 4.c.Se.2**, and must be implemented upon approval. Each BMP Strategic Plan must be circulated for public review and comment for a period of no less than 30 days, and the Regional Board shall hold a public hearing prior to considering approval of each plan. If no significant public comments are received, then the Executive Officer may approve the plan. As identified in the TMDLs and Allocations section, and as further described below, implementation of an approved BMP Strategic Plan, consistent with the actions and schedules identified in the Plan, shall provide the basis for effluent limits expressed as BMPs or BMP-based compliance options in the relevant NPDES permit.

To be considered for approval by the Executive Officer, each BMP Strategic Plan must include the following:

- **Baseline and Source Control Activities** – Identification of source control activities that prevent or minimize new or existing discharges of selenium (such

as volume reduction BMPs). For example, volume reduction BMP fact sheets were developed by the NSMP in 2005⁴² and five potential volume reduction BMPs were identified: (1) discharge to land; (2) discharge to sewer; (3) evaporation ponds; (4) off-site transportation; and (5) reinjection. These volume reduction BMPs do not limit the type of source control BMPs that can be identified in the BMP Strategic Plan(s), but rather serve as examples.

- **Selenium Reduction Projects** – Identification of projects that result in reductions of selenium, including the characteristics, timeframe, and estimated selenium removal for each project.
- **BMP Effectiveness Monitoring** – Identification of the monitoring needed to assess the effectiveness of the BMPs implemented through the BMP Strategic Plan. To ensure an integrated and cohesive approach to monitoring, this monitoring will be incorporated as part of the Regional Monitoring Program (described below).
- **BMP/Technology Evaluation** – Identification of the process and schedule for periodic assessment of selenium BMPs/treatment technologies. This review may include evaluation of journal articles, online references, technical reports, and communication with researchers and vendors to evaluate the most up-to-date information on selenium treatment. The following information must be identified for each potential BMP/treatment technology evaluated:
 - Selenium removal capability and efficiency, and to the extent feasible, removal capability for other pollutants (e.g., nitrogen);
 - Physical requirements and capabilities of the technology, such as operating flows, land and energy requirements, pre-treatment requirements, modular capabilities, portability of the treatment, lifespan of the treatment media, start-up and shut-down considerations, and operation and maintenance requirements;
 - Potential discharge concerns, including any issues with selenium speciation, selenium concentration, nuisance factors, process waste streams, solid waste disposal, associated permitting requirements and costs; and,
 - Capital and operations and maintenance costs.
- **Adaptive Management** – Identification of the process and schedule for how new information (e.g., effectiveness of source control activities and selenium reduction projects, identification of new BMPs/treatment technologies, monitoring data, effectiveness of BMPs/treatment technologies upstream of wetlands to achieve reductions within wetlands) will be evaluated and how the plan may be modified based upon such information. Given the timeframe for

⁴² Document is available to download on the NSMP website at the following web address:
http://www.ocnsmp.com/pdf/Volume%20Reducing%20BMPs_REVISION%2011Aug05.pdf

Phase I (a maximum of 6 years from the TMDL effective date), it is anticipated that only minor modifications to the Plans will occur in Phase I and that a full re-evaluation of the Plans will occur during the TMDL Reconsideration process. A more robust adaptive management process will be required during Phase II implementation (see below).

- **Goals** – Clear, specific, quantifiable and measurable goals for the reduction of selenium must be identified. The goal(s) could take the form of a mass-based reduction, reduction in total selenium concentration, reduction in selenite concentrations, etc. The BMP Strategic Plan must clearly identify how achieving the goals will result in progress toward attaining the WLAs as soon as possible (recognizing that in Phase I of these selenium TMDLs, attainment of the WLAs is not the required or intended objective; final WLAs must be attained as soon as possible but no later than by the end of Phase II). The cumulative actions identified in the plans must be designed to meet the identified goals⁴³.
- **Schedule** – For each element included in the BMP Strategic Plan, the anticipated dates must be identified for the implementation of each action.

Many Regulated Parties have already invested significant effort in the development of BMP Strategic Plans, prior to the adoption of these selenium TMDLs, as part of compliance with their existing NPDES permits. A BMP Strategic Plan (RBF, 2013) for the Santa Ana-Delhi Channel and San Diego Creek subwatershed was developed and received approval from the Executive Officer in December 2013. This BMP Strategic Plan was submitted to meet the requirements of Time Schedule Order (TSO) R8-2009-0069 and Order R8-2009-0070 (i.e., the Irvine TSO). The TSO BMP Strategic Plan identifies discrete actions and includes an implementation schedule for those actions. The actions identified will help address the controllable sources of selenium (e.g., groundwater dewatering discharges), and are also expected to result in reductions in the NPS load as well. It is therefore anticipated that the

⁴³ As part of the development of these TMDLs, the identification of step-wise, interim selenium reduction goals during each recommended phase was carefully considered. The selenium reductions that are estimated to be achieved as the result of the implementation of proposed Phase I projects have been identified (some of these projects are already being implemented - see discussion of TSO BMP Strategic Plan, below). These estimated reductions are reflected in the TSO BMP Strategic Plan that will form the basis for the Phase I BMP Strategic Plans for the San Diego Creek subwatershed and the Santa Ana-Delhi Channel. However, since the specific nature and location of, and need for, projects to be implemented in Phase II are unknown at this time, and since these factors must be known to provide defensible estimates of the selenium reductions that could be achieved, it is not practical to specify additional interim selenium reductions in these TMDLs. Any such interim goals would be purely arbitrary. The establishment of interim goals will be considered as part of the TMDL Reconsideration consideration process, based on the results of Phase I, including monitoring to assess the efficacy of implemented BMPs and the effects of those BMPs on the receiving waters and biota. As part of the TMDL Reconsideration process, a revised implementation plan will be developed, with specific determination of where and what types of projects are necessary and feasible to achieve remaining selenium reductions.

BMP Strategic Plan submitted for approval as part of the requirements for Phase I of these selenium TMDLs⁴⁴ will be consistent with the TSO BMP Strategic Plan.

Individual Action Plan Requirements

Other NPDES Permittees may elect to identify and implement an alternative, acceptable means to comply with the final WLAs through the development and implementation of an Individual Action Plan. As part of the Notice of Intent (NOI), the Individual Action Plan must be submitted to the Executive Officer for approval by the date specified in **Table 4.c.Se.2**, and implemented upon approval. Each Individual Action Plan must be circulated for public review and comment for a period of no less than 30 days, and the Regional Board shall hold a public hearing prior to considering approval of each plan. If no significant public comments are received, then the Executive Officer may approve the plan. Discharges cannot commence until the Individual Action Plan is approved.

To be considered for approval by the Executive Officer, each Individual Action Plan must include the following:

- **Volume Reduction BMPs** – Identification of volume reduction BMPs that prevent or minimize discharges of selenium prior to discharge. Volume reduction BMP fact sheets were developed by the NSMP in 2005 and five potential volume reduction BMPs were identified: (1) discharge to land, (2) discharge to sewer, (3) evaporation ponds, (4) off-site transportation, and (5) reinjection. These Volume Reduction BMPs do not limit the type of volume reduction BMPs that can be identified in an Individual Action Plan, but rather serve as an example;
- **Method of Attaining the final WLAs** – Identification of how the Individual Action Plan will result in attainment of the final WLAs. Methods of attainment may include:
 - Participation in an approved Offset and Trading Program, such that the discharge is offset consistent with all requirements of the Offset and Trading Program and restrictions pertaining to downstream impacts; OR
 - Implementation of BMPs to attain the final WLAs at the point of discharge⁴⁵; OR
 - No discharge (e.g., sewer the discharge).

⁴⁴ The BMP Strategic Plan approved in December 2013 is in response to TSOs for groundwater dewatering permits and therefore does not cover all Regulated Parties subject to this TMDL. Therefore, the BMP Strategic Plan must be resubmitted for approval to address the requirements for all Regulated Parties and the requirements detailed in these TMDLs. Such modifications may entail including and specifying additional parties to the plan (e.g., MS4 Permittees), specifically identifying interim goals, and ensuring the schedule is consistent with **Table 4.c Se.2**. These modifications are anticipated to be minor. It is not the intention to require an overhaul of the TSO BMP Strategic Plans as the timeframe for Phase I of these TMDLs is based upon the actions already identified and approved as part of the TSO BMP Strategic Plans.

⁴⁵ Attainment of the final WLAs at the point of discharge must be demonstrated in the NOI and compliance would need to be immediate. It may be feasible that the Permittee may want to utilize the Offset and Trading Program until BMPs are implemented to meet the final WLAs at the point of discharge.

- **Schedule** – Identification of the timeframe of the discharge and the discrete dates for implementation of each action identified as part of the Individual Action Plan.
 - **Monitoring Program** – Identification of how the Individual Action Plan will demonstrate attainment of the final WLAs, per the method identified above, through monitoring. Where an Individual Action Plan opts to attain the final WLAs through an approved Offset and Trading Program, at a minimum, monitoring must be consistent with the monitoring requirements specified in the Monitoring section below. Where an Individual Action Plan opts to attain the final WLAs at the point of discharge, at a minimum (until it has been shown that the discharge meets the final WLAs), the monitoring must include water column monitoring for total selenium and flow (end of pipe). The monitoring program requirement can be satisfied individually (e.g., a separate and individual monitoring plan) or can be incorporated into the Regional Monitoring Program specified in the Monitoring section below. Where an Individual Action Plan opts to attain the final WLAs by sewerage the discharge, monitoring must include flow measurements (flow that is being sewerage)⁴⁶ and document that no discharge to surface waters is occurring.
- **Reporting** – Identification of the frequency of reports provided to the Regional Board. The frequency should take into account the underlying permit requirements. Contents of the reports are specified in the section on Reporting.

Offset and Trading Program

Since, at the present time, there is no readily available, conventional selenium treatment technology that can be implemented in a reasonably practicable manner given the watershed-scale of the selenium problem, its diffuse origin (largely rising groundwater), and the limited land available for facility placement, it is not reasonable to prohibit such discharges where doing so would seriously jeopardize public safety, impede important groundwater remediation projects, or adversely affect the beneficial uses of receiving waters. In some places, point source discharges from groundwater dewatering facilities help support aquatic habitat that might otherwise be lost if the discharge were prohibited. To prevent these adverse effects, while continuing to protect water quality, it is appropriate and in the best interests of overall water quality to authorize the use of offsets and trading as an alternate method for demonstrating compliance⁴⁷.

An Offset and Trading Program will allow Regulated Parties to demonstrate compliance with the applicable effluent limitation by reducing selenium loads from NPSs (primarily rising groundwater) in lieu of treating or ceasing their own point-source discharge(s).

⁴⁶ The sewerage agency will require certain monitoring to be conducted of water that enters the sewer system. This monitoring data may be utilized to fulfill, fully or in part, monitoring requirements for an Individual Action Plan.

⁴⁷ Investigation and evaluation of potential selenium treatment technologies is a part of the adaptive management approach for implementation of these TMDLs. New, cost-effective, and practicable treatment technologies may be identified in the future. Consistent with this, a Regulated Party's eligibility to participate in the Offset and Trading Program is contingent, in part, on the demonstration that there is no reasonably feasible or practicable conventional treatment technology available that can achieve compliance with the applicable WQO for selenium at the point of discharge.

Implementation of this Offset and Trading Program allows available resources to be leveraged to address both point and non-point sources (the most significant and difficult to control) of selenium. The Offset and Trading Program will be managed so as to ensure that the net effect on water quality and beneficial uses of continued point source discharges mitigated by offsets is better than would be expected if the regulated discharge were prohibited altogether.

If Regulated Parties opt to develop an Offset and Trading Program, it must be submitted to the Executive Officer for approval by the date specified in **Table 4.c.Se.2**, and must be implemented upon approval. The Offset and Trading Program must include a plan and a schedule. The Offset and Trading Program plan and schedule shall be circulated for public review and comment for a period of no less than 30 days, and the Regional Board shall hold a public hearing prior to considering approval of the plan. If no significant public comments are received, then the Executive Officer may approve the plan. This program will cover the entire Newport Bay watershed, though individual trades are limited by subwatershed as described below.

To be considered for approval by the Executive Officer, the Offset and Trading Program must include or conform with all elements/definitions described below:

Offset and Trading Program Elements

- **Program Administration:** The Offset and Trading Program must develop the process for, and identify the party responsible for, managing the program (including the Offset Accounting System described below).
- **Trading Baseline:** A minimum level of effort or level of implementation that must be achieved before a project is eligible to generate credits. For purpose of calculating offset credits, the baseline level is equivalent to the mass-based WLA⁴⁸.
- **Credit Generation:** Selenium "credits" (offset credits) are created under either of the two following conditions:
 - A diversion or treatment project reduces selenium loads (expressed as mass) below the baseline level.
 - A Regulated Party reduces the average concentration of selenium in its point source discharge to below 5 µg/L, or below the applicable water column concentration if the CTR water quality objective is revised in the future. The mass-based credit is calculated by multiplying the discharge flow volume times the difference in concentration (i.e., the effluent concentration minus 5 µg/L or the applicable water column concentration).

⁴⁸ The mass-based WLAs are applicable on an individual Permittee basis. For example, if Permittee A discharges 5 lbs of selenium but implements a diversion project that removes 25 lbs of selenium, then 20 lbs of selenium credits are generated.

- **Offset Ratios:** Groundwater cleanup projects⁴⁹ must offset their discharge by a 1:1 ratio (e.g., acquire one pound [or fraction thereof] of offset credits for each pound [or fraction thereof] of selenium discharged [i.e., a 1:1 ratio]). All other permitted point-source discharges must offset their discharge by a 2:1 ratio (e.g., acquire two pounds of offset credits for each pound of selenium discharged). The 2:1 ratio serves as a “retirement ratio” that is applied to the estimated credits to set aside a portion of credits for net environmental benefit (e.g., ensuring that all projects with a 2:1 offset ratio that generate credits result in a reduction of NPSs).
- **Prior Approval:** Any project for which offset credits are proposed to be generated by reducing existing selenium inputs to surface waters from one or more NPSs, must first be approved by the Executive Officer.⁵⁰ As an example, this approval could be modeled on the Los Angeles Regional Water Quality Control Board’s and/or State Water Resources Control Board’s approach for approval of full capture devices for trash, whereby the Regional Board would create an approved list of BMPs to avoid approving each individual project. As the specifics must be detailed in the Offset and Trading Program, this approach is purely provided as an example for consideration.
- **Offset Accounting:** The Offset and Trading program must develop and establish a selenium accounting system, consistent with the monitoring requirements identified below, which accurately characterizes any load reductions claimed as offset credits and discharges being offset by those credits. The Offset and Accounting System must identify how each project integrates with other selenium reduction efforts in the region including the relevant BMP Strategic Plan.
- **Types of Trades:** Offsets and trades can occur between point source – point source and point source – non-point source.
- **Timing:** Offset credits must be generated before they can be used to offset permitted-point source discharges. Offset credits automatically expire 12 months after they are created regardless of whether they have been used as an offset or not.
- **Trading Area:** Offset credits may only be used as offsets in the same subwatershed (i.e., San Diego Creek, Santa Ana-Delhi Channel, or Big Canyon Wash) in which they were created.
- **Monitoring:** Regulated Parties that rely on offsets and trading to demonstrate compliance will also be required to participate in a monitoring program, as described in the section on Monitoring. This program shall be designed to

⁴⁹ Groundwater cleanup projects are those projects regulated under the groundwater remediation permits.

⁵⁰ Approval is needed for the initial project, not for individual trades of the offset credits. The trades of the offset credits will be documented in the offset accounting system.

demonstrate the effectiveness of the offset and trading program in improving water quality. The program shall include, but may not be limited to, water quality monitoring and biological assessments downstream of the point-source discharge. This monitoring obligation may be satisfied by each discharger individually or by cooperating with other dischargers where doing so would be more cost-effective and efficient. The latter option is intended to increase the opportunities for smaller dischargers to participate in the program.

Eligibility Requirements for the Offset and Trading Program

Regulated Parties will be eligible to participate in the Offset and Trading Program, designed to achieve compliance with the applicable NPDES permit limitation by relying on credits generated from an offset and trading project approved by the Executive Officer, to offset selenium loads in their point-source discharge, provided they demonstrate the following, as determined by the Executive Officer:

- (a) That there is no reasonably feasible or practicable conventional treatment technology available that can achieve compliance with the applicable WQO for selenium at the point of discharge.
- (b) That it is not feasible or practicable to eliminate⁵¹ the discharge, that doing so would pose unreasonable risks to human health, public safety, or the natural environment, or that prohibiting the discharge would result in unreasonable economic hardship on the surrounding community, or result in greater selenium loading to the Newport Bay watershed than would occur in the absence of the offset project.
- (c) That the point source discharge that relies on offset credits to achieve compliance with the applicable WLA is not expected to unreasonably adversely affect beneficial uses of receiving waters downstream of the discharge outfall.

The Regional Board will require point-source dischargers to re-confirm their eligibility for continued participation in the offset and trading program and to reassess the range of conventional treatment technologies each time a permit is renewed. The Regional Board encourages coordination on treatment technologies in order to minimize redundant efforts and share the total cost as described in the BMP Strategic Plans.

Demonstrating Compliance with the Waste Load Allocation

- **Permit Authorization:** An offset credit may not be relied on to demonstrate effective compliance with an effluent limitation unless authorized by a permit (including, but not limited to, the existing Regional Board orders and permits regulating discharges in the Newport Bay Watershed) and unless it has met the credit generation and prior approval requirements.

⁵¹ Individual Action Plan's must include Volume Reduction BMPs and, even if the discharge is reduced, it may be necessary and in the best interests of overall water quality for the remaining discharge to utilize the Offset and Trading Program as an alternate method for demonstrating compliance.

- **Use of Credits:** Sufficient qualified offset credits must be acquired to offset the remaining selenium load (measured as mass), including any applicable offset ratios, in the point-source discharge.
- **Compliance Assessment:** Satisfactory implementation of the Offset and Trading Program, in accordance with the terms and conditions specified by the Executive Officer, will constitute full compliance with the applicable effluent limitation specified to implement the relevant WLA. The Regional Board retains discretion to revise the specific offset requirements to maintain consistency with the TMDLs⁵². The Regional Board also retains discretion to reauthorize or disallow continued reliance on pollutant offsets and trading projects to demonstrate compliance with the selenium effluent limitation implementing the WLA each time a discharge permit is renewed. Such a determination will include an assessment of the program's continued effectiveness in achieving greater water quality improvements than if the program were disallowed.
- **Non-Compliance and Enforcement:** For Regulated Parties that rely on the Offset and Trading Program to demonstrate compliance with an NPDES effluent limitation, failure to comply with the terms and conditions specified by the Executive Officer at the time the Program is approved will be a violation of the discharge permit. Notwithstanding any other enforcement option already available, the Regional Board may also elect to terminate eligibility to participate in the Offset and Trading Program, require a higher offset ratio from the non-compliant discharger, or impose additional terms and conditions to ensure full compliance by the non-compliant discharger.

Development of Site-Specific Objectives

It is the intent of the Regional Board to develop SSOs for selenium for the Newport Bay watershed, with a targeted date of within one to two years ⁵³of the effective date of these TMDLs.

Regional Board staff will work with all relevant parties to ensure that the process is implemented as soon as possible. However, this process is time intensive and will take several years to complete even under the most expeditious of circumstances. Therefore, the time to complete this process, as well as the time needed for implementation and assessment of BMPs, forms, in part, the basis for the timeframe for Phase I of these selenium TMDLs.

TMDL Reconsideration

⁵² The specific offset requirements must be consistent with the TMDL. Any future revisions to the offset ratios, achieved through a Basin Plan Amendment, would be reflected in permit requirements.

⁵³ The timeframe of one to two years refers to the time needed to develop the SSOs and have them considered for adoption by the Regional Board. The timeframe for the SSOs to become effective includes many other regulatory and procedural steps.

The TMDL Reconsideration is a core component of the overall structure and approach for these selenium TMDLs and will occur after the completion of Phase I and prior to the initiation of Phase II.

The TMDL Reconsideration allows these selenium TMDLs to be implemented while there are pending revisions at the state and local levels to the applicable selenium objectives. It is anticipated that the revised objectives will become effective during Phase I of these selenium TMDLs. After the revised objectives are established, the actions needed to attain those objectives can be identified. This process will occur as part of the TMDL Reconsideration and the requirements will be specified as part of the Phase II implementation of these selenium TMDLs.

In addition, the TMDL Reconsideration will also review the overall effectiveness and practicality of BMPs implemented during Phase I and the associated data from the Regional Monitoring Program in developing the appropriate strategies and requirements for Phase II. This approach is consistent with the acknowledged difficulty of controlling selenium discharges in the Newport Bay watershed and the need for further investigation and adaptive management of appropriate and effective control strategies.

Effective BMPs implemented as part of Phase I implementation will continue to be operated during the TMDL Reconsideration. Adaptive management of BMPs and consideration of and planning for new BMPs that are considered likely to be required to attain the revised TMDLs shall also proceed during the TMDL Reconsideration period in order to assure that water quality standards are attained as soon as possible.

The entirety of these selenium TMDLs and supporting documentation may be modified during the TMDL Reconsideration, but it is anticipated that at a minimum, the following elements will be revised:

- Problem Statement
- Numeric Targets
- Linkage Analysis
- TMDLs and Allocations
- Implementation Plan

Implementation of the selenium TMDLs is expected to be an ongoing and dynamic process and may lead to further modifications during Phase II. This includes detailed evaluation of and possible modification of the schedule needed to assure final attainment of the TMDLs. The Regional Board will reevaluate the selenium TMDLs consistent with the implementation schedule in **Table 4.c.Se.2**.

Phase II: LAs Implementation

Phase II will focus on actions designed to attain the final WLAs and LAs as expeditiously as possible. Phase II actions will be determined based on the results of Phase I implementation, the requisite monitoring program, and the Reconsidered TMDL and may include revisions to key TMDL elements like the final WLAs and LAs. A schedule for the actions that may be considered for implementation during Phase II has been developed. Given the revisions to

the selenium WQOs that have taken place at the federal level, are currently underway at the state level,, and the proposed SSOs at that will be initiated at the local level, the actions and schedule are preliminary and will be reevaluated for appropriateness during TMDL Reconsideration and any future TMDL reopener. This approach is consistent with the concept of a Phased TMDL as defined in USEPA guidance. The implementation schedule for these TMDLs is limited to **Table 4.c.Se.2**.

During Phase II, these selenium TMDLs will rely upon the State of California *Nonpoint Source Program Strategy and Implementation Plan* (SWRCB, 2000) and the *Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program* (SWRCB, 2004c). As it is anticipated that the implementation measures described in Phase I: WLA Implementation will also address a portion of the NPS rising groundwater, the need for a NPS strategy and the development of the strategy will be part of the TMDL Reconsideration. The strategy that is developed will be implemented during Phase II.

Phase II: WLAs Implementation

Specific requirements for Phase II will be identified through the TMDL Reconsideration process. However, it is anticipated that the implementation approach and elements identified for Phase I will be the basis for Phase II. These elements include the following:

MS4 Permittees:

- BMP Strategic Plan
- Offset and Trading Program (participation in the program by individual Regulated Parties is optional)
- Monitoring Program
- Reporting

Other NPDES Permittees:

- BMP Strategic Plan OR Individual Action Plan
- Offset and Trading Program (participation in the program by individual Regulated Parties is optional)
- Monitoring Program
- Reporting

A key distinction for Phase II implementation is the timeframe, compared to the timeframe identified for Phase I. As the objective for Phase II will be to achieve the final WLAs and LAs and assure that water quality standards are achieved, a significantly longer timeframe is expected to be needed.

Controlling selenium discharges to surface waters poses multiple challenges in part because the most significant source is rising groundwater that is diffuse in origin. Lining of surface water channels to prevent infiltration of rising groundwater could compromise the structural integrity of the channels and their flood control functions. Diversion of this rising groundwater in all surface waters, even if technically feasible, would dewater the surface waters and

thereby impair wildlife-related and other beneficial uses. The Offset and Trading Program that is expected to be initiated in Phase I of these selenium TMDLs provides one mechanism to address this source. Other mechanisms may be needed, and adequate but reasonable time will be needed to identify, design, and implement them. These selenium TMDLs specify a schedule of *as soon as possible but no later than 30 years* for Phase II. The propriety of this schedule will be carefully considered, and modified if appropriate, during the TMDL Reconsideration.

During Phase II implementation, a more robust adaptive management process will be incorporated, given the now established 30-year implementation timeframe, including the following:

- **Modifications to the BMP Strategic Plans** – Whereas only minor modifications are anticipated during Phase I implementation, major revisions to the plans may be warranted during Phase II, based upon the information developed through the adaptive management process. Such revisions may entail identifying additional or alternative BMPs necessary to achieve the final WLAs/LAs. Regulated Parties will be required to revise and update the BMP Strategic Plans every five years (as needed), unless an alternative schedule is identified, as directed by the Regional Board's Executive Officer.
 - **Evaluation of the Final WLAs** – A key component of these proposed selenium TMDLs is identifying water column concentrations that may be necessary to achieve the tissue-based numeric targets. Therefore, it will be necessary to periodically re-evaluate the water column concentrations derived from the biodynamic model (or alternative model, if adopted for Phase II based on special studies) to ensure that tissue-based targets will be attained. Regulated Parties implementing BMP Strategic Plans will be required to update the applicable model utilized in the Linkage Analysis with new data and submit a report with recommendations to the Regional Board's Executive Officer for review and approval⁵⁴. The frequency of such evaluations shall be consistent with the schedule identified in **Table 4.c.Se.2**.

Incorporation of the TMDLs into NPDES Permits

TMDLs are not self-implementing and must therefore be incorporated into the appropriate regulatory mechanisms to be enforceable. Section 303(d) of the CWA requires WLAs to be implemented through the NPDES permit program. After a TMDL has been developed, water quality-based discharge limits in NPDES permits authorized under CWA section 402 must be consistent with the assumptions and requirements of the WLAs.⁵⁵

The purpose of this section is to provide clear direction to permit writers regarding how these selenium TMDLs are to be incorporated into the relevant NPDES permit.

⁵⁴ Any changes in the proposed water column-based allocations will occur via a public participation process, and if requested, may require consideration and approval by the Regional Board.

⁵⁵ <http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/overviewoftmdl.cfm>

MS4 Permits

Effluent limitations are generally expressed in numerical form. However, USEPA guidance provides discretion for how TMDLs should be incorporated into permits for NPDES-regulated municipal and small construction stormwater discharges, including expressing effluent limitations as BMPs or other similar requirements rather than as numeric effluent limitations as long as the effluent limitations are clear, specific and measurable. As part of the assumptions and requirements of the WLAs, these selenium TMDLs specifically provide for BMP-based compliance, as one of several options, for MS4 Permittees.

As the WLAs are incorporated into the MS4 permit via appropriate effluent limitations, all assumptions and requirements of the WLAs, including all footnotes and all compliance options specified in the TMDLs and Allocations section, will be incorporated into the permit.

Other NPDES Permits

There are several Regional Board orders and/or NPDES permits that may be revised to incorporate the selenium TMDLs' WLAs. The expectation for incorporation of these selenium TMDLs is similar to that stated above for MS4 permits.

As the WLAs are incorporated into other NPDES permits via effluent limitations, the entirety of the WLAs, including all footnotes and all compliance options specified in the TMDLs and Allocations section, shall be incorporated into the permit.

However, there are some additional relevant issues to address for these Other NPDES permits.

- **Effluent limits:** Effluent limits, consistent with the applicable WLAs, will be incorporated into the permit. The approach to the WLAs explicitly acknowledges that the WLAs may be adjusted over time based upon new information. Consequential revisions to permits can be made via approval by the Executive Officer, per delegated authority by the Regional Board, unless during the public review process, a request is made to bring the modification before the Regional Board for consideration. When and if WLAs are adjusted, the most up to date WLAs shall be incorporated into the relevant permits as revised effluent limits.
 - **Compliance via the Offset and Trading Program:** These selenium TMDLs specifically provide for Other NPDES Permittees to comply with effluent limits implementing the WLAs via an Offset and Trading Program. The requirements of the program are specified above, but key aspects related to permit conditions are included here for clarity:
 - Regulated Parties may not rely on offset credits to demonstrate compliance with the applicable effluent limitation based on the WLA unless explicitly authorized by the permit and unless it has met the credit generation and prior approval requirements.
 - Satisfactory implementation of the Offset and Trading Program, in accordance with the terms and conditions specified by the Executive Officer, will constitute full compliance with the applicable effluent limitation specified to implement the

relevant WLA. The Regional Board retains discretion to revise the specific offset requirements to maintain consistency with the TMDLs. The Regional Board also retains discretion to reauthorize or disallow continued reliance on pollutant offset and trading projects to demonstrate compliance with the selenium WLA each time a discharge permit is renewed in order to ensure the TMDL implementation program is making reasonable progress. Such a determination will include an assessment of the Program's continued effectiveness in achieving greater water quality improvements than if the Program were disallowed.

Monitoring

Individual Action Plan Monitoring

For Regulated Parties implementing an Individual Action Plan, a monitoring program must be submitted as part of the Individual Action Plan, detailed above in the Implementation section.

Regional Monitoring Program

For Regulated Parties implementing a BMP Strategic Plan, a Regional Monitoring Program must be developed and submitted as part of the applicable BMP Strategic Plan. The Regional Monitoring Program must be submitted to the Executive Officer for approval⁵⁶, consistent with the schedule identified in Table 4.c.Se.2 and implemented upon that approval. A Regional Monitoring Program must be developed for each subwatershed area (San Diego Creek, Santa Ana-Delhi Channel, and Big Canyon Wash). The monitoring programs can be developed individually for each subwatershed or combined to address multiple subwatersheds (resulting in a minimum of one (1) and a maximum of three (3) monitoring programs) consistent with the applicable BMP Strategic Plan(s).

To be considered for approval by the Executive Officer, each Regional Monitoring Program must include the following elements:

- TMDL Evaluation Monitoring
- BMP Effectiveness Monitoring
- Offset and Trading Program Monitoring⁵⁷
- Source Assessment Monitoring
- Other Considerations
- Special Studies
- Quality Assurance and Quality Control Measures

⁵⁶ It is expected that prior to Executive Officer approval, input and recommendations from the U.S. Fish and Wildlife Service and the California Department of Fish and Wildlife will be solicited concerning the proposed monitoring, particularly biological monitoring conducted as part of Assessment Area monitoring (see below).

⁵⁷ Only required where the Regulated Parties opt to implement an Offset and Trading Program.

The above monitoring elements reflect the various aspects of these selenium TMDLs that are supported, informed and/or evaluated by monitoring in the watershed. In order to ensure integration of these elements and the various components of these selenium TMDLs within each watershed, the monitoring requirements are contained within one unified document, the Regional Monitoring Program.

Regulated Parties may, and are encouraged to, integrate the various monitoring requirements as appropriate and necessary (e.g., one monitoring location may provide data for multiple purposes). Additionally, Regulated Parties may, and are encouraged to, integrate or coordinate the monitoring requirements for this TMDL with other existing monitoring efforts (e.g., other TMDLs, the MS4 Permit, other regional monitoring programs, etc.).

The specific requirements for each element of the Regional Monitoring Program are detailed below.

TMDL Evaluation Monitoring

The purpose of the TMDL evaluation monitoring is to assess progress toward the attainment of the WLAs, LAs, and the tissue-based numeric targets⁵⁸, consistent with California Water Code Section 13242.

The TMDL evaluation monitoring is divided into two categories:

- **Assessment Point Monitoring** – Assessment Point Monitoring will be used to assess, through water column monitoring, whether the WLAs and LAs are being attained. The assessment point within each of the subwatershed/channel areas is as follows:
 - San Diego Creek subwatershed: San Diego Creek at Campus Drive
 - Santa Ana-Delhi Channel: Santa Ana Delhi Channel upstream of Irvine Ave
 - Big Canyon Wash subwatershed: Big Canyon Wash at the outfall to Upper Newport Bay at Back Bay Drive.

The monitoring parameters for the Assessment Point Monitoring must consist of the following:

- Water column: selenium (total and dissolved)⁵⁹
- Flow⁶⁰

⁵⁸ The monitoring program's purpose is not to determine permit compliance. Permit compliance will be determined as described in the TMDLs and Allocations section and Implementation Plan section.

⁵⁹ Selenium species in addition to total and dissolved selenium (collected at same time as assessment area monitoring is being conducted) should be considered, but are not required for all monitoring events or locations.

⁶⁰ To be measured at a nearby gauge or estimated at the point of sample collection if a nearby gauge is not present (e.g., Big Canyon Wash).

The frequency of sample collection must be sufficient to evaluate the WLAs and LAs (including the seasonal evaluation) and must be specified in the Regional Monitoring Program.

- **Assessment Area Monitoring** – Assessment area monitoring will be used to assess, through bird egg and fish tissue samples, attainment of the tissue-based numeric targets. Tissue samples must be collected throughout the subwatershed area. For instances where sufficient tissue samples cannot be collected from an assessment area, a surrogate parameter (e.g., macroinvertebrates such as crayfish; reptiles; amphibians) may be used. The surrogate parameter must be proposed in the Regional Monitoring Program and, therefore, is subject to approval by the Executive Officer. The purpose of the surrogate parameter is to allow for an alternative assessment, as appropriate, of the tissue-based numeric targets to avoid a default presumption of attainment or lack of attainment due to an insufficient number of tissue samples. Given that numeric targets have not been established for these surrogate parameters, they would be used for informative purposes (e.g., to observe trends over time) rather than to determine whether the TMDLs have been attained. Where sufficient tissue samples are not available, these selenium TMDLs do not default to the assessment of water column (per the Assessment Point Monitoring) to determine attainment of the TMDLs. Additionally, where sufficient tissue samples are not available, these selenium TMDLs do not default to a determination that the TMDLs have been attained.

The assessment areas are as follows:⁶¹

- San Diego Creek subwatershed
 - i. Peters Canyon Wash
 - ii. San Diego Creek
 - iii. Off-Channel Wetlands (IRWD Constructed Treatment Wetlands and San Joaquin Marsh Reserve (UCI Wetlands))
- Santa Ana-Delhi Channel
 - i. Santa Ana Gardens Channel
 - ii. Santa Ana Delhi Channel (upstream of proposed diversion)
- Big Canyon Wash subwatershed
 - i. Harbor View Nature Park
 - ii. Big Canyon Country Club Golf Course Pond 4 or 5
 - iii. Big Canyon Nature Park

⁶¹ Each subwatershed, in its entirety, is the assessment area. The sub areas within the subwatersheds are identified to ensure that sampling occurs specifically within at least one of these areas.

At a minimum, the monitoring parameters for the Assessment Area Monitoring must consist of the following:

- **Bird Egg Tissue (individual eggs, contents only):** total selenium; targeted species include shorebirds such as avocets or stilts (invertivorous birds), grebes (omnivorous or insectivorous birds), coots (omnivorous or herbivorous birds) and terns (piscivorous birds); since not all species are expected to be available in any given year within each subwatershed area, the monitoring program must be flexible with regard to the species targeted.
- **Fish Tissue (composite, whole-body tissue analyses):** total selenium; targeted species include juvenile and adult fish of the *Centrarchidae* family (e.g., bluegill, largemouth bass) and smaller fish such as red shiners or mosquito fish; since not all species are expected to be available in any given year within each subwatershed area, the monitoring program must be flexible with regard to the species targeted.
- **Surrogate Parameters:** Field experience indicates that locations with limited habitat (e.g., Upper Peters Canyon Wash, Santa Ana-Delhi Channel, and Big Canyon Wash) may not reliably provide fish or bird eggs for collection. Therefore, the Regional Monitoring Program must identify appropriate surrogate parameters (e.g., larger macroinvertebrates, such as crayfish (tails only, exoskeleton removed), reptiles such as non-native turtles, or amphibians such as non-native frogs) for sampling. At a minimum, surrogate tissue samples will be analyzed for total selenium and percent solids.

The frequency of sample collection must be sufficient to evaluate the tissue-based numeric targets, provided sufficient samples can be collected during target sample collection times, and must be specified in the Regional Monitoring Program.⁶² At a minimum, an attempt to collect samples must be conducted annually in each assessment area, unless and until the Executive Officer determines that sufficient tissue data has been obtained to adequately characterize conditions and a lower sample collection frequency is warranted. Bird egg collection should be conducted during the nesting season (generally March through August). Fish collection should be at the same time of year to capture the potential effects of fish as bird dietary items and for effects to fish reproduction (common timing for most of the target species).

BMP Effectiveness Monitoring

The purpose of the BMP effectiveness monitoring is to assess the effectiveness of the BMPs that have been implemented pursuant to the BMP Strategic Plan(s).

Changes in selenium concentrations in receiving waters, fish tissue, and bird eggs as a result of BMPs can be evaluated on either a project-specific or regional basis (e.g., the assessment area), depending upon the location and scale of the BMP. In addition, depending upon the

⁶² It is expected that prior to Executive Officer approval, input and recommendations from the U.S. Fish and Wildlife Service and the California Department of Fish and Wildlife will be solicited concerning the proposed monitoring, particularly biological monitoring conducted as part of Assessment Area monitoring (see below).

type of BMP implemented, additional parameters or factors may be warranted (e.g., selenium speciation; bacteriological monitoring). Therefore, the monitoring that is appropriate to assess BMP effectiveness will be project-specific. However, to ensure integration of the goals and purposes of the BMP Strategic Plan and the Regional Monitoring Program, a project-specific monitoring plan must be developed for each project. The project-specific monitoring can be approved either through the BMP Strategic Plan approval process (including periodic updates) or through the Regional Monitoring Program approval process (including periodic updates). Each project-specific monitoring plan must be appended to the overall Regional Monitoring Program and address the following:

- Baseline conditions prior to the project;
- Monitoring locations and rationale for the monitoring locations. At a minimum, two (2) monitoring locations must be established: one immediately upstream of the BMP and one immediately downstream of the BMP. If warranted by the type of BMP implemented or its proximity to sensitive or important habitat, another monitoring location may be added further downstream of the BMP⁶³. For diversion projects, monitoring upstream is not required (though monitoring of the diverted water is required, in order to quantify the selenium removed by the diversion⁶⁴). For all types of BMPs, downstream monitoring may be coordinated with other monitoring locations where appropriate;
- Monitoring parameters, which at a minimum must include selenium in water (total and dissolved)⁶⁵;
- Frequency with which each selenium reduction BMP will be monitored once the BMP is constructed and fully functioning. Monitoring must be sufficient to determine performance and selenium reduction effectiveness; and
- Duration of the BMP effectiveness monitoring.

Offset and Trading Program Monitoring

The purpose of the offset and trading program monitoring component is to provide the data that verify the generation of credits, and to conduct assessments on the effects of the offsets and/or trades on receiving water conditions to prevent localized impacts. This monitoring element only applies to Regulated Parties that opt to participate in the Offset and Trading Program.

⁶³ The same monitoring location(s) can potentially be utilized for different aspects of the Regional Monitoring Program (e.g., a TMDL Evaluation location can also serve as a BMP effectiveness monitoring location), provided that the monitoring location will provide the necessary information. The intent of requiring all monitoring aspects in one Regional Monitoring Program is to integrate all of the requirements such that the program is efficient, effective, and practical.

⁶⁴ The sewerage agency will require certain monitoring to be conducted of water that enters the sewer system. This monitoring data may be utilized to fulfill, fully or in part, monitoring requirements for the diversion projects.

⁶⁵ As determined on a project specific basis, the monitoring parameters may also include, if warranted, selenium species: selenate, selenite, and organic selenium.

For Regulated Parties who are generating credits via a BMP, at a minimum, monitoring must include the following⁶⁶:

- Influent water to the BMP (prior to treatment)
- Water Column: selenium (total and dissolved)
- Flow
- Effluent water from the BMP (after treatment)
- Water Column: selenium (total and dissolved)⁶⁷
- Flow

For Regulated Parties who are generating credits via a diversion project, at a minimum, monitoring must include the following:

- Influent water to the diversion
- Water Column: selenium (total and dissolved)
- Flow

For Regulated Parties who seek to use credits, at a minimum, monitoring must include the following:

- At the point of discharge:
 - Water Column: selenium (total and dissolved)
 - Flow
- Downstream of the point of discharge:
 - Water Column: selenium (total and dissolved). Water column monitoring conducted under the TMDL compliance monitoring element may be sufficient to satisfy this requirement.
 - Bird Egg Tissue: consistent with the requirements specified in the TMDL compliance monitoring element. Tissue monitoring conducted under the TMDL compliance monitoring element may be sufficient to satisfy this requirement.

⁶⁶ Note that the BMP itself will be assessed under the requirements specified in the BMP effectiveness monitoring aspect of the Regional Monitoring Program. The requirements specified here are specifically designed to assess the generation of credits for the Offset and Trading Program.

⁶⁷ Additional monitoring parameters may be required depending on the type of BMP being used (e.g., selenium species, bacteria, nutrients, dissolved oxygen).

- Fish Tissue: consistent with the requirements specified in the TMDL compliance monitoring element. Tissue monitoring conducted under the TMDL compliance monitoring element may be sufficient to satisfy this requirement.

Source Assessment Monitoring

As BMPs needed to achieve these proposed selenium TMDLs are implemented, and as conditions in the subwatershed areas change over time, the collection of selenium source data in each of the subwatershed areas may be necessary to identify and assess significant remaining inputs that do not have BMPs. The need for and selection of additional sample collection locations will be based on the results of Assessment Point and Assessment Area monitoring. Each Regional Monitoring Program must provide for this monitoring element.

Other Considerations

In addition to the required elements of the Regional Monitoring Program (TMDL evaluation monitoring, BMP effectiveness monitoring, offset and trading program monitoring, and source assessment monitoring), other elements, such as those listed below, may be considered for inclusion in the Regional Monitoring Program. These elements are not required components of the Regional Monitoring Program, but may be considered as the program develops or added based on consultation with Regional Board staff, and may change over time:

- **Selenium Speciation** – The chemical speciation of selenium is a critical consideration in assessing the potential impacts of selenium because the bioavailability and toxicity of selenium are greatly affected by its chemical forms. Additionally, the various chemical forms of selenium bioaccumulate at different rates. Monitoring aimed at collecting data on the chemical speciation of selenium in the water column should be considered where appropriate. Where selenium speciation is included as part of the assessment area monitoring, the water column samples should be collected within each assessment area at the same location and same time as the fish collection occurs.
- **Additional Monitoring Sites** – Additional sites that provide meaningful data to support refinement of the TMDLs and/or BMP implementation may be considered. These sites would not be used for TMDL evaluation purposes (as detailed under “TMDL Evaluation Monitoring” above), but to support future decision-making.
- **Additional Monitoring Triggers** – As part of the overall adaptive management aspect of these selenium TMDLs, the Regional Monitoring Program may consider triggers where additional monitoring is warranted (e.g., tissue concentrations that are orders of magnitude higher than other samples).

Special Studies

Special studies are supplemental to the core, routine components of the Regional Monitoring Program. These studies are intended to answer discrete questions and are not intended to be part of the routine monitoring conducted through the Regional Monitoring Program. These studies can inform and fill data gaps that support refinement and/or modification to these proposed selenium TMDLs. Therefore, any special study conducted during Phase I must be

completed consistent with the schedule in **Table 4.c.Se.2** in order to be considered during the TMDL Reconsideration.

As part of Phase I of these TMDLs, the following special studies may be implemented by the Regulated Parties or Regional Board:

- **Model Comparison:** This study would provide a comparison of the biodynamic model and a selenium BAF or BSAF model for the Newport Bay watershed. The purpose of the comparison would be to evaluate if the BAF/BSAF model performs equally well for the watershed and to consider revision of the modeling approach utilized for the linkage analysis portion of these selenium TMDLs.
- **Refinement of Site-Specific K_d values:** This study would focus on obtaining algae, fine organic surficial sediment, and suspended particulates from multiple locations in the watershed to aid in refining the partitioning coefficients used in the biodynamic model to predict the probable selenium water column concentrations needed to meet the numeric tissue targets.
- **Special Studies by Regulated Parties:** Additional special studies may be proposed during implementation of Phase I of the proposed selenium TMDLs as funding allows and as deemed necessary. To be considered during the TMDL Reconsideration process, the proposed special studies must meet the following requirements and be submitted to the Regional Board's Executive Officer for review and approval:
 - **Purpose** – Identification of the data and/or information gap that will be filled by completion of the special study.
 - **Timeframe** – Identification of the timeframe for completing the special study. The special study must be completed within a time period that allows a sufficient amount of time for the results of the special study to be considered during the TMDL Reconsideration process.
 - **Link to TMDL Reconsideration** – Identification of the manner in which the results of the special study can be used to revise the TMDLs during the Reconsideration process.
- **Special Studies Requested by the Regional Board:** The Regional Board may identify the need for additional special studies during the implementation of these selenium TMDLs. Where warranted, the Regional Board may issue a California Water Code Section 13267 Order. The Order would meet the requirements of Section 13267 as well as identify the purpose, timeframe, and link to TMDL reconsideration.

Quality Assurance and Quality Control Measures

The Regional Monitoring Program must identify the quality assurance and quality control measures (QA/QC) that will be implemented. At a minimum, the Regional Monitoring Program must be consistent with the requirements of California's Surface Water Ambient Monitoring Program (SWAMP).

Reporting

Reporting is an integral component of these selenium TMDLs as it provides the foundation for assessing progress in attaining the TMDLs and the adaptive management process.

Reporting requirements for Regulated Parties implementing a BMP Strategic Plan or an Individual Action Plan are detailed below.

BMP Strategic Plan Reporting

For Regulated Parties implementing BMP Strategic Plan(s), an annual report must be submitted to the Regional Board, consistent with the schedule identified in **Table 4.cSe.2**.

BMP Strategic Plan Annual Reports must, at a minimum, address the following:

- **Baseline and Source Control Activities** – Detail the baseline and source control activities implemented during the reporting year.
- **Selenium Reduction Projects** – Detail the selenium reduction projects implemented during the reporting year, including the characteristics, timeframe, and resulting changes in selenium loading and concentration of each project, including as appropriate, any changes in selenium species, and any resultant changes in stream flows/hydrology.
- **Goals** – Evaluate progress in attainment of the goal(s) of the BMP Strategic Plan.
- **Schedule** – Verify that actions were implemented consistent with the approved BMP Strategic Plan schedule.
- **Monitoring Results** – Evaluate the results from the Regional Monitoring Program, including:
 - BMP effectiveness monitoring
 - Progress in attaining WLAs
 - Progress in attaining numeric targets
 - If applicable, results and recommendations from any special studies
- **BMP/Technology Evaluation** – When applicable per the schedule defined as part of an approved BMP Strategic Plan, provide any BMP/technology evaluations. Evaluations can be submitted as a separate, stand-alone report.

- **Adaptive Management** – Based upon the results of the reporting year, propose any minor modifications to the BMP Strategic Plan and/or Regional Monitoring Program, if necessary and appropriate.⁶⁸
- **Data** – Submit data from the Regional Monitoring Program in Excel format to Regional Board staff on a semi-annual basis if exceedances of the numeric targets are observed, and annually if exceedances of the numeric targets are not observed. Data must also be uploaded to the California Environmental Data Exchange Network (CEDEN) on an annual basis. If and as a specific need arises, respond to specific data requests by Regional Board staff as soon as possible.

Individual Action Plan Reporting

Individual Action Plans are provided as part of these selenium TMDLs recognizing that certain discharges may be short-term in nature and that long-term participation in a BMP Strategic Plan may, thus, be inappropriate. Therefore, the reporting schedule will be determined on a case-by-case basis for each Regulated Party opting to implement an Individual Action Plan. As noted above, the reporting schedule must be included as part of the Individual Action Plan, which is subject to approval by the Executive Officer.

The Individual Action Plan reports must include the following:

- **Volume Reduction BMPs** – Detail the volume reduction BMPs implemented during the reporting period;
- **Method of Attaining the Final WLAs** – Describe the method of attaining the final WLAs during the reporting period:
 - Participation in an approved Offset and Trading Program, such that the discharge is offset consistent with the requirements of the Offset and Trading Program, including the applicable offset ratios and restrictions pertaining to impacts to downstream beneficial uses; OR
 - Implementation of BMPs to attain the final WLAs at the point of discharge; OR
 - No discharge (e.g., sewer the discharge).
- **Schedule** – Verify that actions were implemented consistent with the approved Individual Action Plan schedule.
- **Monitoring Results** – Evaluate the results of the Individual Action Plan monitoring program to demonstrate that the selected method to attain the final WLAs was effective.
- **Data** – Submit data from the Individual Action Plan Monitoring Program in Excel format to the Regional Board’s Executive Officer for review and approval in accordance with the schedule identified in the permittees Individual Action Plan. Data

⁶⁸ Due to the compressed timeframe for Phase I, it is anticipated that only minor modifications to the BMP Strategic Plans will occur during Phase I. However, a more robust adaptive management process will be required during Phase II of these TMDLs.

must also be uploaded to the California Environmental Data Exchange Network (CEDEN).

Table 4.c.Se.2 Newport Bay Watershed Selenium TMDLs Implementation and Compliance Schedule

PHASE I		
Date	Action	Implemented By
3 months from TMDL effective date	Submit Phase I BMP Strategic Plan for approval by the Executive Officer; implement upon approval	MS4 Permittees; Other NPDES Permittees (existing discharges) opting to participate in a BMP Strategic Plan
3 months from TMDL effective date	Submit Regional Monitoring Program for approval by the Executive Officer; implement upon approval.	MS4 Permittees; existing Other NPDES Permittees opting to participate in a BMP Strategic Plan (in lieu of an Individual Action Plan)
3 months from TMDL effective date	Submit Offset and Trading Program for approval by the Executive Officer; implement upon approval.	MS4 Permittees; existing Other NPDES Permittees opting to participate in an Offset and Trading Program
Submit with Notice of Intent	Submit Individual Action Plan OR documentation of participation in an approved BMP Strategic Plan	Other NPDES Permittees (new discharges) ¹
1 year from approval of Phase I BMP Strategic Plan, then annually thereafter	Submit annual report to Regional Board	MS4 Permittees; Other NPDES Permittees opting to participate in a BMP Strategic Plan
As determined in the approved Individual Action Plan	Submit reports to Regional Board	Other NPDES Permittees opting to implement an Individual Action Plan in lieu of participation in a BMP Strategic Plan
To be considered during the TMDL Reconsideration - 5 years from TMDL effective date	Complete any special studies and submit final report on study to Regional Board	MS4 Permittees; Other NPDES Permittees opting to implement a Special Study
Within 5 years from TMDL effective date	Complete development of selenium SSO	Regional Board with support from MS4 Permittees and Other NPDES Permittees
6 years from TMDL effective date	Complete implementation of Phase I BMP Strategic Plans	MS4 Permittees; Other NPDES Permittees opting to participate in a BMP Strategic Plan (in lieu of an Individual Action Plan)
TMDL RECONSIDERATION		
As soon as possible after the completion of Phase I, but no later than 8 years from the TMDL effective date	Reconsider TMDL -the entirety, or selected sections, of the selenium TMDLs and supporting documentation may be	Regional Board

	modified during the TMDL Reconsideration	
Throughout TMDL Reconsideration Period	Continue to implement Phase I BMP Strategic Plan	MS4 Permittees; Other NPDES Permittees (existing discharges) opting to participate in the BMP Strategic Plan
PHASE II		
Date	Action	Implemented By
6 months from Reconsidered TMDL effective date	Submit Phase II BMP Strategic Plan ² for approval by the Executive Officer; implement upon approval	MS4 Permittees; Other NPDES Permittees (existing discharges) opting to participate in a BMP Strategic Plan
6 months from Reconsidered TMDL effective date	Submit Regional Monitoring Program for approval by the Executive Officer; implement upon approval	MS4 Permittees; existing Other NPDES Permittees opting to participate in a BMP Strategic Plan
Submit with Notice of Intent	Submit Individual Action Plan OR documentation of participation in an approved BMP Strategic Plan	Other NPDES Permittees (new discharges) ¹ opting to implement an Individual Action plan in lieu of participation in the BMP Strategic Plan and Other NPDES Permittees opting to participate in a BMP Strategic Plan
1 year from approval of Phase II BMP Strategic Plan, then annually thereafter	Submit annual report to Regional Board	MS4 Permittees; Other NPDES Permittees opting to participate in a BMP Strategic Plan
As determined in the approved Individual Action Plan	Submit reports to Regional Board	Other NPDES Permittees (new discharges) opting to implement an Individual Action Plan in lieu of participation in the BMP Strategic Plan
9 years from Reconsidered TMDL Effective Date	Evaluate WLAs/LAs and submit report with recommendations to the Regional Board ³	MS4 Permittees; Other NPDES Permittees opting to participate in the BMP Strategic Plan
10 years from Reconsidered TMDL effective date	TMDL Reopener	Regional Board
19 years from Reconsidered TMDL effective date	Evaluate WLAs/LAs and submit report with recommendations to the Regional Board ³	MS4 Permittees; Other NPDES Permittees opting to participate in the BMP Strategic Plan
20 years from Reconsidered TMDL effective date	TMDL Reopener	Regional Board
As soon as possible but no later than 30 years from Reconsidered TMDL effective date	Complete implementation of Phase II BMP Strategic Plans	MS4 Permittees; Other NPDES Permittees opting to participate in the BMP Strategic Plan
As soon as possible but no later than 30 years from Reconsidered TMDL effective date	Attain Final WLAs ⁴	MS4 Permittees and Other NPDES Permittees opting to participate in a BMP Strategic Plan AND Other NPDES Permittees (new discharges) opting to implement an Individual

		Action Plan in lieu of participation in the BMP Strategic Plan
	Attain Final LAs ⁴	Non-Point Source dischargers
<p>¹ = The TMDL considers that there may be new dischargers after the TMDL becomes effective (e.g., a short-term groundwater discharger that was not discharging at the time the TMDL became effective).</p> <p>² = The schedule in the approved Phase II BMP Strategic Plan will include periodic updates and revisions, anticipated to be every 5 years throughout Phase II of these proposed selenium TMDLs. The schedule is subject to approval by the Executive Officer.</p> <p>³ = As the models are directly incorporated into the assumptions and requirements of the WLAs and LAs, the Regional Board can re-evaluate the allocations at any time and, through a public review process, modify the allocations. The discrete tasks here reflect the minimum frequency for re-evaluation of the allocations. Any additional reviews beyond those specified in the implementation schedule would be at the discretion of the Regional Board or at the request of Regulated Parties.</p> <p>⁴ = While the tissue-based WLAs and LAs are expected to result in attainment of the tissue-based numeric targets, bioaccumulation in the various foodwebs in the watershed may be different than what was modeled with the biodynamic model as part of the Linkage Analysis. Therefore, where tissue-based numeric targets are attained, the corresponding WLAs/LAs will also be deemed to be attained, regardless of the actual measured water column concentration.</p>		

End of Resolution No. R8-2017-0014

Anaheim Bay / Huntington Harbour

As in Newport Bay, bacteria and toxics threaten the water quality and beneficial uses of Anaheim Bay/Huntington Harbour. As shown in Table 5-10 in Chapter 5, the presence of toxic metals and pesticides/herbicides has resulted in the designation of Anaheim Bay and Huntington Harbour as a Toxic Hot Spot for some constituents and a Potential Toxic Hot Spot for other constituents. Two major storm drains, the Bolsa Chica Channel and the East Garden Grove Wintersburg Channel, as well as their tributaries, drain in to the Anaheim Bay / Huntington Harbour complex. Inputs of stormwater and urban nuisance flows via these channels appear to be significant sources of pollutants. The County of Orange's general stormwater permit requires the implementation of best management practices (BMPs) and other measures in the watershed to control these inputs to the maximum extent practicable.

During 1992-93, the Regional Board contracted with UC Irvine and UC Davis to evaluate the occurrence and impacts of these toxics in Huntington Harbour [Ref. 23, 24]. Results of the study indicated that concentrations of trace metals have decreased over a 13 year period and 1992/93 measurements met established water quality criteria. However, an unidentified nonpolar organic compound was found to be acutely toxic to test species.

Anaheim Bay (inland of Pacific Coast Highway Bridge) and Huntington Harbour are designated as no discharge areas for vessel sanitary wastes. Pumpout facilities are in place throughout the Harbour to facilitate compliance. Additional discussion of the activities of the Huntington Harbour Waterways Committee is provided in Chapter 8.

Big Bear Lake (The following added under Resolution No. R8-2006-0023)

Big Bear Lake, located in the San Bernardino Mountains, was created by the construction of the Bear Valley Dam in 1884. The Lake has a surface area of approximately 3,000 acres, a storage capacity of 73,320 acre-ft. and an average depth of 24 feet. The lake reaches its deepest point of 72 feet at the dam. The Big Bear Lake drainage basin encompasses 37 square miles and includes more than 10 streams. Local stream runoff and precipitation on the Lake are the sole source of water supply to the Lake. The spillway altitude is 6,743.2 feet. The major inflows to the lake are creeks, including Rathbone (Rathbun) Creek, Summit Creek, and Grout Creek. Outflow from the Lake is to Bear Creek, which is tributary to the Santa Ana River at about the 4,000-foot elevation level. Twelve percent of Big Bear Lake's drainage basin consists of the Lake itself. The US Forest Service is the largest landowner in the Big Bear area. Two ski resorts, Bear Mountain and Snow Summit, lease land from the Forest Service.

The beneficial uses of Big Bear Lake include cold freshwater habitat (COLD), warm freshwater habitat (WARM), water contact recreation (REC1), non-contact water recreation (REC2), municipal and domestic supply (MUN), agriculture supply (AGR), groundwater recharge (GWR), wildlife habitat (WILD) and rare, threatened or endangered species (RARE).

Big Bear Lake is moderately eutrophic. During the summer months, deeper water may exhibit severe oxygen deficits. Nutrient enrichment has resulted in the growth of aquatic plants, which has impaired the fishing, boating, and swimming uses of the lake. To control this vegetation, mechanical harvesters are used to remove aquatic plants, including the roots.

Toxics may be entering the Big Bear Lake watershed and accumulating in aquatic organisms and bottom sediments at concentrations that are of concern, not only for the protection of aquatic organisms, but for the protection of human health as well. Past Toxic Substances Monitoring Program data have indicated the presence of copper, lindane, mercury, zinc, and PCBs in fish tissue.

During 1992-93, the Regional Board conducted a Phase I Clean Lakes study (Section 314 of the Clean Water Act) to evaluate the current water quality condition of the lake and its major tributaries [Ref. 25]. The focus of the study was to identify the tributaries responsible for inputs of toxics and nutrients. As a result of data collected in the Clean Lakes Study, Big Bear Lake and specific tributaries were placed on the 1994 Clean Water Act Section 303(d) List of Water Quality Limited Segments for the reasons indicated in Table 6-1a-b.

Table 6-1a-b

**Big Bear Lake Watershed Waterbodies on the
1994 303(d) List of Impaired Waters**

WATERBODY	STRESSOR
Big Bear Lake	nutrients
	noxious aquatic plants
	sedimentation/siltation
	metals
	copper
	mercury
Rathbone (Rathbun) Creek	nutrients
	sedimentation/siltation
Grout Creek	metals
	nutrients
Summit Creek	nutrients
Knickerbocker Creek	metals
	pathogens

In 2000, the Regional Board convened a TMDL workgroup to assist in the development of Total Maximum Daily Loads for the Big Bear Lake watershed. The Big Bear Municipal Water District, a key contributor to the workgroup, created the Big Bear Lake TMDL Task Force, including representatives of the District, Regional Board staff, the San Bernardino County Flood Control District, the City of Big Bear Lake, the Big Bear Area Regional Wastewater Authority, the State of California Department of Transportation (Caltrans), the US Forest Service and the Big Bear Mountain Resorts. Initial TMDL development efforts were focused on nutrients, leading to Regional Board adoption of a nutrient TMDL for dry hydrological conditions for Big Bear Lake in 2006. Nutrient TMDLs for wet and/or average hydrological conditions will be incorporated in the Basin Plan when these TMDLs are developed in the future. As shown in Table 6-1a-f, the development of these TMDLs is a requirement of the adopted TMDL implementation plan for the nutrient TMDL for dry hydrological conditions.

1. Big Bear Lake Nutrient Total Maximum Daily Loads (TMDLs)

Past studies, starting in 1968/1969, have shown that Big Bear Lake is moderately eutrophic and that the limiting nutrient is generally phosphorus. In Big Bear Lake, nutrients (nitrogen and phosphorus) are available in the water column and sediment and are taken up by aquatic macrophytes and algae. Nutrients are also bound in living and dead organic material, primarily macrophytes and algae. Decomposition of this organic material, as well as macrophyte and algal respiration, consumes dissolved oxygen, resulting in the depletion of dissolved oxygen from the water column. Oxygen depletion in the hypolimnion results in anoxic conditions, leading to periodic fish kills in Big Bear

Lake. Oxygen depletion also results in the release of nutrients from the sediment into the water column, promoting more algae and aquatic macrophyte production. Nutrients released by plant decomposition are cycled back into a bioavailable form.

Although aquatic macrophytes provide protection from shoreline erosion, habitat for fish and other aquatic biota and waterfowl habitat, excessive growth of noxious and nuisance species, particularly Eurasian watermilfoil (*Myriophyllum spicatum*) impairs recreational uses of the Lake and reduces plant and animal species and habitat diversity.

As stated above, development of nutrient TMDLs to address these problems was initiated in 2000. In this process, it was recognized that insufficient data for wet or average hydrological conditions were available to allow calibration of the lake water quality model used to calculate the TMDL. Accordingly, a TMDL was developed to address dry hydrologic conditions only (see Section 1.B., below). This TMDL was adopted by the Regional Board in 2006 and became effective on August 21, 2007. The implementation plan included with this TMDL specifies a requirement for the development of nutrient TMDLs for wet and/or average hydrological conditions.

A key step in the development of the nutrient TMDL was the identification of the numeric targets to be achieved. The numeric targets, identified in Section 1.A., below, do not vary based upon hydrological condition. Like the approved TMDL for dry hydrological conditions, the TMDLs for wet and/or average hydrological conditions that will be developed are expected to assure also that these numeric targets are achieved. Indeed, since the TMDL for dry hydrological conditions was developed to meet the targets under the critical, worst-case conditions, consistent compliance with these targets is expected to be achieved even in the absence of TMDLs for wet/average hydrological conditions, given the greater lake volume and dilution anticipated under wetter conditions. It is recognized that future modifications to the targets may be found necessary.

1. A. Numeric Targets

As shown in Table 6-1a-c, both “causal and response” numeric targets are specified for Big Bear Lake. The causal target is for phosphorus. Phosphorus is the primary limiting nutrient in Big Bear Lake⁶⁹ Response targets include macrophyte coverage, percentage of nuisance aquatic vascular plant species and chlorophyll *a* concentration. These response targets are more direct indicators of impairment and are specified to assess and track water quality improvements in Big Bear Lake. A weight of evidence approach will be used to assess compliance with the TMDL, which means that data pertaining to all the numeric targets will be evaluated and

¹There is evidence that nitrogen is a limiting nutrient under certain conditions. However, given data and analytical limitations, no nitrogen targets are specified. Nitrogen monitoring is required as part of this TMDL. The data will be used to specify nitrogen targets in the future, as warranted.

non-compliance with one target will not automatically imply non-compliance with the TMDL.

**Table 6-1a-c
Big Bear Lake Nutrient TMDL Numeric Targets^a**

Indicator	Target Value
Total P concentration	Annual average ^b no greater than 35 µg/L; to be attained no later than 2015 (dry hydrological conditions), 2020 (all other times) ^c
Macrophyte Coverage	30-40% on a total lake area basis; to be attained by 2015 (dry hydrological conditions), 2020 (all other times) ^{c, d}
Percentage of Nuisance Aquatic Vascular Plant Species	95% eradication on a total area basis of Eurasian Watermilfoil and any other invasive aquatic plant species; to be attained no later than 2015 (dry hydrological conditions), 2020 (all other times) ^{c, d}
Chlorophyll a concentration	Growing season ^e average no greater than 14 µg/L; to be attained no later than 2015 (dry hydrological conditions), 2020 (all other times) ^c

- ^a Compliance with the targets to be achieved as soon as possible, but no later than the date specified
- ^b Annual average determined by the following methodology: the nutrient data from both the photic composite and discrete bottom samples are averaged by station number and month; a calendar year average is obtained for each sampling location by averaging the average of each month; and finally, the separate annual averages for each location are averaged to determine the lake-wide average. The open-water sampling locations used to determine the annual average are MWDL1, MWDL2, MWDL6, and MWDL9 (see 1.B.4. Implementation, Task 4.2, Table 6-1a-i).
- ^c Compliance date for wet and/or average hydrological conditions may change in response to approved TMDLs for wet/average hydrological conditions.
- ^d Calculated as a 5-yr running average based on measurements taken at peak macrophyte growth as determined in the Aquatic Plant Management Plan (see 1.B.4. Implementation, Task 6C)
- ^e Growing season is the period from May 1 through October 31 of each year. The open-water sampling locations used to determine the growing season average are MWDL1, MWDL2, MWDL6 and MWDL9 (see 1.B.4. Implementation, Task 4.2, Table 6-1a-i). The chlorophyll a data from the photic samples are averaged by station number and month; a growing season average is obtained for each sampling location by averaging the average of each month; and finally, the separate growing season averages for each location are averaged to determine the lake-wide average.

1.B. Big Bear Lake Nutrient Total Maximum Daily Load (TMDL) for Dry Hydrological Conditions

The TMDL technical report [Ref. #26] describes in detail the technical basis for the TMDL for Dry Hydrological Conditions that follow.

1.B.1. Nutrient TMDL, WLAs and LAs and Compliance Dates – Dry Hydrological Conditions

A TMDL, and the WLAs and LAs necessary to achieve it, are established for total phosphorus for dry hydrological conditions only. As stated above, phosphorus and nitrogen are the nutrients that cause beneficial use impairment in Big Bear Lake. Dry hydrological conditions are defined by the conditions observed from 1999-2003; that is, average tributary inflow to Big Bear Lake ranging from 0 to 3,049 AF, average lake levels ranging from 6671 to 6735 feet and annual precipitation ranging from 0 to 23 inches. TMDLs, WLAs and LAs for wet and/or average hydrological conditions will be established as part of the TMDL Phase 2 activities once additional data have been collected (see 1.B.4. TMDL Implementation, Task 9).

The phosphorus TMDL for Big Bear Lake for dry hydrological conditions is shown in Table 6-1a-d. Wasteload allocations for point source discharges and load allocations for nonpoint source discharges are shown in Table 6-1a-e.

Table 6-1a-d

Big Bear Lake Nutrient TMDL for Dry Hydrological Conditions

	Total Phosphorus (lbs/yr)^b
TMDL ^a	26,012

^a Compliance to be achieved as soon as possible, but no later than December 31, 2015.

^b Specified as an annual average for dry hydrological conditions only.

Table 6-1a-e

**Big Bear Lake
Phosphorus Wasteload and Load Allocations for Dry Hydrological Conditions**

Big Bear Lake Nutrient TMDL for Dry Hydrological Conditions	Total Phosphorus Load Allocation (lbs/yr)^{a, b}
TMDL	26,012
WLA	475
Urban	475
LA	25,537
Internal Sediment	8,555
Internal macrophyte	15,700
Atmospheric Deposition	1,074
Forest	175
Resort	33

^a Allocation compliance to be achieved as soon as possible, but no later than December 31, 2015.

^b Specified as an annual average for dry hydrological conditions only.

1.B.2. Margin of Safety

The Big Bear Lake Nutrient TMDL for Dry Hydrological Conditions includes an implicit margin of safety (MOS) as follows:

1. The derivation of numeric targets based on the 25th percentile of nutrient data;
2. The use of conservative assumptions in modeling the response of Big Bear Lake to nutrient loads.

1. B.3. Seasonal Variations/Critical Conditions

The critical condition for attainment of aquatic life and recreational uses in Big Bear Lake occurs during the summer and during dry years, when nutrient releases from the sediment are greatest and water column concentrations increase. Macrophyte biomass peaks in the summer/early fall. Recreational uses of the lake are also highest during the summer. This nutrient TMDL for Big Bear Lake is focused on the critical dry hydrological conditions and, in particular, on the control of the internal sediment loads that dominate during these periods. This is the first phase of TMDLs needed to address eutrophication in Big Bear Lake. The next phase will include collection of data needed to refine the in-lake and watershed models (see 1.B.4. TMDL Implementation, Task 6A) and to

develop TMDLs that address other hydrological conditions (see 1.B.4. TMDL Implementation, Task 9). TMDLs for wet and average hydrological conditions will be developed to address external loading that contributes to the nutrient reservoir in the lake and thus eutrophic conditions, particularly during the critical dry periods. However, it is important to note again that since the TMDL for dry hydrological conditions was developed to meet the numeric targets under the critical, worst-case conditions, consistent compliance with these targets is expected to be achieved even in the absence of TMDLs for wet/average hydrological conditions, given the greater lake volume and dilution anticipated under wetter conditions.

The TMDL recognizes that different nutrient inflow and cycling processes dominate the lake during different seasons. These processes were simulated in the in-lake model using data collected during all seasons over a multi-year period. Thus, the model results reflect all seasonal variations. The phosphorus numeric target is expressed as an annual average, while the chlorophyll *a* numeric target is expressed as a growing season average. The intent is to set targets that will, when achieved, result in improvement of the trophic status of Big Bear Lake year-round.

Compliance with numeric targets will ensure water quality improvements that prevent excessive algae blooms and fish kills, particularly during the critical summer period when these problems are most likely to occur.

1.B.4. TMDL Implementation

Table 6-1a-f outlines the tasks and schedules to implement the TMDL for Dry Hydrological Conditions. Each of these tasks is described below.

Table 6-1a-f

**Big Bear Lake Nutrient TMDL Implementation
Plan/Schedule Report Due Dates**

Task	Description	Compliance Date-As soon As Possible but No Later Than
TMDL Phase 1		
Task 1	Establish New Waste Discharge Requirements for Nutrient Sources	February 29, 2008
Task 2	Establish New Waste Discharge Requirements for Lake Restoration Activities	February 28, 2009
Task 3	Revise Existing Waste Discharge Requirements	February 29, 2008

Task 4	Nutrient Water Quality Monitoring Program 4.1 Watershed-wide Nutrient Monitoring Plan(s) 4.2 Big Bear Lake Nutrient Monitoring Plan(s)	Plan/schedule due November 30, 2007. Annual reports due February 15
Task 5	Atmospheric Deposition Determination	Plan/schedule due August 31, 2008
Task 6	Big Bear Lake – Lake Management Plan, including: 6A. Big Bear Lake and Watershed Model Updates 6B. Big Bear Lake In-Lake Sediment Nutrient Reduction Plan 6C. Big Bear Lake Aquatic Plant Management Plan	Plan/schedule due August 31, 2008. Annual reports due February 15
TMDL Phase 2		
Task 7	Review/Revision of Big Bear Lake Water Quality Standards 7.1 Review/Revise Nutrient Water Quality Objectives 7.2 Development of biocriteria 7.3 Development of natural background definition	December 31, 2015
Task 8	Review Big Bear Lake Tributary Data	December 31, 2008
Task 9	Develop TMDLs, WLAs and LAs for wet and/or average hydrological conditions	December 31, 2012
Task 10	Review of TMDL/WLAs/LAs	Once every three years

Task 1: Establish New Waste Discharge Requirements for Nutrient Sources

On or before February 29, 2008, the Regional Board shall issue the following new waste discharge requirements

- 1.1 Waste Discharge Requirements (WDRs) or Conditional Waiver of WDRs to the US Forest Service to incorporate the nutrient load allocations, compliance schedule and monitoring and reporting requirements for Forested Areas.

Other nutrient discharges will be addressed and permitted as appropriate.

Task 2: Establish New Waste Discharge Requirements for Lake Restoration Activities

On or before February 28, 2009, the Regional Board shall issue the following new waste discharge requirements:

NPDES Permit to the US Forest Service, the State of California, Department of Transportation (Caltrans), the County of San Bernardino, San Bernardino County

Flood Control District, the City of Big Bear Lake, and Big Bear Mountain Resorts for Lake restoration activities, including, but not limited to alum treatment and/or herbicide treatment. Requirements specified in these Waste Discharge Requirements, shall be developed using the Aquatic Plant Management Plan and Schedule submitted pursuant to Task 6C.

Task 3: Review and/or Revise Existing Waste Discharge Requirements

Waste Discharge Requirements (WDRs) have been issued by the Regional Board regulating discharge of various types of wastes in the Big Bear Lake watershed. On or before February 29, 2008, these WDRs shall be reviewed and revised as necessary to incorporate the nutrient wasteload allocations, compliance schedule and TMDL monitoring and reporting requirements.

- 3.1 Waste Discharge Requirements for the San Bernardino County Flood Control and Transportation District, the County of San Bernardino and the Incorporated Cities of San Bernardino County within the Santa Ana Region, Areawide Urban Runoff, NPDES No. CAS 618036 (Regional Board Order No. R8-2002-0012).

The current Order has provisions to address TMDL issues. In light of these provisions, revision of the Order may not be necessary to address TMDL requirements.

- 3.2 State of California, Department of Transportation (Caltrans) Stormwater Permit

Provision E.1 of Order No. 99-06-DWQ requires Caltrans to maintain and implement a Storm Water Management Plan (SWMP). Annual updates of the SWMP needed to maintain an effective program are required to be submitted to the State Water Resources Control Board.

Provision E.2 of Order No. 99-06-DWQ requires Caltrans to submit a Regional Workplan by April 1 of each year for the Executive Officer's approval. As part of the annual update of the SWMP and Regional Workplan, Caltrans shall submit plans and schedules for conducting the monitoring and reporting requirements specified in Task 4 and the special studies required in Task 6.

Task 4: Monitoring

- 4.1 Watershed-wide Nutrient Water Quality Monitoring Program

No later than November 30, 2007, the US Forest Service, the State of California, Department of Transportation (Caltrans), the County of San Bernardino, San Bernardino County Flood Control District, the City of Big Bear Lake and Big Bear Mountain Resorts shall, as a group, submit to the Regional Board for approval a proposed watershed-wide nutrient monitoring program that will provide data necessary to review and update the Big Bear Lake Nutrient TMDL, to determine specific sources of nutrients and to develop TMDLs for other hydrological conditions.

Data to be collected and analyzed shall address, at a minimum, determination of compliance with the phosphorus dry condition TMDL, including the WLAs and LAs, and with the existing total inorganic nitrogen (TIN) objective.

At a minimum, the proposed plan shall include the collection of samples at the stations specified in Table 6-1a-g and shown in Figure 6-3, at the frequency specified in Table 6-1a-h. Modifications to the required sampling stations, sampling frequencies and constituents to be monitored (see below) will be considered upon request by the stakeholders, accompanied by a report that describes the rationale for the proposed changes and identifies recommended alternatives. In addition to water quality samples, every two weeks on a year-round basis, visual monitoring (including documenting flow type and stage) determinations shall be made at all stations shown in Table 6-1a-g. Flow measurements will be required each time water quality samples are obtained.

At a minimum, samples shall be analyzed for the following constituents:

- Total nitrogen
- Nitrate + nitrite nitrogen
- Total phosphorus
- Total dissolved phosphorus
- Suspended sediment concentration
- Chlorophyll a
- Dissolved oxygen
- Alkalinity
- Bedload concentration
- Total nitrogen in sediment
- Ammonia nitrogen
- Total dissolved nitrogen
- Ortho-phosphate (SRP)
- Temperature
- Turbidity
- pH
- Conductivity
- Hardness
- Grain size
- Total phosphorus in sediment

Note: Chlorophyll a to be collected and analyzed only from May 1- October 31 of each year at the frequencies described in Table 6-1a-h; chlorophyll a sampling not required at Bear Creek outlet.

In addition, the proposed plan shall include a proposed plan and schedule for development of a Big Bear Lake Sedimentation Processes Plan for the determination of nutrient loads associated with sediment. At a minimum, the proposed plan shall include the placement of sediment traps at the mouths of Rathbun, Knickerbocker, Grout and Boulder Creeks to determine the rate of influx of sediment and particulate nutrients to Big Bear Lake, as specified in Table 6-1a-g and shown in Figure 6-3, at the specified frequency indicated in Table 6-1a-h. Modifications to the required sampling stations, sampling frequencies and constituents to be monitored will be considered upon request by the stakeholders, accompanied by a report that describes the rationale for the proposed changes and identifies recommended alternatives. The proposed monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL/WLAs/LAs shall be submitted by February 15 of each year.

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. Any such individual or group monitoring plan is due no later than November 30, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s) shall be submitted by February 15 of each year. The report shall summarize the data and evaluate compliance with the TMDL/WLAs/LAs.

**Table 6-1a-g
Big Bear Lake Watershed
Minimum Required Sampling Station Locations**

Station Number	Station Description
MWDC2	Bear Creek Outlet
MWDC3	Grout Creek at Hwy 38
MWDC4	Rathbun Creek at Sandalwood Ave.
MWDC5	Summit Creek at Swan Dr.
MWDC6	Rathbun Creek below the Zoo
MWDC8	Knickerbocker Creek at Hwy 18
MWDC13	Boulder Creek at Hwy 18

Note: Bear Creek outlet to be sampled monthly from March –November. At a minimum, samples shall be analyzed at the frequencies specified in Table 5-9a-h:

**Table 6-1a-h
Big Bear Lake Watershed
Sampling Frequency**

Flow type	Months monitoring is required	Frequency
Baseflow	January 1 – December 31	Once/month when baseflow is present;
Snowmelt	January 1 – May 31 ¹	Varied -See note 2 below
Storm events	January 1 – December 31	3 storms per year ³

¹ Sampling to begin after the first substantial snowfall resulting in an accumulation of 1.0 inch or more of snow

² Samples to be collected daily for the first three days of the snowmelt period. If ambient air temperatures remain above freezing after three days have passed, snowmelt sampling will then be performed once a week for the following three weeks or until the snowmelt period ceases. Snowmelt cessation will be determined by one of the following: a) ambient air temperatures drop below freezing during most of the day; or b) a storm/rain precipitation event occurs after the snowmelt event was initiated. Beginning March 15th of each year, snowmelt flows will most likely be continuous since ambient air temperatures will usually remain above freezing. From March 15th through May 31 of each year, snowmelt sampling events will be conducted daily for the first two days of a snowmelt event and then once a week thereafter until the spring runoff period has ended or the tributary station location shows no signs of daily flows for one week. Flow status will be evaluated in the afternoon, when ambient air temperatures are highest and flow potential is greatest.

³ Two storm events to be sampled during October – March; 1 storm event to be sampled during April – September. For each storm event, eight samples across the hydrograph are to be collected.

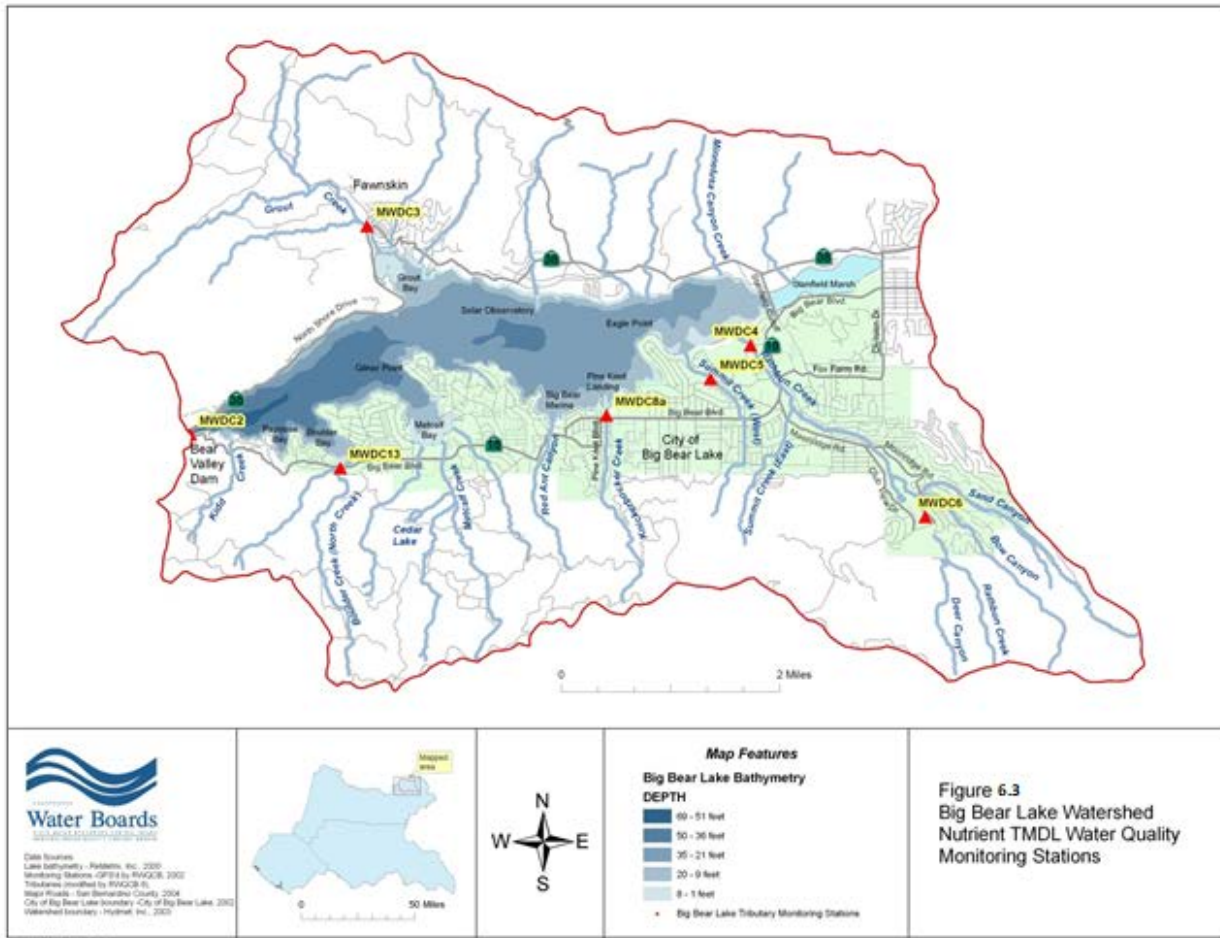


Figure 6-3 Big Bear Lake Watershed Nutrient TMDL Water Quality Stations

4.2 Big Bear Lake: In-Lake Nutrient Monitoring Program

No later than November 30, 2007, the US Forest Service, the State of California, Department of Transportation (Caltrans), the County of San Bernardino, San Bernardino County Flood Control District, the City of Big Bear Lake, and Big Bear Mountain Resorts shall, as a group, submit to the Regional Board for approval a proposed Big Bear Lake nutrient monitoring program that will provide data necessary to review and update the Big Bear Lake Nutrient TMDL, and to develop TMDLs for other hydrological conditions. Data to be collected and analyzed shall address, at a minimum: (1) determination of compliance with phosphorus and chlorophyll *a* numeric targets; (2) determination of compliance with the existing total inorganic nitrogen (TIN) objective; and (3) refinement of the in-lake model for the purposes of TMDL review and development.

At a minimum, the proposed plan shall include the collection of samples at the stations specified in Table 6-1a-i and shown in Figure 6-4, at the specified frequency indicated in Table 6-1a-i. Modifications to the required sampling stations, sampling

frequencies and constituents to be monitored (see below) will be considered upon request by the stakeholders, accompanied by a report that describes the rationale for the proposed changes and identifies recommended alternatives. With the exception of hardness, alkalinity, total organic carbon (TOC), dissolved organic carbon (DOC), and chlorophyll *a*, each sample to be analyzed shall be collected as a photic zone composite (from the surface to 2 times the secchi depth) and as a bottom discrete (0.5 meters off the surface bottom) sample. Hardness, alkalinity, TOC, DOC, and chlorophyll *a* shall be collected as photic zone composites. Dissolved oxygen, water temperature, turbidity, specific conductance, and pH shall be measured at 1-meter intervals from the surface to 0.5 meters from the bottom using a multi-parameter water quality meter. Water clarity shall be measured with a secchi disk.

At a minimum, in-lake samples must be analyzed for the following constituents:

- Specific conductance
- Water temperature
- Chlorophyll *a*
- Total nitrogen
- Nitrate +nitrite nitrogen
- Total phosphorus
- Total hardness
- Total dissolved phosphorus
- Dissolved organic carbon(DOC)
- Total dissolved nitrogen
- Dissolved oxygen
- Water clarity (secchi depth)
- Ammonia nitrogen
- Alkalinity
- Turbidity
- Ortho-phosphate (SRP)
- Total suspended solids (TSS)
- pH
- Total dissolved solids (TDS)
- Total organic carbon (TOC)

The monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL/WLAs/LAs and numeric targets shall be submitted by February 15 of each year.

**Table 6-1a-i
Big Bear Lake Required Sampling Station Locations**

Station Number	Station Description
MWDL1	Big Bear Lake – Dam
MWDL2	Big Bear Lake – Gilner Point
MWDL6	Big Bear Lake – Mid Lake Middle
MWDL9	Big Bear Lake – Stanfield Middle

Frequency of sampling at all stations: for all constituents except TOC and DOC, monthly from March – November; bi-weekly (i.e., every other week) from June 1 through October 31. TOC and DOC to be monitored four times per year (quarterly) from January through December.

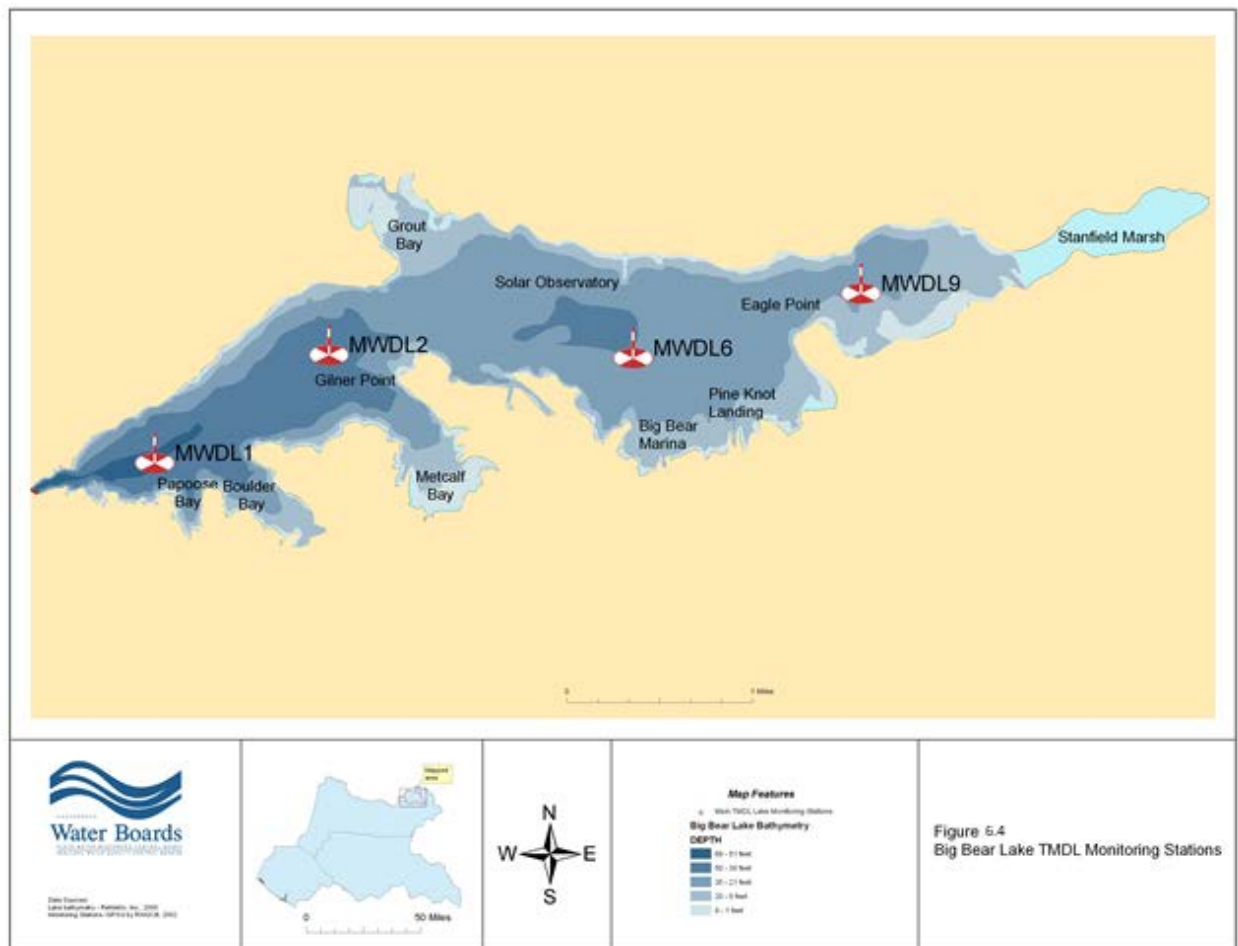


Figure 6-4 Big Bear Lake TMDL Monitoring Stations

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional TMDLs

6-130

January 24, 1995
Updated June 2019 to
include approved amendments

Board approval. Any such individual or group monitoring plan is due no later than November 30, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s), shall be submitted by February 15 of each year. The report shall summarize the data and evaluate compliance with the TMDL/WLAs/LAs and numeric targets.

Task 5: Atmospheric Deposition Determination

No later than August 31, 2008, the Regional Board, in coordination with local stakeholders, the South Coast Air Quality Management District and the California Air Resources Board, shall develop a plan and schedule for quantifying atmospheric deposition of nutrients in the Big Bear Lake watershed.

Task 6: Big Bear Lake-Lake Management Plan

No later than August 31, 2008, the US Forest Service, the State of California, Department of Transportation (Caltrans), the County of San Bernardino, San Bernardino County Flood Control District, the City of Big Bear Lake, and Big Bear Mountain Resorts, shall, as a group, submit to the Regional Board for approval a proposed Lake Management Plan for Big Bear Lake. The purpose of the plan is to identify a coordinated and comprehensive strategy for management of the lake and surrounding watershed to address restoration and protection of the lake's beneficial uses. The plan shall include the following:

- A) A proposed plan and schedule for updating the existing Big Bear Lake watershed nutrient model and the Big Bear Lake in-lake nutrient model. The plan and schedule must take into consideration additional data and information that are or will be generated from the required TMDL monitoring programs (Tasks 4.1 and 4.2, above).
- B) A proposed plan and schedule for in-lake sediment nutrient reduction for Big Bear Lake. The proposed plan shall include an evaluation of the applicability of various in-lake treatment technologies to support development of a long-term strategy for control of nutrients from the sediment. The submittal shall also contain a proposed sediment nutrient monitoring program to evaluate the effectiveness of any strategies implemented.
- C) The proposed plan shall include an evaluation of the applicability of various in-lake treatment technologies to control noxious and nuisance aquatic plants. The plan shall also include a description of the monitoring conducted and proposed to track aquatic plant diversity, coverage, and biomass. Data to be collected and analyzed shall address, at a minimum, determination of compliance with the numeric targets for macrophyte coverage and percentage of nuisance aquatic vascular plant species (see 1.A., above).

In addition, at a minimum, the proposed plan shall also address the following:

- The plan shall be based on identified and acceptable goals for lake capacity, biological resources and recreational opportunities. Acceptable goals shall be identified in coordination with the Regional Board and other responsible agencies, including the California Department of Fish and Game and the U.S. Fish and Wildlife Services.
- The plan shall include a proposed plan and schedule for the development of biocriteria for Big Bear Lake (This is intended to complement Regional Board efforts to develop biocriteria and to signal the parties' commitment to participate substantively.)
- The plan must identify a scientifically defensible methodology for measuring changes in the capacity of the lake.
- The proposed plan shall identify recommended short and long-term strategies for control and management of sediment and dissolved and particulate nutrient inputs to the lake.
- The plan shall also integrate the beneficial use survey information required to be developed pursuant to the Regional Board's March 3, 2005, Clean Water Act Section 401 Water Quality Standards Certification for Big Bear Lake Nutrient/Sediment Remediation Project, City of Big Bear, County of San Bernardino, California. The purpose of the beneficial use survey is to correlate beneficial uses of the lake with lake bottom contours. The survey is required to be conducted throughout the lake. The survey will determine the location and the quality of beneficial uses of the lake and the contours of the lake bottom where these uses occur. The survey is expected to be used in regulating future lake dredge projects to maximize the restoration and protection of the lake's beneficial uses.

The Big Bear Lake – Lake Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting. Once approved, the plan shall be reviewed and revised as necessary at least once every three years. The review and revision shall take into account assessments of the efficacy of control/management strategies implemented and relevant requirements of new or revised TMDLs for Big Bear Lake and its watershed. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL/WLAs/LAs and numeric targets shall be submitted by February 15 of each year.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group Big Bear Lake – Lake Management Plan and schedule for approval by the Regional Board. Any such individual or group plan must conform to the requirements specified above and is due no later than August 31, 2008. An individual

or group plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL/WLAs/LAs and numeric targets shall be submitted by February 15 of each year.

Task 7: Review and Revision of Big Bear Lake Water Quality Standards

By December 31, 2015, the Regional Board shall:

- 7.1 Review/revise as necessary the total inorganic nitrogen and total phosphorus numeric water quality objectives for Big Bear Lake. The Regional Board shall also consider the development of narrative or numeric objectives for other indicators of impairment (e.g., chlorophyll a, macrophyte coverage and species composition), in lieu of or in addition to review/revision of the numeric objectives for phosphorus and nitrogen.
- 7.2 Develop biocriteria for Big Bear Lake.
- 7.3 Develop a definition for natural background sources of nutrients (and other constituents) to Big Bear Lake and its tributaries.

Given budgetary constraints, completion of these tasks are likely to require substantive contributions from interested parties.

Task 8: Review of Big Bear Lake Tributary Data

No later than December 2008, the Regional Board shall review data collected on Rathbun Creek, Summit Creek and Grout Creek to determine whether beneficial uses of these tributaries are impaired by nutrients. If the Creeks are found to be impaired by nutrients, the Regional Board shall develop a TMDL development project plan and schedule. If these tributaries are found not to be impaired by nutrients, Regional Board shall schedule the delisting of the tributaries from the 303(d) list of impaired waters at the earliest opportunity.

Task 9: Development of TMDLs for Wet and/or Average Hydrological Conditions

No later than December 31, 2012, the Regional Board shall utilize additional water quality data and information collected pursuant to monitoring program requirements (Tasks 4 and 5) and model updates (Task 6A) to develop proposed nutrient TMDLs for Big Bear Lake for wet and/or average hydrological conditions. Completion of this task is contingent on the collection of requisite data for wet and/or average hydrological conditions.

Task 10: Review/Revision of the Big Bear Lake Nutrient TMDL for Dry Hydrological Conditions (TMDL “Re-opener”)

The basis for the TMDL for Dry Hydrological Conditions, the implementation plan and

schedule will be re-evaluated at least once every three years⁷⁰ to determine the need for modifying the allocations, numeric targets and TMDL. Regional Board staff will continue to review all data and information generated pursuant to the TMDL requirements on an ongoing basis. Based on results generated through the monitoring programs, special studies and/or modeling analyses, changes to the TMDL may be warranted. Such changes will be considered through the Basin Plan Amendment process.

The Regional Board is committed to the review of this TMDL every three years, or more frequently if warranted by these or other studies.

(End of Amendment adopted under Resolution No. R8-2006-0023)

Lake Elsinore/San Jacinto River Watershed (The following was added under Resolution No. R8-2004-0037)

The Lake Elsinore/San Jacinto River Watershed is located in Riverside County and includes the following major waterbodies: Lake Hemet, San Jacinto River, Salt Creek, Canyon Lake and Lake Elsinore. The total drainage area of the San Jacinto River watershed is approximately 782 square miles. Over 90 percent of the watershed (735 square miles) drains into Canyon Lake. Lake Elsinore is the terminus of the San Jacinto River watershed. The local tributary area to Lake Elsinore, consisting of drainage from the Santa Ana Mountains and the City of Lake Elsinore, is 47 square miles.

Land use in the watershed includes open/forested, agricultural (including concentrated animal feeding operations such as dairies and chicken ranches, and irrigated cropland), and urban uses, including residential, industrial and commercial. Vacant/open space is being converted to residential uses as the population in the area expands. The municipalities in the watershed include the cities of San Jacinto, Hemet, Perris, Canyon Lake, Lake Elsinore and portions of Moreno Valley and Beaumont.

1. Lake Elsinore and Canyon Lake Nutrient Total Maximum Daily Load (TMDL)

Lake Elsinore and Canyon Lake are not attaining water quality standards due to excessive nutrients (nitrogen and phosphorus). Reports prepared by Regional Board staff describe the impact nutrient discharges have on the beneficial uses of Lake Elsinore and Canyon Lake [Ref. #27,28] Lake Elsinore was formed in a geologically active graben area and has been in existence for thousands of years. Due to the Mediterranean climate and watershed hydrology, fluctuations in the level of Lake Elsinore have been extreme, with alternate periods of a dry lake bed and extreme flooding. These drought/flood cycles have a great impact on lake water quality. Fish kills and excessive algae blooms have been reported in Lake Elsinore since the early 20th century. As a result, in 1994, the Regional Board placed Lake Elsinore on the 303(d) list of impaired waters due to excessive levels of nutrients and organic enrichment/low dissolved oxygen.

⁷⁰ The three-year schedule is tied to the 3-year triennial review schedule.

Canyon Lake, located approximately 5 miles upstream of Lake Elsinore, was formed by the construction of Railroad Canyon Dam in 1928. Approximately 735 square miles of the 782-square mile San Jacinto River watershed drain to Canyon Lake. During most years, runoff from the watershed terminates at Canyon Lake without reaching Lake Elsinore, resulting in the buildup of nutrients in Canyon Lake. While Canyon Lake does not have as severe an eutrophication problem as Lake Elsinore, there have been periods of algal blooms and anecdotal reports of occasional fish kills. Accordingly, in 1998, the Regional Board added Canyon Lake to the 303(d) list of impaired waters due to excessive levels of nutrients.

A TMDL technical report prepared by Regional Board staff describes the nutrient related problems in Canyon Lake and Lake Elsinore in greater detail and discusses the technical basis for the TMDLs that follow [Ref. # 29].

A. Lake Elsinore and Canyon Lake Nutrient TMDL Numeric Targets

Numeric targets for Lake Elsinore and Canyon Lake are based on reference conditions when beneficial uses in the lakes were not significantly impacted by nutrients. Table 6-1n shows both “causal” and “response” interim and final numeric targets for both lakes. Causal targets are those for phosphorus and nitrogen. Phosphorus and nitrogen are the primary limiting nutrients in Lake Elsinore and Canyon Lake, respectively. However, under certain conditions, nitrogen may be limiting in Lake Elsinore and phosphorus may be limiting in Canyon Lake. Targets for both nutrients are therefore necessary. Reduction in nitrogen inputs will be necessary over the long-term and only final targets are specified. Response targets include chlorophyll *a* and dissolved oxygen. These targets are specified to assess water quality improvements in the lakes. Finally, ammonia targets are specified to prevent un-ionized ammonia toxicity to aquatic life.

Table 6-1n Lake Elsinore and Canyon Lake Nutrient TMDL Numeric Targets*

Indicator	Lake Elsinore	Canyon Lake
Total P concentration (Final)	Annual average no greater than 0.1 mg/L; to be attained no later than 2020	Annual average no greater than 0.1 mg/L; to be attained no later than 2020
Total N concentration (Final)	Annual average no greater than 0.75 mg/L; to be attained no later than 2020	Annual average no greater than 0.75 mg/L; to be attained no later than 2020
Ammonia nitrogen concentration (Final) [Ref. #4]	<p>Calculated concentrations to be attained no later than 2020</p> <p>Acute: 1-hour average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CMC (acute criteria), where $CMC = 0.411 / (1 + 10^{7.204 - pH}) + 58.4 / (1 + 10^{pH - 7.204})$</p> <p>Chronic: thirty-day average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CCC (chronic criteria) $CCC = (0.0577 / (1 + 10^{7.688 - pH}) + 2.487 / (1 + 10^{pH - 7.688})) * \min(2.85, 1.45 * 10^{0.028(25 - T)})$</p>	<p>Calculated concentrations to be attained no later than 2020</p> <p>Acute: 1-hour average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CMC (acute criteria), where $CMC = 0.411 / (1 + 10^{7.204 - pH}) + 58.4 / (1 + 10^{pH - 7.204})$</p> <p>Chronic: thirty-day average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CCC (chronic criteria) $CCC = (0.0577 / (1 + 10^{7.688 - pH}) + 2.487 / (1 + 10^{pH - 7.688})) * \min(2.85, 1.45 * 10^{0.028(25 - T)})$</p>
Chlorophyll a concentration (Interim)	Summer average no greater than 40 ug/L; to be attained no later than 2015	Annual average no greater than 40 ug/L; to be attained no later than 2015
Chlorophyll a concentration (Final)	Summer average no greater than 25 ug/L; to be attained no later than 2020	Annual average no greater than 25 ug/L; to be attained no later than 2020
Dissolved oxygen concentration (Interim)	Depth average no less than 5 mg/L; to be attained no later than 2015	Minimum of 5 mg/L above thermocline; to be attained no later than 2015
Dissolved oxygen concentration (Final)	No less than 5 mg/L 1 meter above lake bottom; to be attained no later than 2020	Daily average in hypolimnion no less than 5 mg/L; to be attained no later than 2020.

* compliance with targets to be achieved as soon as possible, but no later than the date specified

B. Lake Elsinore and Canyon Lake Nutrient TMDLs, Wasteload Allocations, Load Allocations and Compliance Dates

As discussed in the technical TMDL report, nutrient loading to Canyon Lake and Lake Elsinore varies depending on the hydrologic conditions that occur in the San Jacinto watershed. As part of the TMDL analysis and development, three hydrologic scenarios and the relative frequency of each of these conditions (based upon an 87-year record of flow data at the USGS Gauging station downstream of Canyon Lake), were identified as shown in Table 6-1o. The resulting TMDLs, wasteload allocations and load allocations

are based on 10-year running flow weighted average nutrient loads, taking into account the frequency of the three hydrologic conditions and the nutrient loads associated with each of them. Phosphorus and nitrogen TMDLs for Canyon Lake and Lake Elsinore are shown in Table 6-1p. The TMDLs, expressed as 10-year running averages, will implement the numeric targets and thereby attain water quality standards. Phosphorus and nitrogen wasteload allocations for point source discharges and load allocations for nonpoint source discharges, also expressed as 10-year running averages, are shown in Tables 6-1q and 6-1r. No TMDLs, wasteload allocations or load allocations are specified for chlorophyll a, dissolved oxygen or ammonia. Chlorophyll a and dissolved oxygen targets are intended to serve as measures of the effectiveness of phosphorus and nitrogen reductions implemented to meet TMDL requirements. Until ammonia transformations, and nitrogen dynamics in general, are better understood, no ammonia TMDLs, wasteload allocations or load allocations are specified.

Table 6-1o
San Jacinto River Hydrologic Conditions with Relative Flow Frequency at the USGS Gauging Station Downstream of Canyon Lake (Station No. 1170500)

Hydrologic Condition	Representative Water Year	Years of Hydrologic Condition	Relative Frequency (%)	Description
Wet	1998	14	16	Both Canyon Lake and Mystic Lake overflow; flow at the USGS gauging station 11070500 17,000 AF or greater
Moderate	1994	36	41	No Mystic Lake overflow; Canyon Lake overflowed; flow at the USGS gauging station 11070500 less than 17,000 AF and greater than 2,485 AF
Dry	2000	37	43	No overflows from Mystic Lake or Canyon Lake; flow at the USGS gauging station 11070500 371 AF or less

Table 6-1p

Nutrient TMDLs and Compliance Dates for Lake Elsinore and Canyon Lake

TMDL	Final Total Phosphorus TMDL (kg/yr)^{a, b}	Final Total Nitrogen TMDL (kg/yr)^{a, b}
Canyon Lake	8,691	37,735
Lake Elsinore	28,584	239,025

^a Final compliance to be achieved as soon as possible, but no later than December 31, 2020.

^b TMDL specified as 10-year running average.

Table 6-1q

**Canyon Lake
Nitrogen and Phosphorus Wasteload and Load Allocations^a**

Canyon Lake Nutrient TMDL	Final Total Phosphorus Load Allocation (kg/yr)^{b, c}	Final Total Nitrogen Load Allocation (kg/yr)^{b, c}
TMDL	8,691	37,735
WLA	486	6,248
Supplemental water	48	366
Urban	306	3,974
CAFO	132	1,908
LA	8,205	31,487
Internal Sediment	4,625	13,549
Atmospheric Deposition	221	1,918
Agriculture	1,183	7,583
Open/Forest	2,037	3,587
Septic systems	139	4,850

^a The TMDL allocations for Canyon Lake apply to those land uses located upstream of Canyon Lake.

^b Final allocation compliance to be achieved as soon as possible, but no later than December 31, 2020.

^c TMDL and allocations specified as 10-year running average.

Table 6-1r

**Lake Elsinore
Nitrogen and Phosphorus Wasteload and Load Allocations^a**

Lake Elsinore Nutrient TMDL	Final Total Phosphorus Load Allocation (kg/yr)^{b, c}	Final Total Nitrogen Load Allocation (kg/yr)^{c, d}
TMDL	28,584	239,025
WLA	3,845	7,791
Supplemental water ^d	3,721	7,442
Urban	124	349
CAFO	0	0
LA	21,969	210,461
Internal Sediment	21,554	197,370
Atmospheric Deposition	108	11,702
Agriculture	60	213
Open/Forest	178	567
Septic systems	69	608
CL Watershed ^e	2,770	20,774

^a The Lake Elsinore TMDL allocations for urban, agriculture open/forest, septic systems and CAFOs only apply to those land uses located downstream of Canyon Lake.

^b Final allocation compliance to be achieved as soon as possible, but no later than December 31, 2020.

^c TMDL and allocations specified as 10-year running average.

^d WLA for supplemental water should met as soon as possible as a 5 year running average.

^e Allocation for Canyon Lake overflows

The TMDL distributes the portions of the waterbody’s assimilative capacity to various pollution sources so that the waterbody achieves its water quality standards. The Regional Board supports the trading of pollutant allocations among sources, where appropriate. Trading can take place between point/point, point/nonpoint, and nonpoint/nonpoint pollutant sources. Optimizing alternative point and nonpoint control strategies through allocation tradeoffs may be a cost-effective way to achieve pollution reduction benefits. (See Section E. TMDL Implementation, Task 11, below).

C. Margin of Safety

The Canyon Lake and Lake Elsinore Nutrient TMDLs include an implicit margin of safety (MOS) as follows:

- the derivation of numeric targets based on the 25th percentile of data for Lake Elsinore; Canyon Lake numeric targets to be consistent with the Lake Elsinore targets;
- the use of multiple numeric targets to measure attainment of beneficial uses and thereby assure TMDL efficacy;
- the use of conservative literature values in the absence of site-specific data for source loading rates in the watershed nutrient model;
- the use of conservative assumptions in modeling the response of Lake Elsinore and Canyon Lake to nutrient loads; and
- requiring load reductions to be accomplished during hydrological conditions when model results indicate, in some instances, that theoretical loads could be higher.

D. Seasonal Variations/Critical Conditions

The Canyon Lake and Lake Elsinore Nutrient TMDLs account for seasonal and annual variations in external and internal nutrient loading and associated impacts on beneficial uses by the use of a 10-year running average allocation approach. This 10-year running average approach addresses variation in hydrologic conditions (wet, moderate and dry) that can dramatically affect both nutrient loading and lake response.

Compliance with numeric targets will ensure water quality improvements that prevent excessive algae blooms and fish kills, particularly during the critical summer period when these problems are most likely to occur.

E. TMDL Implementation

Typically, under dry and moderate conditions, the internal nutrient loading drives the nutrient dynamics in both Canyon Lake and Lake Elsinore. However, it is the extreme (albeit infrequent) loading that occurs during wet conditions that provides the nutrients to the lakes that remain in the lakes as internal nutrient sources in subsequent years. Given the complexity of the San Jacinto River watershed hydrology, control of nutrients input to the lakes is needed for all hydrologic conditions. Collection of additional monitoring data is critical to developing long-term solutions for nutrient control. With that in mind, the submittal of plans and schedules to implement the TMDLs should take into consideration the need to develop and implement effective short-term solutions, as well as allow for the development of long-term solutions once additional data have been generated.

Implementation of tasks and schedules as specified in Table 6-1s is expected to achieve compliance with water quality standards. Each of these tasks is described below.

Table 6-1s
Lake Elsinore and Canyon Lake Nutrient TMDL Implementation
Plan/Schedule Report Due Dates

Task	Description	Compliance Date-As soon As Possible but No Later Than
TMDL Phase 1		
1	Establish New Waste Discharge Requirements	March 31, 2006
2	Revise Existing Waste Discharge Permits	March 31, 2006
3	Identify Agricultural Operators	October 31, 2005
4	Nutrient Water Quality Monitoring Program 4.1 Watershed-wide Nutrient Monitoring Plan(s) 4.2 Lake Elsinore Nutrient Monitoring Plan(s) 4.3 Canyon Lake Nutrient Monitoring Plan(s)	<ul style="list-style-type: none"> • Initial plan/schedule due December 31, 2005 • Annual reports due August 15 • Revised plan/schedule due December 31, 2006
5	Agricultural Discharges – Nutrient Management Plan	Plan/schedule due September 30, 2007
6	On-site Disposal Systems (Septic Systems) Management Plan	Dependent on State Board approval of relevant regulations (see text).
7	Urban Discharges 7.1 Revision of Drainage Area Management Plan (DAMP) 7.2 Revision of the Water Quality Management Plan (WQMP) 7.3 Update of the Caltrans Stormwater Management Plan and Regional Plan 7.4 Update of US Air Force, March Air Reserve Base SWPPP	Plan/schedule due: 7.1 August 1, 2006 7.2 August 1, 2006 7.3 April 1, 2006 7.4 Dependent on Task 3 results. See text.
8	Forest Area – Review/Revision of Forest Service Management Plans	Plan/schedule due September 30, 2007
9	Lake Elsinore In-Lake Sediment Nutrient Reduction Plan	Plan/schedule due March 31, 2007
10	Canyon Lake In-Lake Sediment Treatment Evaluation	Plan/schedule due March 31, 2007
11	Watershed and Canyon Lake and Lake Elsinore In-Lake Model Updates	Plan/schedule due March 31, 2007
12	Pollutant Trading Plan	Plan/schedule due September 30, 2007
13	Review and Revise Nutrient Water Quality Objectives	December 31, 2009
14	Review of TMDL/WLA/LA	Once every 3 years to coincide with the Regional Board's triennial review

Task 1: Establish New Waste Discharge Requirements

On or before March 31, 2006, the Regional Board shall issue new waste discharge requirements (NPDES permit) to Elsinore Valley Municipal Water District for supplemental water discharges to Canyon Lake that incorporate the appropriate interim and final wasteload allocations, compliance schedule and monitoring program requirements.

Other proposed nutrient discharges will be addressed and permitted as appropriate.

Task 2: Review and/or Revise Existing Waste Discharge Requirements

There are five Waste Discharge Requirements (WDRs) issued by the Regional Board regulating discharge of various types of wastes in the San Jacinto watershed. On or before March 31, 2006, each of these WDRs shall be reviewed and revised as necessary to implement the Lake Elsinore and Canyon Lake Nutrient TMDLs, including the appropriate nitrogen and phosphorus interim and final wasteload allocations, compliance schedules and/or monitoring program requirements.

- 2.1 Waste Discharge Requirements for the Riverside County Flood Control and Water Conservation District, the County of Riverside and the Incorporated Cities of Riverside County within the Santa Ana Region, Areawide Urban Runoff, NPDES No. CAS 618033 (Regional Board Order No. R8-2002-0011). The current Order has provisions to address TMDL issues (see Task 7.1, below). In light of these provisions, revision of the Order may not be necessary to address TMDL requirements.
- 2.2 Watershed-Wide Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with New Developments in the San Jacinto Watershed, Order No. 01-34, NPDES No. CAG 618005. It is expected that this Order will be rescinded once the Regional Board/Executive Officer approves a Water Quality Management WQMP) under Order No. R8-2002-0011 (see 2.1, above and Task 7.2, below)
- 2.3 General Waste Discharge Requirements for Concentrated Animal Feeding Operations (Dairies and Related Facilities) within the Santa Ana Region, NPDES No. CAG018001 (Regional Board Order No. 99-11).
- 2.4 Waste Discharge and Producer/User Reclamation Requirements for the Elsinore Valley Municipal Water District, Regional Water Reclamation Facility Riverside County, Order No. 00-1, NPDES No. CA8000027. Revised permit specifications will take into consideration the Lake Elsinore Recycled Water Pilot Project findings.

- 2.5 Waste Discharge Requirements for Eastern Municipal Water District, Regional Water Reclamation System, Riverside County, Order No. 99-5, NPDES No. CA8000188¹. Revised permit specifications will take into consideration the Lake Elsinore Recycled Water Pilot Project findings.
- 2.6 Waste Discharge Requirements for US Air Force, March Air Reserve Base, Storm Water Runoff, Riverside County, Order No. R8-2004-0033, NPDES CA 00111007.

Task 3: Identify Agricultural Operators

On or before October 31, 2005, the Regional Board shall develop a list of all known agricultural operators in the San Jacinto watershed that will be responsible for implementing requirements of this TMDL. The Regional Board will send a notice to these operators informing them of their TMDL responsibility and alerting them to potential regulatory consequences of failure to comply.

Task 4: Monitoring

No later than December 31, 2005, the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District¹, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval monitoring program as required by Tasks 4.1, 4.2 and 4.3.

If modifications to the monitoring program are warranted, no later than December 31, 2006, the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District⁷¹, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a revised proposed Watershed nutrient monitoring program (Task 4.1), Lake Elsinore monitoring program (Task 4.2) and Canyon Lake nutrient monitoring program (Task 4.3).

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval for the monitoring program specified in tasks 4.1, 4.2 and 4.3. Any such individual or

⁷¹ Contingent on Eastern Municipal Water District discharge of recycled water to Lake Elsinore.

group monitoring plan is due no later than December 31, 2005. If needed, any individual or group revised monitoring plan is due no later than December 31, 2006.

4.1 Watershed-wide Nutrient Water Quality Monitoring Program

The US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District¹, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed watershed-wide nutrient monitoring program that will provide data necessary to review and update the Lake Elsinore and Canyon Lake Nutrient TMDL. Data to be collected and analyzed shall address, at a minimum: (1) determination of compliance with interim and/or final nitrogen and phosphorus allocations; and (2) determination of compliance with the nitrogen and phosphorus TMDL, including the WLAs and LAs.

At a minimum, the stations specified in Table 6-1t and shown in Figure 6-5, at the frequency specified in Table 6-1t, shall be considered for inclusion in the proposed monitoring plan. If one or more of these monitoring stations are not included, rationale shall be provided and proposed alternative monitoring locations shall be identified in the proposed monitoring plan. In addition to water quality samples, at a minimum, daily discharge (stream flow) determinations shall be made at all stations shown in Table 6-1t.

At a minimum, samples shall be analyzed for the following constituents:

- organic nitrogen
- nitrite nitrogen
- total phosphorus
- total hardness
- total suspended solids (TSS)
- biological oxygen demand (BOD)
- ammonia nitrogen
- nitrate nitrogen
- ortho-phosphate (SRP)
- total dissolved solids (TDS)
- turbidity
- chemical oxygen demand (COD)
- pH
- water temperature

The proposed monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the WLAs/LAs shall be submitted by August 15 of each year.

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. This individual monitoring plan shall be implemented upon Regional

Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s) shall be submitted by August 15 of each year. The report shall summarize the data and evaluate compliance with the WLAs/LAs.

It may be that implementation of these monitoring requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

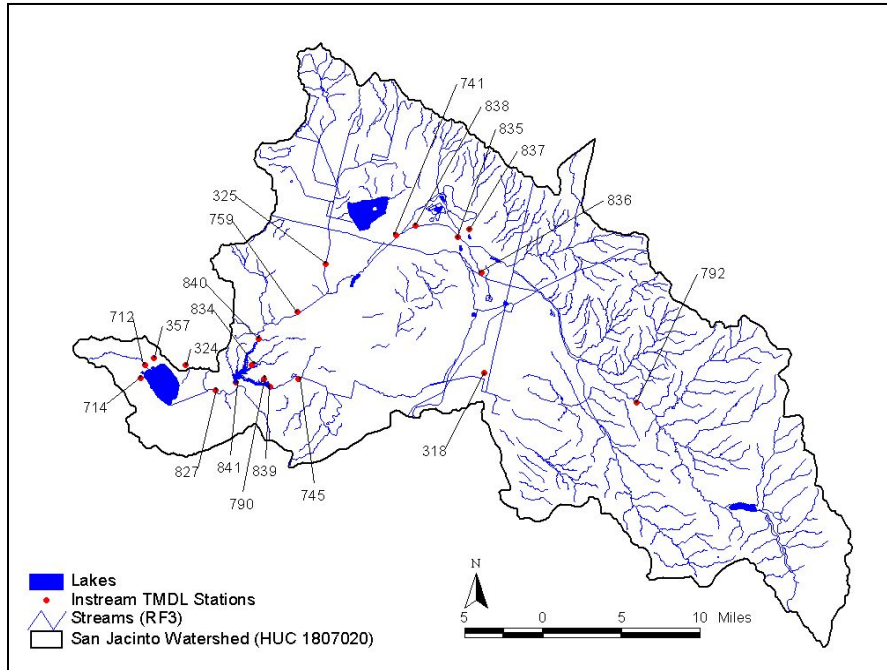


Figure 6-5 – San Jacinto River Watershed Nutrient TMDL Water Quality Stations Locations

Table 6-1t
Lake Elsinore and Canyon Lake Watershed
Minimum Required Sampling Station Locations

Station Number	Station Description
792	San Jacinto River @ Cranston Guard Station
318	Hemet Channel at Sanderson Ave.
745	Salt Creek @ Murrieta Road
759	San Jacinto River @ Goetz Rd
325	Perris Valley Storm Drain @ Nuevo Rd.
741	San Jacinto River @ Ramona Expressway
827	San Jacinto River upstream of Lake Elsinore
790	Fair Weather Dr. Storm Drain in Canyon Lake
357	4 Corners Storm Drain in Elsinore
714	Ortega Flood Channel in Elsinore
324	Lake Elsinore Outlet Channel
712	Leach Canyon Channel in Elsinore
834	Sierra Park Drain in Canyon Lake
835	Bridge Street and San Jacinto River
836	North Side of Ramona Expressway near Warren Road
837	Mystic Lake inflows
838	Mystic Lake outflows
841	Canyon Lake spillway

Frequency of sampling at all stations: dry season – none; wet season; minimum of 3 storms/year whenever possible and 8 samples across each storm hydrograph

4.2 Lake Elsinore: In-Lake Nutrient Monitoring Program

The US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District¹, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed Lake Elsinore nutrient monitoring program that will provide

data necessary to review and update the Lake Elsinore Nutrient TMDL. Data to be collected and analyzed shall address, at a minimum: determination of compliance with interim and final nitrogen, phosphorus, chlorophyll *a*, and dissolved oxygen numeric targets. In addition, the monitoring program shall evaluate and determine the relationship between ammonia toxicity and the total nitrogen allocation to ensure that the total nitrogen allocation will prevent ammonia toxicity in Lake Elsinore.

At a minimum, the proposed plan shall include the collection of samples at the stations specified in Table 6-1u and shown in Figure 6-6, at the specified frequency indicated in Table 6-1u. With the exception of dissolved oxygen and water temperature, all samples to be analyzed shall be depth integrated.

The monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL shall be submitted by August 15 of each year.

Table 6-1u
Lake Elsinore Minimum Required Sampling Station Locations

Station Number	Station Description
LE 14	Lake Elsinore – inlet
LE 15	Lake Elsinore – four corners
LE 16	Lake Elsinore – mid-lake

Frequency of sampling at all stations: monthly October through May; bi-weekly June through September.

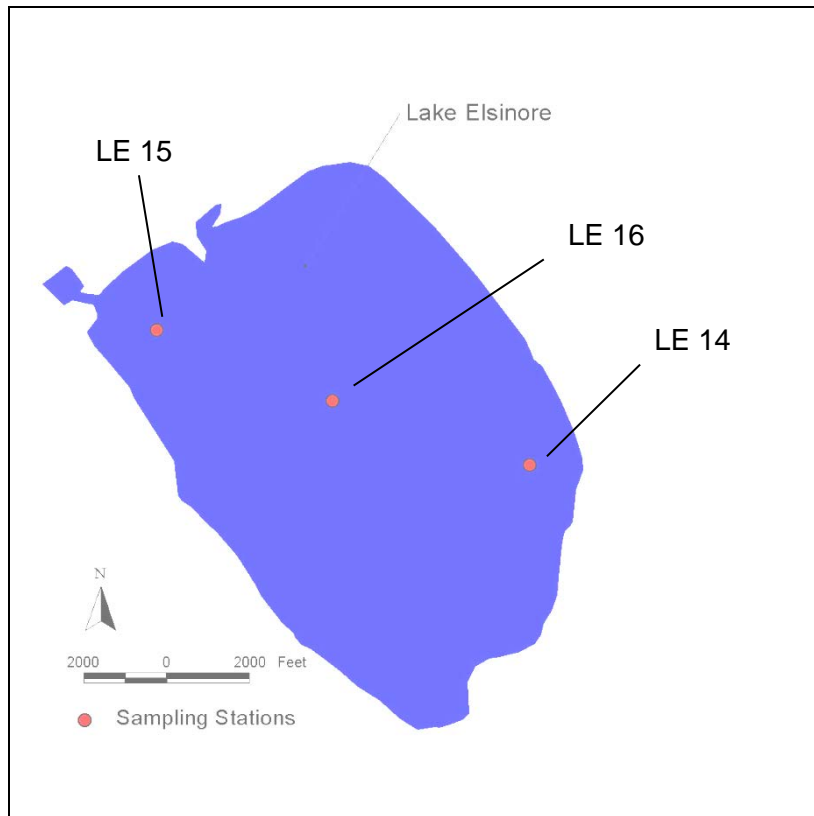


Figure 6-6 Lake Elsinore TMDL monitoring Stations

At a minimum, in-lake samples must be analyzed for the following constituents:

- | | |
|--------------------------------|----------------------------------|
| • specific conductance | • chemical oxygen demand (COD) |
| • water temperature | • dissolved oxygen |
| • pH | • water clarity (secchi depth) |
| • chlorophyll <i>a</i> | • ammonia nitrogen |
| • organic nitrogen | • nitrate nitrogen |
| • nitrite nitrogen | • turbidity |
| • organic phosphorus | • ortho-phosphate (SRP) |
| • total hardness | • total suspended solids (TSS) |
| • total dissolved solids (TDS) | • biological oxygen demand (BOD) |

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. This individual monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s), shall be submitted by August 15 of each year. The report shall summarize the data and evaluate compliance with the numeric targets.

It may be that implementation of these requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

4.3 Canyon Lake Nutrient Monitoring Program

The US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed Canyon Lake nutrient monitoring program that will provide data necessary to review and update the Canyon Lake Nutrient TMDL. Data to be collected and analyzed shall address, at a minimum: determination of compliance with interim and final nitrogen, phosphorus, chlorophyll *a*, and dissolved oxygen numeric targets. In addition, the monitoring program shall evaluate and determine the relationship between ammonia toxicity and the total nitrogen allocation to ensure that the total nitrogen allocation will prevent ammonia toxicity in Canyon Lake.

At a minimum, the proposed plan shall include the collection of samples at the stations specified in Table 6-1v and shown in Figure 6-7, at the specified frequency indicated in Table 6-1v. Discrete samples in Canyon Lake are to be collected in the epilimnion, hypolimnion and thermocline when and where appropriate.

The monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL shall be submitted by August 15 of each year.

**Table 6-1v
Canyon Lake Minimum Required Sampling Station Locations**

Station Number	Station Description
CL 07	Canyon Lake – At the Dam
CL 08	Canyon Lake – North Channel
CL 09	Canyon Lake – Canyon Bay
CL 10	Canyon Lake – East Bay

Frequency of sampling at all stations: monthly October through May;

bi-weekly June through September.

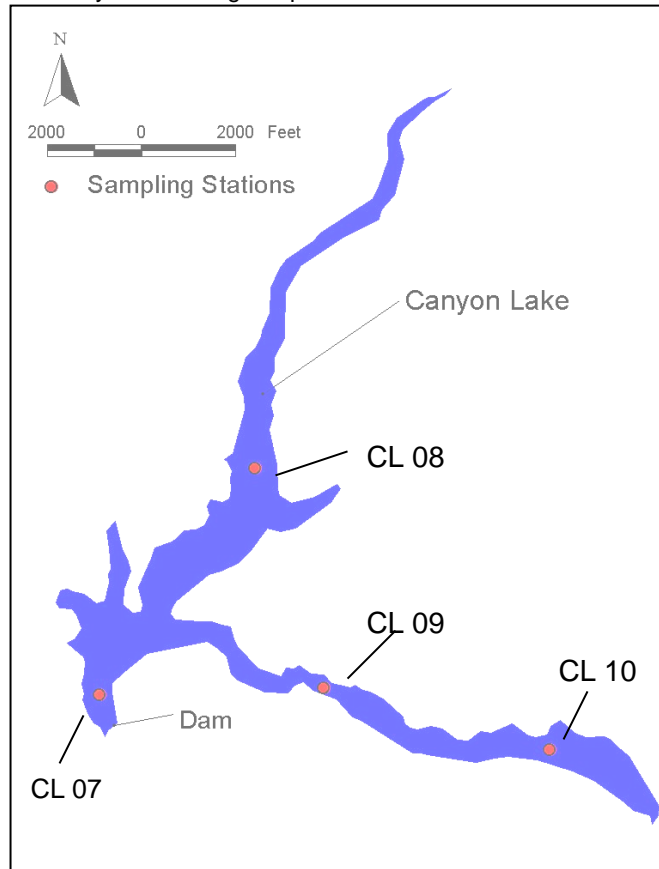


Figure 6-7 – Canyon Lake Nutrient TMDL Monitoring Station Locations

At a minimum, in-lake samples must be analyzed for the following constituents:

- specific conductance
- water temperature
- pH
- chlorophyll *a*
- organic nitrogen
- nitrite nitrogen
- organic phosphorus
- total hardness
- total dissolved solids (TDS)
- chemical oxygen demand (COD)
- dissolved oxygen
- water clarity (secchi depth)
- ammonia nitrogen
- nitrate nitrogen
- turbidity
- ortho-phosphate (SRP)
- total suspended solids (TSS)
- biological oxygen demand (BOD)

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. This individual plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s) shall be submitted by August 15 of each year. The report shall summarize the data and evaluate compliance with the numeric targets.

It may be that implementation of these requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

Task 5: Agricultural Activities

No later than September 30, 2007, the agricultural operators within the Lake Elsinore and Canyon Lake watershed (see Task 2), in cooperation with the Riverside County Farm Bureau, the UC Cooperative Extension, Western Riverside County Ag Coalition shall, as a group, submit a proposed Nutrient Management Plan (NMP). The Nutrient Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of a coordinated plan, one or more of the parties identified above may submit a proposed individual or group Nutrient Management Plan to conduct the above studies for areas within their jurisdiction. Any such individual or group plan shall also be submitted for Regional Board approval no later than September 30, 2007. This Nutrient Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

At a minimum, the NMP shall include, plans and schedules for the following. In order to facilitate any needed update of the numeric targets and/or the TMDLs and/or agricultural LA, the proposed schedule shall take into consideration the Regional Board's triennial review schedule.

- implementation of nutrient controls, BMPs and reduction strategies designed to meet load allocations;
- evaluation of effectiveness of BMPs;
- development and implementation of compliance monitoring; and
- development and implementation of focused studies that will provide the following data and information
 - inventory of crops grown in the watershed;
 - amount of manure and/or fertilizer applied to each crop with corresponding nitrogen and phosphorus amounts; and
 - amount of nutrients discharged from croplands.

The Regional Board expects that the NMP will be submitted and implemented pursuant to these TMDL requirements. Where and when necessary to implement these requirements, the Regional Board will issue appropriate waste discharge requirements.

Compliance with the agricultural load allocation may be achieved through a Regional Board approved program.

Task 6: On-site Disposal Systems (Septic System) Management Plan

No later than 6 months after the effective date of an agreement between the County of Riverside and the Regional Board to implement regulations adopted pursuant to Water Code Sections 13290-13291.7, or if no such agreement is required or completed, within 12 months of the effective date of these regulations, the County of Riverside and the Cities of Perris, Moreno Valley and Murrieta shall, as a group, submit a Septic System Management Plan to identify and address nutrient discharges from septic systems within the San Jacinto watershed. The Septic System Management Plan shall implement regulations adopted by the State Water Resources Control Board pursuant to California Water Code Section 13290 – 13291.7.

At a minimum, the Septic System Management Plan shall include plans and schedules for the development and implementation of the following. In order to facilitate any needed update of the numeric targets and/or the TMDLs and septic system LA, the proposed schedule shall take into consideration the Regional Board's triennial review schedule.

- public education program;
- tracking system, including maintenance thereof;
- maintenance standards;
- enforcement provisions;
- monitoring program; and
- sanitary survey

In lieu of a coordinated plan, one or more of the agencies with septic system oversight responsibilities may submit an individual or group Management Plan to develop the above Plan for areas within their jurisdiction. Any such individual or group plan shall also be submitted no later than March 31, 2006. This Septic System Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

Compliance with the septic systems load allocation may be achieved through a Regional Board approved pollutant trading program.

Task 7: Urban Discharges

Urban discharges, including stormwater runoff, are those discharges from the cities and unincorporated communities in the San Jacinto River watershed. These discharges are regulated under the Riverside County MS4 NPDES permit, the San Jacinto Watershed Construction Activities Storm Water permit, the State Board's General Permit for Storm Water Runoff from Construction Activities, and the State Board's General Permit for Storm Water Runoff from Industrial Activities. Nuisance and stormwater runoff from state highways and right of ways is regulated under the State of California, Department

of Transportation (Caltrans) statewide general NPDES permit. Finally, nuisance and stormwater runoff from the March Air Reserve Base is also regulated through an NPDES permit.

7.1 Revision to the Drainage Area Management Plan (DAMP)

Provision XIII.B. of Order No. R8-2002-0011 (see 2.1, above) requires the permittees to revise their Drainage Area Management Plan (DAMP) to include TMDL requirements. By August 1, 2006, the permittees shall review and revise the DAMP and or WQMP (see 7.2 below) as necessary to address the requirements of these nutrient TMDLs. Further review and revision of the DAMP needed to address these TMDLs shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing. The DAMP revisions shall include schedules for meeting the interim and final nutrient wasteload allocations. In order to facilitate any needed update of the numeric targets and/or the TMDLs and urban discharge WLA, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The revised DAMP/WQMP shall also include a proposal for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the nutrient waste load allocation for urban runoff. The proposal must be implemented upon approval by the Regional Board after public notice and public hearing, or upon approval by the Executive Officer if no significant comments are received during the public notice period.

7.2 Revision of the Water Quality Management Plan (WQMP)

Provision VIII.B. of Order No. R8-2002-0011 (see 2.1, above) requires the permittees to develop and submit a WQMP by June 2004 for approval. On September 17, 2004, the Board approved a WQMP developed by the permittees. The approved WQMP includes source control BMPs, design BMPs and treatment control BMPs. Further revisions to the WQMP and/or the DAMP may be necessary to meet the WLA for urban runoff. By August 1, 2006, the permittees shall submit a revised WQMP and/or revised DAMP (see 7.1 above) that addresses the nutrient input from new developments and significant redevelopments to assure compliance with the nutrient wasteload allocations for urban runoff. The WQMP shall also address requirements currently in Order No. 01-34 (see 2.2, above). Once the WQMP is approved, Order No. 01-34 may be rescinded. Further review and revision of the WQMP necessary to assure that TMDL requirements are addressed shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing.

7.3 Revision of the State of California, Department of Transportation (Caltrans) Stormwater Permit

Provision E.1 of Order No. 99-06-DWQ requires Caltrans to maintain and implement

a Storm Water Management Plan (SWMP). Annual updates of the SWMP needed to maintain an effective program are required to be submitted to the State Water Resources Control Board.

Provision E.2 of Order No. 99-06-DWQ requires Caltrans to submit a Regional Workplan by April 1 of each year for the Executive Officer's approval. By April 1, 2006, Caltrans shall submit a Regional Workplan that includes plans and schedules for meeting the interim and final nutrient wasteload allocations, and provides a proposal for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the nutrient waste load allocations for urban runoff, which includes runoff from Caltrans facilities. In order to facilitate any needed update of the numeric targets and/or the TMDLs and urban discharge WLA, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The proposal shall be implemented upon the Executive Officer's approval. Annual updates to the Regional Workplan shall include, as necessary, revised plans and schedules for meeting the interim and final nutrient wasteload allocations and revised proposals for evaluating the efficacy of control actions and compliance with the nutrient wasteload allocations.

7.4 Revision to the United States Air Force, March Air Reserve Base, Stormwater Permit

Order No. R8-2004-0033 specifies monitoring and reporting requirements for stormwater runoff from the US Air Force, March Air Reserve facility. Provision C.17 indicates that the order could be reopened to incorporate TMDL requirements. Provisions C.18.a and C.18.b require that March Air Reserve Base submit a report and revise the Stormwater Pollution Prevention Plan (SWPPP) to address any pollutants that may be causing or contributing to exceedances of water quality standards. Results from the TMDL nutrient monitoring program conducted pursuant to Task 3, shall serve as the basis for revision of the SWPPP and/or reopening the order.

Development of the Municipal permittee's WQMP and revisions to their DAMP, development of the Caltrans SWMP and Regional Workplan, and Revision to the March Air Reserve Base SWPPP, shall address the urban component of the nutrient TMDL.

Compliance with the urban wasteload allocation may be achieved through a Regional Board approved pollutant trading program.

Task 8: Forest Area –Identification of Forest Lands Management Practices

No later than September 30, 2007, the US Forest Service shall submit for approval a plan with a schedule for identification, development and implementation of Management Practices to reduce nutrient discharges emanating from the Cleveland National Forest and the San Bernardino National Forest. The Plan shall identify watershed-specific appropriate Best Management Practices (BMPs) that will be implemented to achieve the

interim and final load allocations for forest. The proposal shall include specific recommendations and a schedule for 1) evaluating the effectiveness of control actions implemented to reduce nutrient discharges from forest and 2) evaluating compliance with the nutrient load allocation from forest/open space. The revised watershed-specific Management Practices shall be implemented upon Regional Board approval at a duly noticed public meeting.

Compliance with the open space/forest load allocation may be achieved through a Regional Board approved pollutant trading program.

Task 9: Lake Elsinore Sediment Nutrient Reduction Plan

No later than March 31, 2007, the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, the State of California, Department of Transportation (Caltrans), the State of California, Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District¹, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed plan and schedule for in-lake sediment nutrient reduction for Lake Elsinore. The proposed plan shall include an evaluation of the applicability of various in-lake treatment technologies to prevent the release of nutrients from lake sediments to support development of a long-term strategy for control of nutrients from the sediment. The submittal shall also contain a proposed sediment nutrient monitoring program to evaluate the effectiveness of any strategies that are implemented. The Lake Elsinore In-lake Sediment Nutrient Reduction Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group In-lake Sediment Nutrient Reduction Plan for approval by the Regional Board. Any such individual or group Plan is due no later than March 31, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group In-lake Sediment Nutrient Reduction Plan for approval by the Regional Board. Any such individual or group Plan is due no later than March 31, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Compliance with the Lake Elsinore Sediment Nutrient Reduction Plan requirement may be achieved through a Regional Board approved pollutant trading program.

Task 10: Canyon Lake Sediment Nutrient Treatment Evaluation Plan

No later than March 31, 2007, the US Forest Service, the US Air Force (March Air

Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed plan and schedule for evaluating in-lake sediment nutrient treatment strategies for Canyon Lake. The proposed plan shall include an evaluation of the applicability of various in-lake treatment technologies to prevent the release of nutrients from lake sediments in order to develop a long-term strategy for control of nutrients from the sediment. The submittal shall also contain a proposed sediment nutrient monitoring program to evaluate the effectiveness of any strategies that are implemented. The Canyon Lake In-lake Sediment Nutrient Treatment Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group In-lake Sediment Nutrient Treatment Evaluation Plan for approval by the Regional Board. Any such individual or group Plan is due no later than March 31, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task 11: Update of Watershed and In-Lake Nutrient Models

No later than March 31, 2007, the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Riverside and Beaumont, Eastern Municipal Water District, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators shall, as a group, submit to the Regional Board for approval a proposed plan and schedule for updating the existing Lake Elsinore/San Jacinto River Nutrient Watershed Model and the Canyon Lake and Lake Elsinore in-lake models. The plan and schedule must take into consideration additional data and information that are generated from the respective TMDL monitoring programs. In order to facilitate any needed update of the numeric targets and/or the TMDLs/WLAs/LAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The plan for updating the Watershed and In-lake Models shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group plan for update of the Lake Elsinore/San Jacinto River Nutrient Watershed Model and the Canyon Lake and Lake Elsinore in-lake models. The plan and schedule must take into consideration additional data and information that are generated from the respective TMDL monitoring programs. In order to facilitate any needed update of the numeric targets and/or the TMDLs/WLAs/LAs, the proposed

schedule shall take into consideration the Regional Board's triennial review schedule. Any such individual or group Plan is due no later than March 31, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task 12: Pollutant Trading Plan

No later than September 30, 2007, the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Riverside and Beaumont, Eastern Municipal Water District¹, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators shall, as a group, submit to the Regional Board for approval a proposed Pollutant Trading Plan. At a minimum, this plan shall contain a plan, schedule and funding strategy for project implementation, an approach for tracking pollutant credits and a schedule for reporting status of implementation of the Pollutant Trading Plan to the Regional Board, The Pollutant Trading Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group Pollutant Trading Plan. Any such individual or group Plan is due no later than September 30, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task 13: Review and Revision of Water Quality Objectives

By December 31, 2009, the Regional Board shall review and revise as necessary the total inorganic nitrogen numeric water quality objectives for Lake Elsinore and Canyon Lake. In addition, the Regional Board shall evaluate the appropriateness of establishing total phosphorus and un-ionized ammonia numeric water quality objectives for both Lake Elsinore and Canyon Lake. Given budgetary constraints, completion of this task is likely to require substantive contributions from interested parties.

Task 14: Review/Revision of the Lake Elsinore/Canyon Lake Nutrient TMDL

The basis for the TMDLs and implementation schedule will be re-evaluated at least once every three years⁷² to determine the need for modifying the load allocations, numeric targets and TMDLs. Regional Board staff will continue to review all data and information generated pursuant to the TMDL requirements on an ongoing basis. Based on results generated through the monitoring programs, special studies, modeling analysis, and/or special studies by one or more responsible parties, changes to the TMDL, including revisions to the numeric targets, may be warranted. Such changes would be considered through the Basin Plan Amendment process. The Regional Board is committed to the review of this TMDL every three years, or more frequently if warranted by these or other studies.

⁷² The three-year schedule will coincide with the Regional Board's triennial review schedule.

(End of amendment adopted under Resolution No. R8-2004-0037)

Middle Santa Ana River Watershed (The following was added under Resolution No. R8-2005-0001)

The Middle Santa Ana River Watershed covers approximately 488 square miles and lies largely in the southwestern corner of San Bernardino County, and the northwestern corner of Riverside County. A small part of Los Angeles County (Pomona/Claremont area) is also included. This watershed is comprised of three sub-watersheds. The first sub-watershed is the Chino Basin Watershed, which includes portions of San Bernardino County, Los Angeles County, and Riverside County. Surface drainage in this area is directed to Chino Creek and Cucamonga/Mill Creek and is generally southward, from the San Gabriel Mountains toward the Santa Ana River and the Prado Flood Control Basin. The second sub-watershed, the Riverside Watershed, is located in Riverside County. Surface drainage in this area is generally westward from the City of Riverside to the Santa Ana River, Reach 3. The third sub-watershed, the Temescal Canyon Watershed, is also located in Riverside County. Surface drainage in this area is generally northward to Temescal Creek.

Land uses in the Middle Santa Ana River watershed include urban, agriculture, and open space. Although originally developed as an agricultural area, the watershed is being steadily urbanized. Incorporated cities in the Middle Santa Ana River watershed include Pomona, Chino Hills, Upland, Montclair, Claremont, Ontario, Rancho Cucamonga, Rialto, Chino, Fontana, Norco, Corona, and Riverside. In addition, there are several pockets of urbanized unincorporated areas. The current population of the watershed, based upon 2000 census data, is approximately 1.4 million people. The principal remaining agricultural area in the watershed is the area formerly known as the Chino Dairy Preserve. This area is located in the south-central part of the Chino Basin watershed and contains approximately 300,000 cows, which generate the waste equivalent of more than two million people. Recently, the cities of Ontario and Chino annexed the San Bernardino County portions of this area. The remaining portion of the former preserve, which is in Riverside County, remains unincorporated. Open space areas include National Forest lands and State Parks lands.

Middle Santa Ana River Watershed Bacterial Indicator Total Maximum Daily Loads (TMDLs)

Middle Santa Ana River Watershed waterbodies listed on the Clean Water Act Section 303(d) list of impaired waters due to violations of REC1 fecal coliform bacteria objectives are shown in Table 6-1w.

Table 6-1w – Middle Santa Ana River Watershed Waterbodies on the 303(d) List Due to Bacterial Contamination

Waterbody, Reach
Santa Ana River, Reach 3
Chino Creek, Reach 1
Chino Creek, Reach 2
Mill Creek (Prado Area)
Cucamonga Creek, Reach 1
Prado Park Lake

During storm events, these waterbodies receive and transport runoff from urban, agricultural, and open space areas. During dry weather, these waterbodies receive and transport nuisance runoff, primarily from urban areas. Based on monitoring results, and observed waterbody conditions (fish kills and waste-laden stormflows), the Regional Board placed these waterbodies on the 303(d) list of impaired waters due to levels of bacterial indicators that exceeded established objectives for REC1 uses. The listings took place from 1988 to 1998.

A TMDL technical report prepared by Regional Board staff describes the bacterial indicator related problems in the Middle Santa Ana River Watershed waterbodies in greater detail and discusses the technical basis for the TMDLs that follow [Ref. # 31].

A. Middle Santa Ana River Watershed Bacterial Indicator TMDL Numeric Targets

Bacterial indicator numeric targets for the Middle Santa Ana River Watershed waterbodies shown in Table 6-1x are based, in part, on the fecal coliform water quality objective specified in Chapter 4 for the protection of body-contact recreation (REC1) in inland surface waters.

Recognizing that, in the future, *Escherichia coli* (*E. coli*) may be incorporated into the Basin Plan as new bacterial water quality objectives for REC1, alternative numeric targets for *E. coli* are also specified⁷³. These targets are based on *E. coli* criteria recommended by the U.S. Environmental Protection Agency [Ref #32]. The *E. coli* levels were chosen to roughly correspond to the health risk level associated with the fecal coliform objectives.

⁷³ USEPA is requiring the states to evaluate and incorporate more appropriate bacterial indicators, including *E. coli*, as water quality standards based on its Ambient Water Quality Criteria for Bacteria – 1986. The Regional Board is participating in the efforts of the Storm Water Quality Standards Task Force (SWQSTF), which is evaluating USEPA's bacterial indicator recommendations and REC1 beneficial use designations for waterbodies within the Santa Ana Region, including the Middle Santa Ana River watershed waterbodies. This numeric target and resulting TMDLs, WLAs and LAs will be adjusted accordingly when and if recommendations from the SWQSTF are incorporated into the Basin Plan.

The numeric targets for both bacterial indicators incorporate an explicit 10% margin of safety to address uncertainties recognized in the development of the TMDLs. These numeric targets are specified as follows:

Fecal coliform: log mean less than 200 organisms/100 mL based on five or more samples per 30-day period, and not more than 10% of the samples exceed 400 organisms/100 mL for any 30-day period.

***E. coli*: log mean less than 126 organisms/100 mL based on five or more samples per 30-day period, and not more than 10% of the samples exceed 235 organisms/100mL for any 30-day period.**

The fecal coliform numeric targets (and other fecal coliform related provisions of these TMDLs) will become ineffective upon the replacement of the fecal coliform REC1 objectives in the Basin Plan with REC1 objectives based on *E. coli*. Incorporation of new *E. coli* objectives will be considered through the Basin Planning process.

B. Middle Santa Ana River Watershed Bacterial Indicator TMDLs, Wasteload Allocations, Load Allocations and Compliance Dates

As discussed in the technical TMDL Report, the bacterial indicator TMDLs are expressed in terms of density since it is the number of organisms in a given volume of water (i.e., their density), and not their mass that is significant with respect to public health and the protection of beneficial uses. Similarly, the wasteload allocations for point source discharges (WLAs) and load allocations for nonpoint source discharges (LAs) are also based on density. The density-based WLAs and LAs do not add up to equal the TMDLs, since this is not scientifically valid. To achieve the density-based TMDLs, each WLA and LA must meet the density-based TMDL. As indicated in Table 6-1x, the TMDLs, WLAs and LAs also include a 10% margin of safety (see C., below) applied to the existing Basin Plan fecal coliform objective for REC1 for inland surface waters and to the alternative indicator *E. coli* criteria recommended by the U.S. Environmental Protection Agency. Again, the *E. coli* was chosen to correspond with the health risk level associated with the fecal coliform objectives.

WLAs are specified for urban discharges and discharges from Confined Animal Feeding Operations, including stormwater. LAs are specified for runoff from other types of agriculture and from natural sources (open space/undeveloped forest land). TMDLs, WLAs and LAs are specified for both dry weather discharges and wet weather discharges, with separate compliance schedules. An extended schedule for compliance with the wet weather TMDLs is specified in light of the expected increased difficulty in achieving compliance under these conditions.

Table 6-1x – Total Maximum Daily Loads, Waste Load Allocations, and Load Allocations for Bacterial Indicators in Middle Santa Ana River Waterbodies^{a,b,c}

Indicator	Total Maximum Daily Loads for Bacterial Indicators	Waste Load Allocation for Bacterial Indicators in Urban Runoff including stormwater discharges	Waste Load Allocation for Bacterial Indicators in Confined Animal Feeding Operations discharges	Load Allocation for Bacterial Indicators in Agricultural runoff discharges	Load Allocation for Bacterial Indicators from Natural Sources
Dry Summer Conditions: April 1 through October 31, as soon as possible, but no later than December 31, 2015					
Fecal coliform	5–sample/30–day Logarithmic Mean less than 180 organisms/100mL, and not more than 10% of the samples exceed 360 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100mL, and not more than 10% of the samples exceed 360 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100mL, and not more than 10% of the samples exceed 360 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100mL, and not more than 10% of the samples exceed 360 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100mL, and not more than 10% of the samples exceed 360 organisms/100mL for any 30–day period.
E. coli	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.
Wet Winter Conditions: November 1 through March 31, as soon as possible, but no later than December 31, 2025					
Fecal coliform	5–sample/30–day Logarithmic Mean less than 180 organisms/100ml, and not more than 10% of the samples exceed 360 organisms/100ml for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100ml, and not more than 10% of the samples exceed 360 organisms/100ml for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100ml, and not more than 10% of the samples exceed 360 organisms/100ml for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100ml, and not more than 10% of the samples exceed 360 organisms/100ml for any 30–day period.	5–sample/30–day Logarithmic Mean less than 180 organisms/100ml, and not more than 10% of the samples exceed 360 organisms/100ml for any 30–day period.
E. coli	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.	5–sample/30–day Logarithmic Mean less than 113 organisms/ 100mL, and not more than 10% of the samples exceed 212 organisms/100mL for any 30–day period.

^a To be achieved as soon as possible, but no later than dates specified.

^b TMDLs, WLAs and LAs, include a 10% Margin of Safety the REC1 fecal coliform objectives in the Basin Plan by approved REC1 objectives based on E. coli

^c The fecal coliform TMDLs, WLAs, and LAs become ineffective upon the replacement of

C. Margin of Safety

A 10% margin of safety is explicitly incorporated into the Bacterial Indicator TMDLs for the Middle Santa Ana River Watershed to account for unknowns, such as bacterial regrowth, bacteria dilution and organism die-off. As additional data on bacterial dynamics in the Middle Santa Ana River watershed are developed, the margin of safety can be adjusted accordingly.

D. Seasonal Variations/Critical Conditions

The Basin Plan REC1 fecal coliform objectives apply year-round; no distinctions based on climate or other conditions that may affect actual REC1 use are specified⁷⁴. As shown in Table 6-1x, different compliance dates are specified for dry season discharges and wet season discharges. This ensures that dry season recreational beneficial uses are addressed on a priority basis. Additional time is allowed to address complexities associated with the control of wet weather discharges.

E. TMDL Implementation

Implementation is expected to result in compliance with the water quality objectives/numeric targets for fecal coliform and with the numeric targets for *E. coli*. The intent is to ensure protection of the REC1 beneficial uses of Middle Santa Ana River Watershed waterbodies. Collection of additional monitoring data is critical to developing long-term solutions for bacterial indicator control, as well as to consider whether changes to the TMDL are appropriate. With that in mind, the requirements for submittal of plans and schedules to implement the TMDLs take into consideration the need to develop and implement effective short-term solutions, as well as allow for the development of long-term solutions once additional data have been generated.

Implementation of tasks and schedules as specified in Table 6-1y is expected to achieve compliance with the TMDLs and, thereby, water quality standards. Each of these tasks is described below.

⁷⁴ The SWQSTF may recommend changes to the REC1 objectives to reflect conditions, such as high flows, that affect REC1 use. Any such changes will be considered through the Basin Planning process
TMDLs

Table 6-1y – Middle Santa Ana River Watershed Bacterial Indicator TMDL Implementation Plan/Schedule Due Dates

Task	Description	Compliance Date-As soon As Possible but No Later Than
<i>TMDL Phase 1</i>		
Task 1	Revise Existing Waste Discharge Requirements	February 28, 2008
Task 2	Identify Agricultural Operators	June 30, 2007
Task 3	Develop Watershed-Wide Bacterial Indicator Water Quality Monitoring Program Implement Watershed-Wide Bacterial Indicator Water Quality Monitoring Program	November 30, 2007 Upon Regional Board approval Seasonal reports due May 31 and December 31 of each year Triennial reports due every 3 years beginning with first report due February 15, 2010.
Task 4	Urban Discharges 4.1 Develop and Implement Bacterial Indicator Urban Source Evaluation Plan 4.2 San Bernardino County MS4: Revise Municipal Storm Water Management Program (MSWMP) 4.3 Riverside County MS4: Revise Drainage Area Management Plan (DAMP) 4.4 San Bernardino County MS4: Revise Water Quality Management Plan (WQMP) 4.5 Riverside County MS4: Revise Water Quality Management Plan (WQMP)	Plan/schedule due 4.1 November 30, 2007 4.2 Dependent on Task 4.1 results (see text) 4.3 Dependent on Task 4.1 results (see text) 4.4 Dependent on Task 4.1 results (see text) 4.5 Dependent on Task 4.1 results (see text)
Task 5	Agricultural Discharges 5.1 Develop and Implement Bacterial Indicator Agricultural Source Evaluation Plan 5.2 Develop and Implement Bacterial Indicator Agricultural Source Management Plan	Plan/schedule due 5.1 November 30, 2007 5.2 Dependent on Task 5.1 results (see text)
Task 6	Review of TMDLs/WLAs/LAs	Once every 3 years to coincide with the Regional Board's triennial review, or more frequently as warranted

Task 1: Review and/or Revise Existing Waste Discharge Requirements

There are three Waste Discharge Requirements (WDRs) issued by the Regional Board regulating discharge of various types of wastes in the watershed. On or before **February 28, 2008**, each of these WDRs shall be reviewed and revised as necessary to implement the TMDLs, including the appropriate wasteload allocations, compliance schedules and/or monitoring program requirements.

- 1.1 Waste Discharge Requirements for the San Bernardino County Flood Control and Transportation District, the County of San Bernardino and the Incorporated Cities of San Bernardino County within the Santa Ana Region, Areawide Urban Runoff, NPDES No. CAS 618036 (Regional Board Order No. R8-2002-0012). The current Order has provisions to address TMDL issues (see Task 4, below). In light of these provisions, revision of the Order may not be necessary to address TMDL requirements.
- 1.2 Waste Discharge Requirements for the Riverside County Flood Control and Water Conservation District, the County of Riverside and the Incorporated Cities of Riverside County within the Santa Ana Region, Areawide Urban Runoff, NPDES No. CAS 618033 (Regional Board Order No. R8-2002-0011). The current Order has provisions to address TMDL issues (see Task 4, below). In light of these provisions, revision of the Order may not be necessary to address TMDL requirements.
- 1.3 General Waste Discharge Requirements for Concentrated Animal Feeding Operations (Dairies and Related Facilities) within the Santa Ana Region, NPDES No. CAG018001 (Regional Board Order No. 99-11). Updated waste discharge requirements for Concentrated Animal Feeding Operations are expected to be considered by the Regional Board in 2005. These requirements will include appropriate TMDL requirements.

Other waste discharge requirements may be reviewed and/or revised to address bacterial indicator discharges as appropriate.

Task 2: Identify Agricultural Operators

On or before **June 30, 2007**, the Regional Board shall develop a list of all known agricultural owners/operators in the Middle Santa Ana River watershed that will be responsible for implementing requirements of these TMDLs. The Regional Board will send a notice to these operators informing them of their TMDL responsibility and alerting them to the potential regulatory consequences of failure to comply.

To implement the agricultural load allocations for non-Concentrated Animal Feeding Operations, monitoring program requirements specified in Task 3 and the agricultural source evaluation studies (Task 5), the Regional Board may issue waste discharge

requirements or a waiver of such waste discharge requirements that is conditioned on satisfactory compliance with these TMDL elements.

Task 3: Watershed-Wide Bacterial Indicator Water Quality Monitoring Program

No later than **November 30, 2007**, the US Forest Service, the County of San Bernardino, the County of Riverside, the cities of Ontario, Chino, Chino Hills, Montclair, Rancho Cucamonga, Upland, Rialto, Fontana, Norco, Riverside, and Corona, Pomona and Claremont and agricultural operators in the watershed, shall as a group, submit to the Regional Board for approval a proposed watershed-wide monitoring program that will provide data necessary to review and update the TMDLs. Data to be collected and analyzed shall address, at a minimum, determination of compliance with the TMDLs, WLAs and LAs.

At a minimum, the stations specified in Tables 6-1z and 6-1a-a and shown in Figure 6-8, at the frequency specified in Tables 6-1z and 6-1a-a shall be considered for inclusion in the proposed monitoring plan. If one or more of these monitoring stations are not included, the rationale shall be provided and proposed alternative monitoring locations shall be identified in the proposed monitoring plan. The proposed monitoring plan shall also include a plan to compile streamflow measurements at existing USGS stream gauging stations.

At a minimum, samples shall be analyzed for the following constituents:

- Fecal Coliform
- Escherichia Coli (E. coli)
- Total Suspended Solids
- pH
- Temperature
- Electrical Conductivity
- Dissolved Oxygen
- Turbidity
-

The proposed monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. Seasonal reports summarizing and including copies of the data collected during the dry season and wet season monitoring periods shall be submitted by May 31 and December 31 of each year. In order to facilitate review and update of the numeric targets and/or the TMDLs, WLAs, LAs, a triennial report summarizing the data collected for the preceding 3-year period and evaluating compliance with the WLAs/LAs shall be submitted every three years, beginning with the first report due February 15, 2010.

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. Any such individual or group monitoring plan is due no later than November 30, 2007 and shall be implemented upon Regional Board approval at a duly noticed public meeting. Seasonal reports summarizing and including copies of the data collected during the dry season and wet season monitoring periods shall be submitted by May 31 and December 31 of each year. In order to facilitate review and update of the numeric targets and/or the TMDLs, WLAs, LAs, a triennial report summarizing the data collected for the preceding 3-year period and evaluating compliance with the WLAs/LAs shall be submitted every three years, beginning with the first report due February 15, 2010.

Table 6-1z – Watershed Minimum Required Weekly Sampling Station Locations

Station Number	Station Description
C1	Icehouse Canyon Creek
C2	Chino Creek at Schaeffer Avenue
C3	Prado Park Lake at lake outlet
C7	Chino Creek at Central Avenue
C8	Chino Creek at Prado Golf Course
M2	Cucamonga Creek at Regional Plant No. 1
M5	Mill Creek at Chino–Corona Road
S1	Santa Ana River at MWD Crossing
S3	Santa Ana River at Hamner Avenue
T1	Temescal Wash at Lincoln Avenue
TQ1	Tequesquite Arroyo at Palm Avenue

Frequency of sampling:

Dry season: weekly

Wet season: two 30-day sampling periods during which a minimum of 5 samples are to be collected (at least one sample weekly) and if possible, a minimum of 5 of those samples must be from storm events.

Table 6-1a-a –Additional Watershed Event Sampling

Station Number	Station Description
M3	Bon View Avenue @ Merrill Avenue
M4	Archibald Avenue @ Cloverdale Avenue
G1	Grove Channel @ Pine Avenue
E1	Euclid Avenue Channel @ Pine Avenue

Frequency of sampling:

wet weather – one sample/storm event for 5 storm events/year

dry weather – none.

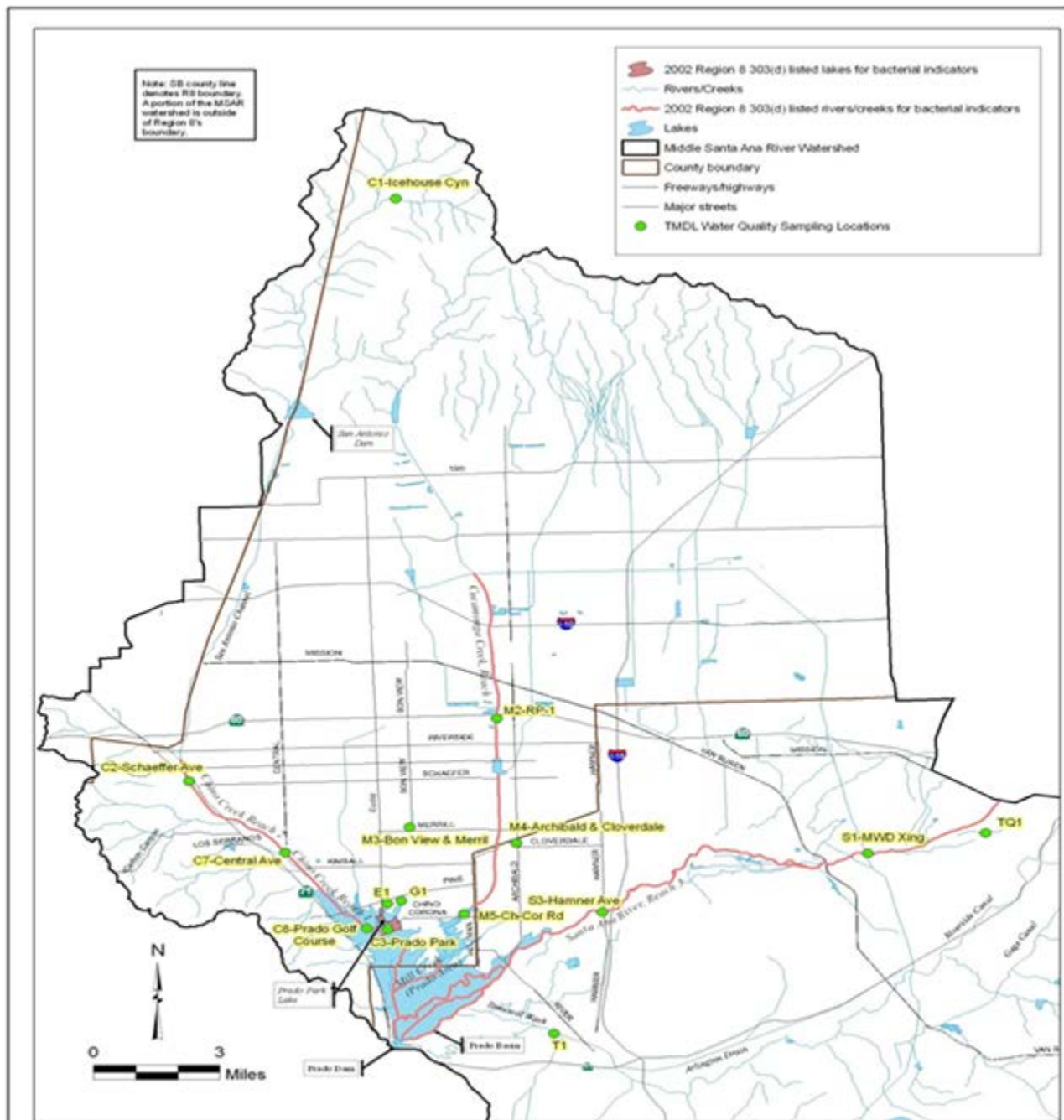
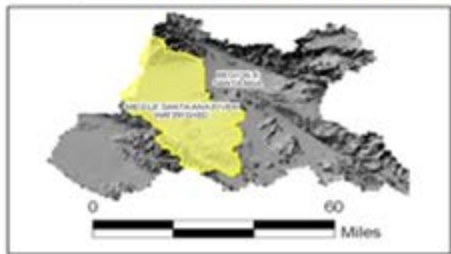


FIGURE 6-8: TMDL WATER QUALITY SAMPLING LOCATIONS



Map created January 2005
Map created by: HB

Data Sources:
Middle Santa Ana River Watershed:
based on Calwater v. 2.2.1 boundaries -
CA Spatial Information Library (2004).
Santa Ana River reach designations,
and GDT streets (SWRCB, 2002)
County: CA Spatial Information Library (2004)
Rivers/creeks, and lakes:
CA Spatial Information Library (1998)
2002 303(d) listed water bodies:
SWRCB (2003)

Task 4: Urban Discharges

Phase I urban discharges, including stormwater runoff, include those from the cities and unincorporated communities in the Middle Santa Ana River Watershed. These discharges are regulated under the MS4 NPDES permits identified in Tasks 1.1 and 1.2 (Review and Revise Existing Waste Discharge Requirements), above. The requirements of these NPDES permits differ somewhat and therefore the TMDL implementation requirements that pertain to the permittees under each permit also vary slightly, as shown below⁷⁵.

4.1 Develop and Implement Bacterial Indicator Urban Source Evaluation Plans

On or before **November 30, 2007**, the County of San Bernardino, the County of Riverside, the cities of Ontario, Chino, Chino Hills, Montclair, Rancho Cucamonga, Upland, Rialto, Fontana, Norco, Riverside, and Corona, Pomona and Claremont shall develop a Bacterial Indicator Urban Source Evaluation Plan(s) (USEP). This plan shall include steps needed to identify specific activities, operations, and processes in urban areas that contribute bacterial indicators to Middle Santa Ana River Watershed waterbodies. The plan shall also include a proposed schedule for completion of each of the steps identified. The proposed schedules can include contingency provisions that reflect uncertainty concerning the schedule for completion of the SWQSTF work and/or other investigations that may affect the steps that are proposed. The USEP shall be implemented upon Regional Board approval at a duly noticed public meeting.

4.2 Revise the San Bernardino County Municipal Storm Water Management Program (MSWMP)

Provision XVI.3. of Order No. R8-2002-0012 (see 1.1, above) requires the permittees to revise their Municipal Storm Water Management Program (MSWMP) to include TMDL requirements. Revisions to the MSWMP may be necessary based on the results of Task 4.1, Basin Plan amendments to address recommendations of the SWQSTF, or other investigations. Because of uncertainties regarding the timing of completion of these studies, it is not feasible to identify an explicit date whereby the revision of the MSWMP is to be accomplished. Instead, the Executive Officer shall notify the permittees of the need to revise the MSWMP. Within 90 days of notification by the Executive Officer, the permittees shall submit for Regional Board approval, a plan and schedule to review and revise the MSWMP as necessary to incorporate measures to address the results of the USEP and/or other studies. Further

⁷⁵ The San Bernardino MS4 permit requires the development and implementation of a Municipal Stormwater Management Program (MSWMP) to address stormwater discharges from existing urban activities. For the Riverside County MS4 permit, the Drainage Area Management Plan (DAMP) addresses stormwater discharges from existing urban activities.

review and revision of the MSWMP needed to address these TMDLs shall be completed in accordance with the requirements of Order No. R8-2002-0012 or amendments thereto that are adopted by the Regional Board at a public hearing. The MSWMP revisions shall include schedules for meeting the bacterial indicator wasteload allocations based on the schedule established in these TMDLs. In order to facilitate any needed update of the numeric targets and/or the TMDLs and urban discharge WLAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The permittees shall also provide a proposal and schedule for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the bacterial indicator waste load allocations for urban runoff. The plan and schedule to review the MSWMP must be implemented upon approval by the Regional Board after public notice and public hearing, or upon approval by the Executive Officer if no significant comments are received during the public notice period.

4.3 Revise the Riverside County Drainage Area Management Plan (DAMP)

Provision XIII.B. of Order No. R8-2002-0011 (see 1.2, above) requires the permittees to revise their Drainage Area Management Plan (DAMP) to include TMDL requirements. Revisions to the DAMP may be necessary based on the results of Task 4.1, Basin Plan amendments to address recommendations of the SWQSTF, or other investigations. Because of uncertainties regarding the timing of completion of these studies, it is not feasible to identify an explicit date whereby the revision of the DAMP is to be accomplished. Instead, the Executive Officer shall notify the permittees of the need to revise the DAMP. Within 90 days of notification by the Executive Officer, the permittees shall submit for Regional Board approval, a plan and schedule to review and revise the DAMP as necessary to incorporate measures to address the results of the USEP and/or other studies. Further review and revision of the DAMP needed to address these TMDLs shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing. The DAMP revisions shall include schedules for meeting the bacterial indicator wasteload allocations based on the schedule established in these TMDLs. In order to facilitate review and update of the numeric targets and/or the TMDLs and urban discharge WLAs, the proposed schedule shall take into consideration the Regional Board's triennial review schedule. The revised DAMP shall also include a proposal and schedule for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the bacterial indicator waste load allocations for urban runoff. The plan and schedule to review and revise the DAMP must be implemented upon approval by the Regional Board after public notice and public hearing, or upon approval by the Executive Officer if no significant comments are received during the public notice period.

4.4 Revise the San Bernardino County Water Quality Management Plan (WQMP)

Provision XII.B. 1. of Order No. R8-2002-0012 requires the permittees to develop and submit a WQMP for new developments and significant redevelopments by January 2004 for the Executive Officer's approval. Revisions to the WQMP may be necessary based on the results of Task 4.1, Basin Plan amendments to address recommendations of the SWQSTF, or other investigations. Because of uncertainties regarding the timing of completion of these studies, it is not feasible to identify an explicit date whereby the revision of the WQMP is to be accomplished. Instead, the Executive Officer shall notify the permittees of the need to revise the WQMP. Within 90 days of notification by the Executive Officer, the permittees shall submit for Regional Board approval a plan and schedule to review and revise the WQMP that addresses the bacterial indicator input from new developments and significant redevelopments to assure compliance with the bacterial indicator wasteload allocations for urban runoff. Further review and revision of the WQMP necessary to address TMDL requirements, shall be completed in accordance with the requirements of Order No. R8-2002-0012 or amendments/updates thereto that are adopted by the Regional Board at a public hearing.

4.5 Revise the Riverside County Water Quality Management Plan (WQMP)

Provision VIII.B. of Order No. R8-2002-0011 (see 1.2, above) requires the permittees to develop and submit a WQMP for new developments and significant redevelopments by June 2004 for approval. On September 17, 2004, the Board approved a WQMP developed by the permittees. The approved WQMP includes source control BMPs, design BMPs and treatment control BMPs. Further revisions to the WQMP may be necessary to meet the WLA for urban runoff. Such revisions may be necessary based on the results of Task 4.1, Basin Plan amendments to address recommendations of the SWQSTF, or other investigations. Because of uncertainties regarding the timing of completion of these studies, it is not feasible to identify an explicit date whereby the revision of the WQMP is to be accomplished. Instead, the Executive Officer shall notify the permittees of the need to revise the WQMP. Within 90 days of notification by the Executive Officer, the permittees shall submit for Regional Board approval a plan and schedule for review and revision of the WQMP that addresses the bacterial indicator input from new developments and significant redevelopments to assure compliance with the bacterial indicator wasteload allocations for urban runoff. Further review and revision of the WQMP necessary to address TMDL requirements, shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing.

If the results of studies conducted pursuant to Tasks 3 and 4.1 above demonstrate that either the Phase II non-traditional small MS4 discharges covered under the statewide Waste Discharge Requirements for Stormwater Discharges from Small Municipal Separate Storm Systems (Order No. 2003-0005-DWQ) or industrial discharges from facilities covered by the statewide Industrial Stormwater General Permit (Order 97-03-DWQ) or any Regional Board individual industrial permit, are responsible, to a significant degree, for exceedances of the urban WLAs, the Regional Board will take the appropriate regulatory steps to address these discharges.

Task 5: Agricultural Discharges

Agricultural discharges include stormwater runoff, wastewater release and tailwater runoff from agricultural land uses. Tailwater runoff is irrigation water that runs off of agricultural land. Agricultural land uses include concentrated animal feeding operations and irrigated and dry-land farming in the Middle Santa Ana River Watershed. Concentrated animal feeding operations are regulated under WDRs (see Task 1.3, above); irrigated agriculture and dry-land farming are not currently regulated.

5.1 Develop and Implement Bacterial Indicator Agricultural Source Evaluation Plans

On or before **November 30, 2007**, concentrated animal feeding facility operators and agricultural operators in the Middle Santa Ana River Watershed shall develop and implement Bacterial Source Agricultural Source Evaluation Plans (AGSEP). These plans shall include steps needed to identify specific activities, operations, and processes in agricultural areas that contribute bacterial indicators to Middle Santa Ana River Watershed waterbodies. The plan shall also include a proposed schedule for completion of each of the steps identified. The proposed schedules can include contingency provisions that reflect uncertainty concerning the schedule for completion of the SWQSTF work and/or other investigations that may affect the steps that are proposed. The AGSEP shall be implemented upon Regional Board approval at a duly noticed public meeting.

The Regional Board expects that the AGSEP will be submitted and implemented pursuant to these TMDL requirements. Where and when necessary to implement these requirements, the Regional Board will utilize appropriate waste discharge requirements including those for concentrated animal feeding operations (see 1.3, above), or other Water Code authorities.

In lieu of a coordinated source evaluation plan, one or more of the parties identified above may submit a proposed individual or group AGSEP to conduct the above studies for areas within their jurisdiction. Any such individual or group plan shall also be submitted for Regional Board approval no later than November 30, 2007. This AGSEP shall be implemented upon Regional Board approval at a duly noticed public meeting.

5.2 Develop and Implement a Bacterial Indicator Agricultural Source Management Plan

Based on the results of Task 5.1 or other studies conducted in the watershed, concentrated animal feeding operators and agricultural operators within the Middle Santa Ana River Watershed shall, as a group, submit a proposed Bacterial Indicator Agricultural Source Management Plan (BASMP). Because of uncertainties regarding the timing of completion of these studies and in recognition that readily identifiable steps may be taken to reduce bacterial discharges from agricultural lands, it is not feasible to identify an explicit date whereby the development and implementation of the BASMP is to be accomplished. Instead, the Executive Officer shall notify agricultural operators of the need to submit the proposed BASMP in whole or to submit plans and schedule to address a subset of tasks identified in the AGSEP. Within 90 days of notification by the Executive Officer, the proposed BASMP, or a subset thereof, shall be submitted. The BASMP, or subset thereof, shall be implemented upon Regional Board approval at a duly noticed public meeting. At a minimum, the BASMP shall include plans and schedules for the following:

- A. implementation of bacterial indicator controls, BMPs and reduction strategies designed to meet load allocations;
- B. evaluation of effectiveness of BMPs; and
- C. development and implementation of compliance monitoring program(s).

The Regional Board expects that the BASMP will be submitted and implemented pursuant to these TMDL requirements. Where and when necessary to implement these requirements, the Regional Board will utilize appropriate waste discharge requirements or other Water Code authorities.

In lieu of a coordinated plan, one or more of the parties identified above may submit a proposed individual or group BASMP to develop and implement the above plan for areas within their jurisdiction. Any such individual or group plan shall also be submitted for Regional Board approval. Because of uncertainties regarding the timing of completion of these studies and in recognition that readily identifiable steps may be taken to reduce bacterial discharges from agricultural lands, it is not feasible to identify an explicit date whereby the development and implementation of the BASMP is to be accomplished. Instead, the Executive Officer shall notify agricultural operators of the need to submit the proposed BASMP in whole or to submit plans and schedule to address a subset of tasks identified in the AGSEP. Within 90 days of notification by the Executive Officer, the proposed BASMP, or a subset thereof, shall be submitted. This BASMP, or a subset thereof, shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task 6: Review/Revision of the Bacterial Indicator TMDL (TMDL “Re-opener”)

The basis for the TMDLs and implementation schedule will be re-evaluated at least once every three years⁷⁶ to determine the need for modifying the load and wasteload allocations, numeric targets and TMDLs. Regional Board staff will continue to review all data and information generated pursuant to the TMDL requirements on an ongoing basis. Based on results generated through the monitoring programs, special studies, modeling analysis, efforts of the Storm Water Quality Standards Task Force⁷⁷ and/or special studies by one or more responsible parties, changes to the TMDLs, including revisions to the numeric targets, WLAs and LAs, may be warranted. Such changes would be considered through the Basin Plan Amendment process.

The Regional Board is committed to the review of this TMDL every three years, or more frequently if warranted by the results of monitoring and/or other relevant studies.

(End of amendment adopted under Resolution No. R8-2005-0001)

⁷⁶ The three-year schedule will coincide with the Regional Board’s triennial review schedule.

⁷⁷ Stakeholders formed the Storm Water Quality Standards Task Force (Task Force) in 2002 to support review and update of the bacterial quality objectives for REC1 waters and to review the REC1 designations themselves to assure their accuracy. Participants include representatives from the Santa Ana Watershed Project Authority, (SAWPA) flood control agencies from the 3 counties within the Santa Ana Region, POTW dischargers and stormwater staff from various municipalities in the watershed. Environmental groups, Regional Board staff and USEPA staff are also participants. SAWPA staff serve as facilitators for the Task Force.