UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

JUL 27 2007

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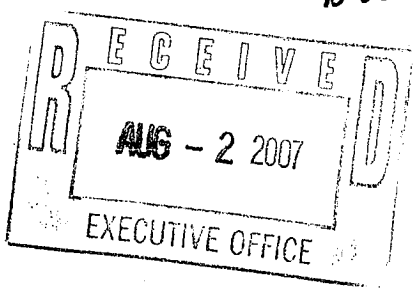

Ms. Dorothy Rice
Executive Director
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

Dear Ms. Rice:

Thank you for submitting the total maximum daily load (TMDL) to address sediment in Squaw Creek. The submission was dated June 22, 2007 and was received on June 25, 2007. The State of California adopted the TMDL to address sedimentation/siltation in Squaw Creek, which is listed as a water quality limited segment as identified on the State's 2004-2006 Clean Water Act Section 303(d) list.

Based on EPA's review, I have concluded the TMDL adequately addresses the pollutant of concern and will, upon implementation, result in attainment of applicable water quality standards. The TMDL includes allocations as needed, takes into consideration seasonal variations and critical conditions, and provides an adequate margin of safety. The State provided adequate opportunities for the public to review and comment on this TMDL. All required elements are adequately addressed; therefore, the TMDL is hereby approved pursuant to Clean Water Act Section 303(d)(2).

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

The enclosed review discusses the basis for this approval decision. We appreciate the State and Regional Boards' work to complete and adopt the TMDL, and we look forward to our continuing partnership in TMDL development. If you have questions concerning this approval, please call me at (415) 972-3572 or Jacques Landy at (775) 589-5248.

Sincerely yours,

Alexis Strauss 27 July 2007
Alexis Strauss, Director
Water Division

Enclosure

cc: Harold Singer, Lahontan RWQCB

TMDL Review Checklist

State: **California**

Waterbodies: **Squaw Creek**

Pollutant(s): **Sedimentation/Siltation**

Date of Initial Submission: **June 22, 2007**

Date Received By EPA: **June 25, 2007**

Dates of Supplemental Submission(s) and Receipt by EPA: **N/A**

EPA Reviewer: **Jacques Landy**

1. Submittal Letter:
State submittal letter indicates final TMDL(s) for specific water(s)/pollutant(s) were adopted by state and submitted to EPA for approval under 303(d). Acknowledge if any supplemental material was provided and receipt date.

Submittal letter dated June 22, 2007, and received June 25, 2007.
The Lahontan RWQCB adopted the sediment TMDL for Squaw Creek on April 13, 2006 (RWQCB Resolution #R6T-2006-0017). The California State Board (SWRCB) approved the sediment TMDL and the Basin Plan amendment on February 20, 2007 (SWRCB Resolution # 2007-0008). The State Office of Administrative Law approved the TMDL on May 18, 2007 (OAL file # 07-0406-02). The submittal addresses one water body: Squaw Creek (Staff Report Supporting the Basin Plan Amendment, p. i), which was placed on the State's 303(d) list in 1992 (Staff Report Supporting the Basin Plan Amendment, p. 2-11--2-12), and identified on the State's 2004-06 CWA Section 303(d) list, for sedimentation/siltation.

The submittal contained the Staff Report Supporting the Basin Plan Amendment (Staff Report) dated April 2006, and the Lahontan RWQCB Resolution, including the adopted Basin Plan Amendment (proposed April 2006).

2. TMDLs Included:
The submittal clearly identifies the water segments and pollutants or stressors for which TMDLs were developed. The submittal should include the water segment identifier (e.g., NHD code) for each segment addressed. The submittal should clearly identify the TMDLs adopted for currently 303(d) listed waterbody-pollutant combinations. It should also clarify if TMDLs were adopted for new impairment findings (by waterbody-pollutant combinations) that do not exist on the current 303(d) list. If appropriate, the submittal should describe any assessment decisions that may have resulted in non-impairment status for water/pollutant combinations that exist on State's most current 303(d) list.

The submittal addresses Squaw Creek (8.2 square mile watershed) (Staff Report, p. 2-1).

3. Water Quality Standards Attainment: *TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.*

(TMDL report, pp. 2-10--2-21)
Narrative water quality objectives exist for sediment and settleable materials in the Lahontan RWQCB Basin Plan. Two categories of numeric targets have been developed for the meadow reach of Squaw

Creek (the most sensitive reach) in the Squaw Creek TMDL: biological condition scores (BCS) and physical habitat conditions (median particle size and percentage of fines and sand) (Staff Report pp. 2-12--2-19). Together, these are designed to protect the most sensitive beneficial uses of the watershed, which are those related to cold freshwater habitat and aquatic life spawning, reproduction and development (p. 2-12). The State relied on EPA guidance, including rapid bioassessment protocols and biologic criteria technical guidance using the reference stream method (EPA, 1999), to support the values selected, which are protective of the most sensitive beneficial uses.

The State reasonably concluded that attainment of the numeric targets and associated TMDLs and load allocations will result in attainment of the applicable narrative water-quality objectives.

4. Numeric Target(s): *Submission describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. Numeric water quality target(s) for TMDL identified, and adequate basis for target(s) as interpretation of water quality standards is provided.*

(Staff Report, pp. 3-1--3-7)
Indicator parameters and target values were selected from an array of parameters measured in the most severely impacted locations, consistent with EPA's 1999 sediment TMDL guidance. Indicators of the relationship between pollutant sources and water quality impacts include: physical habitat measures and BCS, a numeric value based on an index of seven biologic metrics that are sensitive to changes in biologic integrity caused by sedimentation and well-correlated with physical habitat measures (pp. 3-3-3-5). Bioassessments to develop BCSs were conducted at high and low gradient and lower TMDL watershed sites, reference sites, and "load exposure" (other impacted watersheds nearby) sites to evaluate biologic response to sedimentation along a gradient of conditions (p. 2-15). The high gradient and lower TMDL watershed sites were determined to be in good condition, whereas the low gradient (meadow) sites are impaired (p. 2-18, p. 3-6).

Target values were determined from physical, chemical and biological parameters measured at 28 sites and correlated with predicted sediment loads (p. 3-1). Sediment loads were obtained from GIS analysis of sediment modeling results for reference sites and load exposure sites. A gradient of sediment loading conditions and responses were evaluated, per EPA rapid bioassessment protocols (1999). Two physical parameters (median particle size and percentage of fines and sand) were well correlated ($r>0.5$) with predicted sediment loads and biologic measures, and selected as indicators. Fourteen biological metrics were analyzed along a gradient of human disturbance, then correlated with physical habitat measures. Seven were selected to represent richness, composition and pollution tolerance of biologic communities and combined to develop the BCS, allowing comparison between sites. Numeric targets are trends in or rolling averages of these values (p. 3-3--3-5) to account for uncertainty and variability in, for example, response time to mitigation measures. The physical habitat numeric targets are: an increasing trend in D-50 particle size approaching at least 40 mm (geometric mean) and a decreasing trend in percent fines and sand approaching 25 percent within the meadow reach (p.3--3-3-4). The biologic health numeric target is a biologic condition score of 25 or greater in the meadow reach when flow is continuous, evaluated as a rolling average of three consecutive sampling events conducted once every two years (existing—2001—average score is 20, p. 3-6).

This TMDL adequately defines the beneficial uses and the numeric water quality objectives to be achieved.

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 significant sources have been considered. Point, nonpoint, and background sources of pollutants of concern are described, including the magnitude and location of sources. The submittal demonstrates all significant sources have been considered.*

(Staff Report, pp. 4-1--4-12)
The Staff Report estimates the relative magnitude of sediment sources contributing to the impairment and demonstrates that all major sources were considered (p. 4-1). Due to limited concurrent stream flow and sediment concentration monitoring, no sampled sediment loading estimates are available. A screening level analysis of sediment delivery was used to segregate sediment sources by land use and determine order-of-magnitude sediment delivery estimates. Major sediment sources include dirt roads and road cuts, road traction sand, residential and commercial areas, graded ski runs and undisturbed areas, as well as alluvial channel erosion. All are considered nonpoint sources (pp. 6-1--6-2). Sediment delivery estimates in tons/year from controllable and uncontrollable sources are provided (p. 4-10). There are no existing NPDES permits in the watershed although a general construction stormwater permit prohibits discharges from construction sites.

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 water(s).*

(Staff Report, pp. 5-1--5-3)
Loading capacity was determined assuming that beneficial uses will be supported with in-stream sediment loading above natural background levels. Necessary load reductions to protect beneficial uses are based on comparing existing and target conditions, per EPA sediment TMDL guidance. The BCS was selected for estimating load reductions because it is the key benchmark of successful beneficial use protection (p. 5-1). Stream channel substrate measures were not used due to their variability (p. 5-2) and uncertainties associated with direct measurement of sediment loading (p. 5-3). The estimated load reduction necessary to achieve the numeric target BCS is 25 percent, based on comparing the 2001 BCS in the meadow reach of Squaw Creek (BCS=20) with low gradient reference stream conditions considered protective of beneficial uses related to cold water aquatic life (BCS=25, see pp. 3-5, 5-2). The linkage analysis assumes a 1:1 relationship between sediment load reductions and increases in BCS, based on EPA guidance and several EPA- developed or -approved California TMDLs (p. 5-2). Although the estimated load reduction applies to the total sediment load, control of fine sediment sources is considered necessary to meet the physical habitat numeric targets and protect beneficial uses. A direct, numeric linkage between sediment loadings and streambed characteristics targets cannot be established, but previous studies of northern California streams has demonstrated that a linkage exists.

The linkage between sediment loading and aquatic life impairment was established using EPA guidance, best professional judgment based on scientific literature, and correlations between modeling results and observed channel substrate and biologic health conditions (p. 5-3).

The submittal adequately describes the relationship between the numeric targets, pollutant sources and the total assimilative capacity (loading capacity) of the waterbody.

7. TMDL and Allocations:
TMDL—Submittal identifies the total allowable load, which is set equal to or less than the loading capacity. TMDL is expressed in terms of mass-based, concentration-based or other equivalent approaches that are consistent with federal requirements. If TMDL has seasonal features then please describe. TMDLs and allocations should be expressed in terms of daily time steps. If 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.

Allocations—Submittal identifies appropriate waste load allocations for all point sources and load allocations for all non-point sources. Allocations are expressed in terms of mass-based, concentration-

based or other equivalent approaches, the submittal explains why it is reasonable and appropriate to express in those terms. If point sources are present, submittal identifies existing NPDES permits by name and number. More discussion of point sources in watershed. If no point sources are present, waste load allocations are zero. More discussion of non-point sources. If no non-point sources are present, then load allocations are zero.

(Staff Report pp. 6-1--6-4)

Loading Capacity

The TMDL is equal to the loading capacity and represents the sediment load that would be expected if all the land uses were addressed by Best Management Practices common in nearby Lake Tahoe Basin (p. 6-1--6-2), with reasonable and conservative estimates of their effectiveness (p. 6-2). Because an overall load reduction of 25% is needed and nearly half of existing sources are considered uncontrollable (p. 6-1), controllable hillslope sediment sources must be reduced by 50% to achieve the TMDL. The TMDL is mass-based (tons/year) and has no seasonal features (see also item 9 below). The Staff Report explains that an annual sediment load calculation allows multiple sources of sediment discharge to be integrated over time (p. 5-1), and the multi-year rolling average BCS determination and analysis of trends in physical substrate indicators account for the seasonal and annual variability inherent in sediment delivery and in-stream sediment impacts (p. 7-1). In response to a public comment, the State Water Board added a finding to its resolution stating that the 28,425 tons per year loading capacity equals an average daily load of approximately 78 tons while clarifying that: "Attainment with the TMDL will be assessed using multi-year data based on rolling averages and trend analysis" (State Water Board's Responses to Public Comments, pp. 12-13).

Waste Load Allocations for Point Sources and Load Allocations for Nonpoint Sources

Waste load allocations (WLAs) are set at zero due to the absence of point sources and current NPDES permits in the watershed. Facilities covered by existing Waste Discharge Requirements (WDRs) include: the Squaw Valley Ski Corporation, the Resort at Squaw Creek, Intrawest Village at Squaw Valley—Phase I and II, and small construction projects covered by general WDRs. With the exception of the final one mentioned, all sources are assigned load allocations (LAs) (Staff Report p. 6-2). In addition, Placer County will be issued WDRs (or an NPDES permit) to implement LAs for residential and commercial areas and road sanding within six months of final TMDL approval (p. 9-8). If non-point sources are deemed to be point sources in the future, then the appropriate LAs will become equivalent WLAs to be reflected in future NPDES permits.

Load allocations are identified by land use or other source category (e.g. road traction sand), expressed in tons/year (Staff Report, p. 6-2). Land use categories are dirt roads, major dirt road cuts, residential/commercial areas and graded ski runs. The time period is expressed on an annual basis, which is considered appropriate based on the natural fluctuations of sediment loading throughout the year and from year-to-year.

Load allocations reflect broad estimates of reductions needed to meet water quality objectives and provide information on the relative contributions of source types for focusing implementation activities. They are not appropriate as discharge specifications in WDRs (Staff Report, p. 6-2). Rather, an iterative approach to BMP implementation will be required, including use of instream data to guide hillslope activities.

EPA concludes that the State's approach of defining the TMDLs and allocations in terms of ton of sediment per year and allocating by land use type is appropriate for the pollutant of concern and is consistent with the provisions of CWA and federal regulations. See 40 CFR 130.2(j)

8. Margin of Safety: *Submission describes explicit and/or implicit margin of safety for each pollutant.*

(Staff Report, pp. 7-1--7-3)
The submittal incorporates both an implicit and an explicit margin of safety by: 1) utilizing conservative assumptions and adjustments, and 2) reserving 1,275 tons/year (or about four percent of the total loading capacity) to account for uncertainties in the TMDL analysis. Key conservative assumptions include: using multiple-year rolling averages or trends in in-stream indicators to consider varied hydrologic conditions, applying conservative estimates of BMP efficiencies to allocate loads, and not considering the implementation of BMPs that occurred between the date of TMDL studies and the date of adoption of the TMDL.

EPA considers this an appropriate approach for dealing with uncertainty concerning the relationship between the TMDL, load allocations, and water quality conditions.

9. Seasonal Variations and Critical Conditions: *Submission describes method for accounting for seasonal variations and critical conditions in the TMDL(s).*

(Staff Report, pp. 7-3--7-4)
This TMDL accounts for seasonal variations and critical conditions by establishing targets and allocations based on net long-term effects to the most sensitive reach in the watershed to sedimentation, due to its geomorphic characteristics, and by protecting the most sensitive indicators of in-stream health, benthic macroinvertebrates. Because trends may not become apparent over shorter time frames, TMDL attainment will be assessed using rolling averages and trend analysis of long-term (multiple year) biological and physical substrate data. Adverse impacts on in-stream aquatic life may also occur due to excessive groundwater pumping in the vicinity; the TMDL accounts for this by requiring monitoring only when flows are continuous. Furthermore, the State Water Board Resolution requires the Lahontan Water Board to "...continue to support the efforts of entities pumping groundwater and other stakeholders in Squaw Valley to (1) minimize effects on the creek, (2) develop a groundwater management plan that recognizes potential effects of pumping on the creek and seeks to minimize or eliminate adverse effects on Squaw Creek, and (3) conduct a study of the potential interaction between groundwater pumping and flows in Squaw Creek [...and...] report on the progress of these efforts [...] in 2008" (State Water Board's Responses to Public Comments, pp. 2-3).

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).*

(Staff Report, pp. 8-1--8-3, RWQCB's Responses to Public Comments, State Water Board's Responses to Public Comments).

During the course of TMDL development, staff from the Lahontan RWQCB initiated a public participation process that included issuing a press release announcing initiation of the TMDL process in 1999, attending and presenting the TMDL at a Squaw Valley Municipal Advisory Committee meeting in 2000, attending and presenting TMDL study findings at a Friends of Squaw Creek meeting in 2002, conducting a CEQA scoping meeting in January 2005, circulating the draft TMDL for public review in November 2005, and holding a public review draft informational meeting in December 2005.

A public comment period on the draft TMDL was open from November 22, 2005 to January 5, 2006, and the public notice was published November 18, 2005. A public hearing was held April 12, 2006, and the notification of that meeting was published on November 18, 2005. Staff adequately responded to comments (RWQCB Administrative Record pp. 1631 ff.). The SWRCB also provided an opportunity for public comment (notice dated January 16, 2007, according to State Water Board's Responses to Public

Comments, p. 1). The State demonstrated how it provided sufficient opportunities for public comment and adequately responded to public comments.
11. Technical Analysis: *Submission provides appropriate level of technical analysis supporting TMDL elements.* The TMDL analysis provides an acceptable review and summary of available information about sediment in the watershed, and a sufficiently clear discussion of analytical methods used to calculate this TMDL. EPA concludes the State was reasonably diligent in its technical analysis of the sediment loading in the watershed to set the TMDL at a level that will achieve water quality standards.
12. Reasonable Assurances: *If waste load allocations are made less stringent based on inclusion of load allocations that reflect nonpoint source reductions, submission describes how there are reasonable assurances that necessary nonpoint source reductions will occur.* Not applicable
13. Other: *Table for clarifying submittal for TMDL waterbody-combinations for corresponding 303(d) listing, new impairment findings or non-impairment findings.* Not applicable