

**Amendment to the Water Quality Control Plan – Los Angeles Region
to Incorporate the
Total Maximum Daily Load for PCBs, Pesticides and Sediment Toxicity
in McGrath Lake**

Adopted by the California Regional Water Quality Control Board, Los Angeles Region on October 1, 2009

Amendments:

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Chapter 7. Total Maximum Daily Loads (TMDLs) Summaries

Add:

7-37 McGrath Lake PCBs, Pesticides and Sediment Toxicity TMDL

This TMDL was adopted by:

The Regional Water Quality Control Board on October 1, 2009.

This TMDL was approved by:

The State Water Resources Control Board on December 14, 2010.

The Office of Administrative Law on May 31, 2011.

The U.S. Environmental Protection Agency on June 30, 2011.

This TMDL is effective on June 30, 2011.

The elements of the TMDL are presented in Table 7-37.1 and the Implementation Plan in Table 7-37.2.

**Table 7-37.1. McGrath Lake PCBs, Pesticides and Sediment Toxicity
TMDL: Elements**

TMDL Element	Regulatory Provisions																								
<p>Problem Statement</p>	<p>McGrath Lake was placed on the Clean Water Act Section 303(d) list in 1998, 2002, and 2006 as impaired for organochlorine pesticides (chlordane, dieldrin, DDT and derivatives) and polychlorinated biphenyls (PCBs) in sediment and for sediment toxicity. These toxic organic chemicals bind to soil particles, are stored in the fat tissue of exposed organisms, and create long term environmental impairments. Past studies concluded that sediment toxicity in McGrath Lake was likely due to the elevated concentrations of pesticides and PCBs in sediment.</p> <p>Applicable Water Quality Objectives for this TMDL are narrative water quality objectives for Chemical Constituents, Bioaccumulation, Pesticides and Toxicity contained in Chapter 3, the numeric water quality objective for PCBs contained in Chapter 3 and the numeric water quality criteria promulgated in 40 CFR 131 (California Toxics Rule (CTR)).</p> <p>The exposure of the McGrath Lake ecosystem to chlordane, DDT, dieldrin, and PCBs in amounts exceeding the objectives and criteria has impaired the beneficial uses of the lake, including aquatic life uses (rare, threatened or endangered species and estuarine, wildlife, and wetland habitat) and recreation uses (contact and non-contact recreation and commercial and sport fishing).</p>																								
<p>Numeric Targets</p>	<p>Water column targets for PCBs, chlordane, DDT, and dieldrin are based on the CTR water quality criteria for protection of human health (organisms only). These criteria are more stringent than those for the protection of aquatic life and thus will protect both aquatic life and fish consumption beneficial uses. The sediment numeric targets are derived from the Effects Range-Low (ER-Ls) guidelines compiled by the National Oceanographic and Atmospheric Administration (NOAA). The sediment toxicity impairment is addressed by these numeric targets, which are protective of aquatic life in sediment.</p> <table border="1" data-bbox="574 1388 1294 1730"> <thead> <tr> <th>Pollutant</th> <th>Water Column Targets (µg/L)</th> <th>Sediment Targets (ng/dry g)</th> </tr> </thead> <tbody> <tr> <td>Chlordane</td> <td>0.00059</td> <td>0.5</td> </tr> <tr> <td>Dieldrin</td> <td>0.00014</td> <td>0.02</td> </tr> <tr> <td>4,4'-DDT</td> <td>0.00059</td> <td>1</td> </tr> <tr> <td>4,4'-DDE</td> <td>0.00059</td> <td>2.2</td> </tr> <tr> <td>4,4'-DDD</td> <td>0.00084</td> <td>2</td> </tr> <tr> <td>Total DDT</td> <td>--</td> <td>1.58</td> </tr> <tr> <td>Total PCBs</td> <td>0.00017</td> <td>22.7</td> </tr> </tbody> </table>	Pollutant	Water Column Targets (µg/L)	Sediment Targets (ng/dry g)	Chlordane	0.00059	0.5	Dieldrin	0.00014	0.02	4,4'-DDT	0.00059	1	4,4'-DDE	0.00059	2.2	4,4'-DDD	0.00084	2	Total DDT	--	1.58	Total PCBs	0.00017	22.7
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<p>Source Analysis</p>	<p>A source of the pesticide and PCB loading is contaminated surface water and sediments flushing into McGrath Lake from the Central Ditch, which drains agriculture and other lands. All of the contaminants included in this TMDL are</p>																								

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	<p>legacy pollutants. While they are no longer legally sold or used, they remain ubiquitous in the environment, bound to fine-grained particles. Irrigation and rainfall in the watershed mobilize these particles, which are loaded to McGrath Lake. Surface water (stormwater and agricultural drainage) accounts for almost half of the total recharge of the lake, while groundwater accounts for the rest of the recharge. Pesticides and PCBs have been detected in the surface water inlet to the lake (Central Ditch) but not in the groundwater from local monitoring wells. There are no point sources of pesticides or PCBs to McGrath Lake. Atmospheric deposition may be contributing PCBs.</p> <p>In addition to external loading, the in-situ sediments are likely a source of contaminants to the lake water column due to the high concentrations of contaminants in the sediment.</p>
Linkage Analysis	<p>A conceptual model identifies the assimilative capacity of McGrath Lake and links the source loading information to the numeric targets. The chemical properties of the pesticides and PCBs result in strong binding to particulate matter, therefore most of the incoming contaminants from the Central Ditch to the lake are bound to suspended solids. However, pesticide exceedances are observed in the Central Ditch even in low-flow conditions, indicating that some of the contaminants are transported to the lake in the water fraction. Therefore, there are water column and suspended sediment allocations for the Central Ditch.</p> <p>Once the suspended sediment settles to the lake bottom, desorption is possible due to the high contaminant concentrations, favorable environmental conditions and extended contact time (between the sediment and water). The contaminated lake sediments are toxic to benthic organisms and may also be taken up through bioturbation and feeding processes. Therefore, both external loading sources from the lake subwatershed and internal loading from contaminated lake sediments are assigned load allocations.</p>

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<p>Load Allocations</p>	<p>Load allocations (LAs) addressing non-point sources of pesticides and PCBs are assigned to discharges from the Central Ditch to the lake and internal sources from the lake sediments. The lake sediments are defined as bed sediments in the main body of the lake and the riparian corridor west of Harbor Boulevard.</p> <p>The in-lake LAs are for concentrations in sediment only.</p> <table border="1" data-bbox="683 485 1187 852"> <thead> <tr> <th>Pollutant</th> <th>Load Allocation for Concentration in Lake Sediment (µg/dry kg)</th> </tr> </thead> <tbody> <tr> <td>Chlordane</td> <td>0.5</td> </tr> <tr> <td>Dieldrin</td> <td>0.02</td> </tr> <tr> <td>4,4'-DDT</td> <td>1</td> </tr> <tr> <td>4,4'-DDE</td> <td>2.2</td> </tr> <tr> <td>4,4'-DDD</td> <td>2</td> </tr> <tr> <td>Total DDT</td> <td>1.58</td> </tr> <tr> <td>Total PCBs</td> <td>22.7</td> </tr> </tbody> </table> <p>The Central Ditch LAs are for concentrations in both suspended sediment and water.</p> <table border="1" data-bbox="558 989 1312 1356"> <thead> <tr> <th>Pollutant</th> <th>Water Column Load Allocation (µg/L)</th> <th>Load Allocation for Concentration in Suspended Sediment (µg/dry kg)</th> </tr> </thead> <tbody> <tr> <td>Chlordane</td> <td>0.00059</td> <td>0.5</td> </tr> <tr> <td>Dieldrin</td> <td>0.00014</td> <td>0.02</td> </tr> <tr> <td>4,4'-DDT</td> <td>0.00059</td> <td>1</td> </tr> <tr> <td>4,4'-DDE</td> <td>0.00059</td> <td>2.2</td> </tr> <tr> <td>4,4'-DDD</td> <td>0.00084</td> <td>2</td> </tr> <tr> <td>Total DDT</td> <td>--</td> <td>1.58</td> </tr> <tr> <td>Total PCBs</td> <td>0.00017</td> <td>22.7</td> </tr> </tbody> </table>	Pollutant	Load Allocation for Concentration in Lake Sediment (µg/dry kg)	Chlordane	0.5	Dieldrin	0.02	4,4'-DDT	1	4,4'-DDE	2.2	4,4'-DDD	2	Total DDT	1.58	Total PCBs	22.7	Pollutant	Water Column Load Allocation (µg/L)	Load Allocation for Concentration in Suspended Sediment (µg/dry kg)	Chlordane	0.00059	0.5	Dieldrin	0.00014	0.02	4,4'-DDT	0.00059	1	4,4'-DDE	0.00059	2.2	4,4'-DDD	0.00084	2	Total DDT	--	1.58	Total PCBs	0.00017	22.7
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<p>Margin of Safety</p>	<p>The uncertainties associated with this TMDL are due to limited data on the amount and media by which PCBs and pesticides are entering the lake and the extent to which these contaminants are already in the lake. The seasonal and annual variability in the hydrologic budget also creates uncertainty. To address these uncertainties, an implicit margin of safety is applied. Conservative assumptions were used to calculate the loading to the lake and more the protective ER-L sediment quality guidelines were used for the sediment numeric targets.</p>																																								
<p>Seasonal Variations and Critical Conditions</p>	<p>As the contaminants of concern for this TMDL are transported to the lake by the mobilization of sediment, it is expected that the greatest influx of PCBs and pesticides occurs during periods of increased runoff from the watershed. Due to the artificial interference in the watershed hydrologic cycle due to agricultural activities, peak runoff may not correspond to the southern California wet season. Seasonal variations and critical conditions are addressed by the use of</p>																																								

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	<p>concentration-based load allocations. However, due to the bioaccumulative properties of the pollutants, effects occur over extended time periods, which minimizes the importance of seasonal variations.</p>
<p>Monitoring</p>	<p><u>Monitoring Program</u></p> <p>The monitoring program shall measure the progress of pollutant load reductions and improvements in water and sediment quality. The monitoring program shall:</p> <ul style="list-style-type: none"> ▪ Determine attainment of numeric targets for PCBs and pesticides; ▪ Determine compliance with the load allocations for PCBs and pesticides; and ▪ Monitor the effect of implementation actions on lake water and sediment quality. <p>The monitoring program shall consist of two phases. The first phase will focus on sampling the Central Ditch (for the first 10 years of the TMDL implementation schedule) and will be conducted by the responsible parties for the Central Ditch LAs. For the remaining portion of the TMDL implementation schedule, required water and sediment samples will be collected from the Central Ditch by “responsible parties” for the Central Ditch LAs, while required water and sediment samples will be collected from the lake as prescribed by the McGrath Lake Work Plan (MLWP) developed pursuant to a Memorandum of Agreement (MOA) entered into by and between “cooperative parties” and the Regional Board. The “responsible parties” and “cooperative parties” are defined in the implementation section below.</p> <p><u>Phase 1</u></p> <p>Phase 1 requires the development of a monitoring and reporting plan (MRP) to comply with the TMDL requirements. The MRP shall propose a monitoring frequency for water and sediment sampling that will characterize the variability in water and sediment quality observed in the Central Ditch. Water samples will be analyzed for the following constituents:</p> <ul style="list-style-type: none"> ▪ Total Organic Carbon ▪ Total Suspended Solids ▪ Total PCBs ▪ DDT and Derivatives ▪ Dieldrin ▪ Total Chlordane <p>Sediment samples will be analyzed for the following constituents:</p> <ul style="list-style-type: none"> ▪ Total Organic Carbon ▪ Total PCBs ▪ DDT and Derivatives ▪ Dieldrin ▪ Total Chlordane

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	<p>The annual monitoring reports will summarize proposed changes to the MRP based on the results of the previous year's monitoring. Sampling frequency may be reduced during future years once characterization of the variability in water and sediment quality has been achieved. In addition to the constituents above, general water chemistry (temperature, dissolved oxygen, pH and electrical conductivity) and a flow measurement will be required at each sampling event.</p> <p>Responsible parties for phase 1 monitoring shall submit a MRP plan to assess compliance with LAs and a Quality Assurance Project Plan (QAPP). The MRP and QAPP must be submitted to the Executive Officer for approval within six months of the effective date of the TMDL. The QAPP shall include protocols for sample collection, standard analytical procedures, and laboratory certification. All samples shall be collected in accordance with Surface Water Ambient Monitoring Program (SWAMP) protocols, where available or alternative protocols proposed by dischargers and approved by the Executive Officer. Monitoring shall begin 90 days after the Executive Officer has approved the MRP and QAPP.</p> <p>At the time of TMDL adoption, several of the constituents of concern had numeric targets lower than the laboratory detection limits. As analytical methods and detection limits continue to improve (i.e. development of lower detection limits) and become more environmentally relevant, responsible parties shall incorporate new analytical methods with lower detection limits in the MRP and the QAPP.</p> <p>A monitoring report shall be prepared and submitted to the Regional Board annually within three months after the completion of the final sampling event of the year.</p> <p><u>Phase 2</u> The sampling, analysis and flow measurements begun in Phase 1 will continue. Additionally, samples will be collected from within the lake. Water column and surficial sediment (top 2 cm) samples will be collected at the northern end of the lake and from the deepest portion of the lake. All samples will be collected in accordance with SWAMP protocols. Cooperative parties shall only commence, participate or fund the Phase 2 monitoring as provided in the MLWP.</p> <p>Water samples will be analyzed for the following constituents:</p> <ul style="list-style-type: none"> ▪ Total Organic Carbon ▪ Total Suspended Solids ▪ Total PCBs ▪ DDT and Derivatives ▪ Dieldrin ▪ Total Chlordane <p>Sediment samples will be analyzed for the following constituents:</p> <ul style="list-style-type: none"> ▪ Total Organic Carbon ▪ Total PCBs

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	<ul style="list-style-type: none"> ▪ DDT and Derivatives ▪ Dieldrin ▪ Total Chlordane ▪ Toxicity (if toxicity is determined, a TIE shall be completed to elucidate the cause of the toxicity) <p>Samples from the lake will be collected annually. The annual reports required for Phase 1 will continue during Phase 2. Additional monitoring may be required depending on which implementation option is chosen.</p> <p>Three years from the effective date of the TMDL, cooperative parties must submit the MLWP as discussed in the implementation section below.</p> <p>At the time of TMDL adoption, several of the constituents of concern had numeric targets lower than the laboratory detection limits. All required monitoring under Phase 1 and Phase 2 shall incorporate new analytical methods, once commercially available with lower detection limits, in the MRP and the QAPP.</p> <p>A monitoring report shall be prepared and submitted to the Regional Board annually within three months after the completion of the final sampling event of the year.</p>

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<p>Implementation Plan</p>	<p>Compliance with this TMDL will require the elimination of pollutant loads in toxic amounts from the Central Ditch to the lake and identification and implementation of strategies to remediate the contaminated sediments at the bottom of the lake. Table 7-37.2 contains a schedule for cooperative parties to implement a MOA to jointly develop the MLWP to implement strategies to remediate the contaminated lake sediments and achieve lake sediment load allocations.</p> <p>I. Implementation and Determination of Compliance with the Central Ditch LAs for Agricultural Non-point Source Discharges</p> <p>The Central Ditch load allocations assigned to agriculture non-point source dischargers will be implemented through the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Conditional Waiver) or other appropriate Regional Board Orders. The load allocations for the Central Ditch shall be incorporated into the Conditional Waiver or other appropriate Regional Board Orders.</p> <p>It is likely that a combination of implementation measures will be needed to achieve the LAs. The Central Ditch implementation actions may include, but are not limited to the following:</p> <ul style="list-style-type: none"> ▪ On-Farm BMPs ▪ Regional Sub-Watershed BMPs ▪ Regional Treatment System ▪ Redirect Agriculture Discharge <p>The estimated costs for on-farm BMPs such as buffer crops, filter strips, and sedimentation basins are approximately \$373/acre of BMP, \$1002/acre of BMP, and \$10,000/acre of BMP, respectively. The estimated costs for regional sub-watershed BMPs, such as converting the Central Ditch to a grassed waterway or converting the dirt road that runs along the Central Ditch into a filter strip, are approximately \$1,288/per acre of BMP and \$1002/per acre of BMP, respectively. The estimated cost of a regional treatment system to address the Central Ditch water is about \$151,536/year. The estimated costs to redirect the agriculture discharge toward a nearby canal are \$612,611 (open ditch) to \$1,287,402 (piped diversion). Potential sources of financing for these implementation alternatives, such as Clean Water Act section 319(h) grant funding, are discussed in Chapter 4. As discussed in Chapter 4, the U.S. Department of Agriculture Soil Conservation Service and the Resource Conservation Districts provide information on, and assistance in, implementing BMPs.</p> <p>Agricultural Dischargers will be considered in compliance with the TMDL LAs if they comply with all provisions of the Conditional Waiver established to implement the LAs , or those of any alternative regulatory order, if any, that may be established to implement the LAs in lieu of the Conditional Waiver.</p>

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	<p data-bbox="407 254 1466 348">II. Implementation of Memorandum of Agreement to Develop McGrath Lake Work Plan and Determination of Compliance with LAs for Contaminated Lake Sediments</p> <p data-bbox="407 386 1466 852">The contaminated lake sediment LAs may be implemented through a MOA, which the Executive Officer is authorized to negotiate and execute, provided it is consistent with the following: The MOA shall detail the voluntary efforts that will be undertaken to attain the load allocations. The MOA shall comply with the <u>Water Quality Control Policy for Addressing Impaired Waters: Regulatory Structure and Options</u> ("Policy"), including part II, section 2 (c)(ii) and related provisions, and shall be consistent with the requirements of this TMDL. If the MOA is timely adopted in accordance with the implementation schedule below, the program described in the MOA shall be deemed "certified", pursuant to the Policy, subject to the conditions of Policy section 2 (e). The MOA shall include development of the MLWP, which must be approved by the Executive Officer, and may be amended with Executive Officer approval, as necessary. Implementation of the MOA shall be reviewed annually by the Executive Officer as part of the MRP annual reports.</p> <p data-bbox="407 890 1466 1020">The purpose of the MOA is not to create evidence of responsibility or ascertain legal liability for subsequent remediation of the lake sediments, but rather to organize stakeholders who have an interest in the remediation of the lake sediments.</p> <p data-bbox="407 1058 1466 1121">To be a valid non-regulatory implementation program adopted by the Regional Board, the MOA shall include the following requirements and conditions:</p> <ul style="list-style-type: none"> <li data-bbox="453 1163 1466 1226">■ The MOA shall direct development of a MLWP that addresses the impaired waterbody as approved by the Executive Officer. <li data-bbox="453 1272 1466 1335">■ The MOA shall outline the roles and responsibilities of the Regional Board and each cooperative party. <li data-bbox="453 1381 1466 1520">■ The MOA shall contain conditions that require trackable progress on attaining load allocations and numeric targets. A timeline shall be included that identifies the point(s) at which Regional Board regulatory intervention and oversight will be triggered if the pace of work lags or fails. <li data-bbox="453 1566 1466 1667">■ The MOA shall contain a provision that it shall be revoked based upon findings that the program has not been adequately implemented, is not achieving its goals, or is no longer adequate to restore water quality. <li data-bbox="453 1713 1466 1843">■ The MOA shall be consistent with the <u>California Policy for Implementation and Enforcement of the Non-point Source Pollution Control Program</u>, including but not limited to, the "Key Elements of a Non-point Source Pollution Control Implementation Program".

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	<p>Pursuant to the terms of the MOA, the cooperative parties and the Regional Board will work jointly to develop the MLWP and remediate the lake sediments. The purpose of the MLWP is to set forth strategies to achieve lake sediment load allocations in a manner that is beneficial to subwatershed landowners and the public in general. To the satisfaction of the Executive Officer, the MLWP shall meet the following criteria:</p> <ul style="list-style-type: none"> ■ Three years from the effective date of the TMDL cooperative parties shall submit a MLWP for approval by the Executive Officer. ■ The MLWP shall include identification of implementation measures that will achieve lake sediment LAs. ■ The MLWP shall include any additional monitoring needed to assess the effectiveness of the MLWP’s chosen implementation strategies. ■ The MLWP shall include a MRP and QAPP for phase 2 monitoring. ■ The MLWP shall include a strategy to secure funds necessary to remediate the lake sediments and achieve lake sediment allocations. ■ The MLWP shall include tasks and a clear timeline for task completion leading to attainment of lake sediment LAs. The roles and responsibilities of each cooperative party shall also be outlined in the MLWP. ■ The MLWP shall consider and address the potential impacts of lake sediment remediation strategies on the implementation of the McGrath Beach Bacteria TMDL and ongoing restoration efforts at McGrath State Beach. ■ The MLWP shall achieve compliance with the load allocations through the implementation of lake management strategies to reduce and manage internal pesticide and PCBs sources from lake bed sediments. The lake management implementation actions may include: <ul style="list-style-type: none"> ■ Sediment Capping; ■ Dredging/Hydraulic Dredging; ■ Monitored Natural Attenuation; or ■ Other appropriate means of implementation. <p>The Executive Officer may require a revised MLWP to reflect the results of data obtained through TMDL implementation.</p> <p>III. APPLICATION OF ALLOCATIONS</p> <p>A. Responsible parties for the Central Ditch LAs are the agricultural dischargers in the McGrath Lake sub-watershed.</p>

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	<p>B. Responsible parties for the lake sediment LAs have not yet been identified. Instead, cooperative parties for the lake sediment LAs are identified, not as responsible parties or as dischargers, but as landowners in the subwatershed who may execute a MOA jointly with the Regional Board for the development of the MLWP so that lake sediment allocations can be achieved in a manner that is in the best interest of both the subwatershed landowners and the public in general.</p> <p>Cooperative parties for the lake sediment LAs include:</p> <ul style="list-style-type: none"> • State of California Department of Parks and Recreation • McGrath Family (owners of the Central Ditch west of Harbor Blvd and the northern end of the lake) • Agricultural Landowners in the McGrath Lake sub-watershed • Ventura Regional Sanitation District (Bailard Landfill) <p>If a MOA is not established by and between cooperative parties and the Regional Board within two years of the effective date of the TMDL, or the cooperative parties do not comply with the terms of the MOA, or if the MOA and MLWP are not implemented or otherwise do not result in attainment of load allocations consistent with the provisions and schedule of the TMDL, the Executive Officer shall initiate an investigation, with input from current landowners, to (1) identify the responsible parties, whether named in this TMDL or not, whose discharges of the legacy pollutants have caused or contributed to the impairment of the lake; (2) ascertain the whereabouts and capacities of those responsible parties and/or their successors; (3) determine the parties to whom responsibility for remediation of sediments should be assigned; and (4) issue appropriate regulatory orders to those responsible parties.</p> <p>In addition, a comprehensive review of the MOA by the Executive Officer shall take place five years from the effective date of the MOA. The purpose of this review is to ensure adequate progress pursuant to the timeline established in the MOA on development of the MLWP and ultimately attainment of the lake sediment load allocations. If the Executive Officer determines that adequate progress has not been made, the Regional Board shall initiate the investigation described above.</p> <p>If the Executive Officer is unable to identify the responsible parties per the investigations above, then the TMDL shall be reconsidered.</p>

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Table 7-37.2 McGrath Lake PCBs and Pesticides TMDL: Implementation Schedule

Task Number	Task	Deadline
1	Responsible parties assigned Central Ditch LAs shall submit a Monitoring and Reporting Plan (MRP) to the Executive Officer for review and approval to address Phase 1 monitoring.	6 months from the effective date of the TMDL
2	Responsible parties assigned Central Ditch LAs shall begin monitoring as outlined in the approved MRP.	90 days from the date of MRP approval
3	Responsible parties assigned Central Ditch LAs shall submit annual monitoring reports. Reports shall be submitted within three months after the completion of the final sampling event of the year.	Annually
4	Cooperative parties shall enter into a Memorandum of Agreement (MOA) with the Regional Board to implement the lake sediment LAs.	Two years from the effective date of the TMDL
5	Parties subject to the MOA shall submit a McGrath Lake Work Plan (MLWP) for review and approval by the Executive Officer.	Three years from the effective date of the TMDL
6	Parties subject to the MOA shall submit annual progress reports.	Annually from the date of MLWP approval
7	Responsible parties shall attain Central Ditch LAs.	10 years from the effective date of the TMDL
8	Begin implementation of McGrath Lake sediment remediation actions based on MLWP.	As soon as possible, but no later than 10 years from the effective date of the TMDL
9	Phase 2 monitoring shall begin as outlined in the MLWP. The results shall be included as part of the annual progress reports initiated in Task 6.	To be determined based on MLWP.
10	Lake sediment LAs shall be achieved.	14 years from the effective date of the TMDL