

**STATE WATER RESOURCES CONTROL BOARD
BOARD MEETING SESSION – DIVISION OF WATER QUALITY
DECEMBER 6, 2011**

ITEM 15

SUBJECT

CONSIDERATION OF A PROPOSED RESOLUTION APPROVING AN AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR THE LOS ANGELES REGION TO INCORPORATE A TOTAL MAXIMUM DAILY LOAD FOR PESTICIDES AND POLYCHLORINATED BIPHENYLS IN MACHADO LAKE

DISCUSSION

The California Regional Water Quality Control Board, Los Angeles (Los Angeles Water Board) adopted [Resolution No. R10-008](#) on September 2, 2010 incorporating a Total Maximum Daily Load (TMDL) for Pesticides and Polychlorinated Biphenyls (PCBs) in Machado Lake. Machado Lake is impaired for chlordane, DDT, dieldrin, and PCBs in fish tissue and chlordane, DDT, and PCBs in sediment. The exposure of the Machado Lake ecosystem to chlordane, DDT, dieldrin, and PCBs has impaired the aquatic life (WARM, WILD, RARE, WET) and recreation (REC 1, REC2) beneficial uses of the lake. As a result, Machado Lake was placed on the Clean Water Act section 303(d) List of impaired waterbodies in 1998, 2002, 2006 and 2008. This TMDL has been developed to protect the aquatic life (WARM, WILD, RARE, WET) and recreation (REC 1, REC2) beneficial uses by reducing sediment contamination in Machado Lake for chlordane, DDT, dieldrin, and PCBs. Reducing these contaminants in the water and sediment will address the impairment of fish tissue.

A schedule for development of TMDLs in the Los Angeles Region was established in a consent decree (Heal the Bay Inc., et al. v. Browner C 98-4825 SBA) approved on March 22, 1999. Based on the consent decree schedule, TMDLs in this region must be approved or established by U.S. Environmental Protection Agency (U.S. EPA) by March 2012. In accordance with the consent decree, the Machado Lake Pesticides and PCBs TMDL addresses the listings for chlordane, dieldrin, DDT and PCBs in fish tissue for analytical unit 73.

SOURCES

Due to potential harm to human health and the environment, PCBs, DDT, dieldrin, and chlordane are no longer legally sold or used; yet, they remain ubiquitous in the environment, bound to fine-grained particles. When these particles become waterborne, the chemicals are ferried to new locations. The more recent small discharges of Pesticides and PCBs to Machado Lake most likely come from the erosion of pollutant-laden sediment further up in the watershed. Urban runoff and rainfall higher in the watershed mobilize the particles, which are then washed into storm drains and channels that discharge to the lake. Moreover, all of these pollutants bioaccumulate as they move through the food chain, thereby spreading throughout the food chain, while increasing exposure. Finally, sediment toxicity has been reported at Machado Lake, and it is likely that Pesticides and PCBs contribute to the toxic condition of the sediments.

Pollutants that enter Machado Lake through direct, piped, and channeled discharges such as storm drains are classified as point sources. The point sources of Pesticides and PCBs into

Machado Lake are storm water and urban runoff discharges from the municipal separate storm sewer systems (MS4), roads and projects controlled by the California Department of Transportation (Caltrans), as well as general construction and industrial dischargers. Storm water and urban runoff discharges to Machado Lake occur through the Wilmington Drain, Project 77 and Project 510 subdrainage systems.

Nonpoint sources, by definition, include pollutants that reach surface waters from a number of diffuse land uses and source activities that are not point sources. The major nonpoint source of Pesticides and PCBs to Machado Lake is the internal lake sediments. The contaminated lake sediments are a reservoir of historically deposited pollutants. The re-suspension of these sediments contributes to the fish tissue impairment in the lake. Additionally, the feeding behaviors of fish expose them to contaminated sediments.

TARGETS AND TMDL ALLOCATIONS

Applicable water quality objectives for this TMDL are narrative objectives for Chemical Constituents, Bioaccumulation, Pesticides, and Toxicity in the Basin Plan and the numeric water quality criteria promulgated in 40 CFR section 131.38 of the California Toxics Rule (CTR). Water column targets for PCBs, chlordane, DDT, and dieldrin are based on the CTR water quality criteria for protection of human health (for consumption of organisms only). These criteria are more stringent than those for the protection of aquatic life, and as a result these objectives will protect both aquatic life and fish consumption beneficial uses. The sediment numeric targets are based on the freshwater Threshold Effect Concentration guidelines compiled by the National Oceanic and Atmospheric Administration. Fish tissue targets for Pesticides and PCBs are selected from *"Fish Contaminant Goals and Advisory Tissue Levels for Common Contaminants in California Sport Fish: Chlordane, DDTs, Dieldrin, Methylmercury, PCBs, Selenium, and Toxaphene"*, which were developed by the Office of Environmental Health Hazard Assessment in June 2008 to assist other agencies in developing fish tissue-based objectives, with a goal toward pollution mitigation or elimination and protection of humans from consumption of contaminated fish or other aquatic organisms.

Concentration-based waste load allocations for contaminants associated with suspended sediment are assigned to MS4 permittees, including the Cities of Carson, Lomita, Los Angeles, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Torrance, the County of Los Angeles, and Los Angeles County Flood Control District. In addition, Caltrans, general construction and industrial stormwater permittees, and other storm water NPDES permittees are assigned the same concentration-based waste load allocations for sediment. Compliance with the concentration-based waste load allocations for sediment will be determined by lagoon sediment pollutant concentrations at points in the West Arm, North Arm, and Central Arm that represent the cumulative inputs from the MS4 drainage system to the lake.

Responsible Party	Pollutant	Waste load Allocation (WLA) for Suspended Sediment-Associated Contaminants¹ (µg/kg dry weight)
MS4 Permittees, Caltrans, General Construction and Industrial Stormwater Permittees, Other Non-stormwater NPDES Permittees	Total PCBs	59.8
	DDT (all congeners)	4.16
	DDE (all congeners)	3.16
	DDD (all congeners)	4.88
	Total DDT	5.28
	Chlordane	3.24
	Dieldrin	1.9
¹ WLAs are applied with a 3-year averaging period.		

Mass-based load allocations addressing nonpoint sources of Pesticides and PCBs are assigned to the existing lake sediments. The City of Los Angeles, Department of Recreation and Parks is responsible for attainment of the load allocations. The load allocations are set to attain the lake loading capacity, including a ten percent margin of safety to address uncertainties associated with the TMDL.

Responsible Party	Pollutant	Load Allocation (grams)
City of Los Angeles, Department of Recreation and Parks	Chlordane	1,147
	Total DDT	1,870
	Dieldrin	467
	PCBs	12,644

MONITORING AND IMPLEMENTATION

The TMDL relies on waste load allocations being incorporated into the MS4, Caltrans and general construction and industrial storm water NPDES permits, and other non-storm water NPDES permits. Because the pollutants in the TMDL are attached to sediment particles, the Los Angeles Water Board found that the control of sediment loading to Machado Lake is an effective method to attain the waste load allocations. The TMDL identifies a variety of implementation strategies that permitted storm water dischargers can implement to meet the required waste load allocations. For example, non-structural and structural best management practices, and/or diversion and treatment to reduce sediment transport from the watershed to the lake. Additionally, as presented in the Source Assessment, a relatively small discharge of pollutants is currently transported to the lake from the watershed. Therefore, it is likely that some areas of the watershed are already attaining the waste load allocations and only compliance monitoring would be required.

One of the options identified in the TMDL to implement the load allocations assigned to internal lake sources includes the Los Angeles Water Board Executive Officer entering into a Memorandum of Agreement with responsible parties. The Memorandum of Agreement shall include the development of a Lake Water Quality Management Plan and describe the voluntary efforts that will be undertaken to attain the load allocations. Alternatively, if the Memorandum of Agreement is not established within one year from the effective date of the TMDL or compliance with its terms does not occur, the TMDL requires the Los Angeles Water Board Executive Officer to issue a clean-up and abatement order or use another appropriate regulatory mechanism to implement the load allocations.

If the Memorandum of Agreement option is chosen it must comply with the Water Quality Control Policy for Addressing Impaired Waters: Regulatory Structure and Options ([State Board Resolution No. 2005-0050](#)), including Section II, Section 2(c)(ii), and the requirements of this TMDL. One and one-half years from the effective date, of the TMDL, the responsible parties entering into the Memorandum of Agreement must submit a letter of intent, Lake Water Quality Management Plan, Monitoring and Reporting Plan, and Quality Assurance Project Plan for approval by the Los Angeles Water Board Executive Officer. If there is already a Memorandum of Agreement, Lake Water Quality Management Plan, Monitoring and Reporting Plan, and Quality Assurance Project Plan in place to implement the Machado Lake Nutrient TMDL, these documents may be amended to implement and attain the load allocations of this TMDL. Implementation of the Memorandum of Agreement, Lake Water Quality Management Plan, and progress toward the attainment of the TMDL load allocations must be reviewed annually by the Los Angeles Water Board Executive Officer as part of the annual monitoring report submitted by responsible parties. If the Memorandum of Agreement and Lake Water Quality Management Plan are not implemented or otherwise do not result in attainment of load allocations, the Los Angeles Water Board must revoke and rescind the Memorandum of Agreement and the TMDL load allocations may be implemented through a cleanup and abatement order or other appropriate regulatory mechanism.

The goal of the TMDL is to restore all of the beneficial uses of Machado Lake through attainment of water quality objectives. The Los Angeles Water Board plans to determine TMDL effectiveness through water, sediment, and fish tissue monitoring and comparison with the TMDL waste load and load allocations and numeric targets. The TMDL Implementation Schedule is designed to provide responsible parties flexibility to implement best management practices and lake management strategies to address the Pesticides and PCBs impairments at Machado Lake. Implementation consists of development of monitoring/management plans by responsible parties, implementation of best management practices to address external contaminant loading to the lake, and lake management activities to remediate the sediment contamination and protect aquatic life. The TMDL requires all waste load allocation and load allocations to be achieved by September 30, 2019.

COST ESTIMATES

The cost of implementing this TMDL will range widely, depending on the methods that the responsible parties select to meet the waste load and load allocations. The foreseeable methods of compliance for this TMDL entail construction and operation of stormwater management practices such as filter systems and grass swales. Foreseeable methods of compliance also include lake management practices, such as monitored natural attenuation, in-situ capping, and hydraulic dredging.

Storm water management/treatment options for Suspended Sediment

A. Summary of estimated costs for sand/organic filter systems

Item	Unit Price	Total Cost
Construction	\$12,000 ¹	\$9.2 million
Maintenance	5% of construction cost	\$ 460,800 annually
Amortized cost over 7 years (6% interest)		2.5 million annually
¹ Median cost of a 5-acre treatment system adjusted to 2010 dollars		

B. Summary of estimated costs for vegetated swales

Item	Unit Price	Total Cost
Construction	\$19,000 ¹	\$7.3 million
Maintenance	5% of construction cost	\$ 365,000 annually
Amortized cost over 7 years (6% interest)		\$2.0 million annually
¹ Mid-range cost of 10-acre treatment system adjusted to 2010 dollars		

Remediation of in-situ Machado Lake Sediments

A. Summary of annual monitoring costs for Monitored Natural Attenuation

Item	Cost	Total Cost
15 samples	Analysis at \$400 per sample	6,000
3 QAQC samples	Analysis at \$400 per sample	1,200
Sample collection (16 hours)	100 per hour	1,600
Sub total		8,800
10 % Contingency		880
Total		9,680

B. Installation costs for in-situ capping at Machado Lake

Item	Unit Cost	Area (ft ²)	Total Cost
Mobilization/Demobilization ^a	\$300,000		\$300,000
Capping Activities ^b	\$2.15/ft	1,742,400	3,746,160
			4,046,160
^a U.S. Army Corps of Engineers, 2005 ^b U. S. EPA, 2002			

C. Dredging

Sediment removal and disposal costs were obtained from the final Pre-Design Report for the Machado Lake Ecosystem Rehabilitation Project. The High-Level Scenario for sediment removal and disposal at Machado Lake includes dredging, dewatering, rehandling, transporting, and disposal; the High Level Scenario assumes that the majority of sediment in Machado Lake is contaminated. The cost estimate is \$146 per cubic yard of dredged sediment. This estimate

does not include contractor overhead or contingency costs (Pre-Design Report for the Machado Lake Ecosystem Rehabilitation Project Appendix N, July 2009). Based on the value of \$146 per cubic yard, the estimated total costs for dredging Machado Lake is \$71 million.

POLICY ISSUE

Should the State Water Board approve the amendment to the Basin Plan to incorporate a TMDL for Pesticides and PCBs in Machado Lake as adopted by Los Angeles Water Board Resolution No. R10-008?

FISCAL IMPACT

Los Angeles Water Board and State Water Board staff work associated with or resulting from this action will be addressed with existing and future budgeted resources.

REGIONAL WATER BOARD IMPACT

Approval of Los Angeles Water Board Resolution No. R10-008 will amend the Los Angeles Water Board's Basin Plan.

STAFF RECOMMENDATION

That the State Water Board:

1. Approves the amendment to the Basin Plan as adopted under Los Angeles Water Board Resolution No. R10-008.
2. Directs the Executive Director or designee to submit the amendment adopted under Los Angeles Water Board Resolution No. R10-008 to Office of Administrative Law for approval of the regulatory provisions and to U.S. EPA for approval of the TMDL.

State Water Board action on this item will assist the Water Boards in reaching Goal 1 of the Strategic Plan Update: 2008-2012 to implement strategies to fully support the beneficial uses for all 2006-listed water bodies by 2030. In particular, approval of this item will assist in fulfilling Action 1 to prepare, adopt, and take steps to carry out TMDLs, designed to meet water quality standards, for all impaired water bodies on the 2006 list.

**STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2011-**

APPROVING AN AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR
THE LOS ANGELES REGION TO INCORPORATE A TOTAL MAXIMUM DAILY LOAD FOR
PESTICIDES AND POLYCHLORINATED BIPHENYLS IN MACHADO LAKE

WHEREAS:

1. On September 2, 2010, the Los Angeles Regional Water Quality Control Board (Los Angeles Water Board) adopted [Resolution No. R10-008](#), an amendment to the Water Quality Control Plan for the Los Angeles Region (Basin Plan amendment), to incorporate a total maximum daily load (TMDL) for pesticides and Polychlorinated Biphenyls (PCBs) in Machado Lake.
2. The Los Angeles Water Board's goal in establishing the TMDL for pesticides and PCBs in Machado Lake is to protect the recreation (REC 1 and REC 2) and aquatic life (WARM, WILD, RARE, WET) beneficial uses of Machado Lake by achieving the numeric and narrative water quality objectives set to protect those uses.
3. The Los Angeles Water Board found that the analysis contained in the **Final Project Report, entitled "Machado Lake Pesticides and PCBs TMDL,"** the California Environmental Quality Act (CEQA) ~~"Substitute Environmental Document"~~ **action** for the proposed Basin Plan amendment, including the CEQA Checklist, the **final** staff report **entitled "Machado Lake Pesticides and PCBs TMDL,"** and the responses to **comments prepared by Los Angeles Water Board staff and Resolution R10-008 adopted by the Los Angeles Water Board** complies with the requirements of the State Water ~~Resources Control~~ Board's **(State Water Board)** certified regulatory CEQA process, as set forth in the California Code of Regulations, Title 23, section 3775 et seq. ~~The Los Angeles Water Board also found that the regulatory action meets the "Necessity" standard of the Administrative Procedures Act, Government Code section 11353, Subdivision (b).~~ The State ~~Water~~ Board has reviewed the ~~Substitute Environmental Document~~ **and determinations, including the Statement of Overriding Considerations.**
4. The Los Angeles Water Board also adopted the Basin Plan amendment pursuant to the "Necessity" standard of the Administrative Procedures Act, Government Code section 11353, Subdivision (b).
5. The State Water Board finds that ~~the Basin Plan in amending the Basin Plan the Los Angeles Water Board is in conformance~~ **complied with the requirements set forth in with Water Code section 13240 sections 13240 which specifies that regional water quality control boards may revise basin plans, and section 13242 of the California Water Code which requires a program of implementation for achieving water quality objectives. The State Water Board also finds that the TMDL as reflected in the Basin Plan Amendment is consistent with the requirements of federal Clean Water Act section 303(d).**

6. The Los Angeles Water Board found ~~the Basin Plan that adoption of this~~ amendment is consistent with the **Statement of Policy with Respect to Maintaining High Quality of Waters in California Antidegradation Policy** ([State Water Board Resolution No. 68-16](#)) and ~~the f~~Federal Antidegradation Policy (40 CFR **section** 131.12), in that it does not allow degradation of water quality, but requires restoration of water quality and attainment of water quality standards.
7. Numeric targets for the TMDL are based on narrative and numeric water quality objectives provided in the Basin Plan and 40 CFR **section** 131.38 (California Toxics Rule). Compliance with the targets will be based on an implementation schedule with a final attainment date of September 30, 2019.
8. A Basin Plan amendment does not become effective until approved by the State Water Board and until the regulatory provisions are approved by the Office of Administrative Law (OAL). The TMDL must also be approved by the U.S. Environmental Protection Agency (U.S. EPA).

THEREFORE BE IT RESOLVED THAT:

The State Water Board:

1. Approves the **Basin Plan** amendment ~~to the Basin Plan~~ as adopted under Los Angeles Water Board Resolution No. R10-008.
2. **Authorizes and d**irects the Executive Director or designee to submit the **Basin Plan** amendment adopted under Los Angeles Water Board Resolution No. R10-008 to OAL for approval of the regulatory provisions and to U.S. EPA for approval of the TMDL.

CERTIFICATION

The undersigned Clerk to the Board does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on December 6, 2011.

Jeanine Townsend
Clerk to the Board