

**STATE WATER RESOURCES CONTROL BOARD
BOARD MEETING SESSION – DIVISION OF WATER QUALITY
APRIL 19, 2011**

ITEM 7

SUBJECT

CONSIDERATION OF A PROPOSED RESOLUTION APPROVING OF AN AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR THE LAHONTAN REGION TO ESTABLISH: (1) AN ACTION PLAN FOR THE LAKE TAHOE TOTAL MAXIMUM DAILY LOADS ADDRESSING PHOSPHORUS, NITROGEN, AND FINE SEDIMENT PARTICLE IMPAIRMENTS IN LAKE TAHOE; AND (2) AN IMPLEMENTATION PLAN FOR THE LAKE TAHOE BASIN AND RELATED CHANGES TO THE BASIN PLAN.

DISCUSSION

On November 16, 2010, the Lahontan Regional Water Quality Control Board (Lahontan Water Board) adopted Resolution No. R6T-2010-0058 ([Attachment I](#)) to amend the Water Quality Control Plan for the Lahontan Region to include the Lake Tahoe Total Maximum Daily Load (TMDL) and make related changes to relevant portions of the Plan.

In response to the decline of Lake Tahoe's deep water transparency, the Lahontan Water Board and the Nevada Division of Environmental Protection (NDEP) collaboratively developed the bi-state TMDL. This TMDL identifies the pollutants responsible for transparency decline, quantifies the major pollutant sources, assesses the lake's assimilative capacity, and contains a plan to reduce pollutant loads and restore Lake Tahoe's deep water transparency to meet the established standard.

While the Lake Tahoe TMDL directly addresses the deep water transparency impairment, the TMDL implementation also is expected to indirectly improve near shore conditions around the lake. Casual observers are more apt to see the algae on the rocks, turbid shallow waters, and the presence of aquatic invasive species such as weeds and Asian clams, than notice small changes in deep water transparency. The near shore issues are of great concern and collaborative efforts, supported by more than \$2 million in federal and state funding, are underway to better understand the near shore conditions and the link between the near shore and deep water. Additional policy and implementation efforts will likely be needed to more comprehensively address the near shore issues, and the Lahontan Water Board is committed to taking appropriate actions to reduce the threat of aquatic invasive species and improve near shore water quality.

LAKE TAHOE TMDL

Impairment

Continuous long-term evaluation of water quality in Lake Tahoe has documented a reduction in deep water transparency from an annual average of about 97 feet in 1968 to 69 feet in 2009. Transparency is expressed as Secchi depth, which is the depth an observer can see a 25-centimeter white disk lowered into the water from the surface. Secchi depth is recorded through the entire year and each annual average is composed of between 25 and 35 individual Secchi depth readings.

Due to reduced deep water transparency, the State of California and the U.S. Environmental Protection Agency listed Lake Tahoe as impaired in accordance the Federal Clean Water Act Section 305 (b) in 1998. That same year, Lake Tahoe was included on California's Section 303 (d) list of impaired water bodies, requiring the development of a TMDL.

Source Analysis

The Lahontan Water Board and NDEP conducted extensive research and numeric modeling to estimate nutrient and fine sediment particle loads to Lake Tahoe as of the 2004 baseline year. The identified pollutant sources are upland runoff (forested and urban), atmospheric deposition, stream channel erosion, groundwater, and shoreline erosion.

Upland runoff: Tetra Tech, Inc. developed the Lake Tahoe Watershed Model to simulate runoff and pollutant loads from both the developed and undeveloped upland areas. Model input data were supported by a two-year Tahoe Basin storm water monitoring study and the long term Lake Tahoe Interagency Monitoring Program water quality dataset. The model provides average annual land-use based fine sediment particle, total nitrogen, and total phosphorus loading values. Urban (developed) uplands contribute approximately 72 percent of the fine sediment particle load, 47 percent of the total phosphorus load, and 18 percent of the total nitrogen load. Undeveloped (forested) portions of the Lake Tahoe watershed are estimated to contribute approximately 9 percent, 32 percent, and 18 percent of the average annual fine sediment particle, total phosphorus, and total nitrogen loads, respectively.

Atmospheric deposition: Air quality data provided by the California Air Resources Board (CARB) and the UC Davis Tahoe Environmental Research Center (TERC) were used to estimate lake-wide atmospheric deposition of nutrients and fine sediment particles. Atmospheric deposition (dry + wet) is the second largest source of fine sediment particles entering the lake at 16 percent of the basin-wide total load. Direct deposition accounts for 18 percent of the total phosphorus load and is the dominant source of nitrogen, contributing approximately 63 percent of the basin-wide load. The CARB and TERC studies determined that the majority of the pollutants deposited onto the Lake's surface from the atmosphere originate within the Lake Tahoe basin.

Stream channel erosion: The United States Department of Agriculture-National Sediment Laboratory conducted research to evaluate the contributions of sediment and nutrients from stream channel bed and bank erosion. These efforts revealed that while stream channel erosion is a significant source of bulk sediment to the lake, the contribution to the fine sediment particle load is relatively small. Stream channel erosion contributes an estimate four percent, two percent, and less than one percent of the average annual fine sediment particle, total phosphorus, and total nitrogen loads, respectively.

Groundwater: Research from Thodal (1997) and supplemental analysis by the U.S. Army Corps of Engineers (2003) provided nutrient loading estimates from groundwater inputs to Lake Tahoe. Because sediment is effectively filtered through the soil matrix, groundwater transport of fine sediment particles is assumed to be zero. Groundwater contributes approximately 15 percent of the average annual phosphorus nitrogen load and 13 percent of the average annual nitrogen load.

Shoreline Erosion: Research demonstrates that shoreline erosion is the smallest source of pollutants entering Lake Tahoe. Shoreline erosion contributes less than one percent of the basin-wide fine sediment particle and total nitrogen loads and approximately four percent of the basin-wide total phosphorus load.

Loading Capacity

Researchers at the University of California, Davis developed the Lake Clarity Model to predict Secchi depth changes over time in response to fine sediment particle and nutrient load changes. Lake Clarity Model results indicate current deep water transparency measurements are primarily driven by the number of suspended fine sediment particles, and that the average annual fine sediment particle load must be reduced by 32 percent to halt transparency decline and improve deep water transparency by roughly ten feet. Actions taken to achieve the needed fine sediment particle load reductions are expected to reduce total phosphorus loading by 17 percent and total nitrogen load by four percent.

To achieve the deep water transparency standard, average annual fine sediment particle, total nitrogen, and total phosphorus loads must be reduced by 65 percent, 10 percent, and 35 percent, respectively.

Load Allocation Development

The Water Board conducted the Pollutant Reduction Opportunity project to evaluate the magnitude of load reduction opportunities and assess the cost and expected fine sediment, nitrogen, and phosphorus load reductions from implementing known, quantifiable pollutant control measures for the major pollutant sources. Through an iterative process of stakeholder feedback and implementation strategy refinement, the Water Board developed a recommended implementation strategy to guide the allocation of needed pollutant load reductions among the identified pollutant sources. The strategy prioritizes implementation of cost effective measures to reduce fine sediment particles from all pollutant sources with an emphasis on actions to address urban stormwater runoff pollution.

Based on the implementation strategy framework and an initial goal of improving transparency by ten feet during the first 20-year implementation phase, the Water Board established five year load reduction requirements. The TMDL includes requirements for each pollutant and for each pollutant source that are defined as a percent reduction from the TMDL baseline load condition.

These requirements constitute the TMDL load and waste load allocations.

Implementation Plan and Schedule

The Basin Plan amendment includes an implementation plan and schedule for achieving the pollutant load reductions needed to restore Lake Tahoe's deep water transparency. The schedule requires load reductions from the established 2004 baseline to improve the transparency to 77-80 feet of measured Secchi depth transparency within the first 20 years of TMDL implementation. The transparency standard of an annual average Secchi depth of 97.4 feet is expected to be met within 65 years of TMDL implementation. Progress toward meeting the targets will be evaluated by the Lahontan Water Board in periodic milestone reports. Implementation approaches differ for each of the four major pollutant source categories.

Urban uplands: Urban jurisdictions in the Lake Tahoe basin are regulated through NPDES municipal stormwater permits and the Lahontan Water Board will include load reduction requirements and compliance tracking methods in upcoming permit revisions. The Water Board has developed the Lake Clarity Crediting Program to provide a system of tools and methods to allow urban jurisdictions to link projects, programs, and operations and maintenance activities to estimated pollutant load reductions. The Program (or equivalent methods) will be used to

ensure responsible municipalities and the California Department of Transportation are meeting load reduction requirements.

Forested Uplands: The forest upland load reductions are expected to be accomplished through continued implementation of existing watershed management programs, including: maintaining existing facilities, restoring disturbed lands, prevent pollutant loading from fuels management work, implementing and maintaining treatment facilities, employing Best Management Practices, etc. The Lahontan Regional Board will require forest management agencies to accomplish and track and report activities that are expected to influence average annual pollutant loading rates, consistent with non-point source policy regulatory requirements.

Stream Channel Erosion: The Upper Truckee River, Blackwood Creek, and Ward Creek contribute 96 percent of the basin-wide total for fine sediment from stream channel erosion. Restoration projects have either been implemented or are planned on these three streams. These projects are expected to achieve the needed load reductions for this source.

Atmospheric Deposition: Atmospheric deposition of fine sediment particles and phosphorus will be reduced by addressing dust sources from paved and unpaved roads and other unpaved areas. Actions such as armoring unpaved surfaces and street sweeping will reduce fugitive dust particles and associated phosphorus deposition. The Lahontan Water Board is relying on the Tahoe Regional Planning Agency's air quality and regional transportation plans to reduce average annual nitrogen loads through transportation improvements.

Monitoring Plan

The Lahontan Water Board will work with funding, implementing, and other regulatory agencies to develop a comprehensive TMDL monitoring plan within the first two years following TMDL adoption by U.S. EPA. For urban uplands, the Water Board is supporting the development of the Lake Tahoe Regional Stormwater Monitoring Program (RSWMP) to coordinate urban stormwater monitoring efforts. RSWMP participation or implementation of an equivalent monitoring program will be a condition of NPDES municipal stormwater permits. Atmospheric deposition studies, anticipated to be completed in late 2011, will provide useful information to be compared with targeted air quality control monitoring. For forest uplands, responsible parties will be required to document and report previous year activities that may have affected pollutant loads on the sub-watershed scale. Forest management agencies must also annually submit plans for next year's management activities if it relates to the TMDL. Stream restoration activities will be evaluated on a project by project basis.

Adaptive Management

The Lahontan Water Board is committed to operating a TMDL Management System throughout the implementation timeframe of the TMDL. The Lahontan Water Board, in collaboration with the United States Environmental Protection Agency and NDEP, are developing a TMDL Management System, which is anticipated to be operational within about two years. The TMDL Management System will enable the Lahontan Water Board staff to regularly assess research and monitoring findings relevant to TMDL implementation efforts. Based on management system findings, the Lahontan Water Board may consider reopening the TMDL to adjust load reduction requirements and/or the TMDL implementation approach. In addition, the Lahontan Water Board will continue to evaluate anticipated changes in temperature, precipitation, pollutant loading, and lake processes associated with global climate change to determine if program adjustments are needed in the future.

BASIN PLAN AMENDMENTS

The Lahontan Water Board has adopted an amendment to its Water Quality Control Plan for the Lahontan Region (Basin Plan) to incorporate the Lake Tahoe TMDL and adjust portions of the Basin Plan to be consistent with the most up-to-date understanding of the deep water transparency issue. The substantive changes to the Basin Plan are summarized below.

1. Add sub-section 5-18 to Basin Plan Chapter 5 to include an overview of the TMDL research findings, a detailed synopsis of the TMDL implementation plan, and pollutant load allocation tables.
2. Emphasize fine sediment particles 16 micrometers or less as the primary source of transparency loss in Lake Tahoe while maintaining reference to the importance of addressing elevated phosphorus and nitrogen loading.
3. Replace the previous 20-year Lake Tahoe water quality improvement implementation schedule with the TMDL Implementation timeline.
4. Describe stormwater load reduction requirements for urban stormwater dischargers.
5. Eliminate reference to alternative deicer studies in Chapter 4.8 as the studies are complete and inconclusive.
6. Replace outdated references to the “capital improvement program” with reference to the updated Environmental Improvement Program.

POLICY ISSUE

Should the State Water Board approve the amendment to the Basin Plan to incorporate the Lake Tahoe TMDL and adjust the Basin plan for consistency with TMDL findings?

FISCAL IMPACT

The Lahontan Water Board staff work associated with or resulting from this action will be addressed with existing and future budgeted resources.

REGIONAL WATER BOARD IMPACT

Yes, approval of this resolution will amend the Lahontan Water Board’s Basin Plan.

STAFF RECOMMENDATION

That the State Water Board:

1. Approve the Basin Plan amendments adopted under the Lahontan Water Board Resolution R6T-2010-0058.
2. Authorize the Executive Director or designee to submit the Basin Plan amendment and the Lake Tahoe TMDL adopted under Lahontan Water Board Resolution No. R6T-2010-0058, as approved, and the administrative record for these actions to the Office of Administrative Law to the U.S. Environmental Protection Agency for approval.

State Water Board action on this item will assist the Water Boards in reaching Goal 1 of the Strategic Plan Update: 2008-2012 to implement strategies to fully support the beneficial uses for all 2006-listed water bodies by 2030. In particular, approval of this item will assist in fulfilling a high priority action to prepare, adopt, and take steps to carry out Total Maximum Daily Loads (TMDLs), designed to meet water quality standards for impaired water bodies from non-point source pollution.

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STATE WATER RESOURCES CONTROL BOARD RESOLUTION NO. 2011-

APPROVING AN AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR THE LAHONTAN REGION TO ESTABLISH: (1) AN ACTION PLAN FOR THE LAKE TAHOE TOTAL MAXIMUM DAILY LOADS ADDRESSING PHOSPHORUS, NITROGEN, AND FINE SEDIMENT PARTICLE IMPAIRMENTS IN LAKE TAHOE; AND (2) AN IMPLEMENTATION PLAN FOR THE LAKE TAHOE BASIN AND RELATED CHANGES TO THE BASIN PLAN.

WHEREAS:

1. On November 16, 2010, the Lahontan Regional Water Quality Control Board (Lahontan Water Board) adopted Resolution No. R6T-2010-0058 ([Attachment I](#)) amending the Basin Plan to establish: (1) the Lake Tahoe Total Maximum Daily Load for fine sediment particle, nitrogen, and phosphorus, and (2) a Lake Tahoe TMDL Implementation Plan and associated changes to urban stormwater regulations in the Lake Tahoe basin.
2. The Lahontan Water Board found that the Basin Plan Amendment was consistent with the provisions of the State Water Resources Control Board (State Water Board) [Resolution No. 68-16](#), "Statement of Policy with Respect to Maintaining High Quality of Waters in California" and 40 CFR section 131.12.
3. The Lahontan Water Board has the authority, pursuant to California Water Code section 13243, to specify certain conditions or areas where the discharge of waste, or certain types of waste, will not be permitted (i.e. prohibitions). The Implementation Plan for the TMDL for Lake Tahoe requires compliance with the prohibition of discharges in violation of water quality objectives in the Lake Tahoe Basin. Supporting documentation for the above-named prohibition is provided in the Final Staff Report for the Lake Tahoe TMDL addressing nitrogen, phosphorus, and fine sediment particle impairments in California. Consistent with California Water Code section 13244, the Lahontan Water Board complied with public notice and hearing requirements for the prohibition.
4. The elements of a TMDL are described in 40 CFR sections 130.2 and 130.7 and section 303 (d) of the CWA, and U.S. Environmental Protection Agency guidance documents. A TMDL is defined as "the sum of individual waste load allocations for point sources and load allocations for nonpoint sources and natural background." (40 CFR section 130.2). The Lahontan Water Board has determined that the TMDL addressing the impairments of nitrogen, phosphorus, and fine sediment particles is set at levels necessary to attain and maintain the applicable water quality standards taking into account seasonal variations and a margin of safety.
5. The Lahontan Water Board found that the analysis contained in the Final Staff Report, the California Environmental Quality Act (CEQA) substitute documentation for the proposed Basin Plan amendment, including the CEQA Checklist, the staff report, and the responses to comments complies with the requirements of the State Water Board's certified regulatory CEQA process, as set forth in the California Code of Regulations, Title 23, section 3775 et seq.

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6. The State Water Board finds that the Basin Plan amendments are in conformance with Water Code section 13240, which specifies that Regional Water Quality Control Boards may revise Basin Plans; section 13241, which authorizes Regional Water Quality Control Boards to establish water quality objectives; section 13242, which requires a program of implementation to achieve water quality objectives; and section 13243 which authorizes Regional Water Quality Control Boards to specify certain conditions or areas where the discharges of certain types of waste will not be permitted. The State Water Board also finds that the TMDL, as reflected in the Basin Plan amendment, is consistent with the requirements of federal CWA section 303 (d).
7. The regulatory action meets the "Necessity" standard of the Administrative Procedures Act, Government Code, section 11353, subd. (b). The necessity of developing a TMDL is established in the TMDL staff report, the CWA section 303 (d) List of Water Quality Limited Segments, and the data contained in the administrative record documenting the impairments of Lake Tahoe.
8. A Basin Plan amendment does not become effective until approved by the State Water Board and until the regulatory provisions are approved by the Office of Administrative Law. The TMDL and water quality objectives must also receive approval from the U.S. Environmental Protection Agency.

THEREFORE BE IT RESOLVED THAT:

The State Water Board:

1. Approves the amendment to the Basin Plan adopted under Lahontan Water Board Resolution No. R6T-2010-0058.
2. Authorizes the Executive Director or designee to submit the amendments adopted under Lahontan Water Board Resolution No. R6T-2010-0058, as approved, and the administrative record for these actions to the Office of Administrative Law and the TMDL and water quality objectives to the U.S. Environmental Protection Agency for approval.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on April 19, 2011.

Jeanine Townsend
Clerk to the Board