

Amendments to the 1994 Water Quality Control Plan for the
Sacramento River and San Joaquin River Basins

Subject	Date Adopted By Reg. Bd.	Regional Board Resolution No.	Date in Effect
1. Amendment Specifically Authorizing Compliance Schedules in NPDES Permits for Achieving Water Quality Objectives or Effluent Limits Based on Objectives	5/26/95	95-142	5/26/95*
2. Adoption of Water Quality Objectives and an Implementation Plan Regulation of Agricultural Subsurface Drainage in the Grassland Area	5/3/96	96-147	1/10/97*
3. Adoption of Site Specific Water Quality Objectives for pH and Turbidity for Deer Creek in El Dorado County	7/19/02	R5-2002-0127	10/21/03
4. Adoption of Corrective Language	9/6/02	R5-2002-0151	1/27/04
5. Adoption of a Control Program for Mercury in Clear Lake, including COMM use for Clear Lake and Mercury Objectives for Fish Tissue	12/6/02	R5-2002-0207	10/2/03
6. Adoption of a Control Program for Orchard Pesticide Runoff and Diazinon Runoff into the Sacramento and Feather Rivers, including Site-Specific Water Quality Objectives for Diazinon	10/16/03	R5-2003-0148	8/11/04
7. Adoption of Site Specific Temperature Objectives for Deer Creek in El Dorado And Sacramento Counties	1/31/03 9/16/05	R5-2003-0006 R5-2005-0119	5/17/06
8. Amendment for the Control of Salt and Boron Discharges into the Lower San Joaquin River	9/10/04	R5-2004-0108	7/28/06
9. Amendment to De-Designate Four Beneficial Uses of Old Alamo Creek, Solano County	4/28/05	R5-2005-0053	8/7/06

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Subject	Date Adopted By Reg. Bd.	Regional Board Resolution No.	Date in Effect
10. Amendment for the Control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel	1/27/05	R5-2005-0005	8/23/06
11. Amendment for the Control of Diazinon and Chlorpyrifos Runoff into the San Joaquin River	10/21/05	R5-2005-0138	12/20/06
12. Amendment for the Control of Mercury in Cache creek, Bear Creek, Sulphur Creek and Harley Gulch	10/21/05	R5-2005-0146	2/6/07

- * The amendment is not in effect until it is approved by the State Water Resources Control Board and Office of Administrative Law. If the amendment involves adopting or revising a standard which relates to surface waters it must also be approved by the U.S. Environmental Protection Agency (USEPA) [40 CFR Section 131(c)]. If the standard revision is disapproved by USEPA, the revised standard remains in effect until it is revised by the basin planning process, or USEPA promulgates its own rule which supersedes the standard revision [40 CFR Section 131.21(c)]

THE WATER QUALITY CONTROL PLAN (BASIN PLAN)
FOR THE
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION
FOURTH EDITION
Revised February 2007 (with Approved Amendments)
THE SACRAMENTO RIVER BASIN AND
THE SAN JOAQUIN RIVER BASIN



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

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Rafting the American River: Rapid Shooters, Lotus CA
Yosemite: David Rosen/ Ducks Unlimited

Sunset Waterfowl: David Rosen/ Ducks Unlimited
Sugar Beets: Brenda Grewell/ Dept. of Water Resources

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APPENDIX

MAPS

SURFACE WATER BODIES AND BENEFICIAL USES

SURFACE WATER BODIES (1)	HYDRO UNIT NUMBER	MUN	AGRI-CULTURE		INDUSTRY			RECREATION		FRESHWATER HABITAT (2)		MIGRATION		SPAWNING		WILD	NAV
			AGR	STOCK WATERING	PROC	IND	POW	REC-1	REC-2	WARM	COLD	MIGR	SPWN				
			MUNICIPAL AND DOMESTIC SUPPLY	IRRIGATION	PROCESS	SERVICE SUPPLY	POWER	CONTACT	CANOEING (1) AND RAFTING	OTHER NONCONTACT	WARM	COLD	WARM (3)	COLD (4)	WARM (3)		
30 COLUSA BASIN DRAIN TO EYE ["I"] STREET BRIDGE	520.00	E	E					E	E	E	E	E	E	E	E	E	E
31 SUTTER BYPASS	520.3	E	E					E	E	E	E	E	E	E	E	E	E
32 FEATHER RIVER LAKE ALMANOR	518.41						E	E		E	E			E		E	
33 NORTH FORK, FEATHER RIVER	518.4	E					E	E	E	E	E				E	E	
34 MIDDLE FORK, FEATHER RIVER	518.3							E	E	E	E				E	E	
35 SOURCE TO LITTLE LAST CHANCE CREEK	518.35		E	E				E	E	E	E				E	E	
36 FRENCHMAN RESERVOIR	518.36							E	E	E	P	E			E	E	
37 LITTLE LAST CHANCE CREEK TO LAKE OROVILLE	518.3	E						E	E	E	E				E	E	
38 LAKE DAVIS	518.34							E	E	E	P	E			E	E	
39 LAKES BASIN LAKES	518.5							E	E	E	E				E	E	
40 LAKE OROVILLE	518.12	E	E				E	E	E	E	E			E	E	E	
41 FISH BARRIER DAM TO SACRAMENTO RIVER	515.	E	E					E	E	E	E	E	E	E	E	E	
42 YUBA RIVER SOURCES TO ENGLEBRIGHT RESERVOIR	517.	E	E	E				E	E	E	E	E	E	E	E	E	
43 ENGLEBRIGHT DAM TO FEATHER RIVER	515.3		E	E				E	E	E	E	E	E	E	E	E	
44 BEAR RIVER	515.1	E	E	E				E	E	E	E	E	P	P	P	P	E
45 AMERICAN RIVER	514.5	E	E					E	E	E	P	E			E	E	
46 NORTH FORK, SOURCE TO FOLSOM LAKE	514.4	E	E	E				E	E	E	P	E			E	E	
47 MIDDLE FORK, SOURCE TO FOLSOM LAKE	514.4		E	E				E	E	E	P	E			E	E	
48 DESOLATION VALLEY LAKES	514.4							E	E	E	E				E	E	
49 SOUTH FORK	514.3							E	E	E	P	E			E	E	
50 SOURCE TO PLACERVILLE	514.3	E					E	E	E	E	E				E	E	
51 PLACERVILLE TO FOLSOM LAKE	514.32	E	E				E	E	E	E	E				E	E	
52 FOLSOM LAKE	514.23	E	E		P		E	E	E	E	E			E	E	E	
53 FOLSOM DAM TO SACRAMENTO RIVER	519.21	E	E		E		E	E	E	E	E	E	E	E	E	E	
54 YOLO BYPASS	510.		E	E				E	E	E	P	E	E	E	E	E	
53 CACHE CREEK	513.52	E	E	E				E		E	E	P			E		E
54 CLEAR LAKE (a)	511/513	E	E	E	E	E		E	E	E	P			E	E	E	
54 CLEAR LAKE TO YOLO BYPASS (d)	511/513	E	E	E	E	E		E	E	E	P			E	E	E	

(1) Shown for streams and rivers only with the implication that certain flows are required for this beneficial use.
 (2) Resident does not include anadromous. Any Segments with both COLD and WARM beneficial use designations will be considered COLD water bodies for the application of water quality objectives.
 (3) Striped bass, sturgeon, and shad.

(4) Salmon and steelhead
 (5) As a primary beneficial use.
 (6) The indicated beneficial uses are to be protected for all waters except in specific cases where evidence indicates the appropriateness of additional or alternative beneficial use designations.
 (7) Sport fishing is the only recreation activity permitted.

(8) Beneficial uses vary throughout the Delta and will be evaluated on a case-by-case basis.
 (9) Per State Board Resolution No. 90-28, Marsh Creek and Marsh Creek Reservoir in Contra Costa County are assigned the following beneficial uses: REC1 and REC2

A/ Hidden Reservoir = Hensley Lake
 B/ Buchanan Reservoir = Eastman Lake

(a) The following beneficial uses EXIST in addition to those noted in Table II-1

Mud Slough (north): COMM and SHELL
 Salt Slough: COMM, BIOL, and SHELL
 Wetland Water Supply Channels: BIOL
 Clear Lake: COMM

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

Color

Water shall be free of discoloration that causes nuisance or adversely affects beneficial uses.

excluded or where the fishery is not important as a beneficial use.

Dissolved Oxygen

Within the legal boundaries of the Delta, the dissolved oxygen concentration shall not be reduced below:

7.0 mg/l in the Sacramento River (below the I Street Bridge) and in all Delta waters west of the Antioch Bridge; 6.0 mg/l in the San Joaquin River (between Turner Cut and Stockton, 1 September through 30 November); and 5.0 mg/l in all other Delta waters except for those bodies of water which are constructed for special purposes and from which fish have been

For surface water bodies outside the legal boundaries of the Delta, the monthly median of the mean daily dissolved oxygen (*DO*) concentration shall not fall below 85 percent of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent of saturation. The dissolved oxygen concentrations shall not be reduced below the following minimum levels at any time:

Waters designated WARM 5.0 mg/l
 Waters designated COLD 7.0 mg/l
 Waters designated SPWN 7.0 mg/l

The more stringent objectives in Table III-2 apply to specific water bodies in the Sacramento and San Joaquin River Basins:

**TABLE III-2
 SPECIFIC DISSOLVED OXYGEN WATER QUALITY OBJECTIVES**

<u>AMOUNT</u>	<u>TIME</u>	<u>PLACE</u>
9.0 mg/l *	1 June to 31 August	Sacramento River from Keswick Dam to Hamilton City (13)
8.0 mg/l	1 September to 31 May	Feather River from Fish Barrier Dam at Oroville to Honcut Creek (40)
8.0 mg/l	all year	Merced River from Cressy to New Exchequer Dam (78)
8.0 mg/l	15 October to 15 June	Tuolumne River from Waterford to La Grange (86)

* When natural conditions lower dissolved oxygen below this level, the concentrations shall be maintained at or above 95 percent of saturation.

Floating Material

Water shall not contain floating material in amounts that cause nuisance or adversely affect beneficial uses.

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.

Methylmercury

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

Oil and Grease

Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.

pH

The pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses. In determining compliance with the water quality objective for pH, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

The following site-specific objectives replace the general pH objective, above, in its entirety for the listed water bodies.

For Goose Lake (2), pH shall be less than 9.5 and greater than 7.5 at all times. For Deer Creek, source to Cosumnes River, pH shall not be depressed below 6.5 nor raised above 8.5.

Pesticides

- No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.
- Discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses.
- Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by

the Environmental Protection Agency or the Executive Officer.

- Pesticide concentrations shall not exceed those allowable by applicable antidegradation policies (see State Water Resources Control Board Resolution No. 68-16 and 40 C.F.R. Section 131.12.).
- Pesticide concentrations shall not exceed the lowest levels technically and economically achievable.
- Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of pesticides in excess of the Maximum Contaminant Levels set forth in California Code of Regulations, Title 22, Division 4, Chapter 15.
- Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of thiobencarb in excess of 1.0 µg/l.

Pesticide concentrations shall not exceed the levels identified in Table III-2A. Where more than one objective may be applicable, the most stringent objective applies.

For the purposes of this objective, the term pesticide shall include: (1) any substance, or mixture of substances which is intended to be used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling, or mitigating any pest, which may infest or be detrimental to vegetation, man, animals, or households, or be present in any agricultural or nonagricultural environment whatsoever, or (2) any spray adjuvant,

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TABLE III-2A

SPECIFIC PESTICIDE OBJECTIVES

<u>PESTICIDE</u>	<u>MAXIMUM CONCENTRATION AND AVERAGING PERIOD</u>	<u>APPLICABLE WATER BODIES</u>
Chlorpyrifos	0.025 µ g/L ; 1-hour average (acute) 0.015 µ g/L ; 4-day average (chronic) Not to be exceeded more than once in a three year period.	San Joaquin River from Mendota Dam to Vernalis (Reaches include Mendota Dam to Sack Dam (70), Sack Dam to Mouth of Merced River (71), Mouth of Merced River to Vernalis (83))
Diazinon	0.16 µ g/L ; 1-hour average (acute) 0.10 µ g/L ; 4-day average (chronic) Not to be exceeded more than once in a three year period.	San Joaquin River from Mendota Dam to Vernalis (Reaches include Mendota Dam to Sack Dam (70), Sack Dam to Mouth of Merced River (71), Mouth of Merced River to Vernalis (83))
Diazinon	0.080 µg/L ; 1-hour average 0.050 µg/L ; 4-day average Not to be exceeded more than once every three years on average.	Sacramento River from Shasta Dam to Colusa Basin Drain (13) and the Sacramento River from the Colusa Basin Drain to I Street Bridge (30). Feather River from Fish Barrier Dam to Sacramento River (40).

or (3) any breakdown products of these materials that threaten beneficial uses. Note that discharges of "inert" ingredients included in pesticide formulations must comply with all applicable water quality objectives.

Radioactivity

Radionuclides shall not be present in concentrations that are harmful to human, plant, animal or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal or aquatic life.

At a minimum, waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect.

Salinity

Electrical Conductivity and Total Dissolved Solids—Special Cases in the Sacramento and San Joaquin River Basins Other Than the Delta

The objectives for electrical conductivity and total dissolved solids in Table III-3 apply to the water bodies specified. To the extent of any conflict with the general Chemical Constituents water quality objectives, the more stringent shall apply.

Electrical Conductivity, Total Dissolved Solids, and Chloride--Delta Waters

The objectives for salinity (electrical conductivity, total dissolved solids, and chloride) which apply to the Delta are listed in Table III-5 at the chapter's end. See Figure III-2 for an explanation of the hydrologic year type classification system. The objectives in Table III-5 were adopted by the State Water Board in May 1991 in the Water Quality Control Plan for Salinity.

- b. The discharge of agricultural subsurface drainage water to Salt Slough and wetland water supply channels identified in Appendix 40 is prohibited after 10 January 1997, unless water quality objectives for selenium are being met. This prohibition may be reconsidered if public or private interests prevent the implementation of a separate conveyance facility for agricultural subsurface drainage.
- c. The discharge of agricultural subsurface drainage water to Mud Slough (north) and the San Joaquin River from Sack Dam to the mouth of the Merced River is prohibited after 1 October 2010, unless water quality objectives for selenium are being met. This prohibition may be reconsidered if public or private interests prevent the implementation of a separate conveyance facility for agricultural subsurface drainage to the San Joaquin River.
- d. The discharge of selenium from agricultural subsurface drainage systems in the Grassland watershed to the San Joaquin River is prohibited in amounts exceeding 8,000 lbs/year for all water year types beginning 10 January 1997.
- e. Activities that increase the discharge of poor quality agricultural subsurface drainage are prohibited.

7. *Diazinon Discharges into the Sacramento and Feather Rivers*

Beginning July 1, 2008, (i) the direct or indirect discharge of diazinon into the Sacramento and Feather Rivers is prohibited if, in the previous year (July-June), any exceedance of the diazinon water quality objectives occurred, and (ii) the direct or indirect discharge of diazinon into any sub-watershed (identified in Table IV-7) is prohibited if, in the previous year (July-June), the load allocation was not met in that sub-watershed. Prohibition (i) applies only to diazinon discharges that are tributary to or upstream from the location where the water quality objective was exceeded.

These prohibitions do not apply if the discharge of diazinon is subject to a waiver of waste discharge requirements implementing the water quality objectives and load allocations for diazinon for the Sacramento and Feather Rivers, or governed by individual or general waste discharge requirements.

8. *Dissolved Oxygen in the Stockton Deep Water Ship Channel(DWSC)*

The discharge of oxygen demanding substances or their precursors into waters tributary to the DWSC portion of the San Joaquin River is prohibited after 31 December 2011 when net daily flow in the DWSC portion of the San Joaquin River in the vicinity of Stockton is less than 3,000 cubic feet per second, unless dissolved oxygen objectives in the DWSC are being met.

Any increase in the discharge of oxygen demanding substances or their precursors into waters tributary to the DWSC portion of the San Joaquin River is prohibited after 23 August 2006.

These prohibitions do not apply if the discharge is regulated by a waiver of waste discharge requirements, or individual or general waste discharge requirements or NPDES permits, which implement the *Control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel* or which include a finding that the discharge will have no reasonable potential to cause or contribute to a negative impact on the dissolved oxygen impairment in the DWSC. These prohibitions will be reconsidered by the Regional Water Board by December 2009 based on:

- a) the results of the oxygen demand and precursor studies required in the *Control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel*
- b) the prevailing dissolved oxygen conditions in the DWSC

9. *Control of Diazinon and Chlorpyrifos Runoff into the San Joaquin River*

Beginning 1 December 2010, the direct or indirect discharge of diazinon or chlorpyrifos into the San Joaquin River is prohibited during the dormant season (1 December through 1 March) if any exceedance of the chlorpyrifos or diazinon water quality objectives, or diazinon and chlorpyrifos loading capacity occurred during the previous dormant season.

Beginning 2 March 2011, the direct or indirect discharge of diazinon or chlorpyrifos into the

San Joaquin River is prohibited during the irrigation season (2 March through 30 November) if any exceedance of the chlorpyrifos or diazinon water quality objectives, or diazinon and chlorpyrifos loading capacity occurred during the previous irrigation season.

These prohibitions apply only to i) dischargers who discharge the pollutant causing or contributing to the exceedance of the water quality objective or loading capacity; and ii) dischargers located in those subareas not meeting their load allocations.

These prohibitions do not apply if the discharge of diazinon or chlorpyrifos is subject to a waiver of waste discharge requirements implementing the diazinon and chlorpyrifos water quality objectives and load allocations for diazinon and chlorpyrifos for the San Joaquin River, or governed by individual or general waste discharge requirements.

Regional Water Board Guidelines

The Regional Water Board has adopted guidance for certain types of dischargers which is designed to reduce the possibility that water quality will be impaired. The Regional Water Board may still impose discharge requirements. All of the Guidelines are contained in the Appendix (Items 33 through 37). Currently, the following Guidelines apply to the Sacramento and San Joaquin River Basins:

1. *Wineries*

This Guideline contains criteria for protecting beneficial uses and preventing nuisance from the disposal to land of stillage wastes.

2. *Erosion and Sedimentation*

This Guideline identifies practices to be implemented by local government to reduce erosion and sedimentation from construction activities.

3. *Small Hydroelectric Facilities*

This Guideline specifies measures to protect water quality from temperature, turbidity, and dissolved oxygen effects from the construction and operation of small hydroelectric Facilities.

4. *Disposal from Land Developments*

This Guideline contains criteria for the siting of septic tanks, sewer lines, leach fields, and seepage pits to protect water quality.

5. *Mining*

This Guideline identifies actions that the Regional Water Board takes to address the water quality problems associated with mining. It requires owners and operators of active mines to prepare plans for closure and reclamation, but it does not specify any practices or criteria for mine operators.

Nonpoint Source Action Plans

Section 208 of the 1972 Amendments to the Federal Clean Water Act resulted in monies being made available to states to address nonpoint source problems. The Regional Water Board used 208 grant funds to develop its mining and erosion/sedimentation guidelines, among other things. It also encouraged local governments to make use of the 208 program. As a result, several counties in the sub-basins developed action plans to control nonpoint source problems which affected them. The Regional Water Board action plans are described in Table IV-2

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Board establishes a goal of no significant increases of methylmercury to Clear Lake resulting from such activities. As factors contributing to mercury methylation are better understood, the possible control of existing methylmercury production within tributary watersheds should be examined.

Atmospheric Deposition

Atmospheric loads of mercury originating outside of the Clear Lake watershed and depositing locally are minimal. Global and regional atmospheric inputs of mercury are not under the jurisdiction of the Regional Water Board. Loads of mercury from outside of the Clear Lake watershed and depositing from air onto the lake surface are established at the existing input rate, which is estimated to be 1 to 2 kg/year.

Public Education

An important component of the Clear Lake mercury strategy is public education. Until the effects of all mercury reduction efforts are reflected in fish tissue levels, the public needs to be continually informed about safe fish consumption levels. The Lake County Public Health Department will provide outreach and education to the community, emphasizing portions of the population that are at risk, such as pregnant women and children. Education efforts may include recommendations to eat smaller fish and species having lower mercury concentrations.

Monitoring and Review

The monitoring plan for Clear Lake will determine whether mercury loads have been reduced to meet sediment compliance goals and fish tissue objectives. Monitoring will include fish tissue, water and sediment sampling. The Regional Water Board 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. Chapter V, Surveillance and Monitoring, provides details for monitoring in Clear Lake.

The Regional Water Board will review the progress toward meeting the fish tissue objectives for Clear Lake every five years. The review will be timed to coincide with the five-year review to be conducted by USEPA for the Record of Decision for the Sulphur Bank Mercury Mine Superfund Site. The Clear Lake mercury management strategy was developed with existing information. 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. Regional Water Board staff will consider any new data to refine load estimates and allocations from sources within the Clear Lake watershed. Estimates of existing loads

from SBMM or the tributaries will be refined during the review process. If new data indicate that the linkage analysis or load allocations will not result in attainment of the fish tissue objectives, or the fish tissue objectives or load allocations require adjustment, revisions to the Basin Plan will be proposed.

Cache Creek Watershed Mercury Program

The Cache Creek watershed methylmercury and total mercury implementation program applies to Cache Creek (from Clear Lake to the Settling Basin outflow and North Fork Cache Creek from Indian Valley Reservoir Dam to the main stem Cache Creek), Bear Creek, Sulphur Creek, and Harley Gulch. This implementation program is intended to reduce loads of methylmercury and total mercury to achieve all applicable water quality standards for mercury and methylmercury, including the site-specific water quality objectives for methylmercury in fish tissue. Guidance for monitoring mercury in fish, water, and sediment is provided in Chapter V, Surveillance and Monitoring.

Historic mining activities in the Cache Creek watershed have discharged and continue to discharge large volumes of inorganic mercury (termed total mercury) to creeks in the watershed. Much of the mercury discharged from the mines is now distributed in the creek channels and floodplain downstream from the mines. Natural erosion processes can be expected to slowly move the mercury downstream out of the watershed over the next several hundred years. However, current and proposed activities in and around the creek channel can enhance mobilization of this mercury. Activities in upland areas, such as road maintenance and grazing and timber activities can add to the mercury loads reaching Cache Creek, particularly when the activities take place in areas that have elevated mercury levels.

Total mercury in the creeks is converted to methylmercury by bacteria in the sediment. The concentration of methylmercury in fish tissue is directly related to the concentration of methylmercury in the water. The concentration of methylmercury in the water column is controlled in part by the concentration of total mercury in the sediment and the rate at which the total mercury is converted to methylmercury. The rate at which total mercury is converted to methylmercury is variable from site to site, with some sites (i.e., wetlands and marshes) having greatly enhanced rates of methylation.

Since methylmercury in the water column is directly related to mercury levels in fish, the following methylmercury load allocations are assigned to tributaries and the main stem of Cache Creek.

Methylmercury Load Allocations

Tables IV-6.1 and 6.2 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 methylmercury (unfiltered) concentrations to site-specific, aqueous methylmercury goals, which are 0.14 ng/L in Cache Creek, 0.06 ng/L in Bear Creek, and 0.09 ng/L in Harley Gulch. The allocations in Tables IV-6.1 and IV-6.2 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 below.

Table IV-6.2 provides the load allocation within Bear Creek and its tributaries to attain the allocation for Bear Creek described in Table IV-6.1. The inactive mines listed in Table IV-6.4 are assigned a 95% total mercury load reduction. Reductions in mercury loads from mines, erosion, and other sources in the Sulphur Creek watershed are expected to reduce in channel production of methylmercury to meet the Sulphur Creek methylmercury allocation.

To achieve the water quality objectives and the methylmercury allocations listed in Tables IV-6.1 and IV-6.2, the following actions are needed: 1) reduce loads of total mercury from inactive mines, 2) where feasible, implement projects to reduce total mercury inputs from existing mercury-containing sediment deposits in creek channels and creek banks downstream from historic mine discharges, 3) reduce erosion of soils with enriched total mercury concentrations, 4) limit activities in the watershed that will increase methylmercury discharges to the creeks and, where feasible, reduce discharges of methylmercury from existing sources, and 5) evaluate other remediation actions that are not directly linked to activities of a discharger. Because methylmercury is a function of total mercury, reductions in total mercury loads are needed to achieve the methylmercury load allocations. Methylmercury allocations will be achieved in part by natural erosion processes that remove mercury that has deposited in creek beds and banks since the start of mining.

Table IV-6.3 summarizes implementation actions, affected watersheds, and agencies or persons

assigned primary responsibility for mercury load reduction projects, and required completion dates for the projects. For purposes of this Basin Plan Implementation Program, the term "project" refers to actions or activities that result in a discharge of mercury to Cache Creek or are conducted within the 10-year floodplain.

Inactive Mines

By 6 February 2009, the Regional Water Board shall adopt cleanup and abatement orders or take other appropriate actions to control discharges from the inactive mines (Table IV-6.4) in the Cache Creek watershed. Responsible parties shall develop and submit for Executive Officer approval plans, including a time schedule, to reduce loads of mercury from mining or other anthropogenic activities by 95% of existing loads consistent with State Water Resources Control Board Resolution 92-49. The goal of the cleanup is to restore the mines to pre-mining conditions with respect to the discharge of mercury. Mercury and methylmercury loads produced by interaction of thermal springs with mine wastes from the Turkey Run and Elgin mines are considered to be anthropogenic loading. The responsible parties shall be deemed in compliance with this requirement if cleanup actions and maintenance activities are conducted in accordance with the approved plans. Cleanup actions at the mines shall be completed by 2011.

The wetland immediately downstream from the Abbott and Turkey Run mines in Harley Gulch contains mercury and is a source of methylmercury. After mine cleanup has been initiated, the responsible parties and owners of the wetland shall develop and submit for Executive Officer approval a cleanup and abatement plan to reduce the wetland's methylmercury loads to meet the Harley Gulch aqueous methylmercury allocation. The wetland cleanup and abatement shall be completed by 2011. Cleanup and abatement at the wetland should not be implemented prior to cleanup actions at the upstream mines.

The Sulphur Creek streambed and flood plain directly below the Central, Cherry Hill, Empire, Manzanita, West End and Wide Awake Mines contains mine waste. After mine cleanup has been initiated, the responsible parties and owners of the streambed and floodplain shall develop and submit for Executive Officer approval a cleanup and abatement plan to reduce anthropogenic mercury loading in the creek.

**TABLE IV-6.1
CACHE CREEK METHYLMERCURY ALLOCATIONS**

Source	Existing Annual Load (g/yr)	Acceptable Annual Load (g/yr)	Allocation (% of existing load)
Cache Creek (Clear Lake to North Fork confluence)	36.8	11	30%
North Fork Cache Creek	12.4	12.4	100%
Harley Gulch	1.0	0.04	4%
Davis Creek	1.3	0.7	50%
Bear Creek @ Highway 20	21.1	3	15%
Within channel production and ungauged tributaries	49.5	32	65%
<i>Total of loads</i>	122	7 (a)	10% (a)
Cache Creek at Yolo (b)	72.5	39	54%
Cache Creek Settling Basin Outflow (c)	87	12	14%

- The allocation includes a margin of safety, which is set to 10% of the acceptable loads. In terms of acceptable annual load estimates, the margin of safety is 7 g/yr.
- Cache Creek at Yolo is the compliance point for the tributaries and Cache Creek channel for meeting the allocations and aqueous goals. Agricultural water diversions upstream of Yolo remove methylmercury (50 g/year existing load).
- The Settling Basin Outflow is the compliance point for methylmercury produced in the Settling Basin.

**TABLE IV-6.2
BEAR CREEK METHYLMERCURY ALLOCATIONS**

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

- The allocation includes a margin of safety, which is set to 10% of the acceptable loads. In terms of acceptable annual load estimates, the margin of safety is 0.3 g/yr.
- Bear Creek at Highway 20 is the compliance point for Bear Creek and its tributaries.

**TABLE IV-6.3
IMPLEMENTATION SUMMARY**

Implementation Activity	Affected Watersheds	Assigned Responsibility	Action	Completion Date
Inactive Mines	Bear Creek, Harley Gulch, Sulphur Creek	Mine owners and other responsible parties, USBLM	Cleanup mines, sediment, and wetlands	2011
Creek Sediments-Harley Gulch Delta	Harley Gulch	USBLM	Conduct additional studies	2006
			Submit report on engineering options	2008
			Conduct projects, as required	2011
Creek Sediments-Upper Watershed	Bear Creek, Davis Creek, Harley Gulch, Sulphur Creek, and Cache Creek (Harley Gulch to Camp Haswell)	USBLM, SLC, CDFG, Colusa, Lake, and Yolo Counties, private landowners	Conduct additional studies	2007
			Feasibility studies	(Scope and time schedule for plan and reports determined as needed)
			Conduct Projects (as required)	
Erosion Control-Upper Watershed	Sub-watersheds with “enriched” mercury. Includes areas of Bear Creek, Sulphur Creek, and Cache Creek (Harley Gulch to Camp Haswell)	USBLM, SLC, CDFG, Colusa, Lake, and Yolo Counties, private landowners	Conduct additional studies	2006
			Identify activities that increase erosion	2007
			Submit erosion control plans, as required	2009
			Implement erosion control plans, as required	2011
Erosion Control from New Projects, 10-yr Floodplains	Cache Creek (Harley Gulch to Settling Basin), Bear and Sulphur Creeks, Harley Gulch	Yolo County, Reclamation Board, private landowners, US Army Corps of Engineers	Implement management practices and monitoring for erosion control	During and after project construction
New Reservoirs, Ponds, and Wetlands	Cache Creek watershed	Yolo County or project proponents	Submit plans to control methylmercury discharges	Prior to project construction
Anderson Marsh	Cache Creek at Clear Lake	California Department of Parks and Recreation	Conduct additional studies	2006
			Submit report on management options	2008
			Conduct Project (as required)	2011

**TABLE IV-6.4
CACHE CREEK WATERSHED INACTIVE
MINES (a)**

Mine	Average Annual Load Estimate, kg mercury/year (b)
Abbott and Turkey Run Mines	7
Rathburn and Rathburn-Petray Mines	20
Petray North and South Mines	5
Wide Awake Mine	0.8
Central, Cherry Hill, Empire, Manzanita, and West End Mines	5
Elgin Mine	3
Clyde Mine	0.4

- a. The mines are grouped by current landowner. Although cleanup requirements apply to each mine, a single owner or responsible party having adjacent mines may apply the 95% reduction to the total discharge from their mines.
- b. Estimates of average annual loads are preliminary, based on data collected by the California Geological Survey (Rathburn, Rathburn-Petray, Petray North, and Petray South mines) and Regional Water Board staff (other mines). Load estimates do not include mercury that would be discharged in extreme erosional events. Responsible parties may be required to refine the load estimates.

Creek Sediment – Upper Watershed

There are areas downstream from mines in Harley Gulch, Bear Creek, Sulphur Creek, Davis Creek and Cache Creek that have significant deposits of mercury-containing sediment that were derived, at least in part, from historic discharges from the mines. Where feasible, sediment discharges from these deposits need to be reduced or eliminated.

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

At other sites, further assessments are needed to determine whether responsible parties should be required to conduct feasibility studies to evaluate methods to control sources of mercury and methylmercury. The Executive Officer will, to the extent appropriate, prioritize the need for feasibility studies and subsequent remediation actions based on mercury concentrations and masses, erosion potential, and accessibility. Staff intends to complete the assessments by 6 February 2009. Where applicable, the Executive Officer will notify responsible parties to submit feasibility studies. Following review of the feasibility studies, the Executive Officer will determine whether cleanup actions will be required. Responsible parties that could be required to conduct feasibility studies include the US Bureau of Land Management (USBLM); State Lands Commission (SLC), California Department of Fish and Game (CDFG); Yolo, Lake, and Colusa Counties, mine owners, and private landowners. Assessments are needed of stream beds and banks in the following areas: Cache Creek from Harley Gulch to Camp Haswell, Harley Gulch, Sulphur Creek, and Bear Creek south of the Bear Valley Road crossing.

Erosion Control – Upper Watershed

Activities in upland parts of the watershed (i.e., outside the active floodplain), such as road construction and maintenance, grazing, timber management and other activities, can result in increased erosion and transport of mercury to the creeks, especially in parts of the watershed where the soils have enriched levels of mercury. 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 (less than 63 microns). Provisions described below are applicable in the following areas: the Cache Creek watershed (Harley Gulch to Camp Haswell), Harley Gulch and Sulphur Creek watersheds, and the Bear Creek watershed south of the Bear Valley Road crossing. Some projects subject to this implementation plan may be subject to permits, including general stormwater permits. This implementation plan does not preclude the requirement to obtain any applicable federal, state, or local permit applicable to such projects.

Road Construction and Maintenance

Management practices shall be implemented to control erosion from road construction and maintenance activities in parts of the watershed identified above. All California Department of Transportation (Caltrans) road construction projects or maintenance activities that result in soil disturbance shall comply with the Caltrans statewide Storm Water Management Plan and implement best

management practices to control erosion, including pre-project assessments to identify areas with enriched mercury and descriptions of additional management practices that will be implemented in these areas. Water quality and sediment monitoring may be required to ensure compliance with these requirements. For paved roads, entities maintaining or constructing road shall implement the Caltrans or equivalent management practices to comply with these requirements. For unpaved roads, entities maintaining or constructing road shall implement all reasonable management practices to control erosion during construction and maintenance activities. By 6 February 2009, county and agency road departments shall submit information describing the management practices that will be implemented to control erosion.

Other Activities

A goal of the Regional Water Board is to minimize erosion from areas with enriched mercury concentrations. Further studies are needed to identify specific upland sites within the watershed areas described above that have enriched mercury concentrations and to evaluate whether activities at these sites could result in increased erosion (i.e., grazing, timber harvest activities, etc.) or contribute to increases in methylmercury production. Staff will identify areas with enriched mercury concentrations by 6 February 2008. After the studies are complete, the Executive Officer will require affected landowners and/or land managers to 1) submit reports that identify anthropogenic activities on their lands that could result in increased erosion and 2) implement management practices to control erosion. As necessary, erosion control plans will be required no later than 6 February 2011. Entities responsible for controlling erosion include the 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.

Landowners implementing new projects or proposing change in land use on land in the enriched areas shall implement practices to control erosion and minimize discharges of mercury and methylmercury. If the dischargers are not implementing management practices to control erosion or methylmercury discharges, the Regional Water Board may consider individual prohibitions of waste discharge. For proposed changes in land use or new projects, landowners shall 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 remediation plan.

Erosion Control in the 10-Year Floodplains

Sediment and soil in the depositional zone of creeks downstream of mines in the Cache Creek watershed contains mercury. A goal of this plan is to minimize erosion of the mercury-containing sediment and soil due to human activities in order to protect beneficial uses in Cache Creek and to reduce loads of mercury moving downstream to the Settling Basin and the Delta. Some projects subject to this implementation plan may be subject to permits, including general stormwater permits. This implementation plan does not preclude the requirement to obtain any applicable federal, state, or local permit applicable to such projects.

The following requirements for erosion control apply to all projects conducted 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.

Project proponents are required to: 1) implement management practices to control erosion and 2) conduct monitoring programs that evaluate compliance with the turbidity objective, and submit monitoring results to the Regional Water Board. The monitoring program must include monitoring during the next wet season in which the project sites are inundated. In general, there must be monitoring for each project. However, in cases where projects are being implemented as part of a detailed resource management plan that includes erosion control practices, monitoring is not required as a condition of this amendment for individual projects. Instead, the project proponent may conduct monitoring at designated sites up and downstream of the entire management plan area.

Upon written request by project proponents, the Executive Officer may waive the turbidity monitoring requirements for a project, or group of projects, if the project proponents submit an alternative method for assessing compliance with the turbidity objective.

Whenever practicable, proponents should maximize removal of mercury enriched sediment from the floodplain. Sediment removed from the channel or the Settling Basin must be placed so that it will not erode into the creek. For projects related to habitat restoration or erosion control consistent with a comprehensive resource management plan, the project proponent may relocate sediment within the

channel if the proponent uses the sediment to enhance habitat and provides appropriate erosion controls.

Some projects may not be able to meet the turbidity objectives even when all reasonable management practices will be implemented to control erosion. These projects may still be implemented if project proponents implement actions (offset projects) in some other part of the watershed that would reduce or otherwise prevent discharges of sediment containing mercury in an amount at least equivalent to the incremental increases expected from the original project. Removal of sediment from the Settling Basin would be an acceptable offset project.

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

The Executive Officer may waive, consistent with State and federal law, the requirement for erosion control from a project conducted in the 10-year floodplain for habitat conservation or development activities for bank swallows that are proposed under the State's adopted Bank Swallow Recovery Plan (Department of Fish and Game, 1992).

New Reservoirs, Ponds, and Wetlands

Reservoirs, ponds, impoundments and wetlands generally produce more methylmercury than streams or rivers. Building new impoundments and wetlands that discharge to creeks in the Cache Creek watershed can add to the existing loads of methylmercury in Cache Creek and its tributaries. New impoundments, including reservoirs and ponds, and constructed wetlands shall be constructed and operated in a manner that would preclude an increase in methylmercury concentrations in Cache Creek, Bear Creek, Harley Gulch, or Sulphur Creek. This requirement applies to all new projects in the watershed, including gravel mining pits in lower Cache Creek that are being reclaimed as ponds and wetlands, for which physical construction is started after the approval of this implementation plan. "Preclude an increase in methylmercury concentrations" shall be defined as a measurable increase in aqueous concentration of methylmercury downstream of the discharge relative to upstream of the discharge.

Any entity creating an impoundment or constructed wetland that has the potential through its design to discharge surface water to Cache Creek, Bear Creek, Harley Gulch, or Sulphur Creek (uncontrollable

discharge after inundation by winter storm flows is excepted) must submit plans to the Regional Water Board that describe design and management practices that will be implemented to limit the concentration of methylmercury in discharges to the creek.

The Executive Officer will consider granting exceptions to the no net increase requirement in methylmercury concentration if: 1) dischargers provide information that demonstrates that all reasonable management practices to limit discharge concentrations of methylmercury are being implemented and 2) the projects are being developed for the primary purpose of enhancing fish and wildlife beneficial uses. In granting exceptions to the no net increase requirement, the Executive Officer will consider the merits of the project and whether to require the discharger to propose other activities in the watershed that could offset the incremental increases in methylmercury concentration in the creek. The Regional Water Board will periodically review the progress towards achieving the objectives and may consider prohibitions of methylmercury discharge if the plan described above is ineffective.

The Cache Creek Nature Preserve (CCNP), which includes a wetland restored from a gravel excavation, currently minimizes any methylmercury discharges to Cache Creek by holding water within the wetlands. If water management in the CCNP wetlands is changed significantly, the operator must submit plans describing management practices that will be implemented to limit methylmercury discharge to Cache Creek.

Anderson Marsh Methylmercury

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

Cache Creek Settling Basin

Although the Cache Creek settling basin retains about one half of the total mercury attached to sediment that enters the basin, there is a net increase in methylmercury discharged from the settling basin. Methylmercury loads are expected to decrease as inflow mercury concentrations decline. The Regional Water Board will continue to conduct methylmercury studies in the basin and work with the

Reclamation Board and the US Army Corps of Engineers to develop settling basin improvements to retain more sediment and reduce methylmercury loads. The Sacramento-San Joaquin Delta mercury implementation plan will include total mercury load reduction requirements for the settling basin.

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.

Thermal springs used by the Wilbur Hot Springs resort are a source of mercury and methylmercury to Sulphur Creek. Discharges of mercury or methylmercury from springs used or developed by the Wilbur Hot Springs resort shall not exceed current loads.

Potential Actions

This control plan focuses on reducing mercury discharges from mercury mines, controlling activities that mobilize past discharges from the mines, controlling activities that enhance methylation of mercury, and implementing cleanup and abatement activities at sites where sediment rich in mercury has accumulated. Responsibility for these actions may be assigned to responsible parties. There are a number of other actions that may be considered that would reduce loads of mercury in the creek that are not directly the responsibility of a discharger. The following actions are recommended for further evaluation:

- Construction of a settling basin upstream of Rumsey. The facility could trap mercury enriched sediment, reduce downstream loads and preserve space in the existing settling basin in Yolo Bypass.
- Methylmercury reduction plans for Bear Creek
- Load reductions from Davis Creek

Mercury Offset Program and Alternative Load Allocations

The Regional Water Board recognizes that cleanup 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 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-6.1 and 6.2 are assigned to watersheds. To allow offset program proponents to conduct projects within the watersheds to reduce loads, the Regional Water Board may consider alternative load allocations that will achieve the water quality objectives.

Public Education

The local county health departments should 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 water quality objectives and the Basin Plan requirements at least every five years. The Regional Water Board recognizes that it may take hundreds of years to achieve the fish tissue objectives. The Regional Water Board considers entities to be in compliance with this mercury reduction plan if they comply with the above requirements for mercury, methylmercury, and erosion controls. 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, however, 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 guidance 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. Regional Water Board staff will take the lead in determining compliance with fish tissue objectives for Cache Creek. Monitoring for

cleanup of mines or compliance with the erosion control requirements is the responsibility of the entity performing the cleanup or erosion control.

Pesticide Discharges from Nonpoint Sources

The control of pesticide discharges to surface waters from nonpoint sources will be achieved primarily by the development and implementation of management practices that minimize or eliminate the amount discharged. The Board will use water quality monitoring results to evaluate the effectiveness of control efforts and to help prioritize control efforts.

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Sutter/Butte - is Sacramento Slough near the confluence with the Sacramento River or the sum of the Sutter Bypass near the confluence with the Feather River and Reclamation Slough near the confluence with the Sutter Bypass depending on flow conditions (minus diazinon loading resulting from Sacramento River water being bypassed into tributaries of Sacramento Slough or the Sutter Bypass). The Sutter/Butte sub-watershed includes all land that drains to Sacramento Slough, the Sutter Bypass, and Reclamation Slough.

Sacramento River at I Street – is the Sacramento River at the I Street Bridge in the city of Sacramento.

Sacramento River at Verona – is the Sacramento River at the United States Geological Survey gauging station at Verona (Station Number 11425500).

Diazinon and Chlorpyrifos Runoff in the San Joaquin River Basin

1. The pesticide runoff control program shall:
 - a. Ensure compliance with water quality objectives applicable to diazinon and chlorpyrifos in the San Joaquin River through the implementation of management practices.
 - b. Ensure that measures that are implemented to reduce discharges of diazinon and chlorpyrifos do not lead to an increase in the discharge of other pesticides to levels that cause or contribute to violations of applicable water quality objectives and Regional Water Board policies; and
 - c. Ensure that discharges of pesticides to surface waters are controlled so that pesticide concentrations are at the lowest levels that are technically and economically achievable.
2. Dischargers must consider whether a proposed alternative to diazinon or chlorpyrifos has the potential to degrade ground or surface water. If the alternative has the potential to degrade groundwater, alternative pest control methods must be considered. If the alternative has the potential to degrade surface water, control measures must be implemented to ensure that applicable water quality objectives and Regional Water Board policies are not violated, including State Water Resources Control Board Resolution 68-16.
3. Compliance with applicable water quality objectives, load allocations, and waste load allocations for diazinon and chlorpyrifos in the

San Joaquin River is required by 1 December 2010.

The water quality objectives and allocations will be implemented through one or a combination of the following: the adoption of one or more waivers of waste discharge requirements, and general or individual waste discharge requirements. To the extent not already in place, the Regional Water Board expects to adopt or revise the appropriate waiver(s) or waste discharge requirements by 31 December 2007.

4. The Regional Water Board intends to review the diazinon and chlorpyrifos allocations and the implementation provisions in the Basin Plan at least once every five years, beginning no later than 31 December 2009.
5. Regional Water Board staff will meet at least annually with staff from the Department of Pesticide Regulation and representatives from the California Agricultural Commissioners and Sealers Association to review pesticide use and instream pesticide concentrations during the dormant spray and irrigation application seasons, and to consider the effectiveness of management measures in meeting water quality objectives and load allocations.
6. The Waste Load Allocations (WLA) for all NPDES-permitted dischargers, Load Allocations (LA) for nonpoint source discharges, and the Loading Capacity of the San Joaquin River from the Mendota Dam to Vernalis shall not exceed the sum (S) of one (1) as defined below.

$$S = \frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0$$

where

CD = diazinon concentration in µg/L of point source discharge for the WLA; nonpoint source discharge for the LA; or San Joaquin River for the LC.

CC = chlorpyrifos concentration in µg/L of point source discharge for the WLA; nonpoint source discharge for the LA; or San Joaquin River for the LC.

WQOD = acute or chronic diazinon water quality objective in µg/L.

WQOC = acute or chronic chlorpyrifos water quality objective in µg/L.

Available samples collected within the applicable averaging period for the water quality objective will be used to determine compliance with the allocations and loading capacity. For purposes of calculating the sum (S) above, analytical results that are reported as “non-detectable” concentrations are considered to be zero.

7. At a minimum, Loading Capacity shall be calculated for each of the following six water quality compliance points in the San Joaquin River:
 - San Joaquin River at the Airport Way Bridge near Vernalis (United States Geological Survey (USGS) Identification Number 11303500)
 - San Joaquin River at the Maze Boulevard (Highway 132) Bridge (USGS Identification Number 11290500)
 - San Joaquin River at Las Palmas Avenue near Patterson (USGS Identification Number 11274570)
 - San Joaquin River at Hills Ferry Road
 - San Joaquin River at Highway 165 near Stevinson (USGS Identification Number 11260815)
 - San Joaquin River at Sack Dam

The load allocations for non-point source discharges into the San Joaquin River are assigned to the following subareas:

- a. The combined Stanislaus River; North Stanislaus; and Vernalis North subareas.
- b. The combined Tuolumne River; Northeast Bank; and Westside Creek subareas.
- c. The combined Turlock; Merced; and Greater Orestimba subareas.
- d. The combined Stevinson and Grassland subareas.
- e. The combined Bear Creek and Fresno-Chowchilla subareas.

The established waste load and load allocations for diazinon and chlorpyrifos, and the water quality objectives for chlorpyrifos and diazinon in the San Joaquin River represent a maximum allowable level. The Regional Water Board shall require any additional reductions in diazinon and chlorpyrifos levels necessary to account for additional additive or synergistic toxicity effects or to protect beneficial uses in tributary waters.

8. Pursuant to CWC Section 13267, the Executive Officer will require dischargers to submit a management plan that describes the actions that the discharger will take to reduce diazinon and chlorpyrifos discharges and meet the applicable allocations by the required compliance date.

The management plan may include actions required by State and federal pesticide regulations. The Executive Officer will require the discharger to document the relationship between the actions to be taken and the expected reductions in diazinon and chlorpyrifos discharges. The Executive Officer will allow individual dischargers or a discharger group or coalition to submit management plans.

The management plan must comply with the provisions of any applicable waiver of waste discharge requirements or waste discharge requirements.

The Executive Officer may require revisions to the management plan if compliance with applicable allocations is not attained or the management plan is not reasonably likely to attain compliance.

9. If the loading capacity in the San Joaquin River is not being met by the compliance date, dischargers in subareas where load allocations are not being met will be required to revise their management plans and implement an improved complement of management measures to meet the loading capacity.
10. Any waiver of waste discharge requirements or waste discharge requirements that govern the control of pesticide runoff that is discharged directly or indirectly into the San Joaquin River must be consistent with the policies and actions described in paragraphs 1 - 9.
11. In determining compliance with the waste load allocations, the Regional Water Board will consider any data or information submitted by the discharger regarding diazinon and chlorpyrifos inputs from sources outside of the jurisdiction of the permitted discharger, including any diazinon and chlorpyrifos present in precipitation, and other available relevant information; and any applicable provisions in the discharger’s NPDES permit requiring the discharger to reduce the discharge of pollutants to the maximum extent possible.

Dredging in the Sacramento River and San Joaquin River Basins

Large volumes of sediment are transported in the waters of the Sacramento and San Joaquin Rivers which drain the Central Valley. The average annual sediment load to San Francisco Bay from these two rivers is estimated to be 8 million cubic yards. Dredging and riverbank protection projects are ongoing, continuing activities necessary to keep ship channels open, prevent flooding, and control riverbank erosion. The Delta, with over 700 miles of waterways, is a major area of activity. At present, the Corps is overseeing the conduct and planning of rehabilitation work along 165 miles of levees surrounding 15 Delta islands. In addition, virtually all of the Delta levees have been upgraded by island owners or reclamation districts. The magnitude of recent operations, such as the Stockton and Sacramento Ship Channel Deepening Projects and Sacramento River Bank Protection Project, is discussed in recent U.S. Army Corps of Engineers Reports. For example, the Corps removes over 10 million cubic yards of sediment yearly from the Sacramento River. If the Sacramento River Deep Water Ship Channel is widened and deepened as proposed currently, 25 million cubic yards of bottom material will be removed from the river during the 5-year project.

Environmental impacts of dredging operations and materials disposal include temporary dissolved oxygen reduction, increased turbidity and, under certain conditions, the mobilization of toxic chemicals and release of biostimulatory substances from the sediments. The direct destruction and burial of spawning gravels and alteration of benthic habitat may be the most severe impacts. The existing regulatory process must be consistently implemented to assure protection of water quality and compliance with the certification requirements of Section 401 of the Federal Clean Water Act.

The Regional Water Board continues to work with dredging interests in the San Francisco Bay and Delta to develop a long term management strategy (LTMS) for handling dredge spoils. We will adopt requirements for all significant dredging operations and upland disposal projects in the Region.

Nitrate Pollution of Ground Water in the Sacramento and San Joaquin River Basins

Since 1980, over 200 municipal supply wells have been closed in the Central Valley because of nitrate levels exceeding the State's 45 mg/l drinking water standard. Proposals have been submitted to assess the extent of the problem and explore possible regulatory responses, but without success. The increasing population growth in the Valley is expected to accelerate the problem's occurrence in the years ahead.

The Regional Water Board considers nitrate pollution to be a critical issue for beneficial use protection in the Central Valley Region. Staff will continue efforts to obtain study funds. Since nitrate pollution of ground water is not restricted to the Central Valley Region, the Regional Water Board recommends the State Water

Board take the lead in developing programs for controlling ground water contamination resulting from the use of nitrogen fertilizer on irrigated crops.

Temperature and Turbidity Increases Below Large Water Storage and Diversion Projects in the Sacramento River Basin

The storage and diversion of water for hydroelectric and other purposes can impact downstream beneficial uses because of changes in temperature and the introduction of turbidity. There are several large facilities in the Basin which have had a history of documented or suspected downstream impairments.

Where problems have been identified, the staff will work with operators to prepare management agency agreements or make recommendations to State Water Board regarding requirements to remedy the problems. Where problems are suspected, the staff will seek additional monitoring.

for the prohibition is approximately \$37 million dollars per year to eliminate the impairment through provision of purchased water. The cost of construction of an aeration device of adequate capacity to eliminate the impairment, in conjunction with point source load reductions already required, is estimated to be \$10 million, with yearly operation and maintenance costs of \$200,000 per year.

Potential funding sources:

1. Proposition 13 includes \$40 million in bond funds to address the dissolved oxygen impairment in the DWSC. Approximately \$14.4 million of this \$40 million has been identified to fund the oxygen demanding substance and precursor studies. An additional \$1.2 million is being provided from various watershed stakeholders. Approximately \$24 million of Proposition 13 funds are available to pay for projects such as the design and construction of an aeration device.
2. The State Water Contractors, Port of Stockton, San Luis and Delta Mendota Water Authority, San Joaquin Valley Drainage Authority, and the San Joaquin River Group Authority have proposed to develop an operating entity for an aeration device and have indicated their commitment to execute a funding agreement among themselves and other interested parties, (subject to ultimate approval of respective governing boards) that would provide the mechanism to support operation of a permanent aerator at a cost expected to be in the annual range of \$250,000 to \$400,000.

Diazinon and Chlorpyrifos Runoff into the San Joaquin River Control Program

The total estimated costs for management practices to meet the diazinon and chlorpyrifos objectives for the San Joaquin River range from \$56,000 to \$2.5 million for the dormant season, and from \$3.9 million to \$5.3 million for the irrigation season. The estimated costs for discharger compliance monitoring, planning and evaluation range from \$600,000 to \$3.1 million. The estimated total annual costs range from \$4.4 million to \$10.9 million (2004 dollars).

Potential funding sources include:

1. Those identified in the San Joaquin River Subsurface Agricultural Drainage Control Program and the Pesticide Control Program.

2. The Regional Board will inspect discharge flow monitoring facilities and will continue its cooperative effort with dischargers to ensure the quality of laboratory results.
3. The Regional Board will, on a regular basis, inspect any facilities constructed to store or treat agricultural subsurface drainage.
4. The Regional Board will continue to maintain and update its information on agricultural subsurface drainage facilities in the Grassland watershed. Efforts at collecting basic data on all facilities, including flow estimates and water quality will continue.
5. The Regional Water Board, in cooperation with other agencies, will regularly assess water conservation achievements, cost of such efforts and drainage reduction effectiveness information. In addition, in cooperation with the programs of other agencies and local district managers, the Regional Board will gather information on irrigation practices, i.e., irrigation efficiency, pre-irrigation efficiency, excessive deep percolation and on seepage losses.

Another such study is a surveillance and monitoring program conducted by the El Dorado Irrigation District (EID) on Deer Creek in El Dorado and Sacramento Counties. Regional Board staff will work with EID to ensure adequate temperature, flow and biological monitoring is conducted to evaluate compliance with the site-specific temperature objectives for Deer Creek and their effect on beneficial uses.

Aerial Surveillance

Low-altitude flights are conducted primarily to observe variations in field conditions, gather photographic records of discharges, and document variations in water quality.

Self-Monitoring

Self-monitoring reports are normally submitted by the discharger on a monthly or quarterly basis as required by the permit conditions. They are routinely reviewed by Regional Water Board staff.

Compliance Monitoring

Compliance monitoring determines permit compliance, validates self-monitoring reports, and provides support for enforcement actions. Discharger compliance monitoring and enforcement actions are the responsibility of the Regional Water Board staff.

Complaint Investigation

Complaints from the public or governmental agencies regarding the discharge of pollutants or creation of nuisance conditions are investigated and pertinent information collected.

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.

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 Advisories (Third Edition, 2000) or other statistical methods approved by the Executive Officer.

Analysis of fish tissue for total mercury is acceptable for assessing compliance. 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 will 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 will include a range of sizes of fish between 250 and 350 mm, total length, with average length of 300 mm. If green sunfish and bluegill are not available in this size range; 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 are recommended to be collected periodically throughout the year and 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 Water Board staff or required of project proponents.

Monitoring for mine cleanups or other projects that are expected to significantly affect methylmercury or mercury loads are recommended to include the following parameters. The data may be collected by Regional Water Board staff or required of project proponents.

- Monitoring parameters for soil and sediment: concentration of total mercury in soil or sediment in the silt/clay (<63 microns) fraction.
- Monitoring parameters for water: methylmercury (if project is methylmercury source), total mercury, total suspended solids, turbidity, and stream flow. Water sampling in major tributaries is recommended to include high flow events for mercury and total suspended solids. More frequent monitoring (two to four significant storm events for three consecutive years) is recommended after cleanup to evaluate the effectiveness of cleanup actions.
- Monitoring of mercury in suspended sediment: The ratio of concentrations of mercury in suspended sediment (Hg/TSS) is a useful measure of mercury contamination. Effectiveness of cleanup of the mines may be assessed by comparing concentration of mercury in fine-grained sediment discharging from the mines to the average concentration in background (not affected by mining activities) soil or sediment.

Orchard Pesticide Runoff and Diazinon Runoff into the Sacramento and Feather Rivers

The Regional Water Board requires a focused monitoring effort of pesticide runoff from orchards in the Sacramento Valley.

The monitoring and reporting program for any waste discharge requirements or waiver of waste discharge requirements that addresses pesticide runoff from orchards in the Sacramento Valley must be designed to collect the information necessary to:

1. determine compliance with established water quality objectives for diazinon in the Sacramento and Feather Rivers;
2. determine compliance with established waste load allocations and load allocations for diazinon;

3. determine the degree of implementation of management practices to reduce off-site migration of diazinon;
 4. determine the effectiveness of management practices and strategies to reduce off-site migration of diazinon;
 5. determine whether alternatives to diazinon are causing surface water quality impacts;
 6. determine whether the discharge causes or contributes to a toxicity impairment due to additive or synergistic effects of multiple pollutants; and
 7. demonstrate that management practices are achieving the lowest pesticide levels technically and economically achievable.
5. determine whether alternatives to diazinon and chlorpyrifos are causing surface water quality impacts;
 6. determine whether the discharge causes or contributes to a toxicity impairment due to additive or synergistic effects of multiple pollutants; and
 7. demonstrate that management practices are achieving the lowest pesticide levels technically and economically achievable.

Dischargers are responsible for providing the necessary information. The information may come from the dischargers' monitoring efforts; monitoring programs conducted by State or federal agencies or collaborative watershed efforts; or from special studies that evaluate the effectiveness of management practices.

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Diazinon and Chlorpyrifos Runoff in the San Joaquin River Basin

The Regional Water Board requires a focused monitoring effort of pesticide runoff from orchards and fields in the San Joaquin Valley.

The monitoring and reporting program for any waste discharge requirements or waiver of waste discharge requirements that addresses pesticide runoff from orchards and fields in the San Joaquin valley must be designed to collect the information necessary to:

1. determine compliance with established water quality objectives and the loading capacity applicable to diazinon and chlorpyrifos in the San Joaquin River;
2. determine compliance with established load allocations for diazinon and chlorpyrifos;
3. determine the degree of implementation of management practices to reduce off-site movement of diazinon and chlorpyrifos;
4. determine the effectiveness of management practices and strategies to reduce off-site migration of diazinon and chlorpyrifos;