

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
CENTRAL VALLEY REGION

RESOLUTION NO. R5-2005- \_\_\_\_

AMENDING THE WATER QUALITY CONTROL PLAN  
FOR  
THE SACRAMENTO RIVER AND SAN JOAQUIN RIVER BASINS  
FOR THE CONTROL OF MERCURY IN CACHE CREEK,  
BEAR CREEK, SULPHUR CREEK, AND HARLEY GULCH

WHEREAS, in 1975 the California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Board) adopted a Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (hereafter Basin Plan), which has been amended occasionally; and

WHEREAS, the Basin Plan may be amended in accordance with the California Water Code Section 13240, et seq.; and

WHEREAS, Water Code Section 13241 requires the Regional Board to establish water quality objectives and Section 13242 requires a program for implementation for achieving water quality objectives; and

WHEREAS, Cache Creek, Bear Creek, Sulphur Creek, and Harley Gulch (hereafter Cache Creek watershed) have been identified under the federal Clean Water Act Section 303(d) as impaired waterbodies due to either elevated concentrations of mercury in water, methylmercury in fish tissue, or the existence of a fish consumption advisory; and

WHEREAS, the Regional Board recognizes that the Basin Plan does not include numeric water quality objectives for mercury nor a plan to reduce mercury concentrations in the Cache Creek watershed, therefore, a Basin Plan amendment to adopt water quality objectives and an implementation policy necessary to protect beneficial uses is appropriate; and

WHEREAS, the Regional Board has developed a water quality management strategy as a Basin Plan amendment to reduce the concentrations of methylmercury in fish tissue that is based on reducing the overall mercury and methylmercury loads to the Cache Creek watershed; and

WHEREAS, the proposed amendment modifies Basin Plan Chapter II (Existing and Potential Beneficial Uses) to include commercial and sport fishing as a beneficial use designation for Cache Creek, North Fork Cache Creek, and Bear Creek; and

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WHEREAS, the proposed amendment modifies Basin Plan Chapter III (Water Quality Objectives) to establish site-specific numeric objectives for methylmercury in fish in Cache Creek, Bear Creek, and Harley Gulch; and

WHEREAS, the proposed amendment modifies Basin Plan Chapter IV (Implementation) to establish a water quality management strategy to reduce mercury and methylmercury loads into the Cache Creek watershed, including the allocation requirements of a Total Maximum Daily Load; and

WHEREAS, the proposed amendment modifies Basin Plan Chapter V (Surveillance and Monitoring) to include a water, sediment, and fish tissue monitoring program to monitor progress in achieving mercury and methylmercury concentration reductions; and

WHEREAS, the proposed amendment requires the owners of inactive mines to develop and implement plans to reduce mercury discharges from the mines, and it requires federal, state, and local agencies to develop and implement plans to reduce mercury and methylmercury loads from areas with mercury-contaminated sediments or methylmercury sources; and

WHEREAS, the Regional Board has considered the costs of implementing the proposed amendment, and finds these costs to be reasonable relative to the water quality benefits derived from implementing the proposed amendment; and

WHEREAS, Regional Board staff developed a draft staff report and draft Basin Plan Amendment for external scientific peer review in March 2004 in accordance with Health and Safety Code Section 57004 and the draft final staff report and amendment have been changed to conform to the recommendations of the peer reviewers or staff has provided an explanation of why no change was made; and

WHEREAS, the Regional Board finds that the scientific portions of the Basin Plan Amendment are based on sound scientific knowledge, methods, and practices in accordance with Health and Safety Code Section 57004; and

WHEREAS, Regional Board staff developed a report for public comment and peer review and held a California Environmental Quality Act (CEQA) scoping meeting on 2 June 2004, the Regional Board held a workshop on 18 March 2005, and the Regional Board and held a public hearing on \_\_\_\_ June 2005 to consider the proposed amendment; and

WHEREAS, The basin planning process has been certified as “functionally equivalent” to CEQA requirements for preparing environmental documents and is, therefore, exempt from those requirements (Public Resources Code, Section 21000 et seq.); and

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WHEREAS, Regional Board staff completed an environmental checklist and functional equivalent document in compliance with the provisions of CEQA that concluded that the proposed amendment will have no potential for adverse effects, either individually or cumulatively, on wildlife or the environment; and

WHEREAS, Regional Board staff has circulated a Notice of Public Hearing, Notice of Filing, a written staff report, an environmental checklist, and a draft proposed amendment to interested individuals and public agencies for review and comment in accordance with state and federal environmental regulations (23 CCR Section 3775, 40 CFR 25, and 40 CFR 131); and

WHEREAS, the proposed amendment will not result in degradation of Cache Creek water quality with respect to water quality currently achieved or provided for in the water body and maintains the level of water quality necessary to protect existing and anticipated beneficial use; and

WHEREAS, the proposed amendment is consistent with the State Water Resources Control Board Resolution No. 68-16, in that the changes to water quality objectives (i) consider maximum benefits to the people of the state, (ii) will not unreasonably affect present and anticipated beneficial use of waters, and (iii) will not result in water quality less than that prescribed in policies. Likewise, the proposed amendment is consistent with the federal Antidegradation Policy (40 CFR 131.12); and

WHEREAS, this Basin Plan amendment must be approved by the State Water Resources Control Board, the Office of Administrative Law, and the U.S. Environmental Protection Agency before becoming effective; and

WHEREAS, this regulatory action meets the "Necessity" standard of the Administrative Procedures Act, Government Code, section 11353, subdivision (b):

THEREFORE BE IT RESOLVED, that the Regional Board certifies the staff report and environmental checklist as a functional equivalent document under CEQA for the Basin Plan; and be it further

RESOLVED, pursuant to sections 13240, et seq. of the California Water Code, the Regional Board, after considering the entire record, including oral testimony at the hearing, hereby approves the staff report and adopts an amendment to the Basin Plan to include commercial and sport fishing as a beneficial use, to establish site-specific numeric water quality objectives for methylmercury, and to establish a water quality management strategy to reduce mercury and methylmercury loads Cache Creek, Bear Creek, Sulphur Creek, and Harley Gulch as set forth in Attachment 1; and be it further

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RESOLVED, that the Executive Officer is directed to forward copies of the Basin Plan amendment to the State Water Resources Control Board in accordance with the requirements of Section 13245 of the California Water Code; and be it further

RESOLVED, that the Regional Board requests that the State Water Resources Control Board approve the Basin Plan amendment in accordance with the requirements of Sections 13245 and 13246 of the California Water Code and forward it to the Office of Administrative Law and the U.S. Environmental Protection Agency; and be it further

RESOLVED, that, if during its approval process the State Water Resources Control Board, or Office of Administrative Law, or U.S. Environmental Protection Agency determines that minor, non-substantive corrections to the language of the amendment are needed for clarity or consistency, the Executive Officer may make such changes, and shall inform the Regional Board of any such changes; and be it further

RESOLVED, the Executive Officer is authorized to sign a Certificate of Fee Exemption and following approval of the Basin Plan amendment by the U.S. Environmental Protection Agency submit this Certificate in lieu of payment of the Department of Fish and Game filing fee to the Secretary for Resources; and be it further

RESOLVED, following approval of the Basin Plan amendment by the U.S. Environmental Protection Agency, the Executive Officer shall file a Notice of Decision with the State Clearinghouse.

I, THOMAS R. PINKOS, Executive Officer, do hereby certify that the forgoing is a full, true, and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, Central Valley Region, on \_\_\_\_ June 2005.

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THOMAS R. PINKOS, Executive Officer

ATTACHMENT 1  
RESOLUTION NO. R5-2005-\_\_\_\_\_

AMENDING THE WATER QUALITY CONTROL PLAN FOR  
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Text additions to the existing Basin Plan language are indicated by underline and text deletions are indicated by ~~strike through~~. Revise Basin Plan sections as follows:

**Revise Chapter II (Existing and Potential Beneficial Uses), Table II-1 to add a footnote for Cache Creek Clear Lake to Yolo Bypass:**

Cache Creek Clear Lake to Yolo Bypass (d)

Footnote: “(d) In addition to the beneficial uses noted in Table II-1, COMM exists for Cache Creek from Clear Lake to Yolo Bypass and only in the following tributaries: North Fork Cache Creek and Bear Creek.”

**Revise Chapter III (Water Quality Objectives), Methylmercury, as follows:**

For Clear Lake (53), the methylmercury concentration in fish tissue shall not exceed 0.09 and 0.19 mg methylmercury/kg wet weight of tissue in trophic level 3 and 4 fish, respectively. ~~Compliance with these objectives shall be determined by analysis of fish tissue as described in Chapter V, Surveillance and Monitoring.~~

For Cache Creek (Clear Lake to Yolo Bypass) (54), North Fork Cache Creek, and Bear Creek (tributary to Cache Creek), the average methylmercury concentration shall not exceed 0.12 and 0.23 mg methylmercury/ kg wet weight of muscle tissue in trophic level 3 and 4 fish, respectively. For Harley Gulch (tributary to Cache Creek), the average methylmercury concentration shall not exceed 0.05 mg methylmercury/ kg wet weight in whole, trophic level 2 and 3 fish.

Compliance with the methylmercury fish tissue objectives shall be determined by analysis of fish tissue as described in Chapter V, Surveillance and Monitoring.

**Revise Chapter IV (Implementation) to add:**

**Cache Creek Watershed Mercury:**

The Cache Creek watershed methylmercury and total mercury reduction implementation plan applies to Cache Creek (Clear Lake to the Settling Basin Outflow and North Fork from Indian Valley Reservoir Dam to the main stem creek), Bear Creek, Sulphur Creek, and Harley Gulch.

To protect the beneficial uses of Cache Creek and its tributaries, aqueous methylmercury concentrations and loads of total mercury into aquatic environments that generate methylmercury need to be reduced. This will be accomplished through a three-part process: 1) reduce loads of total mercury entering the water bodies by controlling discharges of

mercury from and erosion at mercury mine sites, 2) determine sources of methylmercury production and develop plans to reduce methylmercury loads, and 3) control discharges of sediments in watersheds where the total mercury concentrations in fine-grained sediment and soil are greater than 0.4 mg/kg, dry weight.

**Methylmercury Load Allocations**

Tables IV-7 and 8 provide methylmercury load allocations for Cache Creek, its tributaries, and instream methylmercury production. Allocations are expressed as a percent of existing methylmercury loads. The methylmercury allocations will be achieved by reducing the annual average aqueous methylmercury (unfiltered) concentrations to 0.14 ng/ L for Cache Creek, 0.06 ng/l for Bear Creek, and 0.09 ng/L for Harley Gulch.

Table IV-7  
 Cache Creek Methylmercury Allocations

<u>Source</u>	<u>Existing Annual Load (gm/yr)</u>	<u>Acceptable Annual Load (gm/yr)</u>	<u>Allocation (% of existing load)</u>
<u>Cache Creek (Clear Lake to North Fork confluence)</u>	<u>36.8</u>	<u>11</u>	<u>30%</u>
<u>North Fork Cache Creek</u>	<u>12.4</u>	<u>12.4</u>	<u>100%</u>
<u>Harley Gulch</u>	<u>1.0</u>	<u>0.04</u>	<u>4%</u>
<u>Davis Creek</u>	<u>1.3</u>	<u>0.7</u>	<u>50%</u>
<u>Bear Creek @ Highway 20</u>	<u>21.1</u>	<u>3</u>	<u>14%</u>
<u>Within channel production and ungauged tributaries</u>	<u>49.5</u>	<u>32</u>	<u>65%</u>
<u>Margin of Safety</u>		<u>7</u>	<u>10% (a)</u>
<u>Cache Creek @ Yolo (b)</u>	<u>122</u>	<u>66</u>	<u>54%</u>

- a. Margin of safety is 10% of acceptable loads.
- b. Includes 49.6 g/yr exported in agricultural diversions.

Table IV-8 provides the load allocation within Bear Creek and its tributaries to attain the allocation for Bear Creek described in Table IV-7.

The allocations in Tables IV-7 and IV-8 apply to sources of methylmercury entering each tributary or stream segment. In aggregate, the sources to each tributary or stream segment shall have reductions of methylmercury loads as shown above. To achieve the water quality objectives and methylmercury allocations listed in Tables IV-7 and IV-8, actions are required to: reduce mercury loads from inactive mines and stream sediments, reduce erosion of soils with elevated total mercury concentrations, and reduce instream production of methylmercury. Reducing sediment mercury concentrations is expected to result in reduced methylmercury production. Methylmercury allocations will be achieved in part by natural erosion processes that remove the large amounts of mercury that have deposited in creek bed and banks since the start of mining.

Table IV-8  
Bear Creek Methylmercury Allocations

<u>Source</u>	<u>Existing Annual Load (gm/yr)</u>	<u>Acceptable Annual Load (gm/yr)</u>	<u>Allocation (% of existing load)</u>
<u>Bear Creek @ Bear Valley Road</u>	<u>1.7</u>	<u>0.9</u>	<u>50%</u>
<u>Sulphur Creek</u>	<u>8</u>	<u>0.8</u>	<u>10%</u>
<u>In channel production and ungauged tributaries</u>	<u>11.4</u>	<u>1</u>	<u>10%</u>
<u>Margin of Safety</u>		<u>0.3</u>	<u>10% (a)</u>
<u>Bear Creek at Hwy 20</u>	<u>21.1</u>	<u>3</u>	<u>15%</u>

a. Margin of safety is 10% of acceptable loads.

Actions are required to insure that future actions and activities of land use entities (agencies and private land owners) do not increase loads of total or methyl mercury to Cache Creek and tributaries. The focus of the implementation plan is to reduce inputs of total mercury from enriched areas (including the mine sites) in the upper watershed. Inputs of total mercury from enriched areas in the lower watershed (creek bed and banks) must not increase due to human activities.

Implementation of the load reductions will be accomplished using a phased approach. The first phase generally requires agencies and landowners in the upper watershed to conduct additional monitoring to further identify sources of methylmercury production and total mercury discharge and to develop feasibility studies for potential remediation projects. The second phase requires landowners to implement approved projects.

The Regional Water Board will participate in mercury and methylmercury source studies if resources are available. These studies include the following areas: Bear Creek, Cache Creek (Harley Gulch to Rumsey), Sulphur Creek, and Anderson Marsh.

Table IV-9 summarizes actions required and time schedules for studies and implementation of control plans. The Regional Water Board will consider adoption of conditional waivers or waste discharge requirements if reports and management plans are not submitted and implemented. The Regional Board will also issue appropriate enforcement orders to assist in achieving compliance with the water quality objectives.

Table IV-9 Implementation Summary

<u>Implementation Project</u>	<u>Affected Watershed</u>	<u>Assigned Responsibility</u>	<u>Action</u>	<u>Completion Date</u>
<u>Inactive mercury mines</u>	<u>Harley Gulch, Sulphur Creek, Bear Creek</u>	<u>Mine Owners, USBLM</u>	<u>Remediate mines, sediment, and wetlands</u>	<u>2011</u>
<u>Creek sediments with elevated mercury</u>	<u>Sulphur Creek, Bear Creek, Cache Creek (Harley Gulch to Rumsey)</u>	<u>USBLM, SLC, CDFG, Colusa, Lake, and Yolo Counties, private landowners</u>	<u>Conduct additional studies</u> <u>Report on engineering options</u> <u>Conduct Projects (as required)</u>	<u>2006</u> <u>2008</u> <u>2011</u>
<u>Harley Gulch delta remediation</u>	<u>Harley Gulch</u>	<u>USBLM</u>	<u>Conduct additional studies</u> <u>Submit report on engineering options</u> <u>Conduct Projects (as required)</u>	<u>2006</u> <u>2008</u> <u>2011</u>
<u>Wetlands in former gravel excavations (new projects)</u>	<u>Lower Cache Creek</u>	<u>Yolo County or project proponents</u>	<u>Submit operational plans, estimate methylmercury inputs to creek</u> <u>Conduct Projects (as required)</u>	<u>(as wetlands projects are proposed)</u>
<u>Anderson Marsh</u>	<u>Cache Creek</u>	<u>California State Parks</u>	<u>Conduct additional studies</u> <u>Submit report on management options</u> <u>Conduct Project (as required)</u>	<u>2006</u> <u>2008</u> <u>2011</u>
<u>Erosion control in active channel, lower watershed</u>	<u>Cache Creek downstream of Rumsey</u>	<u>Yolo County, private landowners, USACOE</u>	<u>Implement erosion control or sediment containment plans</u>	<u>(as projects affecting active channel are proposed)</u>
<u>Management plans for erosion of mercury-enriched soil</u>	<u>Harley Gulch, Sulphur Creek, Bear Creek, Cache Creek upstream of Rumsey</u>	<u>USBLM, SLC, CDFG, Colusa, Lake, and Yolo Counties, private landowners</u>	<u>Conduct additional studies</u> <u>Report on watershed activities</u> <u>Report on erosion control plans (as required)</u> <u>Implement erosion control plans (as required)</u>	<u>2008</u> <u>2008</u> <u>2010</u> <u>2012</u>

**Inactive Mines**

By December 2006 the Regional Water Board shall issue cleanup orders to control discharges from the inactive mines (Table IV-10) in the Cache Creek watershed. Total mercury loads from the individual mines shall be reduced by 95% of current loads associated with mining or other anthropogenic activities.

Table IV-10  
Cache Creek Watershed Inactive Mines (a)

<u>Abbott and Turkey Run Mines</u>
<u>Rathburn and Rathburn-Petray Mines</u>
<u>Petray North and South Mines</u>
<u>Wide Awake Mine</u>
<u>Central, Cherry Hill, Empire, Manzanita, and West End Mines</u>
<u>Elgin Mine</u>
<u>Clyde Mine</u>

(a) The mines are grouped by current owner. Although remediation requirements apply to each mine site, a single owner or responsible party having adjacent sites may apply the 95% reduction to the total discharge from their sites.

The wetland immediately downstream from the Abbott and Turkey Run mines in Harley Gulch contains mercury and is a source of methylmercury. The mine owners and landowners shall remediate the wetlands to eliminate methylmercury loads as part of the mine cleanup.

The Sulphur Creek streambed and flood plain directly below the Central, Cherry Hill, Empire, Manzanita, West End and Wide Awake Mines contains mercury. As part of mine cleanup activities, the mine owners shall reduce anthropogenic mercury loading in the creek by 85%. Mercury and methylmercury loads produced by interaction of geothermal springs with mine wastes from the Turkey Run and Elgin mines shall be addressed as part of the mine cleanup.

**Creek Sediment – Upper Watershed**

Creek banks and creek sediments in Cache and Bear Creeks are significant sources of total mercury and methylmercury. Mercury in the banks of Cache Creek downstream of Harley Gulch is believed to originate from historic mining operations. The following requirements apply to sediments in Cache Creek from Harley Gulch to Rumsey, Bear Creek from Bear Valley Road (southern Bear Creek crossing) to Cache Creek, and Sulphur Creek downstream of Wilbur Hot Springs. Agencies responsible for developing monitoring and load reduction programs include US Bureau of Land Management (USBLM); State Lands Commission (SLC), California Department of Fish and Game (CDFG); Yolo, Lake, and Colusa Counties and private landowners. The agencies and landowners shall coordinate with the Regional Board to conduct studies to further refine total mercury and methylmercury sources. As sources are identified, the Regional Board will require landowners to submit a report that evaluates engineering options or management practices to reduce methylmercury concentrations and total mercury sediment concentrations. Emphasis of the evaluations shall be on control of erosion related to or increased by human activities. At completion of the studies and feasibility reports, the Regional Board will consider whether to require the landowners to implement a project.

The Regional Board and USBLM will conduct additional studies to determine the extent of mercury in sediment at the confluence of Harley Gulch and Cache Creek. The Regional Board will require USBLM to evaluate engineering options to reduce erosion of this material to Cache Creek. If feasible projects are developed, the Regional Board will require USBLM to remediate the sediment.

#### **New Reservoirs, Ponds, and Wetlands**

Regional Water Board staff will review proposals for new impoundments for their potential of methylmercury production. Wetlands and new instream and off-stream water storage facilities shall be constructed and operated in a manner that would preclude a net increase in methylmercury concentrations entering Cache Creek or its tributaries.

Gravel mining pits in lower Cache Creek being reclaimed as ponds and wetlands shall be designed and operated to minimize methylmercury entering Cache Creek. If new reclamation projects result in an increase of methylmercury or total mercury discharged to Cache Creek, the project proponents shall submit a report of waste discharge and propose modifications or remediation projects. The Cache Creek Nature Preserve, which includes a wetland restored from a gravel excavation, may continue current practices of operation. Continuous flow of irrigation tail water through the Cache Creek Nature Preserve to Cache Creek is prohibited.

The Regional Board, in coordination with California State Parks (CSP), will continue to conduct methylmercury studies in Anderson Marsh. If the Regional Board finds that Anderson Marsh is a significant methylmercury source to Cache Creek, the Regional Board will require CSP to evaluate potential management practices to reduce methylmercury loads. The Regional Board will then consider whether to require CSP to implement a load reduction project.

#### **Erosion Prevention – Upper Watershed**

All road construction or maintenance projects by the California Department of Transportation (Caltrans) shall comply with the Caltrans statewide storm water permit and implement the highest level of management practices to control erosion. Water quality and sediment monitoring may be required to ensure compliance with this requirement. County and agency road departments shall implement the Caltrans or equivalent management practices to comply with these requirements. These requirements apply to road projects throughout the Harley Gulch and Sulphur Creek watersheds, the Bear Creek watershed south of the Bear Valley Road Crossing, and the Cache Creek watershed upstream of Camp Haswell.

A goal of the Regional Board is to minimize erosion from areas with enriched mercury concentrations. Enriched soil and sediment is defined as having an average concentration of mercury of 0.4 mg/kg, dry weight, in the silt/clay fraction. Cache Creek tributary watersheds with mercury-enriched soils include Harley Gulch, Judge Davis Creek, Crack Canyon, and Davis Creek. The Regional Board will conduct additional studies, in conjunction with landowners, to identify significant total mercury sources in upper Cache Creek (above Camp Haswell) and in tributaries to Bear Creek.

- After the Regional Board has identified sources in the tributaries, the Board will require those landowners and/or land managers to submit reports that identify anthropogenic activities on their lands that result in increased erosion (i.e., grazing, roads, timber harvest, mines). The Board will then require landowners and managers to submit erosion control plans and implement the plans after approval by the

Executive Officer. Entities responsible for controlling erosion include US Bureau of Land Management (USBLM); State Lands Commission (SLC), California Department of Fish and Game (CDFG); Yolo, Lake, and Colusa Counties and private landowners.

- Erosion from future anthropogenic activities in the enriched areas that results in increases of methylmercury or mercury loads from mercury-enriched areas is prohibited. For proposed changes in land use or other future activities, landowners must submit a plan including erosion estimates from the new project, erosion control practices, and, if a net increase in erosion is expected to occur, a mitigation plan.

### **Erosion Prevention – 10-Year Floodplains**

Sediment in the depositional zone of the Cache Creek channel below mining areas is enriched in mercury (average in fine-grained sediment >0.4 mg/kg). All new projects within the 10-year floodplains of Cache Creek (from Harley Gulch to the Settling Basin outflow), Bear Creek (from tributaries draining Petray and Rathburn Mines to Cache Creek), Sulphur Creek, and Harley Gulch are prohibited from causing a net increase in erosion of mercury-enriched sediment. Compliance with the prohibition will be assessed by conducting monitoring during and after projects are implemented. Compliance will be measured by comparison of monitoring results with existing numeric water quality objectives for turbidity. Photodocumentation, surveying, or turbidity monitoring can be used to determine compliance with this requirement. Removal or remediation of sediment containing mercury from another part of the watershed would be acceptable to meet the “no net increase” standard if the project does or is anticipated to result in an increase of mercury discharge. Sediment removed from the channel must be placed outside of the floodplain so that it will not erode into the creek.

All bridge, culvert, or road construction or maintenance that may cause erosion within the 10-year flood plains must follow the Caltrans management practices or equivalent to control erosion, as described above.

Projects conducted strictly for the purposes of native riparian plant restoration or invasive species plant removal are required to use best management practices to prevent erosion. Projected conducted on stream banks must reestablish vegetation to prevent an increase in erosion or incorporate bioengineering or biotechnical stabilization practices into the project. If net erosion due to the project is observed or the above requirements are not met, then further monitoring and remediation will be required. Evaluation of net erosion should consider controllable factors contributing to erosion in the watershed.

### **Geothermal and Spring Sources**

In general, geothermal springs that discharge mercury and sulfate may not be controllable. However, geothermal discharges adjacent to Sulphur Creek are potential candidates for remediation or mercury offset projects. As needed, the Executive Officer will make a determination of the suitability of geothermal source controls for offset or remediation projects.

The Wilbur Hot Springs resort is a source of mercury and methylmercury to Sulphur Creek. Discharges of mercury or methylmercury greater than existing loads are prohibited.

### **Mercury Offset Program and Alternative Load Allocations**

The Regional Water Board recognizes that remediation of mines and non-point sources will require substantial financial resources. The Regional Water Board, therefore, will allow entities participating in approved mercury offset programs to conduct offset remediation projects in the Cache Creek watershed. Offset programs shall be focused on projects where funding is not otherwise available. Subject to approval by the Executive Officer, entities participating in an offset program may partner with agencies in mercury control actions. The framework for offset programs will be developed in future Basin Plan amendments.

The methylmercury load allocations in Tables IV-7 and 8 are assigned to watersheds. To allow offset program proponents to conduct projects within the watersheds to reduce loads, the Executive Officer may consider alternative load allocations that will achieve the objectives.

### **Public Education**

The local county health departments will provide outreach and education regarding the risks of consuming fish containing mercury, emphasizing portions of the population that are at risk, such as pregnant women and children.

### **Adaptive Implementation**

The Regional Water Board will review the progress toward meeting the Cache Creek goals and water quality objectives every five years. The Regional Water Board recognizes that there are uncertainties with the load estimates and the correlation between reductions in loads of total mercury, methylmercury uptake by biota, and fish tissue concentrations. Using an adaptive management approach, the Regional Water Board will evaluate new data and scientific information to determine the most effective control program and allocations to reduce methylmercury and total mercury sources in the watershed.

### **Monitoring and Review**

The monitoring plan for Cache Creek is described in Chapter V, Surveillance and Monitoring. Regional Water Board staff will oversee the preparation of detailed monitoring plans and resources to conduct monitoring of sediment, water, and fish to assess progress toward meeting the water quality objectives.

## **Revise Chapter IV (Surveillance and Monitoring) to add:**

### **Clear Lake Methylmercury**

The Regional Water Board will use the following criteria to determine compliance with the methylmercury fish tissue objectives in Clear Lake. Mercury will be measured in fish of the species and sizes consumed by humans and wildlife. The objectives are based on the average of methylmercury concentrations in muscle tissue of trophic level 3 and 4 fish. Because greater than 85% of total mercury in muscle tissue of fish of these sizes is methylmercury, analysis of muscle tissue for total mercury is acceptable for assessing compliance. Fish from the following species will be collected and analyzed every ten years. The representative fish species for trophic level 4 shall be largemouth bass (total length 300-400 mm), catfish (total length 300-400 mm), brown bullhead (total length 300-400 mm), and crappie (total length 200-300 mm). The representative fish species for trophic level 3 shall be carp, hitch, Sacramento blackfish, black bullhead, and bluegill of all sizes; and brown bullhead and catfish of lengths less than the trophic level 4 lengths.

~~Fish tissue mercury concentrations are not expected to respond quickly to remediation activities at Sulphur Bank Mercury Mine, Clear Lake sediments, or the tributaries. Adult fish integrate methylmercury over a lifetime and load reduction efforts are not expected to be discernable for more than five years after remediation efforts. Therefore to assess remedial activities, part of the monitoring at Clear Lake will include indicator species, consisting of inland silversides and largemouth bass less than one year old, to be sampled every five years. Juveniles of these species will reflect recent exposure to methylmercury and can be indicators of mercury reduction efforts.~~

~~Average concentrations of methylmercury by trophic level should be determined in a combination of the identified species collected throughout Clear Lake. The number of fish collected to determine compliance with this objective will be based on the statistical variance within each species. The sample size will be determined by methods described in USEPA's Guidance for Assessing Chemical Contaminant Data for Use in Fish or other statistical methods approved by the Executive Officer.~~

~~Total mercury in tributary sediment, lake sediment, and water will be monitored to determine whether loads have decreased. The water and sediment monitoring frequency will be every five years.~~

#### **Mercury and Methylmercury**

The Regional Water Board will use the following criteria to determine compliance with the methylmercury fish tissue objectives. Site-specific criteria for various water bodies are described below.

In general, the objectives are based on the average of methylmercury concentrations in muscle tissue of trophic level (TL) 3 and 4 fish as appropriate. Because greater than 85% of total mercury in muscle tissue of fish of these sizes is methylmercury, analysis of muscle tissue for total mercury is acceptable for assessing compliance. Mercury will be measured in fish of the species and sizes consumed by humans and wildlife.

The number of fish collected to determine compliance with the methylmercury objective will be based on the statistical variance within each species. The sample size will be determined by methods described in USEPA's Guidance for Assessing Chemical Contaminant Data for Use in Fish or other statistical methods approved by the Executive Officer.

Compliance with the fish tissue objective is achieved when the average concentrations in local fish are equivalent to the respective objective for three consecutive years.

#### **Clear Lake**

Fish from the following species will be collected and analyzed every ten years. The representative fish species for trophic level 4 shall be largemouth bass (total length 300-400 mm), catfish (total length 300 – 400 mm), brown bullhead (total length 300-400 mm), and crappie (total length 200-300 mm). The representative fish species for trophic level 3 shall be carp, hitch, Sacramento blackfish, black bullhead, and bluegill of all sizes; and brown bullhead and catfish of lengths less than the trophic level 4 lengths.

Fish tissue mercury concentrations are not expected to respond quickly to remediation activities at Sulphur Bank Mercury Mine, Clear Lake sediments, or the tributaries. Adult fish integrate methylmercury over a lifetime and load reduction efforts are not expected to be

discernable for more than five years after remediation efforts. To assess remedial activities, part of the monitoring at Clear Lake will include indicator species, consisting of inland silversides and largemouth bass less than one year old, to be sampled every five years. Juveniles of these species will reflect recent exposure to methylmercury and can be indicators of mercury reduction efforts.

Average concentrations of methylmercury by trophic level should be determined in a combination of the identified species collected throughout Clear Lake.

Total mercury in tributary sediment, lake sediment, and water will be monitored to determine whether loads have decreased. The water and sediment monitoring frequency will be every five years

### **Cache Creek, Bear Creek, and Harley Gulch**

The Regional Water Board will use the following criteria to determine compliance with the methylmercury fish tissue objectives in Cache and Bear Creeks. Compliance with the respective objectives shall be determined based on fish tissue analysis in Cache Creek from Clear Lake to the settling basin, North Fork Cache Creek, and Bear Creek upstream and downstream of Sulphur Creek.

The representative fish species for each trophic level shall be:

- Trophic Level 3: green sunfish, bluegill, and/or Sacramento sucker (rainbow trout also an option for North Fork Cache Creek);
- Trophic Level 4: Sacramento pikeminnow, largemouth bass, smallmouth bass and/or channel catfish.

The sample sets should include at least two species from each trophic level (i.e., bass and Sacramento pikeminnow, for TL4) collected at each compliance point or stream section. The samples should include a range of sizes of fish between 250 and 350 mm, total length, averaging 300 mm. Green sunfish and bluegill may not be available in this range, therefore those sampled should be greater than 125 mm total length. If two species per trophic level are not available and are unlikely to be present given historical sampling information, one species is acceptable (the only TL4 species typically in North Fork is Sacramento pikeminnow).

Compliance with the Harley Gulch methylmercury water quality objective will be determined using hardhead, California roach, or other small (TL2/3), resident species in the size range of 75-100 mm total length.

Aqueous methylmercury goals are in the form of the annual average concentration in unfiltered samples. For comparison of methylmercury concentration data with aqueous methylmercury goals, water samples should be collected periodically throughout the year. The samples should be collected during typical flow conditions as they vary by season, rather than targeting extreme low or high flow events. Aqueous methylmercury data may be collected by Regional Board staff or required of project proponents.

Monitoring for mine and remediation projects or other activities that are expected to significantly affect methylmercury or mercury loads shall include:

- Monitoring parameters for soil and sediment should be total mercury in soil or sediment, silt/clay (<65 microns) fraction.

- Monitoring parameters for water should include: methylmercury (if project is methylmercury source), total mercury, total suspended solids, and stream flow. Water sampling in major tributaries must include high flow events for mercury and total suspended solids. More frequent monitoring (two to four significant storm events for three consecutive years) is required post remediation to evaluate the effectiveness of cleanup projects and compliance with load allocations.