Date stamp 6 February 2007

Mr. Tom Howard
Acting Executive Director
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

Dear Mr. Howard:

Thank you for submitting the total maximum daily loads (TMDLs) to address mercury and methylmercury in the Cache Creek watershed. The TMDL submittal was dated November 9, 2006 and received by EPA on November 15, 2006. The State of California adopted TMDLs to address mercury in the following water bodies as identified on the State's 2002 Clean Water Act Section 303(d) list: Cache Creek, Bear Creek and Harley Gulch.

Based on EPA's review of the TMDL submittals under Clean Water Act Section 303(d)(2), I have concluded the TMDLs adequately address the pollutants of concern and, upon implementation, will result in attainment of all applicable water quality standards. The TMDLs include waste load and load allocations as needed, take into consideration seasonal variations and critical conditions, and provide an adequate margin of safety. The State provided sufficient opportunities for public review and comment on the TMDLs and demonstrated how public comments were considered in the final TMDLs. All required elements are adequately addressed; therefore, the TMDLs are hereby approved pursuant to Clean Water Act Section 303(d)(2).

The State's submittal also contains a detailed plan for implementing the TMDLs. Current federal regulations do not define TMDLs as containing implementation plans; therefore, EPA is not taking action on the implementation plan provided with the TMDLs. However, EPA generally concurs with the State's proposed implementation approaches.

The enclosed review discusses the basis for this decision in greater detail. I appreciate the State's work to adopt these TMDLs and look forward to our continuing partnership in TMDL development. If you have questions concerning this action, please call me at (415) 972-3572 or Diane Fleck at (415) 972-3480.

Sincerely yours,

Alexis Strauss, Director
Water Division

Enclosure
cc: Pamela Creedon, Central Valley RWQCB

EPA Staff Report Supporting Approval of TMDLs:
TMDLs for Mercury/Methylmercury in Cache Creek, Bear Creek, and Harley Gulch

Background

The State of California included Cache Creek, Bear Creek, and Harley Gulch as water quality limited due to mercury on the its 2002 Clean Water Act Section 303(d) list. Consistent with the requirements of Clean Water Act (CWA) Section 303(d)(1), the Central Valley Regional Water Quality Control Board adopted TMDLs for these three water bodies to meet existing narrative and numeric water quality objectives for mercury, and to meet concurrently adopted water quality objectives for methylmercury.

The Basin Plan amendment containing the TMDLs was adopted by the Central Valley Regional Water Quality Control Board on October 21, 2005 under Resolution No. R5-2005-0146. The amendment was approved by California's State Water Resources Control Board on July 19, 2006 under Resolution No. 2006-0054. California's Office of Administrative Law approved the TMDLs (file no. 06-0901-08S) on October 19, 2006.

EPA is approving the TMDLs for Cache Creek, Bear Creek and Harley Gulch. They meet the requirements of Clean Water Act Section 303(d) and federal regulations at 40 CFR 130.2 and 130.7.

TMDL Review

EPA reviewed the State submittal package to ensure that all required TMDL elements have been adequately addressed. EPA's review is presented in the checklist below, which determines that all required TMDL elements and adequate levels of technical justification for each are included.

The TMDLs are designed to implement California Toxics Rule (CTR) water column mercury criteria and fish tissue methylmercury water quality objectives adopted concurrently with the TMDLs. EPA finds the State's use of these criteria/objectives to serve as numeric targets in the calculations for the Cache Creek, Bear Creek, and Harley Gulch TMDLs, to be reasonable. We also find that the State's conclusion that achieving these targets will result in attainment of water quality standards (i.e., criteria or objectives and beneficial uses) is reasonable.

The TMDLs include load allocations (there are no waste load allocations) in mass of methylmercury, based on aqueous methylmercury water column concentration goals which are linked to methylmercury fish tissue concentrations equal to the new fish tissue water quality objectives. This approach is consistent with federal requirements concerning expression of load and waste load allocations (see 40 CFR 130.2).

TMDL Checklist

Document name:	**Amendments to 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, Staff Report; October 2005.**
State:	**California**
Waterbodies:	**Cache Creek, Bear Creek, and Harley Gulch**
Pollutant(s):	**Mercury/Methylmercury**
Date of State Submission:	**November 15, 2006 (Received by EPA)**
EPA Reviewer:	**Diane E. Fleck**
TMDL status:	**Recommended for Approval**

Review Criteria	Comments
1. Submittal Letter: Letter indicates final TMDL(s) for specific water(s)/pollutant(s) were adopted by state and submitted to EPA for approval under 303(d).	Submittal letter is dated November 9, 2006. On October 21, 2005, Central Valley Regional Water Quality Control Board adopted TMDLs (referred to as a Control Plan) for the control of mercury in Cache Creek, Bear Creek, Sulphur Creek and Harley Gulch. State Water Resources Control Board (SWRCB) approved the TMDLs on July 19, 2006. The Office of Administrative Law approved the TMDLs on October 19, 2006. The submittal includes the Staff Report dated October 2005, which includes the Basin Plan Amendment dated October 21, 2005. The submittal letter states that the documents are submitted under CWA Section 303(d)(2) for EPA approval.
2. TMDLs Included: The submittal clearly identifies the water segments and pollutants or stressors for which TMDLs were developed. The submittal should distinguish TMDLs adopted for listed water/pollutant combinations from TMDLs adopted for water/pollutant combinations not identified on the current Section 303(d) list.	The submittal letter states that the State adopted, under CWA Section 303(d)(2), a Control Plan for the control of mercury in Cache Creek, Bear Creek, Sulphur Creek and Harley Gulch. EPA previously told the State, and the State agreed, that the Control Plan for Sulphur Creek could not be approved under CWA Section 303(d) as a TMDL for Sulphur Creek, at this time; see SWRCB Notice of Opportunity for Public Comment dated June 9, 2006. However, since Sulphur Creek flows into Bear Creek, which flows into Cache Creek, the Control Plan includes analyses and implementation actions on Sulphur Creek to ensure downstream attainment of water quality standards. The State will submit a separate TMDL analysis for Sulphur Creek, after site-specific water quality standards actions have been completed. The Control Plan includes analyses and actions to control total mercury water column concentrations and fish tissue methylmercury concentrations,

Review Criteria	Comments
	consistent with EPA policy and guidance. All water body segments are listed as impaired on the State's current (2002) CWA Section 303(d) list.
3. Water Quality Standards Attainment: TMDL(s) and associated allocations are set at levels adequate to result in attainment of applicable standards.	The Basin Plan amendment includes new mercury water quality objectives for Cache Creek (Clear Lake to Yolo Bypass), North Fork Cache Creek, Bear Creek (tributary to Cache Creek), and Harley Gulch. For Cache and Bear Creeks, 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, the average methylmercury concentration shall not exceed 0.05 mg methylmercury/kg wet weight in whole, trophic level 2 and 3 fish. See Staff Report, Appendix I, Regional Board Basin Plan Amendment, Resolution R5-2005-0146, page 1. In the TMDL analyses, the new fish tissue objectives are strongly correlated to unfiltered methylmercury water column values; methylmercury load allocations are set to achieve the unfiltered methylmercury water column values. Total mercury load reductions are set to achieve the methylmercury load allocations. See Staff Report, Appendix I, Regional Board Basin Plan Amendment, Resolution R5-2005-0146, pages 3-4. Thus, the TMDLs are set to achieve the new fish tissue methylmercury water quality objectives; the TMDLs are also set to ensure that the applicable numeric total mercury water column criterion in the California Toxics Rule (CTR) of 50 ng/l is not exceeded. See Staff Report, page 13. In a separate action, EPA is concurrently approving the State's new mercury water quality objectives for fish tissue under Section 303(c). EPA concurs with the State's TMDL analysis that these new numeric water quality objectives will result in elimination of adverse effects associated with elevated mercury and methylmercury and will adequately protect all applicable water quality standards.
4. Numeric Target(s): Submission describes applicable water quality standards, including beneficial uses, applicable numeric and/or	See above for applicable water quality standards in fish tissue (concurrently adopted) and in water column values (CTR). Numeric targets in the

Review Criteria	Comments
narrative criteria. Numeric water quality target(s) for TMDL identified, and adequate basis for target(s) as interpretation of water quality standards is provided.	TMDL analyses are the new fish tissue objectives, as described above in section 3. See Staff Report, Appendix A: Cache Creek, Bear Creek, and Harley Gulch TMDL for Mercury Staff Report; Chapter 2, Numeric Targets. EPA finds the State's use of its new fish tissue objectives as numeric targets in the TMDL analysis to be reasonable and appropriate.
5. Source Analysis: Point, non-point, and background sources of pollutants of concern are described, including the magnitude and location of sources. Submittal demonstrates all sources have been considered.	In the TMDL analyses, the sources of mercury and methylmercury for each water body are analyzed and estimated. Sources of mercury include waste rock and tailings from historic mercury mines, erosion of naturally occurring mercury–enriched soils, geothermal springs and atmospheric deposition. Sources of methylmercury parallel sources of mercury, since mercury is transformed into methylmercury in sediment by sulfate-reducing bacteria. See Staff Report, Appendix A: Cache Creek, Bear Creek and Harley Gulch TMDL for Mercury; Chapter 3, Source Analysis. This chapter describes all sources, including their magnitude (in percent of total) and general location. No point sources exist. EPA finds the State's source analysis to be complete, reasonable and appropriate.
6. Loading Capacity Linkage Analysis: Submittal describes relationship between numeric target(s) and identified pollutant sources. Submittal clearly identifies loading capacity. For each pollutant, describes analytical basis for conclusion that sum of allocations and margin of safety does not exceed the loading capacity of the receiving waters.	The TMDL analyses include a linkage analysis that describes the relationship between methylmercury concentrations in water and in fish. Data show statistically significant relationships. Numeric targets in fish tissue are linked to methylmercury water column concentrations; water column concentrations are converted into proposed loads, to determine loading capacity; percent reductions from current loads (sources) are proposed as allocations. See Staff Report, Appendix A: Cache Creek, Bear Creek and Harley Gulch TMDL for Mercury, Chapter 4, Linkage Analysis. The TMDL analyses include an explicit margin of safety of 10%. See Staff Report, Appendix A: Cache Creek, Bear Creek and Harley Gulch TMDL for Mercury, Chapter 5, Margin of Safety and Seasonal Variability. The TMDL analyses shows that in order to reduce methylmercury loads, total mercury loads must be reduced. The TMDL requires a 95% reduction of total mercury loads from all anthropogenic mercury

Review Criteria	Comments
	sources (including all mine waste sources). See Basin Plan Amendment at pages 6 – 11, and Staff Report, Appendix A. The Staff Report and its Appendix A (the TMDL Report) clearly describe the relationships between the numeric targets, pollutant sources, loading capacity, TMDL allocations and margin of safety. EPA finds the State's linkage analysis to be reasonable and appropriate.
7. TMDL and Allocations: Submittal identifies the total allowable load, waste load allocations for all point sources and load allocations for non-point sources. The TMDL must be set equal to or less than the loading capacity. If no point sources are present, waste load allocations are zero. If no non-point sources are present, load allocations are zero. TMDLs and allocations should be expressed in terms of daily time steps. It the TMDL and/or allocations are also expressed in terms other than mass loads per day, the submittal explains why it is reasonable and appropriate to express the TMDL in those terms.	**TMDL:** Average annual loads of methylmercury (in grams per year) are presented in the TDML analyses (See Tables IV-7 and IV-8, in Chapter IV of the Basin Plan Amendment, page 3), at specific points along the water bodies (these are the total allowable loads). See Staff Report, Appendix A: Cache Creek, Bear Creek and Harley Gulch TMDL for Mercury, Average daily loads can be determined by simply dividing the average annual loads by 365 days per year. Allowable loads are based on the loading capacity of the water body, including a 10% margin of safety. **Waste Load Allocations**: Since there are no point sources in this watershed, the TMDL does not have any waste load allocations (waste load allocations are equal to zero). **Load Allocations:** The Basin Plan amendment includes specific load allocations for methylmercury (in grams per year) at certain points in Cache Creek, Bear Creek, Harley Gulch, and for in-stream production at Tables IV-7 and IV-8. Allocations are expressed as a percent of the existing methylmercury loads, which are presented in average annual 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 apply to sources of methylmercury entering each tributary or stream segment. See Staff Report, Appendix I, Regional Board Basin Plan Amendment, Resolution R5-2005-0146, pages 2-3. EPA concludes these TMDLs include load allocations that are consistent with the provisions of

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	the CWA and federal regulations.
8. Margin of Safety (MOS): Submission describes explicit and/or implicit margin of safety for each pollutant.	The allocations include an explicit margin of safety of 10%. See Staff Report, Appendix A: Cache Creek, Bear Creek and Harley Gulch TMDL for Mercury, Chapter 5, Margin of Safety and Seasonal Variability. EPA finds the State's analysis to be reasonable and appropriate.
9. Seasonal Variations and Critical Conditions: Submission describes method for accounting for seasonal variations and critical conditions in the TMDL(s)	The TMDL analyses take into account seasonal variability in total and methylmercury loads in the source analyses. Average, annual loads of total mercury and methylmercury are estimated using data collected throughout the year to account for seasonal changes in the transport of total mercury and methylmercury, and methylmercury production. See Staff Report, Appendix A: Cache Creek, Bear Creek and Harley Gulch TMDL for Mercury; Chapter 5, Margin of Safety and Seasonal Variability, page 89. EPA finds the State's analysis to be reasonable and appropriate.
10. Public Participation: Submission documents provision of public notice and public comment opportunity; and explains how public comments were considered in the final TMDL(s).	The Central Valley Regional Water Quality Control Board held several public workshops and public hearings, and adequately responded to written and oral public comments. Formal public hearings were held on June 23, 2005, and October 21, 2005. The State Water Resources Control Board held a formal public hearing on July 19, 2006, and adequately responded to written and oral public comments on these TMDLs. EPA finds that the State adequately noticed and responded to public comment.
11. Technical Analysis: Submission provides appropriate level of technical analysis supporting TMDL elements	The TMDL analyses provide an exceptional level of technical analysis supporting all TMDL elements. The Staff Report and TMDL Report provide clear discussion of all analyses used to calculate the TMDLs.
12. Reasonable Assurances: If waste load allocations are made less stringent based on the inclusion of load allocations that reflect non-point source reductions, submission describes how there are reasonable assurances that necessary non-point source reductions will occur.	Not Applicable. (there are no waste load allocations in these TMDLs)