REGION 6
STAFF
REPORT

Staff Report on

Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies

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Executive Summary

This staff report summarizes the background for Lahontan Regional Board staff's recommendations for changes in the Clean Water Act Section 303(d) list of impaired surface water bodies, and priorities and schedules for development of Total Maximum Daily Loads (TMDLs) for listed waters. In March 2001, staff solicited information and data from the public for use in the list update. Staff also reviewed other existing and readily available information such as discharger self- monitoring reports in the Regional Board's files, reports in the Regional Board's library, and the U.S. Geological Survey's online water quality databases. This report outlines the general criteria used to formulate recommendations. More information on recommendations for specific water bodies is provided in separate "fact sheets." Staff's recommendations would remove 29 water body/pollutant combinations from the list, add 45 new water body/pollutant combinations, and retain 69 water body/pollutant combinations from the 1998 list on the 2002 list. Clarification of the nature of impairment is recommended for some waters (e.g., separate listings for nitrogen and phosphorus rather than a single listing for nutrients). An additional 168 water body/pollutant combinations are recommended for inclusion in a separate "watch list" of waters needing further monitoring and/or assessment to determine whether listing is warranted in the future. The Lahontan Regional Board will consider action on recommendations to the State Water Resources Control Board at its January 2002 meeting.

Introduction

Section 303(d) of the federal Clean Water Act requires states to identify surface water bodies which are not attaining water quality standards and are not expected to do so even with the use of technology-based effluent limitations and other legally required pollution controls such as Best Management Practices. Waters may be listed for more than one pollutant. For each listed water body/pollutant combination, states must develop a strategy, called a Total Maximum Daily Load, or TMDL, to ensure attainment of standards. Section 303(d) lists and priority rankings of water body/pollutant combinations must be updated every two years.

The California Regional Water Quality Control Board, Lahontan Region (Regional Board) is the state agency responsible for setting and enforcing water quality standards for waters in about 20 percent of the state in the portion east of the Sierra Nevada crest and in the northern Mojave Desert. Regional Boards have been asked to provide recommendations to the California State Water Resources Control Board (State Board) for use in the 2002 update of the statewide Section 303(d) list. This staff report summarizes Lahontan Regional Board staff's rationale for recommended additions to and deletions from the Section 303(d) list, and for prioritization of listed waters for development of TMDLs. The report will be circulated for public review. Changes in recommendations may be made in response to written public comments and/or testimony before the Board, and the Lahontan Regional Board will be asked to approve final recommendations for transmittal to the State Board at its January 2002 meeting. The State Board will conduct its own public participation process and will consider approval of a revised statewide Section 303(d) list for submission to the U.S. Environmental Protection Agency in early 2002.

The Section 303(d) List

Section 303(d) requires states to identify those waters within its boundaries for which effluent limitations and controls on thermal discharges are not stringent enough to implement any standard applicable to such waters, to establish priority rankings, and to establish total maximum daily loads for waters impaired by pollutants or thermal discharges. Section 303(d) applies only to surface waters of the United States, including lakes, streams, springs, and wetlands. Surface waters include intermittent and ephemeral waters.

Although Section 303(d) emphasizes point source discharges, the requirement to do TMDLs also applies to water bodies impaired by nonpoint sources or by a combination of point and nonpoint sources. The Lahontan Region has only a few direct point source discharges to surface water (including point source stormwater discharges). The *Water Quality Control Plan for the Lahontan Region* (Basin Plan) prohibits discharges to surface waters throughout the North Lahontan Basin (from the Walker River watershed north to the Oregon border) and in high elevation portions of the South Lahontan Basin (from the Mono Lake watershed south). Most water quality problems in the Lahontan Region come from nonpoint sources (for example, erosion from watershed disturbance by logging, grazing, or construction activities).

The requirement to do TMDLs applies only to waters impaired by "pollutants." Pollutants are defined in the Clean Water Act to include: "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water." TMDLs involve calculations of existing or allowable loads of discrete substances or of heat.

The Clean Water Act also defines "pollution" as "the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water." "Pollution" does not always involve "pollutants"; for example, aquatic life and wildlife uses of water may be adversely affected by water diversions or reservoir management practices. When a water body is impaired by "pollution" but not by "pollutants," and loading calculations are not feasible, the problem is best handled by control measures other than TMDLs.

Update of the Section 303(d) list is not a regulatory or policy action, but an administrative procedure to prioritize water bodies for action. The adoption of Basin Plan amendments to incorporate a TMDL is a regulatory action.

Public Participation

2001-2002 Public Participation Process

Lahontan Regional Board staff updated and expanded the regionwide mailing list for the 1998 Section 303(d) list update and in March 2001 mailed a letter soliciting information and data for use in the current list update. The solicitation process was also publicized in newspapers and via the Internet. The deadline for submittal of information and data was May 15, 2001. Responses received by that date are summarized below. Technical staff at both Lahontan Regional Board offices were asked to notify water

quality assessment staff of water quality problems and the existence of information and data about these problems. Assessment staff reviewed publications and data sets available in the Regional Board's South Lake Tahoe office (including discharger monitoring files containing ambient surface water data). Staff also reviewed other existing and readily available sources of information including the most recent 303(d) list and California Section 305(b) report, the State Water Resources Control Board's Toxic Substances Monitoring Program database, fish consumption advisories and criteria documents produced by the California Office of Health Hazard Assessment, and online water quality databases maintained by the U.S. Geological Survey and the Nevada Division of Environmental Protection.

The scope of the Lahontan Region's assessment process was limited by several factors. Staff resources and time available for the update were limited. Monitoring data for surface waters in the Lahontan Region are limited due to past and present resource constraints on baseline/trend monitoring and the fact that the Lahontan Region has few discharges to surface water and thus few sets of discharger monitoring data. Biomonitoring (including citizen monitoring) is under way in a number of Lahontan Region watersheds, but reference conditions are not yet well defined. Most of the toxic "priority pollutants" covered by the California Toxics Rule and National Toxics Rule are not routinely monitored in Lahontan Region waters.

Factors to be considered in formulation of recommendations for listing and delisting (see below) were developed through consideration of past criteria and discussions with staff of the State and other Regional Boards, and with Lahontan Regional Board management. This staff report, tables summarizing staff recommendations, and fact sheets providing additional information were prepared for public review. The availability of these documents will be noticed to the Regional Board's Section 303(d) mailing list. After consideration of public comments, the Lahontan Regional Board will take action on a resolution to transmit final recommendations regarding the list update to the State Board. Following Board action, Regional Board staff will complete and submit the administrative record to the State Board. Information about the water bodies recommended for listing or delisting will be entered into the Geospatial Waterbody System (GeoWBS) computer database.

Information and Data Received in Response to March 2001 Solicitation

Full copies of information and data submitted in response to the public solicitation will be included in the administrative record for the Regional Board's list update process. The following is a summary of comments received in response to the solicitation; not all of these comments included information or data concerning waters of the Lahontan Region. Letters or emails were received from the following:

- **The Bishop Paiute Tribe** provided water chemistry data for Bishop Creek. Review of these data did not indicate the need for new listings.

- **The California Department of Pesticide Regulation (DPR)** sent a letter recommending that Regional Board staff review several DPR webpages containing pesticide data. None of these webpages included information or data for waters within the Lahontan Region.

- **The League to Save Lake Tahoe** sent a letter identifying sources of data and requesting that Lake Tahoe be listed for violations of several additional standards and that additional tributaries of Lake Tahoe be listed. Review of the references mentioned in the League's letter led to several recommendations for new listings for tributaries of Lake Tahoe. See the fact sheet for Lake

Tahoe for clarification of the lake's listing status, and fact sheets for proposed new listings for Ward Creek, Blackwood Creek, General Creek, the Upper Truckee River, Trout Creek, Heavenly Valley Creek, Hidden Valley Creek, Big Meadow Creek, and Tallac Creek.

- **The U.S. Geological Survey (USGS)** provided electronic files of data collected in the Lahontan Region since 1997, primarily for the Walker River watershed. Regional Board staff used these data to recommend new listings for a number of water body-pollutant combinations.

- **The USDA Forest Service, Angeles National Forest** sent a letter requesting a meeting with Regional Board staff to discuss the Forest's ongoing monitoring program. No response was received to a Regional Board staff request that monitoring data be submitted for review to determine the need for a meeting.

- **The Southern California Alliance of Publicly Owned Treatment Works (SCAP)** sent a letter outlining its concerns about evaluation of data and listing/delisting criteria. This letter did not include data or information about specific Lahontan Region water bodies for use in listing/delisting recommendations. Regional Board staff's approach to evaluation and listing/delisting considerations is summarized below.

- **Cathy Ricioli of Kingsbury Middle School** in Zephyr Cove, Nevada submitted student biomonitoring data on Burke Creek, a tributary to Lake Tahoe on its Nevada side. These data will be retained for comparison with future biomonitoring data for California-side streams.

- **Pat Eckert**, former Mammoth Community Water District Board member, sent an email referencing Board agenda material which showed that MTBE had been detected in 1999 and 2000 in samples from Lake Mary, which provides domestic water supply to the Town of Mammoth Lakes. The MTBE was apparently connected with summer motorboat activity. Lake Mary is recommended for addition to the "Watch List" (Table 2), and the problem is being investigated through other Regional Board programs.

- **Carol Sims**, of Environmentally Concerned, Williams, Arizona, sent a short handwritten comment on a returned mailing list update form asking whether the Regional Board had considered pesticide impacts. A written response outlining the Regional Board's pesticide standards and control programs was sent; a copy will be included in the administrative record.

Listing/Delisting Considerations

Regional Boards began intensive participation in the State's Section 303(d) listing process during the mid-1980s. Guidance from the State Board to Regional Boards on listing/delisting criteria has varied with each list update cycle since that time. There is currently no formal statewide listing/delisting guidance, although the State Board plans to develop and adopt formal guidance before the next (2004) listing cycle. The following general listing and delisting considerations reflect past and current direction from the USEPA and discussions among State and Regional Board staff. Lahontan Regional Board staff also developed more specific listing and delisting considerations.

General Considerations

Listing Considerations

Water bodies and associated pollutants should be recommended for addition to the 303(d) list if any one of the following factors applies:

1. Effluent limitations or other pollution control requirements (e.g., Best Management Practices) are not stringent enough to ensure protection of beneficial uses and attainment of water quality objectives, including those implementing State Board Resolution 68-16, the USEPA promulgated standards in the California Toxics Rule and National Toxics Rule, and the Statement of Policy with Respect to Maintaining High Quality of Waters in California (see also 40 CFR 130.7 (b)(1), and standards are not expected to be attained by the time of the next list update cycle (i.e., by 2004). This does not apply to non-attainment related solely to discharges in violation of existing waste discharge requirements or NPDES permits.

2. A fishing, drinking water or swimming advisory issued by local or state public health or environmental health authorities is currently in effect. This does not apply to advisories related to discharges in violation of existing waste discharge requirements or NPDES permits.

3. Beneficial uses are impaired or are expected to be impaired before the next listing cycle (i.e., by 2004). Impairment is based on evaluation of chemical, physical, or biological integrity. Impairment will be determined by "qualitative assessment," physical/chemical monitoring, bioassay tests, and/or other biological monitoring. Applicable federal criteria and the Regional Board's Basin Plan water quality objectives determine the basis for impairment status. A qualitative assessment is an assessment based on factors other than ambient monitoring data (for example, predictive modeling, professional judgement, or public comments).

4. The water body is on the previous 303(d) list and either: (a) monitoring continues to demonstrate violation of objectives or (b) monitoring has not been performed and (c) none of the delisting considerations discussed below apply.

5. Data indicate tissue concentrations in consumable body parts of fish or shellfish exceed applicable tissue criteria or guidelines. Criteria and guidelines related to protection of human and wildlife consumption include, but are not limited to, U.S. Food and Drug Administration Action Levels, National Academy of Sciences Guidelines, U.S. Environmental Protection Agency tissue criteria, and California Office of Environmental Health Hazard Assessment "Maximum Tissue Residue Levels (MTRLs)." (See the discussion of MTRLs in relation to the Toxic Substances Monitoring Program below.)

6. The water quality is of such concern that the Regional Board determines that the water body needs to be afforded a level of protection offered by a 303(d) listing.

Delisting Considerations

Water bodies may be removed for the list for specific pollutants if any one of these factors is met:

1. The Basin Plan is revised to change water quality objectives (for example, through the adoption of site specific objectives in place of regionwide objectives), and the violation of standards is thereby eliminated.

2. The Basin Plan is revised to remove a designated beneficial use in accordance with the circumstances set forth in federal water quality standards regulations and USEPA guidance, and the non-support issue is thereby eliminated. (USEPA regulations prohibit the removal of designated uses under certain circumstances.)

3. Faulty data led to the initial listing. Faulty data include, but are not limited to, typographical errors, improper quality assurance/quality control (QA/QC) procedures, or limitations in the analytical methods that would lead to an inaccurate conclusion regarding the status of the water body.

4. It has been documented that objectives are being met and beneficial uses are not impaired based upon an evaluation of available monitoring data, and foreseeable changes in hydrology, land use, or product (e.g., pesticide) use are not expected to result in violations of standards.

5. A TMDL has been approved by the USEPA for that specific water body and pollutant (see 40CFR 130.7 (b)(4).

6. There are control measures in place which will result in attainment of standards, including protection of beneficial uses, by the next listing cycle (in 2004). Control measures include permits, cleanup and abatement orders, and Basin Plan requirements which are enforceable and include a time schedule (see 40 CFR 130.7 (b) (1) iii).

Lahontan Regional Board Staff Considerations

Natural Impairment. Because of its geological history, the Lahontan Region has a number of water bodies with concentrations of salts and/or toxic trace elements such as arsenic which exceed drinking water standards or criteria for protection of freshwater aquatic life and wildlife. These waters include inland saline (desert playa) lakes and geothermal springs. Past state and federal guidance led to listing of a number of Lahontan Region waters which are "impaired" only by natural sources. A scientific literature review on saline and geothermal waters shows that these waters are unique ecosystems with their own degree of physical, chemical, and biological integrity, and support aquatic life and wildlife adapted to extreme environmental conditions (California Regional Water Quality Control Board, 2000). These waters should not be judged to be "impaired" on the basis of freshwater aquatic life criteria. USEPA (1997) guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

Other natural phenomena which may lead to violations of water quality standards include catastrophic floods, prolonged droughts, mudslides, and avalanches. All have occurred in the Lahontan Region since the 1980s. At least one water body, Horseshoe Lake near Mammoth, is not "swimmable" due to an air quality problem. Access to recreational facilities near this lake has been restricted because volcanic carbon dioxide is being released through the soil and collects in topographic depressions, including the lake basin, in concentrations which may be lethal.

The Lahontan Basin Plan (page 3-2. "Prohibited Discharges") recognizes that not all factors affecting water quality may be controllable. It states:

"After application of reasonable control measures, ambient water quality shall conform to the narrative and numerical water quality objectives included in this Basin Plan. When other factors result in degradation of water quality beyond the limits established by these water quality objectives, controllable human activities shall not cause further degradation of water quality in either surface or ground waters."

The Clean Water Act's definitions of "pollutants" and "pollution" both specifically reference human causes. These definitions provide justification for not listing waters if violations of standards can be attributed entirely to natural sources. Table 1 includes recommendations for delisting a number of naturally impaired waters. No Lahontan Region waters impaired only by natural sources are recommended for addition to the Section 303(d) list.

Antidegradation. State and federal antidegradation regulations require that specific findings regarding socioeconomic considerations be made to allow lowering of water quality in waters which have better water quality than the level set by water quality standards. Under federal regulations, no long term degradation of designated Outstanding National Resource Waters (such as Lake Tahoe and Mono Lake) is allowed. The Lahontan Basin Plan contains a narrative water quality objective for antidegradation, which references state and federal requirements. USEPA guidance directs that antidegradation be considered in listing decisions. For surface waters of the Lahontan Region where discharges are prohibited, it could be argued that the presence of any non-natural chemicals constitutes degradation in violation of the objective (assuming that findings to allow degradation have not been made) and that such waters should be listed. Examples include boat fuel chemicals monitored in Lake Tahoe and Donner Lake, and the presence of PCBs, probably from atmospheric deposition, in some "pristine" waters of the Lake Tahoe Basin. Staff's recommendation is that waters should not be listed for violations of the nondegradation objective unless a pollutant is present in a concentration which violates another water quality objective or adversely affects a beneficial use, and unless sample numbers are large enough to provide some confidence that they are representative.

Needs for Changes in Water Quality Standards. Some of the water quality objectives in the Lahontan Basin Plan were established in 1975 based on very limited monitoring data or on older published water quality criteria. These objectives may not reflect the natural background conditions of the affected water bodies, or current scientific criteria for protection of beneficial uses. Concerns have also arisen with the consequences of expressing some objectives as running averages or "means of monthly means." High historical values may lead to violation of such objectives even if recent water quality is greatly improved. Listing and tentative schedules for TMDL development are recommended for certain water bodies with violations of standards which may need revision. However, the Regional Board may pursue changes in standards, rather than TMDLs, for these waters.

Toxic Substances Monitoring Program (TSMP) Results. Since 1978, about 10 to 15 Lahontan Region waters have been sampled each year for toxic metals and/or organic compounds in the State Board's TSMP. The TSMP involves collection and analysis of fish tissue samples. Results can be compared to historic TSMP results statewide, and to human fish consumption criteria. During past Section 303(d) list update cycles, Regional Boards were directed to list waters where TSMP data for edible tissue exceeded consumption criteria. However, TSMP samples involve a relatively small number of fish and are not statistically representative of the entire fish population. Also, in waters where game fish are stocked, the TSMP results may reflect hatchery conditions rather than ambient water quality. During the 2001-2002 list update, Lahontan Region waters will not be recommended for listing based on TSMP results alone without additional, statistically representative tissue data, ambient water and sediment data, and/or a fish advisory issued by state or local authorities. Additional monitoring will be recommended for waters where TSMP results indicate a possible fish consumption problem.

Intermittent and Ephemeral Waters. Intermittent or ephemeral streams are common in desert portions of the Lahontan Region. Streams which flow underground in defined channels are considered surface waters for purposes of water rights in California, and in the past, Regional Board staff used this interpretation in listing. The Mojave River was listed for priority organics in the 1980s due to subsurface pollutants from the "Barstow Slug" of chlorinated hydrocarbons. Staff's current approach is to recommend that intermittent streams be assessed for listing only on the basis of data collected from water flowing on the surface.

Evaluation Approach

A "weight of evidence" approach was used to develop recommendations for new listings. The weight of evidence approach involves weighing available information as to its ability to demonstrate a credible line of reasoning leading to a conclusion about the condition of the water. Three possible conclusions exist: (1) the water body is not meeting standards; (2) the water body is meeting standards, or (3) based on the available data and information, standards attainment cannot be determined. Regional Board staff's "weight of evidence approach" involved initial screening of available data for data quality, quantity, and frequency of sampling during the current assessment cycle (1997-2001). Compliance with water quality objectives was evaluated, and preliminary recommendations were discussed with Regional Board supervisors and management. Listing based on only one or a few samples, or on qualitative assessment, was not ruled out. However, after review of available data, staff decided to emphasize listing recommendations for clear violations of numeric standards.

Data Quantity and Quality. Some states establish minimum requirements for the quality and quantity of data used in listing decisions. It has not been feasible to develop data quantity/quality thresholds for the Lahontan Region given the limited time and resources available. Staff evaluated available data and information on a case by case basis, and made recommendations using a weight of evidence approach. The assessment process emphasized data collected since 1997 (the year when the previous list update process began, although older data were evaluated in cases where standards are based on running averages or where the status of point and nonpoint source discharges is not known to have changed significantly. To evaluate compliance with objectives based on annual means, staff looked for data sets with sample frequency more than quarterly, and preferably with several years of data.

Most of the data available to Lahontan Regional Board staff were ambient water chemistry data. The Regional Board is sponsoring biomonitoring for eventual development of "biocriteria" objectives, and a limited amount of citizen monitoring data is available. However, reference conditions have not yet been completely defined, and biomonitoring data were not used to recommend any new listings. Sample numbers were small for tissue and sediment data collected since 1997, and Regional Board staff did not recommend any listings on the basis of these data. (To staff's knowledge, there are no active fish consumption advisories in the Lahontan Region.) No toxicity bioassay data collected since 1997 were available. Listing was recommended only on the basis of data collected and analyzed by agencies, groups, and laboratories known to use appropriate Quality Control/Quality Assurance (QA/QC) procedures. Data with no documented QA/QC procedures, and qualitative "information" were used in some recommendations for the "watch list."

Standards and criteria. Water quality standards in California include beneficial use designations (for example, Municipal and Domestic Supply, Cold Freshwater Habitat, Water Contact Recreation) and narrative or numerical "water quality objectives" established to protect beneficial uses. The term "water quality objectives" is equivalent to the federal term "water quality criteria." Most of the water quality standards for the Lahontan Region are contained in the Lahontan Basin Plan. Chapter 3 of the Basin Plan includes direction on determining compliance with water quality objectives. Most numerical objectives are expressed as annual means and 90th percentile levels.

California water quality standards also include the criteria for toxic "priority pollutants" promulgated by the USEPA under the California Toxics Rule and National Toxics Rule, and the statewide "Nondegradation Policy" (State Board Resolution 68-16). Criteria issued by other agencies, which are not part of the formal water quality standards, can also be used to assess impairment. These include fish consumption criteria and advisories and "public health goals". Lahontan Regional Board staff's recommended additions to the Section 303(d) list are based primarily on violations of numerical water quality objectives. Sampling of surface waters for the toxic pollutants addressed in the California Toxics Rule and National Toxics Rule in surface waters of the Lahontan Region has been done too infrequently to allow conclusions about impairment and the need for listing in relation to these criteria. Some data were evaluated in terms of other criteria such as Office of Health Hazard Assessment fish consumption criteria and public health goals, but no hierarchical ranking was assigned to different types of criteria. One water body (Searles Lake) is recommended for listing on the basis of a documented beneficial use impairment (for the Wildlife Habitat use), but in general, data regarding aquatic life and wildlife uses in the Lahontan Region are insufficient to permit conclusions about attainment of uses or of narrative objectives related to habitat uses. See the discussions of "Lahontan Regional Board Staff Considerations" above for additional information on the use of standards and criteria in the Lahontan Region's Section 303(d) assessment.

Watch List. While a number of water body/pollutant combinations clearly qualify for listing, many waters fall into the category where: "based on the available data and information, standards attainment cannot be determined." Table 2 is a list of these water body/pollutant combinations. The purpose of the list is to highlight the need for additional monitoring and assessment for these waters to determine the need for TMDLs or for action under some other Regional Board program. A "watch list" is not required under Section 303(d) of the Clean Water Act. However, states are directed to identify "threatened" waters under the Section 305(b) water quality assessment program. The "watch list" in Table 2 includes waters from California's 1998 Section 305(b) report to the USEPA that were then identified as "threatened" or "partially meeting beneficial uses" due to pollutants, but were not on the Section 303(d)

list. Staff will recommend that water body-pollutant combinations added to Table 2 but not identified as "threatened" in the 1998 Section 305(b) report be classified as "threatened" in the 2002 Section 305(b) assessment.

Clarification of Existing Listings

Together with the recommended additions to and deletions from the Section 303(d) list, clarification is proposed for the listing status of a number of other water bodies in the 1998 list. Some of these changes are shown in Table 1; others will be entered into the computer database used for reporting to the State Board and the USEPA. Clarification includes changes in descriptions of pollutants; for example, an earlier single listing for a water body impaired by "nutrients" may be replaced by separate listings for "nitrogen," "phosphorus," and/or "iron." In other cases, the impaired portion of a water body has been identified more specifically, and there may be separate listings for upstream and downstream segments.

Priority Ranking

A priority ranking is required for listed waters to guide TMDL planning pursuant to 40 CFR 130.7. Lahontan Region waters are recommended to be ranked into high, medium, and low priority categories for development of TMDLs based on the following considerations:

1. Water body significance (e.g., importance and extent of beneficial uses, concerns related to threatened/endangered species, and size of the water body)

2. Degree of impairment or threat (such as number of pollutants, and number of beneficial uses impaired)

3. Conformity with related activities in the watershed (such as existence of watershed assessment, planning, pollution control and remediation, or restoration efforts in the area)

4. Potential for protection or recovery of beneficial uses

5. Degree of public concern and involvement

6. Availability of funding and information to address the water quality problem

7. Overall need for an adequate pace of TMDL development for all listed waters

8. Higher priorities given to other water bodies and pollutants.

It should be noted that the criteria can be applied in different ways to different water bodies and pollutants. For example, a water body may be severely impaired, but if there is little likelihood of beneficial use recovery, then a lower TMDL priority might be given.

The proposed TMDL priorities differ in some cases from those assigned to the same waters in the 1998 Section 303(d) list. For the most part, high priorities have been given to waters on the 1998 Section 303(d) list for which TMDL development is already under way. High priorities may also be given to

tributaries of these waters recommended for listing in 2002. Low priorities have been recommended for some water body-pollutant combinations expected to be delisted in 2004 under proposed changes to federal regulations. (For example, the new regulations are expected to clarify that TMDLs are not required for waters impaired by flow alterations.) Lower priorities may also be given to water bodies which need further assessment or regulatory action through some other Regional Board program, which lessens the need to begin TMDL development immediately. TMDL priority rankings and schedules may change during the next (2004) list update cycle.

TMDL Schedules

The USEPA has directed that TMDLs should be developed and completed for all water bodies on the 1998 Section 303(d)list by 2011 (unless there is justification for delisting.) The State Board has requested that Regional Board recommendations for the 2002 Section 303(d) list update include schedules for TMDL development for all listed waters. Recommended end dates for TMDL development for Lahontan Region waters are included in Table 1. For budgeting and reporting purposes, completion of TMDLs in California means formal Regional Board consideration of the adoption of Basin Plan amendments to incorporate TMDLs and TMDL implementation programs. Federal regulations do not currently require TMDL implementation programs, but they are required under California law. The Basin Plan amendment process is lengthy and complex, involving scientific peer review, compliance with the California Environmental Quality Act, and approvals of the amendments by several other agencies following Regional Board action.

Schedules beyond the first two years should be regarded as tentative and dependent on the availability of resources. State and federal budget processes do not allow accurate projection of resources beyond two years. Other factors affecting TMDL schedules include stakeholder group priorities, Regional Board priorities for Basin Plan amendments unrelated to TMDLs, and the availability of a Regional Board quorum for a vote. In cases where a water body was listed on the basis of limited data, the need for additional monitoring to provide data on which to base TMDL calculations will delay completion of the TMDL.

Not all waters ranked as "high" priorities for TMDLs can be scheduled for "immediate" TMDL development. Many of the surface waters of the Lahontan Region meet USEPA criteria for designation as "Outstanding National Resource Waters," based on considerations such as location in wilderness areas, presence of threatened/endangered species, or other recreational and ecological values. The scarcity of water in much of the region gives it high value. Thus, most 303(d) listed waters in the Lahontan Region could be given high priority based on resource value alone. Resource constraints will not permit all waters with high resource values or severe problems to be addressed at the same time. Some of the waters ranked "high" have been scheduled for later TMDL development.

Because of the large backlog of waters on the 1998 Section 303(d) list requiring TMDL development by 2011, all Lahontan Region waters recommended for addition to the list in 2002 are projected for completion of TMDLs after 2015. If additional resources become available, it may be possible to complete some of these TMDLs sooner. Schedules for the waters on the 2002 Section 303(d) list will be further revised in 2004 and subsequent list update cycles.

Staff Recommendations

Table 1 lists the water bodies or (or segments of water bodies) in the Lahontan Region recommended for addition to or removal from the Section 303(d) list. Table 1 also includes waters on the 1998 Section 303(d) list which are not recommended for change. Priority rankings and end dates for TMDL development are given for waters recommended for the 2002 Section 303(d) list. Tables 1A, 1B, and 1C are subsets of Table 1 with water bodies grouped by categories of recommendations (addition to, deletion from, or retention on the list).

Table 2 is a "watch list" of waters with some indication of problems but insufficient data to warrant listing at this time. Waters on the "watch list" should receive additional monitoring and assessment when resources are available.

The following is a summary of Lahontan Regional Board staff's recommendations:

Number of water body/pollutant combinations recommended for addition to Section 303(d) list in 2002	45
Number of water body/pollutant combinations recommended for deletion from Section 303(d) list in 2002	29
Number of water body/pollutant combinations on 1998 Section 303(d) list recommended for retention on 2002 list	69
Total number of water body/pollutant combinations recommended for 2002 list	114

References

(The following are general references and references related to "watch list" waters. References related to recommendations for listing and delisting are provided in fact sheets for specific water bodies.)

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Table 1. Recommendations for Update of the Section 303(d) List for the Lahontan Region

Waterbody Name	Proposed Action	Pollutant(s)/Stressor(s)	TMDL Priority Ranking[1]	TMDL End Date [2]	Comments
Surprise Valley HU 641.00[3]					
Upper Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Middle Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Lower Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Mill Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2011	Needs study to verify need for TMDL
Susanville HU 637.00					
Eagle Lake	Retain on 303(d) List[4]	Nitrogen	High	2008	
Eagle Lake	Retain on 303(d) List[4]	Phosphorus	High	2008	
Pine Creek	Retain on 303(d) List	Sedimentation/Siltation [actual problem: Fish Habitat Alterations]	High	2011[5]	TMDL probably not needed[5]
Lassen Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Susan River	Retain on 303(d) List	Unknown Toxicity	High	2007	Listed for toxic bioassay results
Top Spring	Remove from 303(d) List	Radiation	NA	NA	Impairment is natural; no "pollutants"
Amedee Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Wendel Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Honey Lake	Retain on 303(d) List	Arsenic	Medium	2005	Natural sources plus geothermal discharges
Honey Lake	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2005	Natural sources plus geothermal discharges
Honey Lake Area Wetlands	Retain on 303(d) List	Metals	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Flow Alterations	Low	2007[5]	TMDL probably not needed[5]
Honey Lake Wildfowl Mgmt Ponds	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Metals	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Trace Elements	Medium	2007	Natural sources plus geothermal discharges
Skedaddle Creek	Retain on 303(d) List	High Coliform Count	Low	2006	Further study may lead to delisting
Little Truckee River HU 636.00					
Stampede Reservoir	Remove from 303(d) List	Pesticides [Lindane][6]	NA	NA	TSMP- insufficient data for listing[8]
Truckee River HU 635.00					
Donner Lake	Remove from 303(d) List	Priority Organics [PCBs, Chlordane][6]	NA	NA	TSMP- insufficient data for listing[8]
Truckee River	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Bear Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Bronco Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Gray Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Squaw Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2003	TMDL development in progress
Cinder Cone Springs	Retain on 303(d) List	Nutrients	Medium	2007	Further study may lead to delisting
Cinder Cone Springs	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007	Further study may lead to delisting
Lake Tahoe HU 634.00					
Snow Creek	Remove from 303(d) List	Habitat Alterations	NA	NA	Restoration program implemented
Lake Tahoe	Retain on 303(d) List[4]	Phosphorus	High	2007	TMDL development in progress
Lake Tahoe	Retain on 303(d) List[4]	Nitrogen	High	2007	TMDL development in progress
Lake Tahoe	Retain on 303(d) List	Sedimentation/Siltation	High	2007	TMDL development in progress
Upper Truckee River	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Upper Truckee River	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL

Table 1. Lahontan Region 303(d) List Update, continued					
Waterbody Name	**Proposed Action**	**Pollutant(s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
Lake Tahoe HU 634.00 continued					
Upper Truckee River above Christmas Valley	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Big Meadow Creek	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Heavenly Valley Creek above USFS property line	Retain on 303(d) List	Sediment	High	2001	TMDL completed 2001, awaiting final approvals
Heavenly Valley Creek below USFS property line	Add to 303(d) List	Sediment	Medium	After 2015	Restoration progam may eliminate need for TMDL
Heavenly Valley Creek	Add to 303(d) list	Chloride	Low	After 2015	Standard needs revision
Heavenly Valley Creek above USFS property line	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Hidden Valley Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Hidden Valley Creek	Add to 303(d) List	Chloride	Low	After 2015	Standard needs revision
Trout Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Trout Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Trout Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Trout Creek below Hwy 50 in S. Lake Tahoe	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Tallac Creek below Hwy 89	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Ward Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
General Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
General Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Blackwood Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007	TMDL development in progress
Blackwood Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Blackwood Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Blackwood Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
West Fork Carson River HU 633.00					
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Phosphorus	High	After 2015	
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Percent Sodium	Medium	After 2015	Standard needs revision
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Nitrogen	High	After 2015	
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Percent Sodium	Medium	After 2015	Standard needs revision
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Nitrogen	High	After 2015	
West Fork Carson R., Woodfords to State Line	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
East Fork Carson River HU 632.00					
East Fork Carson River	Remove from 303(d) List	Nutrients	NA	NA	Incorrect assumption led to listing
Indian Creek Reservoir	Retain on 303(d) List	Nutrients	High	2002[7]	
Indian Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Indian Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Monitor Creek	Retain on 303(d) List[4]	Iron	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Retain on 303(d) List[4]	Silver	High	2011	TMDL to be coordinated with CERCLA remediation

Table 1. Lahontan Region 303(d) List Update, continued					
Waterbody Name	**Proposed Action**	**Pollutant(s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
East Fork Carson River HU 632.00, continued					
Monitor Creek	Retain on 303(d) List[4]	Aluminum	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Retain on 303(d) List[4]	Manganese	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Add to 303(d) List	Sulfate	High	After 2015	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Add to 303(d) List	Total Dissolved Solids	High	After 2015	TMDL to be coordinated with CERCLA remediation
Wolf Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2011	
Aspen Creek	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
Bryant Creek	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
Leviathan Creek, at and below Leviathan Mine	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
West Walker River HU 631.00					
Topaz Lake	Retain on 303(d) list	Sedimentation/Siltation	High	2007	
West Walker River	Retain on 303(d) List	Sedimentation/Siltation	High	2009	
Fales Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Hot Creek	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
East Walker River HU 630.00					
Bridgeport Reservoir	Retain on 303(d) List[4]	Nitrogen	High	2005	TMDL development in progress
Bridgeport Reservoir	Retain on 303(d) List[4]	Phosphorus	High	2005	TMDL development in progress
Bridgeport Reservoir	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
East Walker River above Bridgeport Reservoir	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
East Walker River below Bridgeport Reservoir	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
East Walker River below Bridgeport Reservoir	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
East Walker River below Bridgeport Reservoir	Remove from 303(d) List	Metals	NA	NA	TSMP- insufficient data for listing[8]
East Walker River below Bridgeport Reservoir	Retain on 303(d) List	Sedimentation/Siltation	High	2009	
Robinson Creek, Hwy 395 to Bridgeport Res.	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Robinson Creek, Twin Lakes to Bridgeport Res.	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Swauger Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Swauger Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Buckeye Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Buckeye Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Virginia Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Green Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Rough Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Aurora Canyon Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Hot Springs Canyon Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005	Needs study to verify need for TMDL
Clark Canyon Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Clearwater Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005	Needs study to verify need for TMDL
Bodie Creek	Retain on 303(d) List	Metals	High	2004	Impairment probably related to past mining activity

Table 1. Lahontan Region 303(d) List Update, continued					
Waterbody Name	**Proposed Action**	**Pollutant (s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
Mono HU 601.00					
Lee Vining Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Mill Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Grant Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Mono Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Owens HU 603.00					
Haiwee Reservoir	Retain on 303(d) List	Copper	Low	2003	TMDL development in progress
Mammoth Creek	Retain on 303(d) List	Metals	High	2008	Needs study to verify need for TMDL
Hot Creek	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Little Hot Creek	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Twin Lakes (Mammoth)	Retain on 303(d) List[4]	Nitrogen	Low	2008	Needs study to verify need for TMDL
Twin Lakes (Mammoth)	Retain on 303(d) List[4]	Phosphorus	Low	2008	Needs study to verify need for TMDL
Little Alkali Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Big Springs	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Owens River	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Owens River (Long HA)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Owens River (Upper)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Owens River (Lower)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Crowley Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Crowley Lake	Retain on 303(d) List[4]	Nitrogen	High	2005	Nutrient loading currently under study
Crowley Lake	Retain on 303(d) List[4]	Phosphorus	High	2005	Nutrient loading currently under study
Keough Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Tinemaha Reservoir	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Tinemaha Reservoir	Retain on 303(d) List	Metals [Copper]	Low	2004	Copper from algicide application
Pleasant Valley Reservoir	Retain on 303(d) List	Nitrogen	High	2006	
Pleasant Valley Reservoir	Retain on 303(d) List[4]	Phosphorus	High	2006	
Tuttle Creek	Retain on 303(d) List[4]	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Goodale Creek	Retain on 303(d) List	Sedimentation/Siltation	Low	2009	Further study may lead to delisting
Owens Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Cottonwood Creek below LADWP diversion	Retain on 303(d) List	Water/Flow Variability	Low	2011[5]	TMDL probably not needed[5]
Deep Springs HU 605.00					
Deep Springs Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Deep Springs Lake	Remove from 303(d) List	Trace Elements	NA	NA	Impairment is natural; no "pollutants"

Table 1. Lahontan Region 303(d) List Update, continued					
Waterbody Name	**Proposed Action**	**Pollutant (s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
Amargosa HU 609.00					
Amargosa River	Remove from 303(d) List	Salinity/TDS/chlorides	NA	NA	Impairment is natural; no "pollutants"
Trona HU 621.00					
Searles Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Searles Lake	Add to 303(d) List	Petroleum Hydrocarbons	Low	After 2015	Documented bird kills from industrial pollutants
Mojave HU 628.00					
Mojave River near Barstow	Remove from 303(d) List	Priority Organics	NA	NA	Ground water, not surface water impairment
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Total Dissolved Solids	High	After 2015	Exceeds drinking water standard
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Chloride	High	After 2015	Exceeds water quality objectives
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Sulfate	High	After 2015	Exceeds water quality objectives
Horseshoe Lake	Retain on 303(d) List	Sedimentation/Siltation	Low	2007	Further study may lead to delisting
Green Valley Lake Creek	Retain on 303(d) List	Priority Organics	Low	2006	Further study may lead to delisting

[1]TMDL priority rankings and end dates are shown only for water bodies recommended for inclusion in the 2002 list. The entry "NA" means "not applicable."

[2] TMDL end dates are the estimated years for Regional Board adoption of Basin Plan amendments. Plan amendments incorporating TMDLs will not take effect unless and until they receive further approvals from the California State Water Resources Control Board, the California Office of Administrative Law, and the U.S. Environmental Protection Agency.

[3] Water bodies are grouped by watersheds in north-to-south order. Watershed (Hydrologic Unit or HU) numbers are Department of Water Resources numbers used in the maps in the Lahontan Basin Plan, and do not run in north-to-south order.

[4] The entry "Retain on 303(d) List" in the "Proposed Action" column means that this water body/pollutant combination is on the 1998 Section 303(d) list and is proposed to remain on the 2002 list. In some cases the nature of the pollutants or the extent of the impaired segment has been clarified. For example, earlier listings for "nutrients" or "organic enrichment/Low D.O." may now be changed to separate listings for individual pollutants (nitrogen and phosphorus), and an earlier single entry for habitat alterations in the Owens River has been changed to three separate entries to reflect different segments of the river. Changes are recommended in priority rankings and TMDL end dates for many of the water body/pollutant combinations from the 1998 list.

[5] Pending revisions to federal regulations for the implementation of Section 303(d) of the Clean Water Act would clarify that TMDLs are not required for waters impaired by flow alterations, water/flow variability and habitat alterations, unless specific "pollutants" are also involved. (Load calculations are not feasible in cases where there are no pollutants.) Under the proposed new regulations, waters impaired by habitat or flow alterations, or by flow variability, would be placed on a separate list of impaired waters to highlight the need for control strategies other than TMDLs.

[6]Clarification of the nature of the pollutants has been added in brackets for some water bodies recommended for removal from the Section 303(d) list. See the fact sheets for these water bodies for further information.

[7]Regional Board staff completed draft Basin Plan amendments incorporating a phosphorus TMDL for Indian Creek Reservoir in November 2000. The Regional Board has been unable to act on these amendments due to lack of a quorum for a vote.

[8]Some waters were listed based on Toxic Substances Monitoring Program (TSMP) fish tissue data. Because sample numbers were small, TSMP data alone are not considered sufficient grounds for listing.

Table 1A. Proposed Additions to the Section 303(d) List for the Lahontan Region

Waterbody Name	Proposed Action	Pollutant(s) /Stressor(s)	TMDL Priority Ranking[1]	TMDL End Date [2]	Comments
Lake Tahoe HU 634.00					
Upper Truckee River	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Upper Truckee River	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Upper Truckee River above Christmas Valley	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Big Meadow Creek	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Heavenly Valley Creek below USFS property line	Add to 303(d) List	Sediment	Medium	After 2015	Restoration progam may eliminate need for TMDL
Heavenly Valley Creek	Add to 303(d) list	Chloride	Low	After 2015	Standard needs revision
Heavenly Valley Creek above USFS property line	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Hidden Valley Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Hidden Valley Creek	Add to 303(d) List	Chloride	Low	After 2015	Standard needs revision
Trout Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Trout Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Trout Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Trout Creek below Hwy 50 in S. Lake Tahoe	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Tallac Creek below Hwy 89	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Ward Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
General Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
General Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Blackwood Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Blackwood Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Blackwood Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
West Fork Carson River HU 633.00					
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Phosphorus	High	After 2015	
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Percent Sodium	Medium	After 2015	Standard needs revision
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Nitrogen	High	After 2015	
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Percent Sodium	Medium	After 2015	Standard needs revision
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Nitrogen	High	After 2015	
West Fork Carson R., Woodfords to State Line	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
East Fork Carson River HU 632.00					
Indian Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Monitor Creek	Add to 303(d) List	Sulfate	High	After 2015	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Add to 303(d) List	Total Dissolved Solids	High	After 2015	TMDL to be coordinated with CERCLA remediation
East Walker River HU 630.00					
East Walker River above Bridgeport Reservoir	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
East Walker River below Bridgeport Reservoir	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
East Walker River below Bridgeport Reservoir	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Robinson Creek, Hwy 395 to Bridgeport Res.	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Robinson Creek, Twin Lakes to Bridgeport Res.	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated

Table 1A. Proposed Additions to Lahontan Region 303(d) List , continued					
Waterbody Name	**Proposed Action**	**Pollutant (s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
East Walker River HU 630.00, continued					
Swauger Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Swauger Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Buckeye Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Buckeye Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Virginia Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Trona HU 621.00					
Searles Lake	Add to 303(d) List	Petroleum Hydrocarbons	Low	After 2015	Documented bird kills from industrial pollutants
Mojave HU 628.00					
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Total Dissolved Solids	High	After 2015	Exceeds drinking water standard
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Chloride	High	After 2015	Exceeds water quality objectives
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Sulfate	High	After 2015	Exceeds water quality objectives

Footnotes for Table 1A. (The following footnotes were developed for Table 1, the master table containing all recommendations. Some of the information is not relevant to this subtable.)

[1]TMDL priority rankings and end dates are shown only for water bodies recommended for inclusion in the 2002 list. The entry "NA" means "not applicable."

[2] TMDL end dates are the estimated years for Regional Board adoption of Basin Plan amendments. Plan amendments incorporating TMDLs will not take effect unless and until they receive further approvals from the California State Water Resources Control Board, the California Office of Administrative Law, and the U.S. Environmental Protection Agency.

[3] Water bodies are grouped by watersheds in north-to-south order. Watershed (Hydrologic Unit or HU) numbers are Department of Water Resources numbers used in the maps in the Lahontan Basin Plan, and do not run in north-to-south order.

[4] The entry "Retain on 303(d) List" in the "Proposed Action" column means that this water body/pollutant combination is on the 1998 Section 303(d) list and is proposed to remain on the 2002 list. In some cases the nature of the pollutants or the extent of the impaired segment has been clarified. For example, earlier listings for "nutrients" or "organic enrichment/Low D.O." may now be changed to separate listings for individual pollutants (nitrogen and phosphorus), and an earlier single entry for habitat alterations in the Owens River has been changed to three separate entries to reflect different segments of the river. Changes are recommended in priority rankings and TMDL end dates for many of the water body/pollutant combinations from the 1998 list.

[5] Pending revisions to federal regulations for the implementation of Section 303(d) of the Clean Water Act would clarify that TMDLs are not required for waters impaired by flow alterations, water/flow variability and habitat alterations, unless specific "pollutants" are also involved. (Load calculations are not feasible in cases where there are no pollutants.) Under the proposed new regulations, waters impaired by habitat or flow alterations, or by flow variability, would be placed on a separate list of impaired waters to highlight the need for control strategies other than TMDLs.

[6]Clarification of the nature of the pollutants has been added in brackets for some water bodies recommended for removal from the Section 303(d) list. See the fact sheets for these water bodies for further information.

[7]Regional Board staff completed draft Basin Plan amendments incorporating a phosphorus TMDL for Indian Creek Reservoir in November 2000. The Regional Board has been unable to act on these amendments due to lack of a quorum for a vote.

[8]Some waters were listed based on Toxic Substances Monitoring Program (TSMP) fish tissue data. Because sample numbers were small, TSMP data alone are not considered sufficient grounds for listing.

Table 1B. Recommended Deletions from the Section 303(d) List for the Lahontan Region

Waterbody Name	Proposed Action	Pollutant(s) /Stressor(s)	TMDL Priority Ranking[1]	TMDL End Date[2]	Comments
Surprise Valley HU 641.00[3]					
Upper Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Middle Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Lower Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Susanville HU 637.00					
Top Spring	Remove from 303(d) List	Radiation	NA	NA	Impairment is natural; no "pollutants"
Amedee Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Wendel Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Little Truckee River HU 636.00					
Stampede Reservoir	Remove from 303(d) List	Pesticides [Lindane][6]	NA	NA	TSMP- insufficient data for listing[8]
Truckee River HU 635.00					
Donner Lake	Remove from 303(d) List	Priority Organics [PCBs, Chlordane][6]	NA	NA	TSMP- insufficient data for listing[8]
Lake Tahoe HU 634.00					
Snow Creek	Remove from 303(d) List	Habitat Alterations	NA	NA	Restoration program implemented
East Fork Carson River HU 632.00					
East Fork Carson River	Remove from 303(d) List	Nutrients	NA	NA	Incorrect assumption led to listing
West Walker River HU 631.00					
Fales Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Hot Creek	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
East Walker River HU 630.00					
East Walker River below Bridgeport Reservoir	Remove from 303(d) List	Metals	NA	NA	TSMP- insufficient data for listing[8]
Mono HU 601.00					
Grant Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Mono Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Owens HU 603.00					
Hot Creek	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Little Hot Creek	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Little Alkali Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Big Springs	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Owens River	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Crowley Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Keough Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Tinemaha Reservoir	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Owens Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Deep Springs HU 605.00					
Deep Springs Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Deep Springs Lake	Remove from 303(d) List	Trace Elements	NA	NA	Impairment is natural; no "pollutants"
Amargosa HU 609.00					
Amargosa River	Remove from 303(d) List	Salinity/TDS/chlorides	NA	NA	Impairment is natural; no "pollutants"
Trona HU 621.00					
Searles Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Mojave HU 628.00					
Mojave River near Barstow	Remove from 303(d) List	Priority Organics	NA	NA	Ground water, not surface water impairment

Footnotes for Table 1B. (The following footnotes were developed for Table 1, the master table containing all recommendations. Some of the information is not relevant to this subtable.)

[1]TMDL priority rankings and end dates are shown only for water bodies recommended for inclusion in the 2002 list. The entry "NA" means "not applicable."

[2] TMDL end dates are the estimated years for Regional Board adoption of Basin Plan amendments. Plan amendments incorporating TMDLs will not take effect unless and until they receive further approvals from the California State Water Resources Control Board, the California Office of Administrative Law, and the U.S. Environmental Protection Agency.

[3] Water bodies are grouped by watersheds in north-to-south order. Watershed (Hydrologic Unit or HU) numbers are Department of Water Resources numbers used in the maps in the Lahontan Basin Plan, and do not run in north-to-south order.

[4] The entry "Retain on 303(d) List" in the "Proposed Action" column means that this water body/pollutant combination is on the 1998 Section 303(d) list and is proposed to remain on the 2002 list. In some cases the nature of the pollutants or the extent of the impaired segment has been clarified. For example, earlier listings for "nutrients" or "organic enrichment/Low D.O." may now be changed to separate listings for individual pollutants (nitrogen and phosphorus), and an earlier single entry for habitat alterations in the Owens River has been changed to three separate entries to reflect different segments of the river. Changes are recommended in priority rankings and TMDL end dates for many of the water body/pollutant combinations from the 1998 list.

[5] Pending revisions to federal regulations for the implementation of Section 303(d) of the Clean Water Act would clarify that TMDLs are not required for waters impaired by flow alterations, water/flow variability and habitat alterations, unless specific "pollutants" are also involved. (Load calculations are not feasible in cases where there are no pollutants.) Under the proposed new regulations, waters impaired by habitat or flow alterations, or by flow variability, would be placed on a separate list of impaired waters to highlight the need for control strategies other than TMDLs.

[6]Clarification of the nature of the pollutants has been added in brackets for some water bodies recommended for removal from the Section 303(d) list. See the fact sheets for these water bodies for further information.

[7]Regional Board staff completed draft Basin Plan amendments incorporating a phosphorus TMDL for Indian Creek Reservoir in November 2000. The Regional Board has been unable to act on these amendments due to lack of a quorum for a vote.

[8]Some waters were listed based on Toxic Substances Monitoring Program (TSMP) fish tissue data. Because sample numbers were small, TSMP data alone are not considered sufficient grounds for listing.

Table 1C. Water Bodies on 1998 303(d) List Recommended for Retention on 2002 List

Waterbody Name	Proposed Action	Pollutant(s) /Stressor(s)	TMDL Priority Ranking[1]	TMDL End Date[2]	Comments
Surprise Valley HU 641.00[3]					
Mill Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2011	Needs study to verify need for TMDL
Susanville HU 637.00					
Eagle Lake	Retain on 303(d) List[4]	Nitrogen	High	2008	
Eagle Lake	Retain on 303(d) List[4]	Phosphorus	High	2008	
Pine Creek	Retain on 303(d) List	Sedimentation/Siltation [actual problem: Fish Habitat Alterations]	High	2011[5]	TMDL probably not needed[5]
Lassen Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Susan River	Retain on 303(d) List	Unknown Toxicity	High	2007	Listed for toxic bioassay results
Honey Lake	Retain on 303(d) List	Arsenic	Medium	2005	Natural sources plus geothermal discharges
Honey Lake	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2005	Natural sources plus geothermal discharges
Honey Lake Area Wetlands	Retain on 303(d) List	Metals	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Flow Alterations	Low	2007[5]	TMDL probably not needed[5]
Honey Lake Wildfowl Mgmt Ponds	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Metals	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Trace Elements	Medium	2007	Natural sources plus geothermal discharges
Skedaddle Creek	Retain on 303(d) List	High Coliform Count	Low	2006	Further study may lead to delisting
Truckee River HU 635.00					
Truckee River	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Bear Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Bronco Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Gray Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Squaw Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2003	TMDL development in progress
Cinder Cone Springs	Retain on 303(d) List	Nutrients	Medium	2007	Further study may lead to delisting
Cinder Cone Springs	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007	Further study may lead to delisting
Lake Tahoe HU 634.00					
Lake Tahoe	Retain on 303(d) List[4]	Phosphorus	High	2007	TMDL development in progress
Lake Tahoe	Retain on 303(d) List[4]	Nitrogen	High	2007	TMDL development in progress
Lake Tahoe	Retain on 303(d) List	Sedimentation/Siltation	High	2007	TMDL development in progress
Heavenly Valley Creek above USFS property line	Retain on 303(d) List	Sediment	High	2001	TMDL completed 2001, awaiting final approvals
Ward Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007	To be coordinated with Lake Tahoe TMDL
Blackwood Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007	TMDL development in progress
East Fork Carson River HU 632.00					
Indian Creek Reservoir	Retain on 303(d) List	Nutrients	High	2002[7]	
Indian Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Monitor Creek	Retain on 303(d) List[4]	Iron	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Retain on 303(d) List[4]	Silver	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Retain on 303(d) List[4]	Aluminum	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Retain on 303(d) List[4]	Manganese	High	2011	TMDL to be coordinated with CERCLA remediation
Wolf Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2011	
Aspen Creek	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
Bryant Creek	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
Leviathan Creek, at and below Leviathan Mine	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation

Table 1(C). Waters Recommended for Retention, continued					
Waterbody Name	**Proposed Action**	**Pollutant (s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
West Walker River HU 631.00					
Topaz Lake	Retain on 303(d) list	Sedimentation/Siltation	High	2007	
West Walker River	Retain on 303(d) List	Sedimentation/Siltation	High	2009	
East Walker River HU 630.00					
Bridgeport Reservoir	Retain on 303(d) List[4]	Nitrogen	High	2005	TMDL development in progress
Bridgeport Reservoir	Retain on 303(d) List[4]	Phosphorus	High	2005	TMDL development in progress
Bridgeport Reservoir	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
East Walker River below Bridgeport Reservoir	Retain on 303(d) List	Sedimentation/Siltation	High	2009	
Green Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Rough Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Aurora Canyon Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Hot Springs Canyon Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005	Needs study to verify need for TMDL
Clark Canyon Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Clearwater Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005	Needs study to verify need for TMDL
Bodie Creek	Retain on 303(d) List	Metals	High	2004	Impairment probably related to past mining activity
Mono HU 601.00					
Lee Vining Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Mill Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Owens HU 603.00					
Haiwee Reservoir	Retain on 303(d) List	Copper	Low	2003	TMDL development in progress
Mammoth Creek	Retain on 303(d) List	Metals	High	2008	Needs study to verify need for TMDL
Twin Lakes (Mammoth)	Retain on 303(d) List[4]	Nitrogen	Low	2008	Needs study to verify need for TMDL
Twin Lakes (Mammoth)	Retain on 303(d) List[4]	Phosphorus	Low	2008	Needs study to verify need for TMDL
Owens River (Long HA)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Owens River (Upper)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Owens River (Lower)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Crowley Lake	Retain on 303(d) List[4]	Nitrogen	High	2005	Nutrient loading currently under study
Crowley Lake	Retain on 303(d) List[4]	Phosphorus	High	2005	Nutrient loading currently under study
Tinemaha Reservoir	Retain on 303(d) List	Metals [Copper]	Low	2004	Copper from algicide application
Pleasant Valley Reservoir	Retain on 303(d) List	Nitrogen	High	2006	
Pleasant Valley Reservoir	Retain on 303(d) List[4]	Phosphorus	High	2006	
Tuttle Creek	Retain on 303(d) List[4]	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Goodale Creek	Retain on 303(d) List	Sedimentation/Siltation	Low	2009	Further study may lead to delisting
Cottonwood Creek below LADWP diversion	Retain on 303(d) List	Water/Flow Variability	Low	2011[5]	TMDL probably not needed[5]
Mojave HU 628.00					
Horseshoe Lake	Retain on 303(d) List	Sedimentation/Siltation	Low	2007	Further study may lead to delisting
Green Valley Lake Creek	Retain on 303(d) List	Priority Organics	Low	2006	Further study may lead to delisting

Footnotes for Table 1C. (The following footnotes were developed for Table 1, the master table containing all recommendations. Some of the information is not relevant to this subtable.)

[1]TMDL priority rankings and end dates are shown only for water bodies recommended for inclusion in the 2002 list. The entry "NA" means "not applicable."

[2] TMDL end dates are the estimated years for Regional Board adoption of Basin Plan amendments. Plan amendments incorporating TMDLs will not take effect unless and until they receive further approvals from the California State Water Resources Control Board, the California Office of Administrative Law, and the U.S. Environmental Protection Agency.

[3] Water bodies are grouped by watersheds in north-to-south order. Watershed (Hydrologic Unit or HU) numbers are Department of Water Resources numbers used in the maps in the Lahontan Basin Plan, and do not run in north-to-south order.

[4] The entry "Retain on 303(d) List" in the "Proposed Action" column means that this water body/pollutant combination is on the 1998 Section 303(d) list and is proposed to remain on the 2002 list. In some cases the nature of the pollutants or the extent of the impaired segment has been clarified. For example, earlier listings for "nutrients" or "organic enrichment/Low D.O." may now be changed to separate listings for individual pollutants (nitrogen and phosphorus), and an earlier single entry for habitat alterations in the Owens River has been changed to three separate entries to reflect different segments of the river. Changes are recommended in priority rankings and TMDL end dates for many of the water body/pollutant combinations from the 1998 list.

[5] Pending revisions to federal regulations for the implementation of Section 303(d) of the Clean Water Act would clarify that TMDLs are not required for waters impaired by flow alterations, water/flow variability and habitat alterations, unless specific "pollutants" are also involved. (Load calculations are not feasible in cases where there are no pollutants.) Under the proposed new regulations, waters impaired by habitat or flow alterations, or by flow variability, would be placed on a separate list of impaired waters to highlight the need for control strategies other than TMDLs.

[6]Clarification of the nature of the pollutants has been added in brackets for some water bodies recommended for removal from the Section 303(d) list. See the fact sheets for these water bodies for further information.

[7]Regional Board staff completed draft Basin Plan amendments incorporating a phosphorus TMDL for Indian Creek Reservoir in November 2000. The Regional Board has been unable to act on these amendments due to lack of a quorum for a vote.

[8]Some waters were listed based on Toxic Substances Monitoring Program (TSMP) fish tissue data. Because sample numbers were small, TSMP data alone are not considered sufficient grounds for listing.

Table 2. "Watch list" of Lahontan Region waters and pollutants requiring additional monitoring to determine the need for listing and TMDL development. Waters are grouped by watershed in north-to-south watershed order.

Water Body Name	Watershed	Pollutant(s)
Raider Creek	Surprise Valley	Sediment
Emerson Creek	Surprise Valley	Sediment
Eagle Lake	Susan River	Mercury
Pine Creek	Susan River	Nitrogen
Pine Creek	Susan River	Phosphorus
Susan River u/s of Susanville	Susan River	Mercury
Susan River d/s of Paiute Creek	Susan River	Mercury
Susan River d/s of Paiute Creek	Susan River	PCBs
Lassen Creek	Susan River	Sediment
Long Valley Creek	Susan River	Sediment
Little Truckee River	Little Truckee River	Sediment
Stampede Reservoir	Little Truckee River	Lindane
Truckee River	Truckee River	Chloride
Truckee River	Truckee River	TDS
Squaw Creek Meadow Wetlands	Truckee River	Pesticides
Cold Stream	Truckee River	Sediment
Martis Creek	Truckee River	Nutrients
Summit Creek	Truckee River	Petroleum products
Donner Lake	Truckee River	Pathogens
Donner Lake	Truckee River	Boat Fuel Constituents
Donner Lake	Truckee River	PCBs
Donner Lake	Truckee River	Chlordane
Donner Creek	Truckee River	Sediment
Lake Tahoe	Lake Tahoe	Iron
Lake Tahoe	Lake Tahoe	Mercury in sediment
Lake Tahoe	Lake Tahoe	Lead in sediment
Lake Tahoe	Lake Tahoe	Boat fuel constituents
Lake Tahoe	Lake Tahoe	Pesticides (40 different compounds)
Tahoe Keys Sailing Lagoon	Lake Tahoe	PCBs
Tahoe Keys Sailing Lagoon	Lake Tahoe	Toxaphene
Upper Angora Lake	Lake Tahoe	Pesticides (16 different compounds)
Taylor Creek	Lake Tahoe	Pesticides (8 different compounds)
Lily Lake	Lake Tahoe	Nutrients
Upper Truckee River	Lake Tahoe	Pesticides (7 different compounds)
Upper Truckee River	Lake Tahoe	Nitrogen
General Creek	Lake Tahoe	Pesticides (5 different compounds)
Blackwood Creek	Lake Tahoe	Pesticides (4 different compounds)
Lower Echo Lake	Lake Tahoe	Nutrients
Upper Echo Lake	Lake Tahoe	Nitrogen
Fallen Leaf Lake	Lake Tahoe	Nutrients
Meiss Lake	Lake Tahoe	Nutrients
Griff Creek	Lake Tahoe	Sediment
McKinney Creek	Lake Tahoe	Sediment
Meeks Creek	Lake Tahoe	Sediment
Lonely Gulch Creek	Lake Tahoe	Sediment

Table 2. "Watch List," continued

Water Body Name	Watershed	Pollutant(s)
Madden Creek	Lake Tahoe	Sediment
Sawmill Pond	Lake Tahoe	Sediment
Grass Lake Wetlands	Lake Tahoe	Road salt
Watson Creek	Lake Tahoe	Sediment
Heavenly Valley Creek	Lake Tahoe	Nitrogen
West Fork Carson River	Carson River	Percent sodium
West Fork Carson River	Carson River	Sulfate
West Fork Carson River	Carson River	Boron
Red Lake Creek	Carson River	Sulfate, Acid Mine Drainage
Fredericksburg Canyon Creek	Carson River	Sediment
Scotts Lake	Carson River	Sediment
Indian Creek	Carson River	Phosphorus
Indian Creek	Carson River	Nitrogen
Heenan Reservoir	Carson River	Nutrients
Monitor Creek	Carson River	Nitrogen
Monitor Creek	Carson River	Phosphorus
Silver Creek	Carson River	Metals/Acid Mine Drainage
Markleeville Creek	Carson River	Nitrogen
Markleeville Creek	Carson River	Phosphorus
Markleeville Creek	Carson River	Total Dissolved Solids
Markleeville Creek	Carson River	Chloride
Desert Creek	Carson River	Sulfate, Acid Mine Drainage
Asa Lake	Carson River	Nutrients
West Walker River	Walker River	Total Dissolved Solids
West Walker River	Walker River	Nitrogen
Koenig Lake	Walker River	Nutrients
Mill Creek	Walker River	Nitrogen
Little Walker River	Walker River	Sediment
Little Walker River	Walker River	Total Dissolved Solids
Little Walker River	Walker River	Nitrogen
Swauger Creek	Walker River	Total Dissolved Solids
Green Creek	Walker River	Nitrogen
Swauger Creek	Walker River	Nitrogen
Buckeye Creek	Walker River	Total Dissolved Solids
Buckeye Creek	Walker River	Phosphorus
Robinson Creek	Walker River	Total Dissolved Solids
Robinson Creek	Walker River	Phosphorus
Robinson Cr. above Barney Lake	Walker River	Nitrogen
Robinson Cr,. Barney Lake to Twin Lakes	Walker River	Nitrogen
East Walker River above Bridgeport Reservoir	Walker River	Phosphorus
East Walker River below Bridgeport Reservoir	Walker River	Fuel oil (spill)
East Walker River below Bridgeport Reservoir	Walker River	Mercury, other metals
Aurora Canyon Creek	Walker River	Total Dissolved Solids

Table 2. "Watch List,", continued

Water Body Name	Watershed	Pollutant(s)
Aurora Canyon Creek	Walker River	Nitrogen
Aurora Canyon Creek	Walker River	Phosphorus
Aurora Canyon Creek	Walker River	Mercury
Upper Twin Lake	Walker River	Nutrients
Lower Twin Lake	Walker River	Nutrients
Summers Creek	Walker River	Nitrogen
Summers Creek	Walker River	Total Dissolved Solids
Virginia Creek	Walker River	Total Dissolved Solids
Virginia Creek	Walker River	Sediment
Virginia Creek	Walker River	Nitrogen
Virginia Creek	Walker River	Phosphorus
Eagle Creek	Walker River	Phosphorus
Eagle Creek	Walker River	Nitrogen
Barney Lake	Walker River	Nitrogen
Blue Lake	Walker River	Nitrogen
Bonnie Lake	Walker River	Nitrogen
Chain o Lakes	Walker River	Nitrogen
Cooney Lake	Walker River	Nitrogen
Crown Lake	Walker River	Nitrogen
East Lake	Walker River	Nitrogen
Fremont Lake	Walker River	Nitrogen
Frog Lake	Walker River	Nitrogen
Gilman Lake	Walker River	Nitrogen
Harriet Lake	Walker River	Nitrogen
Helen Lake	Walker River	Nitrogen
Hoover Lake	Walker River	Nitrogen
Long Lake (Upper)	Walker River	Nitrogen
Long Lake (Lower)	Walker River	Nitrogen
Peeler Lake	Walker River	Nitrogen
Robinson Lake (Upper)	Walker River	Nitrogen
Robinson Lake (Lower)	Walker River	Nitrogen
Roosevelt Lake	Walker River	Nitrogen
Ruth Lake	Walker River	Nitrogen
Snow Lake	Walker River	Nitrogen
Stella Lake	Walker River	Nitrogen
Summit Lake	Walker River	Nitrogen
Tower Lake	Walker River	Nitrogen
Trumbull Lake	Walker River	Nitrogen
Virginia Lake (Upper)	Walker River	Nitrogen
Green Lake	Walker River	Nitrogen
Green Creek above Green Lake	Walker River	Nitrogen
Horse Creek	Walker River	Nitrogen
Reversed Creek	Mono Basin	Sediment
Reversed Creek	Mono Basin	Nutrients
Lundy Lake	Mono Basin	Mine drainage
June Lake	Mono Basin	Nutrients
June Lake	Mono Basin	Mercury
Silver Lake	Mono Basin	Nutrients
Gull Lake	Mono Basin	Nutrients
Sherwin Creek	Owens River	Sediment, nutrients

Table 2. "Watch List", continued

Water Body Name	Watershed	Pollutant(s)
Lake George	Owens River	Metals
Lake Mary	Owens River	Boat fuel constituents including MTBE
Diaz Lake	Owens River	Nutrients
McGee Creek	Owens River	Mine drainage
Pine Creek	Owens River	Mine/tailings drainage
Pine Creek	Owens River	Sediment
Independence Creek	Owens River	Mercury
Los Angeles Aqueduct	Owens River	Copper
Ivanpah Dry Lake	Ivanpah HU	Radioactive elements (lanthanides)
Littlerock Reservoir	Antelope HU	Sediment
Littlerock Reservoir	Antelope HU	Iron
Littlerock Reservoir	Antelope HU	Manganese
Deep Creek	Mojave River	Total Dissolved Solids
Deep Creek	Mojave River	Sulfate
Deep Creek	Mojave River	Fluoride
Shake Creek	Mojave River	Total Dissolved Solids
Shake Creek	Mojave River	Nitrate
Shake Creek	Mojave River	Sulfate
Shake Creek	Mojave River	Boron
Shake Creek	Mojave River	Fluoride
Shake Creek	Mojave River	Landfill leachate constituents
West Fork Mojave River	Mojave River	Nitrogen
Mojave River at Dam Forks	Mojave River	Sulfate
Mojave River between Upper and Lower Narrows	Mojave River	PCE and TCE (organic solvents)
Mojave River @ Lower Narrows	Mojave River	Nutrients
Mojave River, Barstow to Waterman Fault	Mojave River	Nitrogen
Mojave River, Barstow to Waterman Fault	Mojave River	Total Dissolved Solids
Lake Arrowhead	Mojave River	Boat fuel constituents
Lake Arrowhead	Mojave River	Nutrients
Silverwood Lake	Mojave River	Salts, trace elements (from imported water)
Spring Valley Lake	Mojave River	Sediment

From: Judith Unsicker
To: Diane Beaulaurier
Date: 3/26/02 9:00AM
Subject: Error in Assessment for Section 303(d) Listing of Virginia Creek

Region 6 staff recently discovered a transcription error in compiling the data used for assessment of Virginia Creek in the East Walker River watershed. In Table 2 on page 2 of the "Virginia Creek, Pathogens" fact sheet (page 483 of our administrative record) the numbers in the "Fecal coliform" and "Fecal streptococci" columns were transposed except for the last three rows. This means that among 14 samples, only one clear violation of the 40 colonies/100 ml water quality objective for fecal coliform bacteria occurred (on July 12, 2000). (Another sample taken January 10, 2001, with 64 colonies, had a "K" code indicating that the colony count was outside of the acceptable range or ideal count.) The erroneous transcription led to the conclusion that 6 out of 14 samples were in violation.

I discussed this problem with Chuck Curtis, Region 6's Planning and Toxics Division Manager. Because of the small number of violations, he recommends that State Board not include Virginia Creek in its forthcoming list of California waters recommended for Section 303(d) listing. The creek will be sampled further for bacteria when resources are available, and may
be considered for listing at a later date.

Please contact me or Chuck Curtis [telephone (530) 542-5460] if you have any questions.

Judith Unsicker
Staff Environmental Scientist
Lahontan RWQCB
2501 Lake Tahoe Boulevard
South Lake Tahoe, CA 96150
Phone: (530) 542-5462
Fax (530) 542-5470
Email: JUnsicker@rb6s.swrcb.ca.gov

The energy challenge facing California is real.Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our web-site at http://www.swrcb.ca.gov

CC: Chuck Curtis

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

Meeting of January 9-10, 2002
South Lake Tahoe

LATE REVISIONS

ITEM:	**5**
SUBJECT:	**RECOMMENDATIONS TO THE STATE WATER RESOURCES CONTROL BOARD FOR UPDATEOF THE LAHONTAN REGION'S SECTION 303(D) LIST AND PRIORITIES FOR TOTAL MAXIMUM DAILY LOADS**

The following changes are recommended to Table 1, the attachment to the proposed *resolution:*

Under the recommendations for the Mojave River watershed, delete the three rows related to proposed additions of a segment of the Mojave River to the Section 303(d) list for total dissolved solids, chloride, and sulfate.

ERRATA FOR SECTION 303(D) WATER BODY FACT SHEETS
January 2002

The following changes to the the November 2001 Water Body Fact Sheets prepared by Lahontan Regional Board staff are made by reference. (Fact Sheets are supporting information in the record of the Section 303(d) list update, but are not part of the Lahontan Regional Board's recommendations to the State Water Resources Control Board.)

West Fork Carson River, Headwaters to Woodfords, Nitrogen, Page 2:

In the "Water Quality Objectives Violated" section, the total nitrogen objective in the third line should be 0.15 mg/L rather than 15 mg/L. In the last line of the "Evidence of Impairment" section, the units "mg/L" should be added after the mean of monthly means (0.20) for total N.

West Fork Carson River, Woodfords to Paynesville, Pathogens, Page 2:

In the third line of the "Evidence of Impairment" section, the units for numbers of bacterial colonies should be expressed as numbers per 100 ml, rather than numbers per ml.

Tallac Creek, Pathogens, Page 2:

The "Evidence of Impairment" section was inadvertently left blank. It should read as follows:

"The U.S. Forest Service, Lake Tahoe Basin Management Unit monitors fecal coliform bacteria at two stations in the Baldwin grazing allotment. Results for Station B-1 (the downstream station) in 2001 showed fecal coliform bacteria numbers ranging from 0-108 per 100 ml, with violations of the 40/100 ml single value component of the objective in June, July, August and October. Bacteria numbers at Station B-2 ranged from 0-264, and the 40/100 ml component of the objective was violated in July".

Change the "Potential Sources" section as follows:

"Livestock are probably the major sources of fecal coliform loading to the segment of Tallac Creek proposed for listing. Wildlife (particularly beavers), human recreational users of the watershed and their pets are other possible sources".

Searles Lake, Petroleum Hydrocarbons:

Add the following sentence at the end of the "Watershed Characteristics" section:

"Searles Lake is located to the Pacific Flyway and serves as resting habitat for several species of migratory birds including Brown Pelican, Common Snipe, Whitefaced Ibis, Mallard and American Coot".

Change the the "Water Quality Standards Not Attained" section as follows:

"~~Searles Lake is located to the Pacific Flyway and serves as resting habitat for several species of migratory birds including Brown Pelican, Common Snipe, Whitefaced Ibis, Mallard and American Coot. Documented bird kills are considered impairment of the Wildlife Habitat (WILD) beneficial use for surface waters of the Lake.~~ Lahontan Regional Board Cleanup And Abatement Order No. 6-00-64 ~~also~~ cites impairments of the Non-Contact Water Recreation (REC-2), Water Contact Recreation (REC-1) and Saline Water Habitat (SAL) uses and violations of narrative water quality objectives for chemical constituents, floating material, oil and grease, and toxicity. The Regional Board has asked staff to evaluate the appropriateness of some beneficial uses at Searles Lake, particularly REC-1".

In the eleventh line of the italicized quotation in the "Evidence of Impairment" Section, correct the date in parentheses to June 23, 2000.

In the "TMDL Priority" section, change the last sentence to read:

"Searles Lake may be recommended for delisting in the future if ongoing cleanup activities lead to attainment of water quality standards ~~the wildlife use~~".

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

Meeting of January 9 and 10, 2002
South Lake Tahoe

ITEM: 5

SUBJECT: RECOMMENDATIONS TO THE STATE WATER RESOURCES CONTROL BOARD FOR UPDATE OF THE LAHONTAN REGION'S SECTION 303(D) LIST AND PRIORITIES FOR TOTAL MAXIMUM DAILY LOADS

DISCUSSION: Under Section 303(d) of the federal Clean Water Act, states are required to maintain lists of impaired surface water bodies needing Total Maximum Daily Loads (TMDLs). These lists, and priorities for developing TMDLs, must be updated every two years. The State Water Resources Control Board (State Board) has requested Regional Boards to develop and (following public participation) submit recommendations for changes in California's Section 303(d) list for waters of their regions. The State Board will conduct its own public participation process, and will act on an updated statewide Section 303(d) list, and statewide TMDL priorities, in early 2002.

Lahontan Regional Board staff solicited information and data from the public for use in update of the Section 303(d) list, and reviewed other existing and readily available information and data. A staff report, including recommendations for additions to and deletions from the current (1998) Section 303(d) list, and recommended TMDL priorities for all Lahontan Region waters on the 2002 list, was made available for public review. The staff report provides a general overview of the assessment process and the factors considered in staff's recommendations for listing and delisting. It also includes a "watch list" of water bodies needing additional monitoring and assessment to determine whether listing is warranted. Background information for recommendations concerning specific water body-pollutant combinations was summarized in fact sheets. The staff report and fact sheets were posted on the Regional Board's Internet webpage. Copies of written public comments received by the mailing date for the agenda packet are enclosed with this item.

At the January meeting, staff will provide an overview of the recommendations and of the underlying listing/delisting considerations. This item has not been noticed as a public hearing;

however, members of the public may wish to speak to the Board regarding staff's recommendations. Staff will respond to written comments and public testimony at the meeting.

RECOMMENDATION: Approval of Resolution R6S-2002-PROPOSED, transmitting Lahontan Regional Board recommendations to the State Water Resources Control Board.

Enclosures:
1. Notice of Availability
2. Staff Report
3. Water Body Fact Sheets
4. Public Comment Letters
5. Draft Resolution

Enclosure 1
Notice of Availability

California Regional Water Quality Control Board
Lahontan Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov/rwqcb6
2501 Lake Tahoe Boulevard, South Lake Tahoe, California 96150
Phone (530) 542-5400 • FAX (530) 544-2271

Gray Davis
Governor

November 27, 2001

To Interested Parties:

NOTICE OF AVAILABILITY OF AND REQUEST FOR COMMENTS ON DRAFT RECOMMENDATIONS FOR CHANGES IN LAHONTAN REGION'S SECTION 303(D) LIST

The California Regional Water Quality Control Board, Lahontan Region (Regional Board) is soliciting comments from the public on recommended changes to California's list of impaired surface water bodies. States are required to maintain and update such lists under Section 303(d) of the federal Clean Water Act. ("Impaired" means that listed waters do not meet applicable water quality standards.) A summary list of recommendations is enclosed. Proposed changes are included in the November 2001 *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.* Background information is provided in separate fact sheets for specific water bodies. The staff report and fact sheets will be available online at http://www.swrcb.ca.gov/rwqcb6 by late November 2001. Paper copies may be requested from the Regional Board's administrative staff at (530) 542-5404.

At its January 9-10, 2002 meeting in South Lake Tahoe, California, the Lahontan Regional Board will hold a public workshop to consider approving recommendations to the State Water Resources Control Board (State Board). The State Board will conduct a separate public participation process before adopting an updated statewide list of impaired surface water bodies for transmittal to the U.S. Environmental Protection Agency.

Between March and May 2001, the Regional Board solicited information and data from the public for use in the Section 303(d) list update. At this time, the Regional Board is only accepting public comments on proposed changes to the list, and is not collecting additional information or data. Written public comments must be received by the Regional Board no later than **December 28, 2001**. Comments should be submitted to Judith Unsicker at the address above or emailed to unsij@rb6s.swrcb.ca.gov. Technical questions about the staff report or fact sheets should be directed to Ms. Unsicker at (530) 542-5462.

Enclosure

Enclosure 2
Staff Report

Staff Report on

Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies

California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Boulevard
South Lake Tahoe CA 96150
http://www.swrcb.ca.gov/rwqcb6

November 2001

Contact Person:

Judith Unsicker
Staff Environmental Scientist
Telephone: (530) 542-5462
FAX (530) 542-5470
Email:unsij@rb6s.swrcb.ca.gov

Executive Summary

This staff report summarizes the background for Lahontan Regional Board staff's recommendations for changes in the Clean Water Act Section 303(d) list of impaired surface water bodies, and priorities and schedules for development of Total Maximum Daily Loads (TMDLs) for listed waters. In March 2001, staff solicited information and data from the public for use in the list update. Staff also reviewed other existing and readily available information such as discharger self- monitoring reports in the Regional Board's files, reports in the Regional Board's library, and the U.S. Geological Survey's online water quality databases. This report outlines the general criteria used to formulate recommendations. More information on recommendations for specific water bodies is provided in separate "fact sheets." Staff's recommendations would remove 29 water body/pollutant combinations from the list, add 45 new water body/pollutant combinations, and retain 69 water body/pollutant combinations from the 1998 list on the 2002 list. Clarification of the nature of impairment is recommended for some waters (e.g., separate listings for nitrogen and phosphorus rather than a single listing for nutrients). An additional 168 water body/pollutant combinations are recommended for inclusion in a separate "watch list" of waters needing further monitoring and/or assessment to determine whether listing is warranted in the future. The Lahontan Regional Board will consider action on recommendations to the State Water Resources Control Board at its January 2002 meeting.

Introduction

Section 303(d) of the federal Clean Water Act requires states to identify surface water bodies which are not attaining water quality standards and are not expected to do so even with the use of technology-based effluent limitations and other legally required pollution controls such as Best Management Practices. Waters may be listed for more than one pollutant. For each listed water body/pollutant combination, states must develop a strategy, called a Total Maximum Daily Load, or TMDL, to ensure attainment of standards. Section 303(d) lists and priority rankings of water body/pollutant combinations must be updated every two years.

The California Regional Water Quality Control Board, Lahontan Region (Regional Board) is the state agency responsible for setting and enforcing water quality standards for waters in about 20 percent of the state in the portion east of the Sierra Nevada crest and in the northern Mojave Desert. Regional Boards have been asked to provide recommendations to the California State Water Resources Control Board (State Board) for use in the 2002 update of the statewide Section 303(d) list. This staff report summarizes Lahontan Regional Board staff's rationale for recommended additions to and deletions from the Section 303(d) list, and for prioritization of listed waters for development of TMDLs. The report will be circulated for public review. Changes in recommendations may be made in response to written public comments and/or testimony before the Board, and the Lahontan Regional Board will be asked to approve final recommendations for transmittal to the State Board at its January 2002 meeting. The State Board will conduct its own public participation process and will consider approval of a revised statewide Section 303(d) list for submission to the U.S. Environmental Protection Agency in early 2002.

The Section 303(d) List

Section 303(d) requires states to identify those waters within its boundaries for which effluent limitations and controls on thermal discharges are not stringent enough to implement any standard applicable to such waters, to establish priority rankings, and to establish total maximum daily loads for waters impaired by pollutants or thermal discharges. Section 303(d) applies only to surface waters of the United States, including lakes, streams, springs, and wetlands. Surface waters include intermittent and ephemeral waters.

Although Section 303(d) emphasizes point source discharges, the requirement to do TMDLs also applies to water bodies impaired by nonpoint sources or by a combination of point and nonpoint sources. The Lahontan Region has only a few direct point source discharges to surface water (including point source stormwater discharges). The *Water Quality Control Plan for the Lahontan Region* (Basin Plan) prohibits discharges to surface waters throughout the North Lahontan Basin (from the Walker River watershed north to the Oregon border) and in high elevation portions of the South Lahontan Basin (from the Mono Lake watershed south). Most water quality problems in the Lahontan Region come from nonpoint sources (for example, erosion from watershed disturbance by logging, grazing, or construction activities).

The requirement to do TMDLs applies only to waters impaired by "pollutants." Pollutants are defined in the Clean Water Act to include: "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water." TMDLs involve calculations of existing or allowable loads of discrete substances or of heat.

The Clean Water Act also defines "pollution" as "the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water." "Pollution" does not always involve "pollutants"; for example, aquatic life and wildlife uses of water may be adversely affected by water diversions or reservoir management practices. When a water body is impaired by "pollution" but not by "pollutants," and loading calculations are not feasible, the problem is best handled by control measures other than TMDLs.

Update of the Section 303(d) list is not a regulatory or policy action, but an administrative procedure to prioritize water bodies for action. The adoption of Basin Plan amendments to incorporate a TMDL is a regulatory action.

Public Participation

2001-2002 Public Participation Process

Lahontan Regional Board staff updated and expanded the regionwide mailing list for the 1998 Section 303(d) list update and in March 2001 mailed a letter soliciting information and data for use in the current list update. The solicitation process was also publicized in newspapers and via the Internet. The deadline for submittal of information and data was May 15, 2001. Responses received by that date are summarized below. Technical staff at both Lahontan Regional Board offices were asked to notify water

quality assessment staff of water quality problems and the existence of information and data about these problems. Assessment staff reviewed publications and data sets available in the Regional Board's South Lake Tahoe office (including discharger monitoring files containing ambient surface water data). Staff also reviewed other existing and readily available sources of information including the most recent 303(d) list and California Section 305(b) report, the State Water Resources Control Board's Toxic Substances Monitoring Program database, fish consumption advisories and criteria documents produced by the California Office of Health Hazard Assessment, and online water quality databases maintained by the U.S. Geological Survey and the Nevada Division of Environmental Protection.

The scope of the Lahontan Region's assessment process was limited by several factors. Staff resources and time available for the update were limited. Monitoring data for surface waters in the Lahontan Region are limited due to past and present resource constraints on baseline/trend monitoring and the fact that the Lahontan Region has few discharges to surface water and thus few sets of discharger monitoring data. Biomonitoring (including citizen monitoring) is under way in a number of Lahontan Region watersheds, but reference conditions are not yet well defined. Most of the toxic "priority pollutants" covered by the California Toxics Rule and National Toxics Rule are not routinely monitored in Lahontan Region waters.

Factors to be considered in formulation of recommendations for listing and delisting (see below) were developed through consideration of past criteria and discussions with staff of the State and other Regional Boards, and with Lahontan Regional Board management. This staff report, tables summarizing staff recommendations, and fact sheets providing additional information were prepared for public review. The availability of these documents will be noticed to the Regional Board's Section 303(d) mailing list. After consideration of public comments, the Lahontan Regional Board will take action on a resolution to transmit final recommendations regarding the list update to the State Board. Following Board action, Regional Board staff will complete and submit the administrative record to the State Board. Information about the water bodies recommended for listing or delisting will be entered into the Geospatial Waterbody System (GeoWBS) computer database.

Information and Data Received in Response to March 2001 Solicitation

Full copies of information and data submitted in response to the public solicitation will be included in the administrative record for the Regional Board's list update process. The following is a summary of comments received in response to the solicitation; not all of these comments included information or data concerning waters of the Lahontan Region. Letters or emails were received from the following:

- **The Bishop Paiute Tribe** provided water chemistry data for Bishop Creek. Review of these data did not indicate the need for new listings.

- **The California Department of Pesticide Regulation (DPR)** sent a letter recommending that Regional Board staff review several DPR webpages containing pesticide data. None of these webpages included information or data for waters within the Lahontan Region.

- **The League to Save Lake Tahoe** sent a letter identifying sources of data and requesting that Lake Tahoe be listed for violations of several additional standards and that additional tributaries of Lake Tahoe be listed. Review of the references mentioned in the League's letter led to several recommendations for new listings for tributaries of Lake Tahoe. See the fact sheet for Lake

Tahoe for clarification of the lake's listing status, and fact sheets for proposed new listings for Ward Creek, Blackwood Creek, General Creek, the Upper Truckee River, Trout Creek, Heavenly Valley Creek, Hidden Valley Creek, Big Meadow Creek, and Tallac Creek.

- **The U.S. Geological Survey (USGS)** provided electronic files of data collected in the Lahontan Region since 1997, primarily for the Walker River watershed. Regional Board staff used these data to recommend new listings for a number of water body-pollutant combinations.

- **The USDA Forest Service, Angeles National Forest** sent a letter requesting a meeting with Regional Board staff to discuss the Forest's ongoing monitoring program. No response was received to a Regional Board staff request that monitoring data be submitted for review to determine the need for a meeting.

- **The Southern California Alliance of Publicly Owned Treatment Works (SCAP)** sent a letter outlining its concerns about evaluation of data and listing/delisting criteria. This letter did not include data or information about specific Lahontan Region water bodies for use in listing/delisting recommendations. Regional Board staff's approach to evaluation and listing/delisting considerations is summarized below.

- **Cathy Ricioli of Kingsbury Middle School** in Zephyr Cove, Nevada submitted student biomonitoring data on Burke Creek, a tributary to Lake Tahoe on its Nevada side. These data will be retained for comparison with future biomonitoring data for California-side streams.

- **Pat Eckert**, former Mammoth Community Water District Board member, sent an email referencing Board agenda material which showed that MTBE had been detected in 1999 and 2000 in samples from Lake Mary, which provides domestic water supply to the Town of Mammoth Lakes. The MTBE was apparently connected with summer motorboat activity. Lake Mary is recommended for addition to the "Watch List" (Table 2), and the problem is being investigated through other Regional Board programs.

- **Carol Sims**, of Environmentally Concerned, Williams, Arizona, sent a short handwritten comment on a returned mailing list update form asking whether the Regional Board had considered pesticide impacts. A written response outlining the Regional Board's pesticide standards and control programs was sent; a copy will be included in the administrative record.

Listing/Delisting Considerations

Regional Boards began intensive participation in the State's Section 303(d) listing process during the mid-1980s. Guidance from the State Board to Regional Boards on listing/delisting criteria has varied with each list update cycle since that time. There is currently no formal statewide listing/delisting guidance, although the State Board plans to develop and adopt formal guidance before the next (2004) listing cycle. The following general listing and delisting considerations reflect past and current direction from the USEPA and discussions among State and Regional Board staff. Lahontan Regional Board staff also developed more specific listing and delisting considerations.

General Considerations

Listing Considerations

Water bodies and associated pollutants should be recommended for addition to the 303(d) list if any one of the following factors applies:

1. Effluent limitations or other pollution control requirements (e.g., Best Management Practices) are not stringent enough to ensure protection of beneficial uses and attainment of water quality objectives, including those implementing State Board Resolution 68-16, the USEPA promulgated standards in the California Toxics Rule and National Toxics Rule, and the Statement of Policy with Respect to Maintaining High Quality of Waters in California (see also 40 CFR 130.7 (b)(1), and standards are not expected to be attained by the time of the next list update cycle (i.e., by 2004). This does not apply to non-attainment related solely to discharges in violation of existing waste discharge requirements or NPDES permits.

2. A fishing, drinking water or swimming advisory issued by local or state public health or environmental health authorities is currently in effect. This does not apply to advisories related to discharges in violation of existing waste discharge requirements or NPDES permits.

3. Beneficial uses are impaired or are expected to be impaired before the next listing cycle (i.e., by 2004). Impairment is based on evaluation of chemical, physical, or biological integrity. Impairment will be determined by "qualitative assessment," physical/chemical monitoring, bioassay tests, and/or other biological monitoring. Applicable federal criteria and the Regional Board's Basin Plan water quality objectives determine the basis for impairment status. A qualitative assessment is an assessment based on factors other than ambient monitoring data (for example, predictive modeling, professional judgement, or public comments).

4. The water body is on the previous 303(d) list and either: (a) monitoring continues to demonstrate violation of objectives or (b) monitoring has not been performed and (c) none of the delisting considerations discussed below apply.

5. Data indicate tissue concentrations in consumable body parts of fish or shellfish exceed applicable tissue criteria or guidelines. Criteria and guidelines related to protection of human and wildlife consumption include, but are not limited to, U.S. Food and Drug Administration Action Levels, National Academy of Sciences Guidelines, U.S. Environmental Protection Agency tissue criteria, and California Office of Environmental Health Hazard Assessment "Maximum Tissue Residue Levels (MTRLs)." (See the discussion of MTRLs in relation to the Toxic Substances Monitoring Program below.)

6. The water quality is of such concern that the Regional Board determines that the water body needs to be afforded a level of protection offered by a 303(d) listing.

Delisting Considerations

Water bodies may be removed for the list for specific pollutants if any one of these factors is met:

1. The Basin Plan is revised to change water quality objectives (for example, through the adoption of site specific objectives in place of regionwide objectives), and the violation of standards is thereby eliminated.

2. The Basin Plan is revised to remove a designated beneficial use in accordance with the circumstances set forth in federal water quality standards regulations and USEPA guidance, and the non-support issue is thereby eliminated. (USEPA regulations prohibit the removal of designated uses under certain circumstances.)

3. Faulty data led to the initial listing. Faulty data include, but are not limited to, typographical errors, improper quality assurance/quality control (QA/QC) procedures, or limitations in the analytical methods that would lead to an inaccurate conclusion regarding the status of the water body.

4. It has been documented that objectives are being met and beneficial uses are not impaired based upon an evaluation of available monitoring data, and foreseeable changes in hydrology, land use, or product (e.g., pesticide) use are not expected to result in violations of standards.

5. A TMDL has been approved by the USEPA for that specific water body and pollutant (see 40CFR 130.7 (b)(4).

6. There are control measures in place which will result in attainment of standards, including protection of beneficial uses, by the next listing cycle (in 2004). Control measures include permits, cleanup and abatement orders, and Basin Plan requirements which are enforceable and include a time schedule (see 40 CFR 130.7 (b) (1) iii).

Lahontan Regional Board Staff Considerations

Natural Impairment. Because of its geological history, the Lahontan Region has a number of water bodies with concentrations of salts and/or toxic trace elements such as arsenic which exceed drinking water standards or criteria for protection of freshwater aquatic life and wildlife. These waters include inland saline (desert playa) lakes and geothermal springs. Past state and federal guidance led to listing of a number of Lahontan Region waters which are "impaired" only by natural sources. A scientific literature review on saline and geothermal waters shows that these waters are unique ecosystems with their own degree of physical, chemical, and biological integrity, and support aquatic life and wildlife adapted to extreme environmental conditions (California Regional Water Quality Control Board, 2000). These waters should not be judged to be "impaired" on the basis of freshwater aquatic life criteria. USEPA (1997) guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

Other natural phenomena which may lead to violations of water quality standards include catastrophic floods, prolonged droughts, mudslides, and avalanches. All have occurred in the Lahontan Region since the 1980s. At least one water body, Horseshoe Lake near Mammoth, is not "swimmable" due to an air quality problem. Access to recreational facilities near this lake has been restricted because volcanic carbon dioxide is being released through the soil and collects in topographic depressions, including the lake basin, in concentrations which may be lethal.

The Lahontan Basin Plan (page 3-2. "Prohibited Discharges") recognizes that not all factors affecting water quality may be controllable. It states:

"After application of reasonable control measures, ambient water quality shall conform to the narrative and numerical water quality objectives included in this Basin Plan. When other factors result in degradation of water quality beyond the limits established by these water quality objectives, controllable human activities shall not cause further degradation of water quality in either surface or ground waters."

The Clean Water Act's definitions of "pollutants" and "pollution" both specifically reference human causes. These definitions provide justification for not listing waters if violations of standards can be attributed entirely to natural sources. Table 1 includes recommendations for delisting a number of naturally impaired waters. No Lahontan Region waters impaired only by natural sources are recommended for addition to the Section 303(d) list.

Antidegradation. State and federal antidegradation regulations require that specific findings regarding socioeconomic considerations be made to allow lowering of water quality in waters which have better water quality than the level set by water quality standards. Under federal regulations, no long term degradation of designated Outstanding National Resource Waters (such as Lake Tahoe and Mono Lake) is allowed. The Lahontan Basin Plan contains a narrative water quality objective for antidegradation, which references state and federal requirements. USEPA guidance directs that antidegradation be considered in listing decisions. For surface waters of the Lahontan Region where discharges are prohibited, it could be argued that the presence of any non-natural chemicals constitutes degradation in violation of the objective (assuming that findings to allow degradation have not been made) and that such waters should be listed. Examples include boat fuel chemicals monitored in Lake Tahoe and Donner Lake, and the presence of PCBs, probably from atmospheric deposition, in some "pristine" waters of the Lake Tahoe Basin. Staff's recommendation is that waters should not be listed for violations of the nondegradation objective unless a pollutant is present in a concentration which violates another water quality objective or adversely affects a beneficial use, and unless sample numbers are large enough to provide some confidence that they are representative.

Needs for Changes in Water Quality Standards. Some of the water quality objectives in the Lahontan Basin Plan were established in 1975 based on very limited monitoring data or on older published water quality criteria. These objectives may not reflect the natural background conditions of the affected water bodies, or current scientific criteria for protection of beneficial uses. Concerns have also arisen with the consequences of expressing some objectives as running averages or "means of monthly means." High historical values may lead to violation of such objectives even if recent water quality is greatly improved. Listing and tentative schedules for TMDL development are recommended for certain water bodies with violations of standards which may need revision. However, the Regional Board may pursue changes in standards, rather than TMDLs, for these waters.

Toxic Substances Monitoring Program (TSMP) Results. Since 1978, about 10 to 15 Lahontan Region waters have been sampled each year for toxic metals and/or organic compounds in the State Board's TSMP. The TSMP involves collection and analysis of fish tissue samples. Results can be compared to historic TSMP results statewide, and to human fish consumption criteria. During past Section 303(d) list update cycles, Regional Boards were directed to list waters where TSMP data for edible tissue exceeded consumption criteria. However, TSMP samples involve a relatively small number of fish and are not statistically representative of the entire fish population. Also, in waters where game fish are stocked, the TSMP results may reflect hatchery conditions rather than ambient water quality. During the 2001-2002 list update, Lahontan Region waters will not be recommended for listing based on TSMP results alone without additional, statistically representative tissue data, ambient water and sediment data, and/or a fish advisory issued by state or local authorities. Additional monitoring will be recommended for waters where TSMP results indicate a possible fish consumption problem.

Intermittent and Ephemeral Waters. Intermittent or ephemeral streams are common in desert portions of the Lahontan Region. Streams which flow underground in defined channels are considered surface waters for purposes of water rights in California, and in the past, Regional Board staff used this interpretation in listing. The Mojave River was listed for priority organics in the 1980s due to subsurface pollutants from the "Barstow Slug" of chlorinated hydrocarbons. Staff's current approach is to recommend that intermittent streams be assessed for listing only on the basis of data collected from water flowing on the surface.

Evaluation Approach

A "weight of evidence" approach was used to develop recommendations for new listings. The weight of evidence approach involves weighing available information as to its ability to demonstrate a credible line of reasoning leading to a conclusion about the condition of the water. Three possible conclusions exist: (1) the water body is not meeting standards; (2) the water body is meeting standards, or (3) based on the available data and information, standards attainment cannot be determined. Regional Board staff's "weight of evidence approach" involved initial screening of available data for data quality, quantity, and frequency of sampling during the current assessment cycle (1997-2001). Compliance with water quality objectives was evaluated, and preliminary recommendations were discussed with Regional Board supervisors and management. Listing based on only one or a few samples, or on qualitative assessment, was not ruled out. However, after review of available data, staff decided to emphasize listing recommendations for clear violations of numeric standards.

Data Quantity and Quality. Some states establish minimum requirements for the quality and quantity of data used in listing decisions. It has not been feasible to develop data quantity/quality thresholds for the Lahontan Region given the limited time and resources available. Staff evaluated available data and information on a case by case basis, and made recommendations using a weight of evidence approach. The assessment process emphasized data collected since 1997 (the year when the previous list update process began, although older data were evaluated in cases where standards are based on running averages or where the status of point and nonpoint source discharges is not known to have changed significantly. To evaluate compliance with objectives based on annual means, staff looked for data sets with sample frequency more than quarterly, and preferably with several years of data.

Most of the data available to Lahontan Regional Board staff were ambient water chemistry data. The Regional Board is sponsoring biomonitoring for eventual development of "biocriteria" objectives, and a limited amount of citizen monitoring data is available. However, reference conditions have not yet been completely defined, and biomonitoring data were not used to recommend any new listings. Sample numbers were small for tissue and sediment data collected since 1997, and Regional Board staff did not recommend any listings on the basis of these data. (To staff's knowledge, there are no active fish consumption advisories in the Lahontan Region.) No toxicity bioassay data collected since 1997 were available. Listing was recommended only on the basis of data collected and analyzed by agencies, groups, and laboratories known to use appropriate Quality Control/Quality Assurance (QA/QC) procedures. Data with no documented QA/QC procedures, and qualitative "information" were used in some recommendations for the "watch list."

Standards and criteria. Water quality standards in California include beneficial use designations (for example, Municipal and Domestic Supply, Cold Freshwater Habitat, Water Contact Recreation) and narrative or numerical "water quality objectives" established to protect beneficial uses. The term "water quality objectives" is equivalent to the federal term "water quality criteria." Most of the water quality standards for the Lahontan Region are contained in the Lahontan Basin Plan. Chapter 3 of the Basin Plan includes direction on determining compliance with water quality objectives. Most numerical objectives are expressed as annual means and 90th percentile levels.

California water quality standards also include the criteria for toxic "priority pollutants" promulgated by the USEPA under the California Toxics Rule and National Toxics Rule, and the statewide "Nondegradation Policy" (State Board Resolution 68-16). Criteria issued by other agencies, which are not part of the formal water quality standards, can also be used to assess impairment. These include fish consumption criteria and advisories and "public health goals". Lahontan Regional Board staff's recommended additions to the Section 303(d) list are based primarily on violations of numerical water quality objectives. Sampling of surface waters for the toxic pollutants addressed in the California Toxics Rule and National Toxics Rule in surface waters of the Lahontan Region has been done too infrequently to allow conclusions about impairment and the need for listing in relation to these criteria. Some data were evaluated in terms of other criteria such as Office of Health Hazard Assessment fish consumption criteria and public health goals, but no hierarchical ranking was assigned to different types of criteria. One water body (Searles Lake) is recommended for listing on the basis of a documented beneficial use impairment (for the Wildlife Habitat use), but in general, data regarding aquatic life and wildlife uses in the Lahontan Region are insufficient to permit conclusions about attainment of uses or of narrative objectives related to habitat uses. See the discussions of "Lahontan Regional Board Staff Considerations" above for additional information on the use of standards and criteria in the Lahontan Region's Section 303(d) assessment.

Watch List. While a number of water body/pollutant combinations clearly qualify for listing, many waters fall into the category where: "based on the available data and information, standards attainment cannot be determined." Table 2 is a list of these water body/pollutant combinations. The purpose of the list is to highlight the need for additional monitoring and assessment for these waters to determine the need for TMDLs or for action under some other Regional Board program. A "watch list" is not required under Section 303(d) of the Clean Water Act. However, states are directed to identify "threatened" waters under the Section 305(b) water quality assessment program. The "watch list" in Table 2 includes waters from California's 1998 Section 305(b) report to the USEPA that were then identified as "threatened" or "partially meeting beneficial uses" due to pollutants, but were not on the Section 303(d)

list. Staff will recommend that water body-pollutant combinations added to Table 2 but not identified as "threatened" in the 1998 Section 305(b) report be classified as "threatened" in the 2002 Section 305(b) assessment.

Clarification of Existing Listings

Together with the recommended additions to and deletions from the Section 303(d) list, clarification is proposed for the listing status of a number of other water bodies in the 1998 list. Some of these changes are shown in Table 1; others will be entered into the computer database used for reporting to the State Board and the USEPA. Clarification includes changes in descriptions of pollutants; for example, an earlier single listing for a water body impaired by "nutrients" may be replaced by separate listings for "nitrogen," "phosphorus," and/or "iron." In other cases, the impaired portion of a water body has been identified more specifically, and there may be separate listings for upstream and downstream segments.

Priority Ranking

A priority ranking is required for listed waters to guide TMDL planning pursuant to 40 CFR 130.7. Lahontan Region waters are recommended to be ranked into high, medium, and low priority categories for development of TMDLs based on the following considerations:

1. Water body significance (e.g., importance and extent of beneficial uses, concerns related to threatened/endangered species, and size of the water body)

2. Degree of impairment or threat (such as number of pollutants, and number of beneficial uses impaired)

3. Conformity with related activities in the watershed (such as existence of watershed assessment, planning, pollution control and remediation, or restoration efforts in the area)

4. Potential for protection or recovery of beneficial uses

5. Degree of public concern and involvement

6. Availability of funding and information to address the water quality problem

7. Overall need for an adequate pace of TMDL development for all listed waters

8. Higher priorities given to other water bodies and pollutants.

It should be noted that the criteria can be applied in different ways to different water bodies and pollutants. For example, a water body may be severely impaired, but if there is little likelihood of beneficial use recovery, then a lower TMDL priority might be given.

The proposed TMDL priorities differ in some cases from those assigned to the same waters in the 1998 Section 303(d) list. For the most part, high priorities have been given to waters on the 1998 Section 303(d) list for which TMDL development is already under way. High priorities may also be given to

tributaries of these waters recommended for listing in 2002. Low priorities have been recommended for some water body-pollutant combinations expected to be delisted in 2004 under proposed changes to federal regulations. (For example, the new regulations are expected to clarify that TMDLs are not required for waters impaired by flow alterations.) Lower priorities may also be given to water bodies which need further assessment or regulatory action through some other Regional Board program, which lessens the need to begin TMDL development immediately. TMDL priority rankings and schedules may change during the next (2004) list update cycle.

TMDL Schedules

The USEPA has directed that TMDLs should be developed and completed for all water bodies on the 1998 Section 303(d)list by 2011 (unless there is justification for delisting.) The State Board has requested that Regional Board recommendations for the 2002 Section 303(d) list update include schedules for TMDL development for all listed waters. Recommended end dates for TMDL development for Lahontan Region waters are included in Table 1. For budgeting and reporting purposes, completion of TMDLs in California means formal Regional Board consideration of the adoption of Basin Plan amendments to incorporate TMDLs and TMDL implementation programs. Federal regulations do not currently require TMDL implementation programs, but they are required under California law. The Basin Plan amendment process is lengthy and complex, involving scientific peer review, compliance with the California Environmental Quality Act, and approvals of the amendments by several other agencies following Regional Board action.

Schedules beyond the first two years should be regarded as tentative and dependent on the availability of resources. State and federal budget processes do not allow accurate projection of resources beyond two years. Other factors affecting TMDL schedules include stakeholder group priorities, Regional Board priorities for Basin Plan amendments unrelated to TMDLs, and the availability of a Regional Board quorum for a vote. In cases where a water body was listed on the basis of limited data, the need for additional monitoring to provide data on which to base TMDL calculations will delay completion of the TMDL.

Not all waters ranked as "high" priorities for TMDLs can be scheduled for "immediate" TMDL development. Many of the surface waters of the Lahontan Region meet USEPA criteria for designation as "Outstanding National Resource Waters," based on considerations such as location in wilderness areas, presence of threatened/endangered species, or other recreational and ecological values. The scarcity of water in much of the region gives it high value. Thus, most 303(d) listed waters in the Lahontan Region could be given high priority based on resource value alone. Resource constraints will not permit all waters with high resource values or severe problems to be addressed at the same time. Some of the waters ranked "high" have been scheduled for later TMDL development.

Because of the large backlog of waters on the 1998 Section 303(d) list requiring TMDL development by 2011, all Lahontan Region waters recommended for addition to the list in 2002 are projected for completion of TMDLs after 2015. If additional resources become available, it may be possible to complete some of these TMDLs sooner. Schedules for the waters on the 2002 Section 303(d) list will be further revised in 2004 and subsequent list update cycles.

Staff Recommendations

Table 1 lists the water bodies or (or segments of water bodies) in the Lahontan Region recommended for addition to or removal from the Section 303(d) list. Table 1 also includes waters on the 1998 Section 303(d) list which are not recommended for change. Priority rankings and end dates for TMDL development are given for waters recommended for the 2002 Section 303(d) list. Tables 1A, 1B, and 1C are subsets of Table 1 with water bodies grouped by categories of recommendations (addition to, deletion from, or retention on the list).

Table 2 is a "watch list" of waters with some indication of problems but insufficient data to warrant listing at this time. Waters on the "watch list" should receive additional monitoring and assessment when resources are available.

The following is a summary of Lahontan Regional Board staff's recommendations:

Number of water body/pollutant combinations recommended for addition to Section 303(d) list in 2002	45
Number of water body/pollutant combinations recommended for deletion from Section 303(d) list in 2002	29
Number of water body/pollutant combinations on 1998 Section 303(d) list recommended for retention on 2002 list	69
Total number of water body/pollutant combinations recommended for 2002 list	114

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Table 1. Recommendations for Update of the Section 303(d) List for the Lahontan Region

Waterbody Name	Proposed Action	Pollutant(s)/Stressor(s)	TMDL Priority Ranking[1]	TMDL End Date[2]	Comments
Surprise Valley HU 641.00[3]					
Upper Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Middle Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Lower Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Mill Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2011	Needs study to verify need for TMDL
Susanville HU 637.00					
Eagle Lake	Retain on 303(d) List[4]	Nitrogen	High	2008	
Eagle Lake	Retain on 303(d) List[4]	Phosphorus	High	2008	
Pine Creek	Retain on 303(d) List	Sedimentation/Siltation [actual problem: Fish Habitat Alterations]	High	2011[5]	TMDL probably not needed[5]
Lassen Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Susan River	Retain on 303(d) List	Unknown Toxicity	High	2007	Listed for toxic bioassay results
Top Spring	Remove from 303(d) List	Radiation	NA	NA	Impairment is natural; no "pollutants"
Amedee Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Wendel Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Honey Lake	Retain on 303(d) List	Arsenic	Medium	2005	Natural sources plus geothermal discharges
Honey Lake	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2005	Natural sources plus geothermal discharges
Honey Lake Area Wetlands	Retain on 303(d) List	Metals	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Flow Alterations	Low	2007[5]	TMDL probably not needed[5]
Honey Lake Wildfowl Mgmt Ponds	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Metals	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Trace Elements	Medium	2007	Natural sources plus geothermal discharges
Skedaddle Creek	Retain on 303(d) List	High Coliform Count	Low	2006	Further study may lead to delisting
Little Truckee River HU 636.00					
Stampede Reservoir	Remove from 303(d) List	Pesticides [Lindane][6]	NA	NA	TSMP- insufficient data for listing[8]
Truckee River HU 635.00					
Donner Lake	Remove from 303(d) List	Priority Organics [PCBs, Chlordane][6]	NA	NA	TSMP- insufficient data for listing[8]
Truckee River	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Bear Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Bronco Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Gray Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Squaw Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2003	TMDL development in progress
Cinder Cone Springs	Retain on 303(d) List	Nutrients	Medium	2007	Further study may lead to delisting
Cinder Cone Springs	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007	Further study may lead to delisting
Lake Tahoe HU 634.00					
Snow Creek	Remove from 303(d) List	Habitat Alterations	NA	NA	Restoration program implemented
Lake Tahoe	Retain on 303(d) List[4]	Phosphorus	High	2007	TMDL development in progress
Lake Tahoe	Retain on 303(d) List[4]	Nitrogen	High	2007	TMDL development in progress
Lake Tahoe	Retain on 303(d) List	Sedimentation/Siltation	High	2007	TMDL development in progress
Upper Truckee River	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Upper Truckee River	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL

Table 1. Lahontan Region 303(d) List Update, continued					
Waterbody Name	**Proposed Action**	**Pollutant(s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
Lake Tahoe HU 634.00 continued					
Upper Truckee River above Christmas Valley	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Big Meadow Creek	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Heavenly Valley Creek above USFS property line	Retain on 303(d) List	Sediment	High	2001	TMDL completed 2001, awaiting final approvals
Heavenly Valley Creek below USFS property line	Add to 303(d) List	Sediment	Medium	After 2015	Restoration progam may eliminate need for TMDL
Heavenly Valley Creek	Add to 303(d) list	Chloride	Low	After 2015	Standard needs revision
Heavenly Valley Creek above USFS property line	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Hidden Valley Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Hidden Valley Creek	Add to 303(d) List	Chloride	Low	After 2015	Standard needs revision
Trout Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Trout Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Trout Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Trout Creek below Hwy 50 in S. Lake Tahoe	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Tallac Creek below Hwy 89	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Ward Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
General Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
General Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Blackwood Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007	TMDL development in progress
Blackwood Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Blackwood Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Blackwood Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
West Fork Carson River HU 633.00					
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Phosphorus	High	After 2015	
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Percent Sodium	Medium	After 2015	Standard needs revision
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Nitrogen	High	After 2015	
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Percent Sodium	Medium	After 2015	Standard needs revision
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Nitrogen	High	After 2015	
West Fork Carson R., Woodfords to State Line	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
East Fork Carson River HU 632.00					
East Fork Carson River	Remove from 303(d) List	Nutrients	NA	NA	Incorrect assumption led to listing
Indian Creek Reservoir	Retain on 303(d) List	Nutrients	High	2002[7]	
Indian Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Indian Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Monitor Creek	Retain on 303(d) List[4]	Iron	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Retain on 303(d) List[4]	Silver	High	2011	TMDL to be coordinated with CERCLA remediation

Table 1. Lahontan Region 303(d) List Update, continued					
Waterbody Name	**Proposed Action**	**Pollutant(s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
East Fork Carson River HU 632.00, continued					
Monitor Creek	Retain on 303(d) List[4]	Aluminum	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Retain on 303(d) List[4]	Manganese	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Add to 303(d) List	Sulfate	High	After 2015	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Add to 303(d) List	Total Dissolved Solids	High	After 2015	TMDL to be coordinated with CERCLA remediation
Wolf Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2011	
Aspen Creek	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
Bryant Creek	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
Leviathan Creek, at and below Leviathan Mine	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
West Walker River HU 631.00					
Topaz Lake	Retain on 303(d) list	Sedimentation/Siltation	High	2007	
West Walker River	Retain on 303(d) List	Sedimentation/Siltation	High	2009	
Fales Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Hot Creek	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
East Walker River HU 630.00					
Bridgeport Reservoir	Retain on 303(d) List[4]	Nitrogen	High	2005	TMDL development in progress
Bridgeport Reservoir	Retain on 303(d) List[4]	Phosphorus	High	2005	TMDL development in progress
Bridgeport Reservoir	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
East Walker River above Bridgeport Reservoir	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
East Walker River below Bridgeport Reservoir	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
East Walker River below Bridgeport Reservoir	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
East Walker River below Bridgeport Reservoir	Remove from 303(d) List	Metals	NA	NA	TSMP- insufficient data for listing[8]
East Walker River below Bridgeport Reservoir	Retain on 303(d) List	Sedimentation/Siltation	High	2009	
Robinson Creek, Hwy 395 to Bridgeport Res.	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Robinson Creek, Twin Lakes to Bridgeport Res.	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Swauger Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Swauger Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Buckeye Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Buckeye Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Virginia Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Green Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Rough Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Aurora Canyon Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Hot Springs Canyon Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005	Needs study to verify need for TMDL
Clark Canyon Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Clearwater Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005	Needs study to verify need for TMDL
Bodie Creek	Retain on 303(d) List	Metals	High	2004	Impairment probably related to past mining activity

Table 1. Lahontan Region 303(d) List Update, continued					
Waterbody Name	**Proposed Action**	**Pollutant (s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
Mono HU 601.00					
Lee Vining Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Mill Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Grant Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Mono Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Owens HU 603.00					
Haiwee Reservoir	Retain on 303(d) List	Copper	Low	2003	TMDL development in progress
Mammoth Creek	Retain on 303(d) List	Metals	High	2008	Needs study to verify need for TMDL
Hot Creek	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Little Hot Creek	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Twin Lakes (Mammoth)	Retain on 303(d) List[4]	Nitrogen	Low	2008	Needs study to verify need for TMDL
Twin Lakes (Mammoth)	Retain on 303(d) List[4]	Phosphorus	Low	2008	Needs study to verify need for TMDL
Little Alkali Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Big Springs	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Owens River	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Owens River (Long HA)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Owens River (Upper)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Owens River (Lower)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Crowley Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Crowley Lake	Retain on 303(d) List[4]	Nitrogen	High	2005	Nutrient loading currently under study
Crowley Lake	Retain on 303(d) List[4]	Phosphorus	High	2005	Nutrient loading currently under study
Keough Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Tinemaha Reservoir	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Tinemaha Reservoir	Retain on 303(d) List	Metals [Copper]	Low	2004	Copper from algicide application
Pleasant Valley Reservoir	Retain on 303(d) List	Nitrogen	High	2006	
Pleasant Valley Reservoir	Retain on 303(d) List[4]	Phosphorus	High	2006	
Tuttle Creek	Retain on 303(d) List[4]	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Goodale Creek	Retain on 303(d) List	Sedimentation/Siltation	Low	2009	Further study may lead to delisting
Owens Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Cottonwood Creek below LADWP diversion	Retain on 303(d) List	Water/Flow Variability	Low	2011[5]	TMDL probably not needed[5]
Deep Springs HU 605.00					
Deep Springs Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Deep Springs Lake	Remove from 303(d) List	Trace Elements	NA	NA	Impairment is natural; no "pollutants"

Table 1. Lahontan Region 303(d) List Update, continued					
Waterbody Name	**Proposed Action**	**Pollutant (s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
Amargosa HU 609.00					
Amargosa River	Remove from 303(d) List	Salinity/TDS/chlorides	NA	NA	Impairment is natural; no "pollutants"
Trona HU 621.00					
Searles Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Searles Lake	Add to 303(d) List	Petroleum Hydrocarbons	Low	After 2015	Documented bird kills from industrial pollutants
Mojave HU 628.00					
Mojave River near Barstow	Remove from 303(d) List	Priority Organics	NA	NA	Ground water, not surface water impairment
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Total Dissolved Solids	High	After 2015	Exceeds drinking water standard
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Chloride	High	After 2015	Exceeds water quality objectives
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Sulfate	High	After 2015	Exceeds water quality objectives
Horseshoe Lake	Retain on 303(d) List	Sedimentation/Siltation	Low	2007	Further study may lead to delisting
Green Valley Lake Creek	Retain on 303(d) List	Priority Organics	Low	2006	Further study may lead to delisting

[1]TMDL priority rankings and end dates are shown only for water bodies recommended for inclusion in the 2002 list. The entry "NA" means "not applicable."

[2] TMDL end dates are the estimated years for Regional Board adoption of Basin Plan amendments. Plan amendments incorporating TMDLs will not take effect unless and until they receive further approvals from the California State Water Resources Control Board, the California Office of Administrative Law, and the U.S. Environmental Protection Agency.

[3] Water bodies are grouped by watersheds in north-to-south order. Watershed (Hydrologic Unit or HU) numbers are Department of Water Resources numbers used in the maps in the Lahontan Basin Plan, and do not run in north-to-south order.

[4] The entry "Retain on 303(d) List" in the "Proposed Action" column means that this water body/pollutant combination is on the 1998 Section 303(d) list and is proposed to remain on the 2002 list. In some cases the nature of the pollutants or the extent of the impaired segment has been clarified. For example, earlier listings for "nutrients" or "organic enrichment/Low D.O." may now be changed to separate listings for individual pollutants (nitrogen and phosphorus), and an earlier single entry for habitat alterations in the Owens River has been changed to three separate entries to reflect different segments of the river. Changes are recommended in priority rankings and TMDL end dates for many of the water body/pollutant combinations from the 1998 list.

[5] Pending revisions to federal regulations for the implementation of Section 303(d) of the Clean Water Act would clarify that TMDLs are not required for waters impaired by flow alterations, water/flow variability and habitat alterations, unless specific "pollutants" are also involved. (Load calculations are not feasible in cases where there are no pollutants.) Under the proposed new regulations, waters impaired by habitat or flow alterations, or by flow variability, would be placed on a separate list of impaired waters to highlight the need for control strategies other than TMDLs.

[6]Clarification of the nature of the pollutants has been added in brackets for some water bodies recommended for removal from the Section 303(d) list. See the fact sheets for these water bodies for further information.

[7]Regional Board staff completed draft Basin Plan amendments incorporating a phosphorus TMDL for Indian Creek Reservoir in November 2000. The Regional Board has been unable to act on these amendments due to lack of a quorum for a vote.

[8]Some waters were listed based on Toxic Substances Monitoring Program (TSMP) fish tissue data. Because sample numbers were small, TSMP data alone are not considered sufficient grounds for listing.

Table 1A. Proposed Additions to the Section 303(d) List for the Lahontan Region

Waterbody Name	Proposed Action	Pollutant(s) /Stressor(s)	TMDL Priority Ranking[1]	TMDL End Date[2]	Comments
Lake Tahoe HU 634.00					
Upper Truckee River	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Upper Truckee River	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Upper Truckee River above Christmas Valley	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Big Meadow Creek	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Heavenly Valley Creek below USFS property line	Add to 303(d) List	Sediment	Medium	After 2015	Restoration progam may eliminate need for TMDL
Heavenly Valley Creek	Add to 303(d) list	Chloride	Low	After 2015	Standard needs revision
Heavenly Valley Creek above USFS property line	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Hidden Valley Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Hidden Valley Creek	Add to 303(d) List	Chloride	Low	After 2015	Standard needs revision
Trout Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Trout Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Trout Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Trout Creek below Hwy 50 in S. Lake Tahoe	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Tallac Creek below Hwy 89	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Ward Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
General Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
General Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Blackwood Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Blackwood Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Blackwood Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
West Fork Carson River HU 633.00					
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Phosphorus	High	After 2015	
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Percent Sodium	Medium	After 2015	Standard needs revision
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Nitrogen	High	After 2015	
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Percent Sodium	Medium	After 2015	Standard needs revision
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Nitrogen	High	After 2015	
West Fork Carson R., Woodfords to State Line	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
East Fork Carson River HU 632.00					
Indian Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Monitor Creek	Add to 303(d) List	Sulfate	High	After 2015	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Add to 303(d) List	Total Dissolved Solids	High	After 2015	TMDL to be coordinated with CERCLA remediation
East Walker River HU 630.00					
East Walker River above Bridgeport Reservoir	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
East Walker River below Bridgeport Reservoir	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
East Walker River below Bridgeport Reservoir	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Robinson Creek, Hwy 395 to Bridgeport Res.	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Robinson Creek, Twin Lakes to Bridgeport Res.	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated

Table 1A. Proposed Additions to Lahontan Region 303(d) List , continued					
Waterbody Name	**Proposed Action**	**Pollutant (s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
East Walker River HU 630.00, continued					
Swauger Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Swauger Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Buckeye Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Buckeye Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Virginia Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Trona HU 621.00					
Searles Lake	Add to 303(d) List	Petroleum Hydrocarbons	Low	After 2015	Documented bird kills from industrial pollutants
Mojave HU 628.00					
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Total Dissolved Solids	High	After 2015	Exceeds drinking water standard
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Chloride	High	After 2015	Exceeds water quality objectives
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Sulfate	High	After 2015	Exceeds water quality objectives

Footnotes for Table 1A. (The following footnotes were developed for Table 1, the master table containing all recommendations. Some of the information is not relevant to this subtable.)

[1]TMDL priority rankings and end dates are shown only for water bodies recommended for inclusion in the 2002 list. The entry "NA" means "not applicable."

[2] TMDL end dates are the estimated years for Regional Board adoption of Basin Plan amendments. Plan amendments incorporating TMDLs will not take effect unless and until they receive further approvals from the California State Water Resources Control Board, the California Office of Administrative Law, and the U.S. Environmental Protection Agency.

[3] Water bodies are grouped by watersheds in north-to-south order. Watershed (Hydrologic Unit or HU) numbers are Department of Water Resources numbers used in the maps in the Lahontan Basin Plan, and do not run in north-to-south order.

[4] The entry "Retain on 303(d) List" in the "Proposed Action" column means that this water body/pollutant combination is on the 1998 Section 303(d) list and is proposed to remain on the 2002 list. In some cases the nature of the pollutants or the extent of the impaired segment has been clarified. For example, earlier listings for "nutrients" or "organic enrichment/Low D.O." may now be changed to separate listings for individual pollutants (nitrogen and phosphorus), and an earlier single entry for habitat alterations in the Owens River has been changed to three separate entries to reflect different segments of the river. Changes are recommended in priority rankings and TMDL end dates for many of the water body/pollutant combinations from the 1998 list.

[5] Pending revisions to federal regulations for the implementation of Section 303(d) of the Clean Water Act would clarify that TMDLs are not required for waters impaired by flow alterations, water/flow variability and habitat alterations, unless specific "pollutants" are also involved. (Load calculations are not feasible in cases where there are no pollutants.) Under the proposed new regulations, waters impaired by habitat or flow alterations, or by flow variability, would be placed on a separate list of impaired waters to highlight the need for control strategies other than TMDLs.

[6]Clarification of the nature of the pollutants has been added in brackets for some water bodies recommended for removal from the Section 303(d) list. See the fact sheets for these water bodies for further information.

[7]Regional Board staff completed draft Basin Plan amendments incorporating a phosphorus TMDL for Indian Creek Reservoir in November 2000. The Regional Board has been unable to act on these amendments due to lack of a quorum for a vote.

[8]Some waters were listed based on Toxic Substances Monitoring Program (TSMP) fish tissue data. Because sample numbers were small, TSMP data alone are not considered sufficient grounds for listing.

Table 1B. Recommended Deletions from the Section 303(d) List for the Lahontan Region

Waterbody Name	Proposed Action	Pollutant(s) /Stressor(s)	TMDL Priority Ranking[1]	TMDL End Date[2]	Comments
Surprise Valley HU 641.00[3]					
Upper Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Middle Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Lower Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Susanville HU 637.00					
Top Spring	Remove from 303(d) List	Radiation	NA	NA	Impairment is natural; no "pollutants"
Amedee Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Wendel Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Little Truckee River HU 636.00					
Stampede Reservoir	Remove from 303(d) List	Pesticides [Lindane][6]	NA	NA	TSMP- insufficient data for listing[8]
Truckee River HU 635.00					
Donner Lake	Remove from 303(d) List	Priority Organics [PCBs, Chlordane][6]	NA	NA	TSMP- insufficient data for listing[8]
Lake Tahoe HU 634.00					
Snow Creek	Remove from 303(d) List	Habitat Alterations	NA	NA	Restoration program implemented
East Fork Carson River HU 632.00					
East Fork Carson River	Remove from 303(d) List	Nutrients	NA	NA	Incorrect assumption led to listing
West Walker River HU 631.00					
Fales Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Hot Creek	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
East Walker River HU 630.00					
East Walker River below Bridgeport Reservoir	Remove from 303(d) List	Metals	NA	NA	TSMP- insufficient data for listing[8]
Mono HU 601.00					
Grant Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Mono Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Owens HU 603.00					
Hot Creek	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Little Hot Creek	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Little Alkali Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Big Springs	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Owens River	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Crowley Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Keough Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Tinemaha Reservoir	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Owens Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Deep Springs HU 605.00					
Deep Springs Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Deep Springs Lake	Remove from 303(d) List	Trace Elements	NA	NA	Impairment is natural; no "pollutants"
Amargosa HU 609.00					
Amargosa River	Remove from 303(d) List	Salinity/TDS/chlorides	NA	NA	Impairment is natural; no "pollutants"
Trona HU 621.00					
Searles Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Mojave HU 628.00					
Mojave River near Barstow	Remove from 303(d) List	Priority Organics	NA	NA	Ground water, not surface water impairment

Footnotes for Table 1B. (The following footnotes were developed for Table 1, the master table containing all recommendations. Some of the information is not relevant to this subtable.)

[1]TMDL priority rankings and end dates are shown only for water bodies recommended for inclusion in the 2002 list. The entry "NA" means "not applicable."

[2] TMDL end dates are the estimated years for Regional Board adoption of Basin Plan amendments. Plan amendments incorporating TMDLs will not take effect unless and until they receive further approvals from the California State Water Resources Control Board, the California Office of Administrative Law, and the U.S. Environmental Protection Agency.

[3] Water bodies are grouped by watersheds in north-to-south order. Watershed (Hydrologic Unit or HU) numbers are Department of Water Resources numbers used in the maps in the Lahontan Basin Plan, and do not run in north-to-south order.

[4] The entry "Retain on 303(d) List" in the "Proposed Action" column means that this water body/pollutant combination is on the 1998 Section 303(d) list and is proposed to remain on the 2002 list. In some cases the nature of the pollutants or the extent of the impaired segment has been clarified. For example, earlier listings for "nutrients" or "organic enrichment/Low D.O." may now be changed to separate listings for individual pollutants (nitrogen and phosphorus), and an earlier single entry for habitat alterations in the Owens River has been changed to three separate entries to reflect different segments of the river. Changes are recommended in priority rankings and TMDL end dates for many of the water body/pollutant combinations from the 1998 list.

[5] Pending revisions to federal regulations for the implementation of Section 303(d) of the Clean Water Act would clarify that TMDLs are not required for waters impaired by flow alterations, water/flow variability and habitat alterations, unless specific "pollutants" are also involved. (Load calculations are not feasible in cases where there are no pollutants.) Under the proposed new regulations, waters impaired by habitat or flow alterations, or by flow variability, would be placed on a separate list of impaired waters to highlight the need for control strategies other than TMDLs.

[6]Clarification of the nature of the pollutants has been added in brackets for some water bodies recommended for removal from the Section 303(d) list. See the fact sheets for these water bodies for further information.

[7]Regional Board staff completed draft Basin Plan amendments incorporating a phosphorus TMDL for Indian Creek Reservoir in November 2000. The Regional Board has been unable to act on these amendments due to lack of a quorum for a vote.

[8]Some waters were listed based on Toxic Substances Monitoring Program (TSMP) fish tissue data. Because sample numbers were small, TSMP data alone are not considered sufficient grounds for listing.

Table 1C. Water Bodies on 1998 303(d) List Recommended for Retention on 2002 List

Waterbody Name	Proposed Action	Pollutant(s) /Stressor(s)	TMDL Priority Ranking[1]	TMDL End Date [2]	Comments
Surprise Valley HU 641.00[3]					
Mill Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2011	Needs study to verify need for TMDL
Susanville HU 637.00					
Eagle Lake	Retain on 303(d) List[4]	Nitrogen	High	2008	
Eagle Lake	Retain on 303(d) List[4]	Phosphorus	High	2008	
Pine Creek	Retain on 303(d) List	Sedimentation/Siltation [actual problem: Fish Habitat Alterations]	High	2011[5]	TMDL probably not needed[5]
Lassen Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Susan River	Retain on 303(d) List	Unknown Toxicity	High	2007	Listed for toxic bioassay results
Honey Lake	Retain on 303(d) List	Arsenic	Medium	2005	Natural sources plus geothermal discharges
Honey Lake	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2005	Natural sources plus geothermal discharges
Honey Lake Area Wetlands	Retain on 303(d) List	Metals	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Flow Alterations	Low	2007[5]	TMDL probably not needed[5]
Honey Lake Wildfowl Mgmt Ponds	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Metals	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Trace Elements	Medium	2007	Natural sources plus geothermal discharges
Skedaddle Creek	Retain on 303(d) List	High Coliform Count	Low	2006	Further study may lead to delisting
Truckee River HU 635.00					
Truckee River	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Bear Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Bronco Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Gray Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Squaw Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2003	TMDL development in progress
Cinder Cone Springs	Retain on 303(d) List	Nutrients	Medium	2007	Further study may lead to delisting
Cinder Cone Springs	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007	Further study may lead to delisting
Lake Tahoe HU 634.00					
Lake Tahoe	Retain on 303(d) List[4]	Phosphorus	High	2007	TMDL development in progress
Lake Tahoe	Retain on 303(d) List[4]	Nitrogen	High	2007	TMDL development in progress
Lake Tahoe	Retain on 303(d) List	Sedimentation/Siltation	High	2007	TMDL development in progress
Heavenly Valley Creek above USFS property line	Retain on 303(d) List	Sediment	High	2001	TMDL completed 2001, awaiting final approvals
Ward Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007	To be coordinated with Lake Tahoe TMDL
Blackwood Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007	TMDL development in progress
East Fork Carson River HU 632.00					
Indian Creek Reservoir	Retain on 303(d) List	Nutrients	High	2002[7]	
Indian Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Monitor Creek	Retain on 303(d) List[4]	Iron	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Retain on 303(d) List[4]	Silver	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Retain on 303(d) List[4]	Aluminum	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Retain on 303(d) List[4]	Manganese	High	2011	TMDL to be coordinated with CERCLA remediation
Wolf Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2011	
Aspen Creek	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
Bryant Creek	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
Leviathan Creek, at and below Leviathan Mine	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation

Table 1(C). Waters Recommended for Retention, continued					
Waterbody Name	**Proposed Action**	**Pollutant (s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
West Walker River HU 631.00					
Topaz Lake	Retain on 303(d) list	Sedimentation/Siltation	High	2007	
West Walker River	Retain on 303(d) List	Sedimentation/Siltation	High	2009	
East Walker River HU 630.00					
Bridgeport Reservoir	Retain on 303(d) List[4]	Nitrogen	High	2005	TMDL development in progress
Bridgeport Reservoir	Retain on 303(d) List[4]	Phosphorus	High	2005	TMDL development in progress
Bridgeport Reservoir	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
East Walker River below Bridgeport Reservoir	Retain on 303(d) List	Sedimentation/Siltation	High	2009	
Green Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Rough Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Aurora Canyon Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Hot Springs Canyon Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005	Needs study to verify need for TMDL
Clark Canyon Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Clearwater Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005	Needs study to verify need for TMDL
Bodie Creek	Retain on 303(d) List	Metals	High	2004	Impairment probably related to past mining activity
Mono HU 601.00					
Lee Vining Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Mill Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Owens HU 603.00					
Haiwee Reservoir	Retain on 303(d) List	Copper	Low	2003	TMDL development in progress
Mammoth Creek	Retain on 303(d) List	Metals	High	2008	Needs study to verify need for TMDL
Twin Lakes (Mammoth)	Retain on 303(d) List[4]	Nitrogen	Low	2008	Needs study to verify need for TMDL
Twin Lakes (Mammoth)	Retain on 303(d) List[4]	Phosphorus	Low	2008	Needs study to verify need for TMDL
Owens River (Long HA)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Owens River (Upper)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Owens River (Lower)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Crowley Lake	Retain on 303(d) List[4]	Nitrogen	High	2005	Nutrient loading currently under study
Crowley Lake	Retain on 303(d) List[4]	Phosphorus	High	2005	Nutrient loading currently under study
Tinemaha Reservoir	Retain on 303(d) List	Metals [Copper]	Low	2004	Copper from algicide application
Pleasant Valley Reservoir	Retain on 303(d) List	Nitrogen	High	2006	
Pleasant Valley Reservoir	Retain on 303(d) List[4]	Phosphorus	High	2006	
Tuttle Creek	Retain on 303(d) List[4]	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Goodale Creek	Retain on 303(d) List	Sedimentation/Siltation	Low	2009	Further study may lead to delisting
Cottonwood Creek below LADWP diversion	Retain on 303(d) List	Water/Flow Variability	Low	2011[5]	TMDL probably not needed[5]
Mojave HU 628.00					
Horseshoe Lake	Retain on 303(d) List	Sedimentation/Siltation	Low	2007	Further study may lead to delisting
Green Valley Lake Creek	Retain on 303(d) List	Priority Organics	Low	2006	Further study may lead to delisting

Footnotes for Table 1C. (The following footnotes were developed for Table 1, the master table containing all recommendations. Some of the information is not relevant to this subtable.)

[1]TMDL priority rankings and end dates are shown only for water bodies recommended for inclusion in the 2002 list. The entry "NA" means "not applicable."

[2] TMDL end dates are the estimated years for Regional Board adoption of Basin Plan amendments. Plan amendments incorporating TMDLs will not take effect unless and until they receive further approvals from the California State Water Resources Control Board, the California Office of Administrative Law, and the U.S. Environmental Protection Agency.

[3] Water bodies are grouped by watersheds in north-to-south order. Watershed (Hydrologic Unit or HU) numbers are Department of Water Resources numbers used in the maps in the Lahontan Basin Plan, and do not run in north-to-south order.

[4] The entry "Retain on 303(d) List" in the "Proposed Action" column means that this water body/pollutant combination is on the 1998 Section 303(d) list and is proposed to remain on the 2002 list. In some cases the nature of the pollutants or the extent of the impaired segment has been clarified. For example, earlier listings for "nutrients" or "organic enrichment/Low D.O." may now be changed to separate listings for individual pollutants (nitrogen and phosphorus), and an earlier single entry for habitat alterations in the Owens River has been changed to three separate entries to reflect different segments of the river. Changes are recommended in priority rankings and TMDL end dates for many of the water body/pollutant combinations from the 1998 list.

[5] Pending revisions to federal regulations for the implementation of Section 303(d) of the Clean Water Act would clarify that TMDLs are not required for waters impaired by flow alterations, water/flow variability and habitat alterations, unless specific "pollutants" are also involved. (Load calculations are not feasible in cases where there are no pollutants.) Under the proposed new regulations, waters impaired by habitat or flow alterations, or by flow variability, would be placed on a separate list of impaired waters to highlight the need for control strategies other than TMDLs.

[6]Clarification of the nature of the pollutants has been added in brackets for some water bodies recommended for removal from the Section 303(d) list. See the fact sheets for these water bodies for further information.

[7]Regional Board staff completed draft Basin Plan amendments incorporating a phosphorus TMDL for Indian Creek Reservoir in November 2000. The Regional Board has been unable to act on these amendments due to lack of a quorum for a vote.

[8]Some waters were listed based on Toxic Substances Monitoring Program (TSMP) fish tissue data. Because sample numbers were small, TSMP data alone are not considered sufficient grounds for listing.

Table 2. "Watch list" of Lahontan Region waters and pollutants requiring additional monitoring to determine the need for listing and TMDL development. Waters are grouped by watershed in north-to-south watershed order.

Water Body Name	Watershed	Pollutant(s)
Raider Creek	Surprise Valley	Sediment
Emerson Creek	Surprise Valley	Sediment
Eagle Lake	Susan River	Mercury
Pine Creek	Susan River	Nitrogen
Pine Creek	Susan River	Phosphorus
Susan River u/s of Susanville	Susan River	Mercury
Susan River d/s of Paiute Creek	Susan River	Mercury
Susan River d/s of Paiute Creek	Susan River	PCBs
Lassen Creek	Susan River	Sediment
Long Valley Creek	Susan River	Sediment
Little Truckee River	Little Truckee River	Sediment
Stampede Reservoir	Little Truckee River	Lindane
Truckee River	Truckee River	Chloride
Truckee River	Truckee River	TDS
Squaw Creek Meadow Wetlands	Truckee River	Pesticides
Cold Stream	Truckee River	Sediment
Martis Creek	Truckee River	Nutrients
Summit Creek	Truckee River	Petroleum products
Donner Lake	Truckee River	Pathogens
Donner Lake	Truckee River	Boat Fuel Constituents
Donner Lake	Truckee River	PCBs
Donner Lake	Truckee River	Chlordane
Donner Creek	Truckee River	Sediment
Lake Tahoe	Lake Tahoe	Iron
Lake Tahoe	Lake Tahoe	Mercury in sediment
Lake Tahoe	Lake Tahoe	Lead in sediment
Lake Tahoe	Lake Tahoe	Boat fuel constituents
Lake Tahoe	Lake Tahoe	Pesticides (40 different compounds)
Tahoe Keys Sailing Lagoon	Lake Tahoe	PCBs
Tahoe Keys Sailing Lagoon	Lake Tahoe	Toxaphene
Upper Angora Lake	Lake Tahoe	Pesticides (16 different compounds)
Taylor Creek	Lake Tahoe	Pesticides (8 different compounds)
Lily Lake	Lake Tahoe	Nutrients
Upper Truckee River	Lake Tahoe	Pesticides (7 different compounds)
Upper Truckee River	Lake Tahoe	Nitrogen
General Creek	Lake Tahoe	Pesticides (5 different compounds)
Blackwood Creek	Lake Tahoe	Pesticides (4 different compounds)
Lower Echo Lake	Lake Tahoe	Nutrients
Upper Echo Lake	Lake Tahoe	Nitrogen
Fallen Leaf Lake	Lake Tahoe	Nutrients
Meiss Lake	Lake Tahoe	Nutrients
Griff Creek	Lake Tahoe	Sediment
McKinney Creek	Lake Tahoe	Sediment
Meeks Creek	Lake Tahoe	Sediment
Lonely Gulch Creek	Lake Tahoe	Sediment

Table 2. "Watch List," continued

Water Body Name	Watershed	Pollutant(s)
Madden Creek	Lake Tahoe	Sediment
Sawmill Pond	Lake Tahoe	Sediment
Grass Lake Wetlands	Lake Tahoe	Road salt
Watson Creek	Lake Tahoe	Sediment
Heavenly Valley Creek	Lake Tahoe	Nitrogen
West Fork Carson River	Carson River	Percent sodium
West Fork Carson River	Carson River	Sulfate
West Fork Carson River	Carson River	Boron
Red Lake Creek	Carson River	Sulfate, Acid Mine Drainage
Fredericksburg Canyon Creek	Carson River	Sediment
Scotts Lake	Carson River	Sediment
Indian Creek	Carson River	Phosphorus
Indian Creek	Carson River	Nitrogen
Heenan Reservoir	Carson River	Nutrients
Monitor Creek	Carson River	Nitrogen
Monitor Creek	Carson River	Phosphorus
Silver Creek	Carson River	Metals/Acid Mine Drainage
Markleeville Creek	Carson River	Nitrogen
Markleeville Creek	Carson River	Phosphorus
Markleeville Creek	Carson River	Total Dissolved Solids
Markleeville Creek	Carson River	Chloride
Desert Creek	Carson River	Sulfate, Acid Mine Drainage
Asa Lake	Carson River	Nutrients
West Walker River	Walker River	Total Dissolved Solids
West Walker River	Walker River	Nitrogen
Koenig Lake	Walker River	Nutrients
Mill Creek	Walker River	Nitrogen
Little Walker River	Walker River	Sediment
Little Walker River	Walker River	Total Dissolved Solids
Little Walker River	Walker River	Nitrogen
Swauger Creek	Walker River	Total Dissolved Solids
Green Creek	Walker River	Nitrogen
Swauger Creek	Walker River	Nitrogen
Buckeye Creek	Walker River	Total Dissolved Solids
Buckeye Creek	Walker River	Phosphorus
Robinson Creek	Walker River	Total Dissolved Solids
Robinson Creek	Walker River	Phosphorus
Robinson Cr. above Barney Lake	Walker River	Nitrogen
Robinson Cr,. Barney Lake to Twin Lakes	Walker River	Nitrogen
East Walker River above Bridgeport Reservoir	Walker River	Phosphorus
East Walker River below Bridgeport Reservoir	Walker River	Fuel oil (spill)
East Walker River below Bridgeport Reservoir	Walker River	Mercury, other metals
Aurora Canyon Creek	Walker River	Total Dissolved Solids

Table 2. "Watch List,", continued

Water Body Name	Watershed	Pollutant(s)
Aurora Canyon Creek	Walker River	Nitrogen
Aurora Canyon Creek	Walker River	Phosphorus
Aurora Canyon Creek	Walker River	Mercury
Upper Twin Lake	Walker River	Nutrients
Lower Twin Lake	Walker River	Nutrients
Summers Creek	Walker River	Nitrogen
Summers Creek	Walker River	Total Dissolved Solids
Virginia Creek	Walker River	Total Dissolved Solids
Virginia Creek	Walker River	Sediment
Virginia Creek	Walker River	Nitrogen
Virginia Creek	Walker River	Phosphorus
Eagle Creek	Walker River	Phosphorus
Eagle Creek	Walker River	Nitrogen
Barney Lake	Walker River	Nitrogen
Blue Lake	Walker River	Nitrogen
Bonnie Lake	Walker River	Nitrogen
Chain o Lakes	Walker River	Nitrogen
Cooney Lake	Walker River	Nitrogen
Crown Lake	Walker River	Nitrogen
East Lake	Walker River	Nitrogen
Fremont Lake	Walker River	Nitrogen
Frog Lake	Walker River	Nitrogen
Gilman Lake	Walker River	Nitrogen
Harriet Lake	Walker River	Nitrogen
Helen Lake	Walker River	Nitrogen
Hoover Lake	Walker River	Nitrogen
Long Lake (Upper)	Walker River	Nitrogen
Long Lake (Lower)	Walker River	Nitrogen
Peeler Lake	Walker River	Nitrogen
Robinson Lake (Upper)	Walker River	Nitrogen
Robinson Lake (Lower)	Walker River	Nitrogen
Roosevelt Lake	Walker River	Nitrogen
Ruth Lake	Walker River	Nitrogen
Snow Lake	Walker River	Nitrogen
Stella Lake	Walker River	Nitrogen
Summit Lake	Walker River	Nitrogen
Tower Lake	Walker River	Nitrogen
Trumbull Lake	Walker River	Nitrogen
Virginia Lake (Upper)	Walker River	Nitrogen
Green Lake	Walker River	Nitrogen
Green Creek above Green Lake	Walker River	Nitrogen
Horse Creek	Walker River	Nitrogen
Reversed Creek	Mono Basin	Sediment
Reversed Creek	Mono Basin	Nutrients
Lundy Lake	Mono Basin	Mine drainage
June Lake	Mono Basin	Nutrients
June Lake	Mono Basin	Mercury
Silver Lake	Mono Basin	Nutrients
Gull Lake	Mono Basin	Nutrients
Sherwin Creek	Owens River	Sediment, nutrients

Table 2. "Watch List", continued

Water Body Name	Watershed	Pollutant(s)
Lake George	Owens River	Metals
Lake Mary	Owens River	Boat fuel constituents including MTBE
Diaz Lake	Owens River	Nutrients
McGee Creek	Owens River	Mine drainage
Pine Creek	Owens River	Mine/tailings drainage
Pine Creek	Owens River	Sediment
Independence Creek	Owens River	Mercury
Los Angeles Aqueduct	Owens River	Copper
Ivanpah Dry Lake	Ivanpah HU	Radioactive elements (lanthanides)
Littlerock Reservoir	Antelope HU	Sediment
Littlerock Reservoir	Antelope HU	Iron
Littlerock Reservoir	Antelope HU	Manganese
Deep Creek	Mojave River	Total Dissolved Solids
Deep Creek	Mojave River	Sulfate
Deep Creek	Mojave River	Fluoride
Shake Creek	Mojave River	Total Dissolved Solids
Shake Creek	Mojave River	Nitrate
Shake Creek	Mojave River	Sulfate
Shake Creek	Mojave River	Boron
Shake Creek	Mojave River	Fluoride
Shake Creek	Mojave River	Landfill leachate constituents
West Fork Mojave River	Mojave River	Nitrogen
Mojave River at Dam Forks	Mojave River	Sulfate
Mojave River between Upper and Lower Narrows	Mojave River	PCE and TCE (organic solvents)
Mojave River @ Lower Narrows	Mojave River	Nutrients
Mojave River, Barstow to Waterman Fault	Mojave River	Nitrogen
Mojave River, Barstow to Waterman Fault	Mojave River	Total Dissolved Solids
Lake Arrowhead	Mojave River	Boat fuel constituents
Lake Arrowhead	Mojave River	Nutrients
Silverwood Lake	Mojave River	Salts, trace elements (from imported water)
Spring Valley Lake	Mojave River	Sediment

Enclosure 3

Water Body Fact Sheets

Water Body Fact Sheets for 2002
Section 303(d) List Update
Lahontan Region

SURPRISE VALLEY HYDROLOGIC UNIT

California Regional Water Quality Control Board, Lahontan Region
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UPPER ALKALI LAKE, SALINITY/TDS/CHLORIDES
2002 303(d) Fact Sheet
Delisting

Rationale for Delisting

Upper Alkali Lake is located in Surprise Valley in eastern Modoc County. It is proposed for delisting because it is a desert playa lake whose high salinity and high trace element levels are due to natural processes such as input from geothermal springs and concentration by evaporation over geologic time. Salts and trace elements coming entirely from natural sources are not "pollutants" as defined in the Clean Water Act. Table 1 summarizes available water quality data for Upper Alkali Lake.

Table 1. Water Quality of Upper Alkali Lake, from California Department of Water Resources (1960). Units are parts per million (ppm). "TDS" means "Total Dissolved Solids."

Sampling date	TDS (ppm)	pH	Sulfate (ppm)	Chloride (ppm)	Boron (ppm)	Fluoride (ppm)	Arsenic (ppm)
9-17-53	8340	9.3	467	3380	49	9.0	0.27
12-2-58	10100	9.3	561	4020	48	7.7	0.7
12-2-58	9900	9.3	555	3950	46	8.0	0.7
5-5-54	8850	9.3	535	3880	50	7.8	0.7
5-5-54	5840	9.1	333	2150	24	7.9	0.18
8-5-57	7570	8.8	446	3080	49	7.2	-

The "percent sodium" for all samples in Table 1 was 99 percent or greater.

Some of the values in Table 1 exceed drinking water Maximum Contaminant Levels (MCLs). However, the Alkali Lakes are not designated for the Municipal and Domestic Supply (MUN) beneficial use. Because of their poor quality and ephemeral nature, they are unlikely to be in demand for domestic supply in the future.

The California Department of Water Resources data in Table 1, above, are the most comprehensive set available. No biological data are available, but Upper Alkali Lake is assumed to support the saline aquatic habitat and wildlife habitat uses of other California playa lakes when water is present. (See the fact sheet for Middle Alkali Lake.) As indicated in Lahontan Regional Board staff's (2000) literature review on inland saline lakes and geothermal springs, such waters support aquatic life and wildlife adapted to their unique extreme environmental conditions, and these waters should not be considered "impaired" for biological uses because chemical concentrations exceed normal freshwater criteria. The U.S. Environmental Protection Agency's (USEPA's) 1997 guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

Watershed Characteristics

Upper Alkali Lake is one of three large ephemeral playa lakes in Surprise Valley, a closed drainage basin in eastern Modoc County. The Alkali Lakes are remnants of Pleistocene Lake Surprise. The areas and volumes of the Alkali Lakes vary from year to year with precipitation and runoff, and the concentrations of salts vary accordingly. They receive freshwater inputs from streams draining the east slope of the Warner Mountains, and there are a number of ephemeral tributaries originating near the California-Nevada border. The Alkali Lakes also receive input from geothermal springs, which themselves have high concentrations of sulfate, boron, fluoride, and sodium, and arsenic.

Information Sources

California Department of Water Resources, 1960. *Water Quality Investigation, Surprise Valley.*

California Department of Water Resources, 1963. *Northeastern Counties Ground Water Investigation*, Volume I, Bulletin No. 98.

California Department of Water Resources, 1970. Arsenic in Wells in Northeastern California. Memorandum from Bruce Wormald dated December 11, 1970.

California Regional Water Quality Control Board, Central Valley Region, 2000. *A Compilation of Water Quality Goals.*

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2000. *Use Attainability Analysis for Nine "Naturally Impaired" Waters of the Lahontan Region*, April 2000.

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Water Bodies.*

U. S. Environmental Protection Agency, 1997. Establishing Site Specific Aquatic Life Criteria Equal to Natural Background. Memorandum dated November 5, 1997 from Tudor T. Davies, Director, Office of Science and Technology, USEPA Office of Water.

MIDDLE ALKALI LAKE, SALINITY/TDS/CHLORIDES
2002 303(d) Fact Sheet
Delisting

Rationale for Delisting

Middle Alkali Lake is located in Surprise Valley in eastern Modoc County. It is proposed for delisting because it is a desert playa lake whose high salinity and high trace element levels are due to natural sources such as input from geothermal springs and concentration by evaporation in an internally drained basin over geologic time. Salts and trace elements coming entirely from natural sources are not "pollutants" as defined in the Clean Water Act. Table 1 summarizes available chemical water quality data for Middle Alkali Lake.

Table 1. Water Quality of Middle Alkali Lake, from California Department of Water Resources (1960). Units are parts per million (ppm). "TDS" means "Total Dissolved Solids."

Sampling Date	TDS (ppm)	pH	Sulfate (ppm)	Chloride (ppm)	Boron (ppm)	Fluoride (ppm)	Arsenic (ppm)
12-2-58	17500	9.4	1560	6810	94	14	1.8
7-17-56	3310	8.9	302	1180	20	5.9	0.4
9-17-53	6150	9.2	510	2380	31	9.0	0.21
8-7-57	11100	8.8	808	4480	64	11	-
5-5-54	8160	9.1	576	3330	38	6.0	0.39

The percent sodium value for all samples in Table 1 was 99% or greater.

Some of the values in Table 1 exceed drinking water maximum contaminant levels (MCLs). However, the Alkali Lakes are not designated for the Municipal and Domestic Supply (MUN) beneficial use and, because of their poor quality and ephemeral nature, are unlikely to be in demand for domestic supply in the future.

Patterson and Jacobson (1984) studied Middle Alkali Lake, which, as a result of a wet El Nino year, had a mean depth of 1 meter and was used by hundreds of birds of about 70 species for foraging, loafing, or breeding. Fairy shrimp, tadpole shrimp, copepods, daphnia, and brine flies were present.. The specific conductivity of the lake ranged from 10170 in December 1982 to 356 in May 1983. The lake was estimated to hold a minimum of 30,000 acre feet of water in 1982; however, the authors noted that it still dries up almost every year.

As indicated in Lahontan Regional Board staff's literature review on inland saline lakes and geothermal springs, such waters support aquatic life and wildlife adapted to their unique extreme environmental conditions, and these waters should not be considered "impaired" for biological uses because chemical concentrations exceed normal freshwater criteria. The USEPA's (1997) guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

Watershed Characteristics

Middle Alkali Lake is one of three large ephemeral playa lakes in Surprise Valley, a closed drainage basin, in eastern Modoc County. The Alkali Lakes are remnants of Pleistocene Lake Surprise. The areas and volumes of the Alkali Lakes vary from year to year with precipitation and runoff, and the concentrations of salts vary accordingly. They receive freshwater inputs from streams draining the east slope of the Warner Mountains, and there are a number of ephemeral tributaries originating near the California-Nevada border. The Alkali Lakes also receive input from geothermal springs, which themselves have high concentrations of sulfate, boron, fluoride, and sodium, and arsenic.

Information Sources

California Department of Water Resources, 1960. *Water Quality Investigation, Surprise Valley*

California Department of Water Resources, 1963. *Northeastern Counties Ground Water Investigation, Volume I*, Bulletin No. 98.

California Department of Water Resources, 1970. Arsenic in Wells in Northeastern California. Memorandum from Bruce Wormald dated December 11, 1970.

California Regional Water Quality Control Board, Central Valley Region, 2000. *A Compilation of Water Quality Goals.*

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2000. *Use Attainability Analysis for Nine "Naturally Impaired" Waters of the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Water Bodies.*

Patterson, D.W. and S.L. Jacobson, 1984. *1983 Surprise Valley Ground Water Recharge Field Study Report.* U.S. Soil Conservation Service, Red Bluff, CA.

U. S. Environmental Protection Agency, 1997. Establishing Site Specific Aquatic Life Criteria Equal to Natural Background. Memorandum dated November 5, 1997 from Tudor T. Davies, Director, Office of Science and Technology, USEPA Office of Water.

LOWER ALKALI LAKE, SALINITY/TDS/ CHLORIDES
2002 303(d) Fact Sheet
Delisting

Rationale for Delisting

Lower Alkali Lake is located in Surprise Valley in eastern Modoc County. It is proposed for delisting because desert playa lake whose high salinity and high trace element levels are due to natural sources such as input from geothermal springs and concentration by evaporation in an internally drained basin over geologic time. Salts and trace elements coming entirely from natural sources are not "pollutants" as defined in the Clean Water Act. Table 1 summarizes available chemical water quality data for Lower Alkali Lake.

Table 1. Water Quality of Lower Alkali Lake, from California Department of Water Resources (1960). Units are parts per million (ppm). "TDS" means "Total Dissolved Solids."

Sampling Date	TDS (ppm)	Ph	Sulfate (ppm)	Chloride (ppm)	Boron (ppm)	Fluoride (ppm)	Arsenic
12-2-58	13400	9.5	1230	4840	57	27	1.1
12-2-58	12300	9.5	1070	4540	52	25	0.8
8-7-57	11300	8.9	4260	4260	56	25	-

Some of the values in Table 1 exceed drinking water Maximum Contaminant Levels. However, the Alkali Lakes are not designated for the Municipal and Domestic Supply (MUN) beneficial use, and because of their poor quality and ephemeral nature, are not likely to be in demand for domestic supply in the future.

The California Department of Water Resources data in Table 1, above, are the most comprehensive set available. No biological data are available, but Lower Alkali Lake is assumed to support the saline aquatic habitat and wildlife habitat uses of other California playa lakes when water is present. (See the fact sheet for Middle Alkali Lake.)

The U.S. Environmental Protection Agency's (USEPA's) 1997 guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

Watershed Characteristics

Lower Alkali Lake is one of three large ephemeral playa lakes in Surprise Valley, a closed drainage basin, in eastern Modoc County. The Alkali Lakes are remnants of Pleistocene Lake Surprise. The areas and volumes of the Alkali Lakes vary from year to year with precipitation and runoff, and the concentrations of salts vary accordingly. They receive freshwater inputs from

streams draining the east slope of the Warner Mountains, and there are a number of ephemeral tributaries originating near the California-Nevada border. The Alkali Lakes also receive input from geothermal springs, which themselves have high concentrations of sulfate, boron, fluoride, and sodium, and arsenic.

Information Sources

California Department of Water Resources, 1960. *Water Quality Investigation, Surprise Valley.*

California Department of Water Resources, 1963. *Northeastern Counties Ground Water Investigation, Volume I,* Bulletin No. 98.

California Department of Water Resources, 1970. Arsenic in Wells in Northeastern California. Memorandum from Bruce Wormald dated December 11, 1970.

California Regional Water Quality Control Board, Central Valley Region, 2000. *A Compilation of Water Quality Goals.*

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2000. *Use Attainability Analysis for Nine "Naturally Impaired" Waters of the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Water Bodies.*

U. S. Environmental Protection Agency, 1997. Establishing Site Specific Aquatic Life Criteria Equal to Natural Background. Memorandum dated November 5, 1997 from Tudor T. Davies, Director, Office of Science and Technology, USEPA Office of Water.

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SUSANVILLE HYDROLOGIC UNIT

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Note: This packet contains water body-specific fact sheets for three waters of the Susanville Hydrologic Unit. Two additional water bodies, Amedee Hot Springs and Wendel Hot Springs, are also proposed for delisting. See the entries for these water bodies in the summary fact sheet for "Nine Naturally Impaired Waters."

TOP SPRING, RADIATION
2002 303(d) Fact Sheet
Delisting

Rationale for Delisting

Top Spring, located in Lassen County west of Honey Lake, is proposed for delisting because the source of radioactivity is entirely natural. Because no human sources or discharges are involved, the radioactive elements in question are not "pollutants" under the definition in the Clean Water Act. See the Lahontan Regional Board staff report for a discussion of natural impairment in relation to Section 303(d) listing.

Table 1. Examples of Radiation Data for Top Spring.

Sampling or Reporting Date	Parameter	Radioactivity (pCi/L)*
2-25-86	Gross alpha activity	11.3
4-1-86	Gross alpha activity	25.3
4-1-86	Uranium	13.5
4-1-86	Total Radium	1.3
4-5-86	Gross alpha activity	27
4-5-86	Radium 226	<1
4-5-86	Radium 228	<1
4-5-86	Uranium	26
7-22-86 "upper spring"	Gross alpha activity	10.0
11-3-86	Gross alpha activity	31.1

*pCi/L = picocuries per liter.

Table 1 summarizes radioactivity data from several sampling dates (see Koehne, 1998). In addition, a sample from the Laufman Ranger Station sink taken on March 4, 1986, which was a composite sample of almost all drinking water sources, had a gross alpha activity of 39.96 pCi/L.

In 1987, the Plumas National Forest geologist reviewed the available information and concluded that the "top spring" had radioactivity levels from two to 40 and more times higher than all of the other water sources then being sampled. By 1987, gross alpha activity in the top spring had decreased to 4.84 pCi/L, and this parameter had been decreasing since the earlier tests..

In the 1980s, Top Spring was in violation of the water quality objective for radioactivity, the State drinking water Maximum Contaminant Level (MCL). No recent data are available. Current MCLs and other water quality goals, summarized in California Regional Water Quality Control Board, Central Valley Region, 2000, are as follows:

Radioactivity, Gross Alpha: State and federal primary MCLs= 15 pCi/L; federal MCL goal= 0 pCi/L

Uranium: State primary MCL= 20 pCi/L; federal MCL= 20 micrograms per liter (ug/L) or 30 pCi/L; U.S. Environmental Protection Agency (USEPA) IRIS Reference Dose as a Drinking Water Level = 20 ug/L.

The California Office of Environmental Health Hazard Assessment (OEHHA) has recently established a Public Health Goal for naturally occurring uranium in drinking water, based on its radioactivity. This Public Health Goal is 0.5 parts per billion (ppb) or 0.43 pCi/L.

Watershed Characteristics

"Top Spring" (not an official geographic name) is a natural spring located near the U.S. Forest Service Laufman Ranger Station in the Diamond Mountains west of Honey Lake in Lassen County (latitude 40.143°N, longitude 120.353°W). The name comes from the fact that it was the uppermost of several springs sampled during the 1980s. It was fully developed and used as domestic water supply for the ranger station (including 4-5 residences, 20-30 day workers, and possibly two campgrounds) until the radioactivity was discovered. An alternate domestic supply has since been developed, but the spring is still contained within a pipe.

Information Sources

California Office of Environmental Health Hazard Assessment, 2001. *Public Health Goals for Chemicals in Drinking Water: Uranium, 2001.*

California Regional Water Quality Control Board, Central Valley Region, 2000. *A Compilation of Water Quality Goals, 2000.*

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, 1998. Letter from Ranjit S. Gill to Ralf Koehne, U.S. Forest Service, Plumas National Forest. Request for Water Quality Information on "Top Spring" for Use in Development of Total Maximum Daily Loads.

California Regional Water Quality Control Board, Lahontan Region, 2000. Email from Peter J. Fischer to Judith Unsicker, "top springs," February 22, 2000.

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes in Lahontan Regions Section 303(d) List of Impaired Surface Water Bodies.*

Hinrich, R.L., 1986. Summaries of telephone calls regarding samples at Laufman Ranger Station. (California Dept. of Health Services, Office of Drinking Water, Redding).

Koehne, R., 1998. Memo to Ranjit S. Gill and Peter Fischer, Top Springs Water Reports. U.S.D.A. Forest Service, Plumas National Forest, March 31, 1998.

EAGLE LAKE, ORGANIC ENRICHMENT/LOW D.O
2002 303(d) Fact Sheet
Clarification of Existing Listing

Summary of Proposed Action

The current single listing for Eagle Lake, which describes beneficial use problems, is recommended to be changed to separate listings for nitrogen and phosphorus to reflect the actual pollutants involved.

Description of Problem

The descriptor "Organic Enrichment/Low D.O. [Dissolved Oxygen]" is from a limited picklist of problem types associated with an earlier computer database. It does not actually describe pollutants requiring TMDLs. Eagle Lake is currently Section 303(d) listed as the result of a fish kill which occurred in the late 1980s, presumably as a result of oxygen depletion due to high phytoplankton productivity and consequent high biochemical oxygen demand. No fish kills have occurred since that time, and the 1980s kill may have been related to higher temperatures and low lake levels during a prolonged drought. However, there is other evidence of the occurrence of eutrophication, including algae blooms. These problems can best be addressed through TMDLs for nutrients (phosphorus and nitrogen). The current numerical water quality objectives for nutrients in Eagle Lake were set at levels observed in the early 1980s, and may not be protective of beneficial issues. As a prelude to TMDL development, Regional Board staff should review current and historic monitoring data in relation to the scientific literature on eutrophication, and recommended state and federal nutrient criteria for Eagle Lake's "ecoregion". Revisions in water quality objectives for nitrogen and phosphorus may be appropriate. Depending on which nutrient proves to be limiting, only one TMDL may be necessary.

Watershed Characteristics

Eagle Lake in Lassen County, with an area of 25,000 acres, is the second largest natural freshwater lake entirely within California. It is located in a closed basin and is a remnant of prehistoric Lake Lahontan. Soils in the watershed are of volcanic origin. The lake has three almost-separate basins with different depths, degrees of stratification, and phytoplankton productivity. Its largest tributary is Pine Creek. Eagle Lake supports an endemic subspecies of rainbow trout adapted to its high alkalinity, and large breeding bird colonies. The lake is a Department of Fish and Game "Significant Natural Area" due to the presence of the Eagle Lake trout, Eagle Lake tui chub, double crested cormorant, and California Gull. Sandhill cranes are also found in the watershed.. Recreation is an important use: the Eagle Lake trout fishery is valued at $1 million/year. Much of the watershed is in public ownership; there are several small residential subdivisions. Since the 1980s, the Lahontan Regional Board has prohibited septic system discharges in portions of the watershed and has worked toward controls on livestock grazing in order to reduce nutrient loading to the lake.

TMDL Priority

Eagle Lake has a high priority for development of TMDLs, and the estimated end date for TMDL completion (through Regional Board adoption of Basin Plan amendments) is currently 2008.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1994. Water Body Fact Sheet for "Eagle Lake (2)."

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

NINE NATURALLY IMPAIRED WATERS, SALINITY, METALS, AND ARSENIC
2002 303(d) Fact Sheet
Delisting

Rationale for Delisting

The nine water bodies listed in Tables 1 and 2 are saline or geothermal surface waters which were listed in the late 1980s or early 1990s for salinity and/or toxic trace metals. Although constituents exceed drinking water standards, all of these water bodies were given potential Municipal and Domestic Supply (MUN) beneficial use designations as a result of Basin Plan amendments which applied the MUN use to almost all waters in the Lahontan Region. The Regional Board amended its Basin Plan in 2000 to remove the MUN use, and the conflict with drinking water standards, for the waters in Table 1. These amendments have been approved by the State Board and are pending final approvals from other agencies. Regional Board staff conducted a scientific literature review and prepared a detailed Use Attainability Analysis which shows that:

- These waters meet the "Sources of Drinking Water Policy" (State Water Resources Control Board Resolution 88-63) criteria for exclusion from the MUN use due to their poor quality, and are unlikely to be in demand as drinking water due to the relatively small amounts of water available;

- The salts and trace elements affecting these water bodies come from natural sources (volcanic, geothermal, and/or evaporative concentration in closed basins over geologic time);

- Saline and geothermal waters support unique biological communities adapted to their extreme environmental conditions, and should not be considered "impaired" in relation to freshwater aquatic life criteria. The U.S. Environmental Protection Agency's (USEPA's) 1997 guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

These waters, and other "naturally impaired" waters in the Lahontan Region, are recommended for removal from the Section 303(d) list because the salts and trace elements in question are not "pollutants" under the definition in the Clean Water Act. See the Regional Board staff report on the Section 303(d) List update for further discussion of naturally impaired waters in relation to listing.

Because of the extensive documentation already provided in the Use Attainability Analysis, separate fact sheets have not been prepared for these waters.

Table 1. Naturally Impaired Waters Addressed in Lahontan Region's 2000 Basin Plan Amendments

Water Body Name	County	HU No.	Reason for Listing
Wendel Hot Springs	Lassen	637.20	Metals
Amedee Hot Springs	Lassen	637.20	Metals
Hot Creek	Mono	631.40	Metals
Fales Hot Springs	Mono	631.40	Metals
Little Hot Creek	Mono	603.10	Arsenic
Little Alkali Lake	Mono	603.10	Arsenic
Deep Springs Lake	Inyo	605.00	Salinity/TDS/Chlorides
Keough Hot Springs	Inyo	603.00	Metals
Amargosa River	Inyo/San Bernardino	609.00	Salinity/TDS/Chlorides

Table 2. Summary of Compliance With Drinking Water Criteria for Nine "Naturally Impaired" Waters (from Use Attainability Analysis report).

Water Body Name	Sources of Drinking Water Policy TDS Threshold (3000 mg/L) Exceeded?	Parameters for Which Other Standards or Criteria are Exceeded	Water Quantity Considerations
Wendel Hot Springs	No	TDS, specific conductance, arsenic, sulfate, fluoride, sodium	Flow in natural springs reduced due to nearby geothermal development.
Amedee Hot Springs	No	TDS, sulfate, fluoride, boron, sodium	Flow in natural springs reduced due to nearby geothermal development.
Fales Hot Springs	No	TDS, specific conductance, sulfate, fluoride, arsenic, copper, molybdenum, lead, aluminum	
Hot Creek	No	Specific conductance, fluoride, boron	
Little Hot Creek	No	Arsenic, beryllium, specific conductance, boron, lead, fluoride, antimony.	Annual flow ca. 1000 afa; evaporation increases salinity
Little Alkali Lake	Yes	TDS, Arsenic	Ephemeral
Keough Hot Springs	No	TDS	Flow 600 gallons per minute
Deep Springs Lake	Yes	TDS, specific conductance, pH	Ephemeral
Amargosa River	Yes (in Death Valley)	TDS, specific conductance, arsenic, sulfate, sodium, chloride, fluoride, boron.	Intermittent, variable annual flows

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2000. *Use Attainability Analysis for Nine "Naturally Impaired" Waters of the Lahontan Region*, April 2000.

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

California State Water Resources Control Board, 1988. Resolution 88-63, Sources of Drinking Water Policy.

U.S. Environmental Protection Agency, 1997. Establishing Site Specific Aquatic Life Criteria Equal to Natural Background. Memorandum dated November 5, 1997 from Tudor T. Davies, Director, Office of Science and Technology, USEPA Office of Water.

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TRUCKEE RIVER AND LITTLE TRUCKEE RIVER HYDROLOGIC UNITS

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DONNER LAKE, PRIORITY ORGANICS
2002 Section 303(d) Fact Sheet
Delisting

Rationale for Delisting

Donner Lake, in the Truckee River watershed, is proposed for removal from the Section 303(d) list because listing was based on limited data which do not, in Regional Board staff's opinion, constitute conclusive evidence of impairment.

Under the California State Water Resources Control Board's Toxic Substances Monitoring Program (TSMP) fish tissue samples have been collected since 1978 and analyzed since for toxic trace metals and organic compounds. As the *TSMP Data Base Description* explains:

> *"The TSMP is a sentinel program; it provides the State Water Board, other agencies, and the public, with an early warning of higher than expected concentrations of pollutants at specific sites. TSMP findings often lead to more intensive local follow-up studies for identifying sources of pollutants, and to cleanup and abatement orders and enforcement actions by the Regional Water Boards."*

TSMP results for edible (fish filet) tissue can be compared to human fish consumption criteria for various toxic substances. In the past, the State Water Resources Control Board directed that surface waters be listed if tissue concentrations exceeded the "Maximum Tissue Residue Level" (MTRL) criteria calculated by the California Office of Environmental Health Hazard Assessment (OEHHA). However, because sample numbers in the TSMP are small and are not designed to be statistically representative of the fish population in a give water body, there appears to be insufficient evidence to justify listing on the basis of TSMP results alone. Lahontan Regional Board staff recommend that no new waters be listed solely because of TSMP results and that waters previously listed because of TSMP results be delisted unless there is other evidence of impairment.

Donner Lake was listed due to TSMP results showing filet concentrations of polychlorinated biphenyls (PCBs) and of the pesticide chlordane above the then-current MTRLs. PCBs were also detected in a TSMP sample of Donner Lake sediment. The following concentrations of total PCBs were found in filet tissue sampled from Donner Lake in 1991 and 1993.

Year	Species	# of Fish	Age of Fish	PCB Concentration
1991	Kokanee salmon	7	3-4 years	165 ppb
1993	Lake trout	6	6-8 years	102 ppb

The OEHHA has recently recalculated MTRLs based on criteria in the U.S. Environmental Protection Agency's California Toxics Rule (40.CFR.131.38). The current MTRL for "PCBs (total)" is 5.3 ug/kg (micrograms per kilogram, equivalent to parts per billion or ppb) in fish filet tissue. PCBs are now banned from use; potential historic sources include spills from I-80 or the railroad, power transformers, exposure of planted fish during early development in a hatchery, and atmospheric deposition. (PCBs detected in remote waters of the Lake Tahoe Basin have been attributed to atmospheric deposition.)

The current MTRL for total chlordane, 8.0 ug/kg (micrograms per kilogram or parts per billion) is based on the California Toxics Rule (40CFR 131.38). The filet tissue concentration of chlordane in kokanee salmon collected in Donner Lake in 1991 was 26.2 ppb. Chlordane is now banned from use; historic sources in the Donner Lake watershed may include stormwater from development around the lake, spills from I-80 or the railroad, atmospheric deposition, or exposure of planted game fish to pesticides at a fish hatchery.

Although the historic TSMP samples exceed the current MTRLs for PCBs and chlordane, there are no past or current OEHHA fish consumption advisories for Donner Lake. No recent data are available on ambient PCB or chlordane concentrations in sediment or water.

Watershed Characteristics

Donner Lake, with an area of 960 acres, is located in Nevada County; its watershed includes portions of Placer and Nevada Counties. It has several relatively small tributary streams, and is tributary to the Truckee River via Donner Creek. The lake is managed as a reservoir. It provides domestic supply to surrounding development and contributes to domestic supply for the Reno, Nevada area. Land use in the watershed includes residential and commercial development, Donner Memorial State Park, Interstate 80, and a railroad. The lake supports a recreational fishery.

Recommendation

Donner Lake is proposed to be removed from the Section 303(d) list and added to a "watch list" of waters needing further monitoring and assessment to determine the need for TMDLs. Listing for PCBs or chlordane may be reconsidered in the future if there is evidence of significant impacts on beneficial uses of the lake.

Information Sources

California Office of Environmental Health Hazard Assessment, 1999. Fish consumption advisories statewide and General Information. Available on the Internet:
http://www.oehha.ca.gov/general/99fish.html.

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

California State Water Resources Control Board, Toxic Substances Monitoring Program database.

California State Water Resources Control Board, 1995. *Toxic Substances Monitoring Program (TSMP), Freshwater Bioaccumulation Monitoring Program, Data Base Description.* Revised September 1995.

Datta, S. and 4 other authors, 1998. *Evidence for Atmospheric Transport and Deposition for Polychlorinated Biphenyls to the Lake Tahoe Basin, California-Nevada.* Available on the Internet: http://www.nal.usda.gov/ttic/tektran/data/000009/25/0000092538.html.

STAMPEDE RESERVOIR, PESTICIDES
2002 Section 303(d) Fact Sheet
Delisting

Rationale for Delisting

Stampede Reservoir, in the Little Truckee River watershed, is recommended for delisting because listing was based on limited data and there is no current evidence of impairment.

Under the California State Water Resources Control Board's Toxic Substances Monitoring Program (TSMP) fish tissue samples have been collected since 1978 and analyzed since for toxic trace metals and organic compounds. As the *TSMP Data Base Description* explains:

> *"The TSMP is a sentinel program; it provides the State Water Board, other agencies, and the public, with an early warning of higher than expected concentrations of pollutants at specific sites. TSMP findings often lead to more intensive local follow-up studies for identifying sources of pollutants, and to cleanup and abatement orders and enforcement actions by the Regional Water Boards."*

TSMP results for edible (fish filet) tissue can be compared to human fish consumption criteria for various toxic substances. In the past, the State Water Resources Control Board has directed that surface waters be listed if tissue concentrations exceed the "Maximum Tissue Residue Level" (MTRL) criteria calculated by the California Office of Environmental Health Hazard Assessment (OEHHA). However, because sample numbers in the TSMP are small and are not designed to be statistically representative of the fish population in a given water body, there appears to be insufficient evidence to justify listing on the basis of TSMP results alone. Lahontan Regional Board staff recommend that no new waters be listed solely because of TSMP results and that waters previously listed because of TSMP results be delisted unless there is other evidence of impairment..

The current MTRL for lindane (gamma hexachlorocyclohexane or HCH), is 2.5 micrograms per kilogram (ug/kg or ppb) in fish filet tissue. The TSMP lindane concentration for kokanee salmon tissue sampled in Stampede Reservoir in 1989 was 2.6 ug/kg, exceeding the MTRL only slightly. No fish consumption advisory is currently in effect for Stampede Reservoir, and no ambient lindane data are available for the water column or sediment.

Watershed Characteristics

Stampede Reservoir is located on the Little Truckee River in Sierra County. Its watershed includes portions of Nevada and Sierra Counties. It has several tributary streams including Sagehen Creek. It is managed by a federal watermaster as part of the Truckee River system which provides domestic supplies to the Reno, Nevada area and supports threatened/endangered fish in Pyramid Lake. Water is released from Stampede Reservoir to the Little Truckee River and stored in Boca Reservoir before being released to the Truckee River. The watershed of Stampede Reservoir is largely undeveloped, but has been disturbed by logging, grazing and wildfires. Stampede Reservoir supports a recreational fishery.

Recommendation

Stampede Reservoir is proposed to be removed from the Section 303(d) list and added to a "watch list" of waters needing further monitoring and assessment to determine the need for TMDLs. Listing for lindane may be reconsidered in the future if there is evidence of significant impacts on beneficial uses of the reservoir.

Information Sources

California Office of Environmental Health Hazard Assessment, 1999. Fish consumption advisories statewide and General Information. Available on the Internet: http://www.oehha.ca.gov/general/99fish.html.

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

California State Water Resources Control Board, Toxic Substances Monitoring Program database.

California State Water Resources Control Board, 1995. *Toxic Substances Monitoring Program (TSMP), Freshwater Bioaccumulation Monitoring Program, Data Base Description.* Revised September 1995.

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LAKE TAHOE HYDROLOGIC UNIT

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SNOW CREEK, HABITAT ALTERATIONS
2002 Section 303(d) Fact Sheet
Delisting

Rationale for Delisting

Snow Creek was listed due the impacts on beneficial uses of fill in the wetland/riparian area near its confluence with Lake Tahoe. The creek is now recommended for delisting because a restoration project has been implemented.

The original disturbance involved partial grading of a meadow, possibly for development which never occurred, and dumping of fill by highway maintenance crews in the early 1960s. Before restoration, about 75 percent of the project area was occupied by sparsely vegetated fill. Much of the fill was contaminated with petroleum products, which were used for dust control at the time. Fill mounds up to five feet deep altered the course of the creek.

The California Tahoe Conservancy has acquired and restored the four-acre disturbed site in coordination with the Placer County Department of Public Works. About 30,000 cubic yards (2000 truckloads) of contaminated fill were hauled away. (The project's $4.2 million cost reflected the necessity for toxics cleanup.) The stream channel (950 feet) and ponds were restored. The existing constructed pond was made smaller and reconfigured as a seasonal meadow wetland. Channels were reconfigured to promote more frequent inundation of the meadow areas, and the area was revegetated with a variety of wetland and riparian plant species. In 2000, revegetation was projected to be successful within 2 years. Three new box culverts were installed under State Highway 28 to allow free fish passage and reduce flooding of the highway.

Watershed Characteristics

Snow Creek (Hydrologic Unit No. 634.20, latitude 39.240°N, longitude 120.050°W) is a tributary to Lake Tahoe on its north shore. The disturbed wetland/riparian area is adjacent to State Highway 28 in the community of Tahoe Vista. The main creek channel is 3.66 miles long, and the watershed area is 4.49 square miles.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

DeLong, Jeff, 2000. Larger Wetlands Project is Set for Lake Tahoe. *Reno Gazette-Journal,/RGJ.com*, Sunday October 15, 2000.

Erlich, Robert, Lahontan Regional Board staff, personal communication, October 2001 .

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

LAKE TAHOE, SEDIMENT, NITROGEN, PHOSPHORUS
2002 Section 303(d) Fact Sheet
Clarification of Existing Listing

Summary of Proposed Action

Lake Tahoe is currently Section 303(d) listed for nutrients and sediment. For clarity, the listing for "nutrients" is proposed to be replaced by separate listings for nitrogen and phosphorus. As noted below, other water quality standards are being violated as a result of increased sediment and nutrient loading. However, violations of these standards result from sediment and nutrient problems, and no separate new listings are proposed.

Watershed Characteristics

Lake Tahoe has a surface area of 192 square miles (120,000 acres), and its watershed area is 314 square miles. The lake has an average depth of 1027 feet, a maximum depth of 1646 feet, and 72 miles of shoreline. Because of its large volume, Lake Tahoe has a water residence time of 700 years. Lake Tahoe has 63 tributary streams, and these in turn have smaller streams and lakes at their headwaters. (There are more than 170 lakes and ponds in the Lake Tahoe watershed as a whole.) In addition, small "intervening areas" between streams contribute runoff directly to the lake. About two thirds of the watershed is in California (in Placer, El Dorado, and Alpine Counties) and one third in Nevada. About 75 percent of the watershed is in public ownership; most development on private lands has occurred near the lake. The only outflow from Lake Tahoe is to the Truckee River. The lake is managed as a reservoir, with the upper six feet under control of a federal watermaster; the effective storage capacity is 745,000 acre feet.

Lake Tahoe is known for its extraordinary clarity (historic Secchi depth up to 120 feet) and deep blue color. It is a recreational attraction because of its scenic quality and the availability of summer and winter outdoor activities and casino gaming in Nevada. Because of its high ecological and recreational value, Lake Tahoe is a designated "Outstanding National Resource Water" in which no long term degradation can be permitted.

Water Quality Objectives Not Attained

Lake Tahoe is considered to be an oligotrophic (low productivity) lake. It still has relatively low concentrations of nitrogen and phosphorus in spite of increased nutrient loading since the mid-20th Century, and water quality objectives for these parameters are not being violated. Lake Tahoe was historically nitrogen limited, but increased atmospheric nitrogen loading has led to phosphorus limitation. (Both nutrients are still considered important.) Because suspended sediment is affecting beneficial uses, the lake can be considered to be in violation of the regionwide narrative suspended sediment and suspended materials objectives. Sediment is of concern not only for its direct impacts, but also because it carries particulate nutrients into the lake. Iron is of concern as a nutrient in Lake Tahoe and its tributaries, and several tributaries are recommended to be listed for iron in 2002. There is insufficient information about the role of iron in Lake Tahoe to justify listing the lake for iron at this time.

Lake Tahoe has violations, or threatened violations, of a number of other narrative water quality objectives which are indicators of increased nutrient loading, including the following:

Nondegradation
Algal Growth Potential
Biostimulatory Substances
Biological indicators (algal productivity and phytoplankton, zooplankton, and periphyton biomass)
Clarity
Plankton Counts
Transparency

The most frequently measured indicators of compliance with these objectives are transparency and phytoplankton productivity. The water quality objectives for these parameters are set at levels measured between 1967 and 1971. Transparency (measured as Secchi depth) has decreased 30 percent, and phytoplankton productivity has increased almost 300 percent, since 1968.

Beneficial uses of Lake Tahoe are also being affected. Increased productivity and sediment loading, and decreased transparency are affecting the aesthetic enjoyment component of the Non-Contact Water Recreation beneficial use. Changes in nutrient loading may also be contributing to impairment of aquatic life uses. For example, the Tahoe benthic stonefly, a species found only in Lake Tahoe, depends on deep water plant beds which could be shaded out by significantly more turbid waters. By changing aquatic habitat conditions, increased pollutant loading may also favor the invasion of exotic plant and animal species.

It is not feasible to develop a TMDL for each parameter covered in the narrative objectives listed above. (For example, one cannot allocate loads or wasteloads of "transparency.") These violations are clearly the result of increased loading of sediment and nutrients, and their attainment can best be ensured through development of TMDLs for sediment, nitrogen, and phosphorus.

Extent of Impairment

The entire lake is Section 303(d) listed.

Potential Sources

The sources of sediment and nutrient loading to Lake Tahoe include erosion from past and present watershed disturbance, stormwater, and other nonpoint sources including urban fertilizer use and past wastewater disposal to land. (Wastewater is currently exported from the watershed for disposal.) Atmospheric deposition is an important source of nutrient loading. Another watershed problem affecting sediment and nutrient loading has been the widespread development and disturbance of wetland and riparian areas that formerly helped to filter out sediment and nutrients before they entered the lake.

TMDL Priority

Lake Tahoe has a high priority for TMDL development. Work on the TMDL has already begun, and it is currently scheduled for completion (through Regional Board action) in 2007.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

BLACKWOOD CREEK, NITROGEN
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Blackwood Creek, a tributary of Lake Tahoe, is currently listed for sediment. An additional listing for nitrogen is recommended.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Blackwood Creek	**Pollutant(s)**	Nitrogen
Hydrologic Unit	Lake Tahoe (634.20)	**Sources**	Atmospheric deposition, erosion, stormwater
Total Length	6.20 miles	**TMDL Priority**	High
Size Affected	6.20 miles	**TMDL End Date**	After 2015
Latitude/Longitude	39.108° N, 120.157° W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Blackwood Creek, in Placer County, is tributary to Lake Tahoe on its northwest shore. It enters the lake near the small communities of Tahoe Pines and Idlewild. It has a total watershed area of 11.2 square miles and a main channel length of 6.20 miles. There are five small tributaries. Between 1993 and 1996, the annual average runoff was estimated at 31,800 acre feet and the average annual mean daily streamflow at 44.0 cubic feet per second (cfs). Most of the watershed is now in U.S. Forest Service ownership. Barker Pass Road runs as a paved road near the creek for much of its length; the Pacific Crest Trail crosses the headwaters. Blackwood Creek's watershed was severely disturbed in the past by activities such as logging and gravel mining.

Water Quality Objectives Not Attained

Blackwood Creek is in violation of the numerical water quality objective for total nitrogen, 0.19 milligrams per liter (mg/L) as an annual mean.

Evidence of Impairment

Data from the Lake Tahoe Interagency Monitoring Program (LTIMP) reported in TRPA (1999), show that, on an annual mean basis, the total nitrogen objective was violated in Blackwood Creek in 6 of 8 years between Water Years 1989 and 1996. Annual average concentrations ranged from 0.103 mg/L in 1994 to 0.293 mg/L in 1995. The range of single value concentrations for total

Kjeldahl nitrogen (ammonia plus organic nitrogen) reported by Rowe (1998) for the LTIMP period of record (through 1996) was 0.02-1.7 mg/L, with a median value of 0.13 mg/L. The range of single value concentrations for nitrate plus nitrate was 0.002-0.086 mg/L, with a median value of 0.016 mg/L.

Extent of Impairment

LTIMP samples are collected near the mouth of Blackwood Creek. The entire creek (main channel length 6.20 miles) is proposed for listing.

Potential Sources

Atmospheric deposition, erosion due to past and present watershed disturbance, stormwater.

TMDL Priority

Because of its importance in nutrient loading to Lake Tahoe, Blackwood Creek is recommended to be ranked "high" priority for development of a nitrogen TMDL. Nutrient loading from the Blackwood Creek watershed will be addressed during development of the Lake Tahoe TMDL; if a more specific nitrogen TMDL is needed, if will be completed after 2015.

Information Sources:

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

Rowe, T.G., 1998. *Loads and Yields of Sediment and Nutrients for Selected Watersheds in the Lake Tahoe Basin, California and Nevada.* U.S. Geological Survey, paper presented at Water Quality Monitoring Council 1998 Conference. Available on the Internet: http://204.87.241.11/98proceedings/Papers/50-ROWE.html.

Rowe, T.G., 2001. Loads and Yields of Suspended Sediment for Selected Watersheds in the Lake Tahoe Basin, California and Nevada. *Proceedings of the Seventh Federal Interagency Sedimentation Conference*, March 25 to 29, 2001, Reno Nevada.

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

BLACKWOOD CREEK, PHOSPHORUS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Blackwood Creek, a tributary of Lake Tahoe, is currently listed for sediment. An additional listing for phosphorus is recommended.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Blackwood Creek	**Pollutant(s)**	Phosphorus
Hydrologic Unit	Lake Tahoe (634.20)	**Sources**	Atmospheric deposition, erosion, stormwater, forest fire
Total Length	6.20 miles	**TMDL Priority**	High
Size Affected	6.20 miles	**TMDL End Date**	After 2015
Latitude/Longitude	39.108° N, 120.157° W	**Original Listing Year**	2002

Watershed Characteristics

Blackwood Creek, in Placer County, is tributary to Lake Tahoe on its northwest shore. It enters the lake near the small communities of Tahoe Pines and Idlewild. It has a total watershed area of 11.2 square miles and a main channel length of 6.20 miles. There are five small tributaries. Between 1993 and 1996, the annual average runoff was estimated at 31,800 acre feet and the average annual mean daily streamflow at 44.0 cubic feet per second (cfs). Most of the watershed is now in U.S. Forest Service ownership. Barker Pass Road runs as a paved road near the creek for much of its length; the Pacific Crest Trail crosses the headwaters. Blackwood Creek's watershed was severely disturbed in the past by activities such as logging and gravel mining along the central reaches of the stream.

Water Quality Objectives Not Attained

Blackwood Creek is in violation of the numerical water quality objective for total phosphorus, 0.015 milligrams per liter (mg/L), as an annual mean.

Evidence of Impairment

Lake Tahoe Interagency Monitoring Program (LTIMP) data summarized by the Tahoe Regional Planning Agency (1999) show that annual mean concentrations of total phosphorus violated the objective in 15 of 17 water years from 1980 to 1996. The Water Year 1996 mean concentration was 0.126 mg/L. Rowe (1998) cites a concentration range during the LTIMP period of record (through 1996) of 0.010 to 0.994 mg/L, with a median value of 0.031 mg/L total phosphorus.

Extent of Impairment

LTIMP samples are collected near the mouth of Blackwood Creek. The entire creek (main channel length 6.20 miles) is proposed for listing.

Potential Sources

Atmospheric deposition (including particulate phosphorus from forest fires), erosion due to past and present watershed disturbance, stormwater.

TMDL Priority

Because of its importance in nutrient loading to Lake Tahoe, Blackwood Creek is recommended to be ranked "high" priority for development of a phosphorus TMDL. Phosphorus loading from the Blackwood Creek watershed will be addressed during development of the Lake Tahoe TMDL; if a more specific phosphorus TMDL is needed, it will be completed after 2015.

Information Sources:

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

Rowe, T.G., 1998. *Loads and Yields of Sediment and Nutrients for Selected Watersheds in the Lake Tahoe Basin, California and Nevada.* U.S. Geological Survey, paper presented at Water Quality Monitoring Council 1998 Conference. Available on the Internet: <http://204.87.241.11/98proceedings/Papers/50-ROWE.html> .

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

BLACKWOOD CREEK, IRON
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Blackwood Creek, a tributary of Lake Tahoe, is currently listed for sediment. An additional listing for iron is proposed.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Blackwood Creek	**Pollutant(s)**	Iron
Hydrologic Unit	Lake Tahoe (634.20)	**Sources**	Erosion, stormwater
Total Length	6.20 miles	**TMDL Priority**	Medium
Size Affected	6.20 miles	**TMDL End Date**	After 2015
Latitude/Longitude	39.108° N, 120.157° W	**Original Listing Year**	2002

Watershed Characteristics

Blackwood Creek, in Placer County, is tributary to Lake Tahoe on its northwest shore. It enters the lake near the small communities of Tahoe Pines and Idlewild. It has a total watershed area of 11.2 square miles and a main channel length of 6.20 miles. There are five small tributaries. Between 1993 and 1996, the annual average runoff was estimated at 31,800 acre feet and the average annual mean daily streamflow at 44.0 cfs. Most of the watershed is now in U.S. Forest Service ownership. Barker Pass Road runs as a paved road near the creek for much of its length; the Pacific Crest Trail crosses the headwaters. Blackwood Creek's watershed was severely disturbed in the past by activities such as logging and gravel mining along the central reaches of the stream.

Water Quality Objectives Not Attained

Blackwood Creek is in violation of the numerical water quality objective for total iron (0.03 milligrams per liter [mg/L], annual mean).

Evidence of Impairment

Lake Tahoe Interagency Monitoring Program (LTIMP) data summarized by the Tahoe Regional Planning Agency show that annual mean iron concentrations violated the objective every year from Water Year 1989 to Water Year 1996. LTIMP data summarized by Rowe (1998) shows a range of iron concentrations during the period of record (through 1996) from 103 to 14,800 mg/L, with a median concentration of 440 mg/L. (Rowe expresses iron concentrations in micrograms per liter [ug/L] in the text of his report, and the use of mg/L in his summary table is probably a typographical error.)

Iron is measured in the LTIMP as "total biologically available iron (BaFe)" or "total bioreactive iron." It is monitored because of its importance as a plant nutrient. Water quality objectives for iron in tributaries of Lake Tahoe were based on limited data collected before 1980 and probably do not reflect natural background concentrations.

Extent of Impairment

LTIMP samples are collected near the mouth of Blackwood Creek. The entire creek (main channel length 6.20 miles) is proposed for listing.

Potential Sources

Iron is naturally present in soils of the Blackwood Creek watershed. Loading of iron to the creek has probably increased over natural background levels due to watershed disturbance.

TMDL Priority

A high priority is recommended for this TMDL. However, due to other recommended priorities, the TMDL is not projected to be completed until after 2015. Revision of water quality objectives for iron in tributaries of Lake Tahoe may be considered before that date.

Information Sources:

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

Rowe, T.G., 1998. *Loads and Yields of Sediment and Nutrients for Selected Watersheds in the Lake Tahoe Basin, California and Nevada.* U.S. Geological Survey, paper presented at Water Quality Monitoring Council 1998 Conference. Available on the Internet: http://204.87.241.11/98proceedings/Papers/50-ROWE.html.

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

HEAVENLY VALLEY CREEK, SEDIMENT
2002 Section Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of Heavenly Valley Creek between the National Forest boundary and the confluence with Trout Creek is proposed to be listed for sediment. (A sediment TMDL has been completed for the upper reach of the creek.)

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Heavenly Valley Creek	**Pollutant(s)**	Sediment
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Upstream erosion
Total Length	3 miles	**TMDL Priority**	Medium
Size Affected	1 mile	**TMDL End Date**	After 2015
Latitude/Longitude	38.924 °N, 119.916° W	**Original Listing Year**	2002

Watershed Characteristics

Heavenly Valley Creek, in El Dorado County, is a tributary of Trout Creek. Soils are derived from granitic parent materials. Its upper watershed, with a steep gradient, has been extensively disturbed by ski resort development. The lower reach flows through an urban area before joining Trout Creek. The watershed includes an area used for disposal of secondary wastewater effluent by the South Tahoe Public Utility District until 1968. The creek receives surface runoff from Pioneer Trail (a major thoroughfare) and urban development in the watershed.

Water Quality Objectives Not Attained

Although a numerical suspended sediment objective applies to all tributaries of Lake Tahoe, monitoring data are not available for this reach to determine compliance. Bedload sediment from the upstream reach has probably impacted benthic habitat uses and thus violated the narrative water quality objectives for sediment and settleable materials, which reference protection of beneficial uses.

Evidence of Impairment

As of 1996, the lower reach of Heavenly Valley Creek was rated as "marginal" fish habitat by the Tahoe Regional Planning Agency (TRPA). The TRPA's Environmental Improvement Program includes a project (#404) for stream habitat restoration. The project, with an estimated cost of $50,000, would involve stabilization of the banks of Heavenly Valley Creek through revegetation at Pioneer Trial and 0.5 miles above and below. Completion of this project, tentatively scheduled for 2004, is expected to restore this segment to "good" fish habitat condition. The project summary notes that further assessment is needed.

Suspended sediment is not routinely monitored within this segment of Heavenly Valley Creek. Monitoring at the U.S. Forest Service Property Line station indicates that erosion control measures implemented since 1991 are having an effect and that the upper reach of the creek is approaching

attainment of the suspended sediment objective (60 milligrams per liter [mg/L] as an annual 90th percentile level). U.S. Forest Service monitoring of changes in stream cross sections also indicates that large "slugs" of bedload sediment have moved downstream in the past. This sediment is presumed to have affected instream uses of the lower reaches of Heavenly Valley Creek.

Extent of Impairment

The segment proposed for listing is about 1 mile long.

Potential Sources

The major source of sediment is upstream watershed disturbance at the Heavenly Ski Resort. This segment of the creek is also affected by local streambank erosion , by stormwater from Pioneer Trail and other nonpoint sources.

TMDL Priority

This TMDL is recommended for a medium priority, with completion projected to occur after 2015. If the Tahoe Regional Planning Agency's proposed restoration project is successful, delisting of this segment may be feasible.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Tahoe Regional Planning Agency, 1996. *Draft 1996 Evaluation Report: Environmental Threshold Carrying Capacities and the Regional Plan Package for the Lake Tahoe Region*, December 1996.

Tahoe Regional Planning Agency, 1998. *Environmental Improvement Program for the Lake Tahoe Region.* Draft for Initial Adoption.

U.S. Forest Service, Lake Tahoe Basin Management Unit, 1998. *Heavenly Ski Resort 1997 Environmental Monitoring Report.*

U.S. Forest Service, Lake Tahoe Basin Management Unit, 1999. *Heavenly Ski Resort 1998 Environmental Monitoring Report.*

HEAVENLY VALLEY CREEK, CHLORIDE
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Heavenly Valley Creek is proposed to be listed for chloride. (A sediment TMDL for a different segment of Heavenly Valley Creek is currently awaiting final approvals.) Available data indicate that the standards violation is probably due mostly to background sources and that revision of water quality objectives may be more appropriate than TMDL development.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Heavenly Valley Creek	**Pollutant(s)**	Chloride
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Natural background, past wastewater disposal to land, road salt
Total Length	3 miles	**TMDL Priority**	Low
Size Affected	3 mile	**TMDL End Date**	After 2015
Latitude/Longitude	38.924 °N, 119.916° W	**Original Listing Year**	2002

Watershed Characteristics

Heavenly Valley Creek, in El Dorado County, is a tributary of Trout Creek. Soils are derived from granitic parent materials. Its upper watershed, with a steep gradient, has been extensively disturbed by ski resort development. The lower reach flows through an urban area before joining Trout Creek. The watershed includes an area used for disposal of secondary wastewater effluent by the South Tahoe Public Utility District until 1968. The creek receives surface runoff from Pioneer Trail (a major thoroughfare) and urban development in the watershed.

Water Quality Objectives Not Attained

Numerical water quality objectives for Trout Creek apply upstream to its tributaries. The chloride objectives for Trout Creek are an annual mean of 0.15 milligrams per liter (mg/L) and 0.20 mg/L as a 90th percentile value.

Evidence of Impairment

Chloride data for Heavenly Valley Creek are summarized in Table 2. Data collected by the U.S. Forest Service, Lake Tahoe Basin Management Unit, for the upper reaches of Heavenly Valley Creek (and for another tributary of Trout Creek with an undisturbed watershed) show violations of the water quality objective at all stations.

Table 2. Chloride Concentrations in Heavenly Valley Creek and a reference stream (Hidden Valley Creek)

Station	Year	Annual Mean	Range	Source of Data
Undisturbed Tributary of Heavenly Valley Creek (HVC-1)	1997	0.4 mg/L	0.1-1.3 mg/L	USFS/LTBMU
Undisturbed Tributary of Heavenly Valley Creek (HVC-1)	1998	0.4 mg/L	0.1-1.4 mg/L	USFS/LTBMU
Heavenly Valley Creek at Sky Meadows (HVC-1A)	1997	0.5 mg/L	0.1-1.4 mg/L	USFS/LTBMU
Heavenly Valley Creek at Sky Meadows (HVC-1A)	1998	0.5 mg/L	0.3-1.1 mg/L	USFS/LTBMU
Heavenly Valley Creek below Patsy's Chair (HVC-2)	1997	0.6 mg/L	0.1-1.4 mg/L	USFS/LTBMU
Heavenly Valley Creek below Patsy's Chair (HVC-2)	1998	1.3 mg/L	0.1-3.2 mg/L	USFS/LTBMU
Heavenly Valley Creek at Property Line (HVC-3)	1997	0.6 mg/L	0.1-1.9 mg/L	USFS/LTBMU
Heavenly Valley Creek at Property Line (HVC-3)	1998	0.8 mg/L	0.4-1.4 mg/L	USFS/LTBMU
Heavenly Valley Creek below Pioneer Trail	2000-2001	1.2 mg/L	0.7-1.8 mg/L	South Tahoe PUD
Hidden Valley Creek (43-H5)	1997	0.4 mg/L	0.1-1.0	USFS/LTBMU
Hidden Valley Creek (43-H5)	1998	0.4 mg/L	0.1- 1.0	USFS/LTBMU

Extent of Impairment

The entire creek is recommended for listing.

Potential Sources

Because the objective is exceeded at stations with undisturbed watersheds (HVC-1 and Hidden Valley Creek), the major source of chloride is probably atmospheric deposition. The LTBMU noted that chloride concentrations increased in developed portions of the ski resort. This might possibly be due to past use of salt for snow conditioning on ski runs.

In the lower watershed, chloride could be contributed from a former wastewater disposal area near Pioneer Trail, and from salt use for deicing on roads and driveways. Other possible sources are livestock and pet wastes, and urban fertilizer use.

TMDL Priority

This TMDL is recommended for a low priority, with completion projected to occur after 2015. The water quality objective for Trout Creek is based on limited data collected before 1980. (Chloride is not routinely monitored as part of the current Lake Tahoe Interagency Monitoring Program.) The data in Table 2 for stations with undisturbed watersheds indicate that the main source of chloride is probably atmospheric deposition. Chloride at these concentrations is probably not harmful to aquatic life uses. The Regional Board may consider updating chloride objectives for waters of the Lake Tahoe Basin based on current data as an alternative to development of a TMDL. Efforts to control the impacts of deicing chemicals, including road salt, on water quality in the Lake Tahoe Basin are part of the ongoing nonpoint source control program.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

South Tahoe Public Utility District, 2000-2001. Monitoring Data for Heavenly Valley Creek (in Regional Board files).

U.S. Forest Service, Lake Tahoe Basin Management Unit, 1998. *Heavenly Ski Resort 1997 Environmental Monitoring Report.*

U.S. Forest Service, Lake Tahoe Basin Management Unit, 1999. *Heavenly Ski Resort 1998 Environmental Monitoring Report.*

HEAVENLY VALLEY CREEK, PHOSPHORUS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of Heavenly Valley Creek within National Forest boundaries is proposed to be listed for phosphorus.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Heavenly Valley Creek	**Pollutant(s)**	Phosphorus
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Erosion, stormwater
Total Length	3 miles	**TMDL Priority**	High
Size Affected	3 mile	**TMDL End Date**	After 2015
Latitude/Longitude	38.924 °N, 119.916° W	**Original Listing Year**	2002

Watershed Characteristics

Heavenly Valley Creek, in El Dorado County, is a tributary of Trout Creek. Its upper watershed, with a steep gradient, has been extensively disturbed by ski resort development. (A sediment TMDL has been completed for this reach.) The lower reach flows through an urban area before joining Trout Creek. Soils are derived from granitic parent materials. The watershed includes an area used for disposal of secondary wastewater effluent by the South Tahoe Public Utility District until 1968. The creek receives surface runoff from Pioneer Trail (a major thoroughfare) and other paved streets and driveways.

Water Quality Objectives Not Attained

Numerical water quality objectives for Trout Creek apply upstream to its tributaries. The total phosphorus objective for Trout Creek is 0.015 milligrams per liter (mg/L) as an annual mean.

Evidence of Impairment

Table 2 summarizes monitoring data collected by the U.S. Forest Service, Lake Tahoe Basin Management Unit (LTBMU), for several stations on Heavenly Valley Creek within National Forest boundaries, and for Hidden Valley Creek, a nearby reference stream. Recent phosphorus data are not available for the segment of the creek between the National Forest property line and the confluence with Trout Creek.

Table 2. Total Phosphorus Data for Heavenly Valley Creek

Station	Year	Annual Mean (mg/L)	Range (mg/L)	Source of Data
Undisturbed Tributary of Heavenly Valley Creek (HVC-1)	1997	0.026	0.010-0.050	USFS/LTBMU
Undisturbed Tributary of Heavenly Valley Creek (HVC-1)	1998	0.029	0.018-0.055	USFS/LTBMU
Heavenly Valley Creek at Sky Meadows (HVC-1A)	1997	0.019	0.005-0.040	USFS/LTBMU
Heavenly Valley Creek at Sky Meadows (HVC-1A)	1998	0.021	0.008-0.055	USFS/LTBMU
Heavenly Valley Creek below Patsy's Chair (HVC-2)	1997	0.021	0.008-0.037	USFS/LTBMU
Heavenly Valley Creek below Patsy's Chair (HVC-2)	1998	0.054	0.011-0.195	USFS/LTBMU
Heavenly Valley Creek at Property Line (HVC-3)	1997	0.021	0.012-0.045	USFS/LTBMU
Heavenly Valley Creek at Property Line (HVC-3)	1998	0.034	0.010-0.090	USFS/LTBMU
Heavenly Valley Creek below Pioneer Trail				STPUD
Hidden Valley Creek (43-H5)	1997	0.021	0.012-0.030	USFS/LTBMU
Hidden Valley Creek (43-H5)	1998	0.027	0.018-0.048	USFS/LTBMU

Potential Sources

Table 2 shows that violations of the phosphorus objective occur even at stations with undisturbed watersheds. The phosphorus at these stations presumably comes from natural geologic sources and/or from atmospheric deposition (from sources such as road dust, windblown soil, and ash from forest fires, wood stoves, etc.). Additional phosphorus loading may occur at some stations from accelerated erosion due to watershed disturbance.

TMDL Priority

This TMDL is recommended for high priority. It may be coordinated with development of a phosphorus TMDL for Trout Creek. TMDL completion is projected to occur after 2015. The Regional Board may also consider revision of the phosphorus objective.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

U.S. Forest Service, Lake Tahoe Basin Management Unit, 1998. *Heavenly Ski Resort 1997 Environmental Monitoring Report.*

U.S. Forest Service, Lake Tahoe Basin Management Unit, 1999. *Heavenly Ski Resort 1998 Environmental Monitoring Report.*

HIDDEN VALLEY CREEK, CHLORIDE
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Hidden Valley Creek, a tributary of Trout Creek in the Lake Tahoe Basin, is proposed to be listed for violation of the water quality objective for chloride. Since the watershed of Hidden Valley Creek is undisturbed, the chloride presumably comes from natural background sources, and revision of the water quality objective may be more appropriate than development of a TMDL.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Hidden Valley Creek	**Pollutant(s)**	Chloride
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Natural background, atmospheric deposition
Total Length	2.95 miles	**TMDL Priority**	Low
Size Affected	2.95 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.858°N, 119.899°W	**Original Listing Year**	2002

Watershed Characteristics

"Hidden Valley Creek" is not an official geographic name. It is the name used by U.S. Forest Service, Lake Tahoe Basin Management Unit (LTBMU) staff for an unnamed tributary of Trout Creek in El Dorado County, with watershed characteristics (size, geology, vegetation) similar to those of Heavenly Valley Creek. Hidden Valley Creek originates from springs below Freel Peak, approximately 3.5 miles south of the Heavenly Valley Creek watershed. Its watershed area is about 1,162 acres. The LTBMU is monitoring Hidden Valley Creek as a reference stream for its watershed restoration program at the Heavenly Ski Resort.

Water Quality Objectives Not Attained

Numerical water quality objectives for Trout Creek apply upstream to its tributaries. The chloride objectives for Trout Creek are 0.15 milligrams per liter (mg/L) as an annual mean, and 0.20 mg/L as a 90th percentile value.

Evidence of Impairment

Table 2 shows chloride data for Hidden Valley Creek collected by the LTBMU in 1997 and 1998. The water quality objective was violated in both years.

Table 2. Chloride Concentration Data for Hidden Valley Creek

Station	Year	Annual Mean	Range
Hidden Valley Creek (43-H5)	1997	0.4 mg/L	0.1-1.0
Hidden Valley Creek (43-H5)	1998	0.4 mg/L	0.1-1.0

Extent of Impairment

The only available data are for Hidden Valley Creek near its mouth. The entire creek is recommended for listing.

Potential Sources

In comparing chloride data for Heavenly Valley and Hidden Valley Creeks, the LTBMU stated that generally chloride concentrations appear to be lower at the two undeveloped sites, and that chloride is assumed to enter streams through salts in precipitation.

TMDL Priority

This TMDL is recommended for a low priority, with completion projected to occur after 2015. The water quality objective for chloride in Trout Creek is based on limited data collected before 1980. Because the watershed of Hidden Valley Creek is undisturbed, the chloride presumably comes from atmospheric deposition. Chloride at these concentrations is probably not harmful to aquatic life uses. The Regional Board may consider updating chloride objectives for waters of the Lake Tahoe Basin based on current data as an alternative to development of a TMDL.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

U.S. Forest Service, Lake Tahoe Basin Management Unit, 1998. *Heavenly Ski Resort 1997 Environmental Monitoring Report.*

U.S. Forest Service, Lake Tahoe Basin Management Unit, 1999. *Heavenly Ski Resort 1998 Environmental Monitoring Report.*

HIDDEN VALLEY CREEK, PHOSPHORUS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Hidden Valley Creek, a tributary of Trout Creek in the Lake Tahoe Basin, is proposed to be listed for phosphorus.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Hidden Valley Creek	**Pollutant(s)**	Phosphorus
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Natural background, atmospheric deposition
Total Length	2.95 miles	**TMDL Priority**	High
Size Affected	2.95 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.858°N, 119.899°W	**Original Listing Year**	2002

Watershed Characteristics

"Hidden Valley Creek" is not an official geographic name. It is the name used by U.S. Forest Service, Lake Tahoe Basin Management Unit (LTBMU) staff for an unnamed tributary of Trout Creek in El Dorado County, with watershed characteristics (size, geology, vegetation) similar to those of Heavenly Valley Creek. Hidden Valley Creek originates from springs below Freel Peak, approximately 3.5 miles south of the Heavenly Valley Creek watershed. Its watershed area is about 1,162 acres. The LTBMU is monitoring Hidden Valley Creek as a reference stream for its watershed restoration program at the Heavenly Ski Resort.

Water Quality Objectives Not Attained

Numerical water quality objectives for Trout Creek apply upstream to its tributaries. The total phosphorus objective for Trout Creek is 0.015 milligrams per liter (mg/L) as an annual mean.

Evidence of Impairment

Table 2 summarizes data collected by the LTBMU for total phosphorus in Hidden Valley Creek. Annual means are in violation of the water quality objective in both years.

Table 2. Phosphorus data for Hidden Valley Creek.

Station	Year	Annual Mean (mg/L)	Range (mg/L)
Hidden Valley Creek (43-H5)	1997	0.021	0.012-0.030
Hidden Valley Creek (43-H5)	1998	0.027	0.018-0.048

Extent of Impairment

The entire creek is recommended for listing.

Potential Sources

Since the watershed of Hidden Valley Creek is undisturbed, the phosphorus presumably comes from natural geologic sources and/or from atmospheric deposition (from sources such as road dust, windblown soil, and ash from forest fires, wood stoves, etc.).

TMDL Priority

This TMDL is recommended to be given high priority, but is not projected for completion until after 2015. It may be developed in connection with a phosphorus TMDL for the entire Trout Creek watershed.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Liu, M.S., J.E. Reuter, and C.R. Goldman, 2001. Seasonal Significance of Atmospheric Deposition of Phosphorus and the Sources of Deposition for Lake Tahoe, CA-NV. Abstract of paper presented at meeting of American Society of Limnology and Oceanography, Albuquerque NM, February 2001.

U.S. Forest Service, Lake Tahoe Basin Management Unit, 1998. *Heavenly Ski Resort 1997 Environmental Monitoring Report.*

U.S. Forest Service, Lake Tahoe Basin Management Unit, 1999. *Heavenly Ski Resort 1998 Environmental Monitoring Report.*

GENERAL CREEK, PHOSPHORUS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

General Creek, a tributary of Lake Tahoe, is proposed to be added to the Section 303(d) list for violation of the water quality objective for total phosphorus.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	General Creek	**Pollutant(s)**	Phosphorus
Hydrologic Unit	Lake Tahoe (634.20)	**Sources**	Erosion, atmospheric deposition, stormwater
Total Length	9.17 miles	**TMDL Priority**	High
Size Affected	9.17 miles	**TMDL End Date**	After 2015
Latitude/Longitude	39.055°N, 120.112 °W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

General Creek, in Placer County, is tributary to Lake Tahoe on its western shore. It has a watershed area of 7.63 square miles and a main channel length of 9.17 miles. Soils are derived mostly from granitic parent materials. The watershed is forested and relatively undisturbed; it is mostly under U.S. Forest Service and California State ownership (Sugar Pine Point State Park). General Creek is used as a "reference stream" in the Lake Tahoe Interagency Monitoring Program. State Highway 89 crosses the lower part of the watershed, and there are developed campground and day use facilities in the State Park.

Water Quality Objectives Not Attained

The numerical water quality objective for total phosphorus in General Creek is 0.015 milligrams per liter (mg/L) as an annual mean.

Evidence of Impairment

Data from the Lake Tahoe Interagency Monitoring Program (LTIMP) summarized by the Tahoe Regional Planning Agency (1999) show that annual mean concentrations of Total Phosphorus in General Creek violated the water quality objective during 12 of 16 water years between Water Years 1981 and 1996. Annual mean values ranged from 0.011 to 0.031 mg/L. Rowe's summary of LTIMP data cited the range of phosphorus concentrations as 0.007 to 0.275 mg/L in General Creek between 1988 and 1996, and the median concentration as 0.021 mg/L.

Extent of Impairment

The entire creek is recommended for listing.

Potential Sources

Although the General Creek watershed is relatively undisturbed, it is not totally "pristine." Sources of phosphorus in the creek may include streambank erosion, road dust, windblown soil from unvegetated campgrounds and day use areas, and ash from forest fires, campfires, and home woodstoves or fireplaces.

TMDL Priority

A high priority ranking is recommended for this TMDL. Phosphorus loading from the General Creek watershed will be addressed in development of the Lake Tahoe phoshorus TMDL. If a more specific TMDL is needed for General Creek, it will be completed after 2015.

Information Sources:

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Liu, M.S., J.E. Reuter, and C.R. Goldman, 2001. Seasonal Significance of Atmospheric Deposition of Phosphorus and the Sources of Deposition for Lake Tahoe, CA-NV. Abstract of paper presented at meeting of American Society of Limnology and Oceanography, Albuquerque NM, February 2001.

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

Rowe, T.G., 2001. Loads and Yields of Suspended Sediment for Selected Watersheds in the Lake Tahoe Basin, California and Nevada. *Proceedings of the Seventh Federal Interagency Sedimentation Conference*, March 25 to 29, 2001, Reno, Nevada.

Rowe, T.G., 1998. *Loads and Yields of Sediment and Nutrients for Selected Watersheds in the Lake Tahoe Basin, California and Nevada.* U.S. Geological Survey, paper presented at Water Quality Monitoring Council 1998 Conference. Available on the Internet: http://204.87.241.11/98proceedings/Papers/50-ROWE.htm.

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

GENERAL CREEK, IRON
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

General Creek, a tributary of Lake Tahoe, is proposed to be listed for iron.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	General Creek	**Pollutant(s)**	Iron
Hydrologic Unit	Lake Tahoe (634.20)	**Sources**	Erosion, stormwater
Total Length	9.17 miles	**TMDL Priority**	Medium
Size Affected	9.17 miles	**TMDL End Date**	After 2015
Latitude/Longitude	39.055°N, 120.112 °W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

General Creek, in Placer County, is tributary to Lake Tahoe on its western shore. It has a watershed area of 7.63 square miles and a main channel length of 9.17 miles. Soils are derived mostly from granitic parent materials. The watershed is forested and relatively undisturbed; it is mostly under U.S. Forest Service and California State ownership (Sugar Pine Point State Park). General Creek is used as a "reference stream" in the Lake Tahoe Interagency Monitoring Program. State Highway 89 crosses the lower part of the watershed, and there are developed campground and day use facilities in the State Park

Water Quality Objectives Not Attained

The numerical water quality objective for total iron in General Creek is 0.03 milligrams per liter (mg/L).

Evidence of Impairment

As reported by the Tahoe Regional Planning Agency in 1999, the mean annual concentration of total iron measured in General Creek in the Lake Tahoe Interagency Monitoring Program (LTIMP) exceeded the objective during the eight water years when iron was sampled between Water Years 1989 and 1996. Annual mean concentrations ranged from 0.084 mg/L to 0.385 mg/L. Rowe's analysis of LTIMP data cited a range of instantaneous "total bioreactive iron" concentrations in General Creek of 32-7,650 mg/L with a median concentration of 101 mg/L. (Rowe expresses iron concentrations in micrograms per liter [ug/L] in the text of his report, and the use of mg/L in his summary table is probably a typographical error.)

Iron is measured in the LTIMP as "total biologically available iron (BaFe)" or "total bioreactive iron." It is monitored because of its importance as a plant nutrient. Water quality objectives for iron in tributaries of Lake Tahoe were based on limited data collected before 1980 and probably do not reflect natural background concentrations.

Extent of Impairment

The entire creek is proposed for listing.

Potential Sources

Iron is naturally present in soils of the General Creek watershed. Loading of iron to the creek has probably increased over natural background levels due to watershed disturbance.

TMDL Priority

A medium priority is recommended for this TMDL. However, due to other priorities, the TMDL is not projected to be completed until after 2015. Revision of water quality objectives for iron in tributaries of Lake Tahoe may be considered before that date.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

Rowe, T.G., 1998. *Loads and Yields of Sediment and Nutrients for Selected Watersheds in the Lake Tahoe Basin, California and Nevada.* U.S. Geological Survey, paper presented at Water Quality Monitoring Council 1998 Conference. Available on the Internet: http://204.87.241.11/98proceedings/Papers/50-ROWE.html.

Rowe, T.G., 2001. Loads and Yields of Suspended Sediment for Selected Watersheds in the Lake Tahoe Basin, California and Nevada. *Proceedings of the Seventh Federal Interagency Sedimentation Conference*, March 25 to 29, 2001, Reno, Nevada.

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

UPPER TRUCKEE RIVER, PHOSPHORUS
2002 303(d) Fact Sheet
Listing

Summary of Proposed Action

The Upper Truckee River, a tributary to Lake Tahoe, is proposed to be listed for phosphorus.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Upper Truckee River	**Pollutant(s)**	Phosphorus
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Atmospheric deposition, erosion stormwater, fertilizer, etc.
Total Length	21.5 miles	**TMDL Priority**	High
Size Affected	21.5 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.942°N, 119.995° W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The Upper Truckee River is the largest stream tributary to Lake Tahoe in terms of flow and watershed size, and it may be delivering some of the largest nutrient and sediment loads to the lake. The Upper Truckee River watershed, with an area of 56.5 square miles, is almost entirely within El Dorado County; about 3 square miles of the upper watershed is in Alpine County. Land surface elevations range from lake level (about 6,625 feet above sea level) to 10,063 feet at Red Lake Peak. Slopes range from nearly flat at lake level to as much as 50% in the upper elevations. There are 24 tributary streams to the Upper Truckee River. The main tributary drainages to the Upper Truckee River, with watershed areas, are as follows: Grass Lake Creek (6.4 square miles), Angora Creek (5.7 square miles), Echo Creek (5.4 square miles), and Big Meadow Creek (5.1 square miles). Major wetlands include Grass Lake, Osgood Swamp, Truckee Marsh, Benwood Meadow, and Big Meadow. Grass Lake is the largest quaking bog in California. Major lakes in the watershed include Upper and Lower Echo Lakes, and smaller lakes include Dardanelles, Round, Showers, Elbert, Tamarack, Ralston, and Angora Lakes. Most of the watershed is in U.S. Forest Service ownership. The upper reach of the Upper Truckee River, above Christmas Valley, has been recommended for inclusion in the federal Wild and Scenic Rivers system. Water is diverted out of the Lake Tahoe Basin to the American River from Lower Echo Lake.

The Upper Truckee River watershed was severely disturbed in the 19th and early 20th Centuries by logging and grazing, and in the later 20th Century by hydromodification and urban development. The river has been channelized near the South Lake Tahoe airport and near its confluence with Lake Tahoe, and a large portion of the Truckee Marsh near its mouth has been developed as the Tahoe Keys subdivision. The *Lake Tahoe Watershed Assessment* gave the river an Aquatic Ecosystem Rating of "imperiled."

Water Quality Objectives Not Attained

The numerical water quality objective for total phosphorus for the Upper Truckee River is 0.015 milligrams per liter (mg/L).

Evidence of Impairment

The Tahoe Regional Planning Agency's (1999) summary of data collected in the Lake Tahoe Interagency Monitoring Program (LTIMP) shows that annual mean concentrations of total phosphorus in the Upper Truckee River violated the water quality objective in all 17 water years of sampling between Water Years 1980 and 1996. Rowe's (1998) analysis of LTIMP data collected between 1988 and 1996 shows a range of total phosphorus concentrations between 0.004 and 0.222 mg/L, with a median concentration of 0.30 mg/L. LTIMP data from the U.S. Geological Survey's NWIS database show that the objective was also violated in 1997, 1998, and 1999.

Potential Sources

Potential sources of phosphorus loading to the Upper Truckee River include erosion, stormwater, urban fertilizer use (including use on two golf courses), and the loss of natural filtration capacity due to development and disturbance of wetlands and riparian areas.

TMDL Priority

This TMDL is recommended to be ranked high priority. Phosphorus loading from the Upper Truckee River will be addressed during development of the Lake Tahoe phosphorus TMDL. If needed, a more specific phosphorus TMDL for the Upper Truckee River will be completed after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

Liu, M.S., J.E. Reuter, and C.R. Goldman, 2001. Seasonal Significance of Atmospheric Deposition of Phosphorus and the Sources of Deposition for Lake Tahoe, CA-NV. Abstract of paper presented at meeting of American Society of Limnology and Oceanography, Albuquerque NM, February 2001.

Murphy, D.M. and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

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Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

U.S. Geological Survey, 2001. Water Quality Samples for California, USGS 10336610 Upper Truckee River at South Lake Tahoe Calif. NWIS Database; <http:www.usgs.gov/ca/nwis>

UPPER TRUCKEE RIVER, IRON
2002 303(d) Fact Sheet
Listing

Summary of Proposed Action

The Upper Truckee River, a tributary of Lake Tahoe, is proposed to be listed for iron.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Upper Truckee River	**Pollutant(s)**	Iron
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Erosion, stormwater
Total Length	21.5 miles	**TMDL Priority**	Medium
Size Affected	21.5 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.942°N, 119.995° W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The Upper Truckee River is the largest stream tributary to Lake Tahoe in terms of flow and watershed size, and it may be delivering some of the largest nutrient and sediment loads to the lake. The Upper Truckee River watershed, with an area of 56.5 square miles, is almost entirely within El Dorado County; about 3 square miles of the upper watershed is in Alpine County. Land surface elevations range from lake level (about 6,625 feet above sea level) to 10,063 feet at Red Lake Peak. Slopes range from nearly flat at lake level to as much as 50% in the upper elevations. There are 24 tributary streams to the Upper Truckee River. The main tributary drainages to the Upper Truckee River, with watershed areas, are as follows: Grass Lake Creek (6.4 square miles), Angora Creek (5.7 square miles), Echo Creek (5.4 square miles), and Big Meadow Creek (5.1 square miles). Major wetlands include Grass Lake, Osgood Swamp, Truckee Marsh, Benwood Meadow, and Big Meadow. Grass Lake is the largest quaking bog in California. Major lakes in the watershed include Upper and Lower Echo Lakes, and smaller lakes include Dardanelles, Round, Showers, Elbert, Tamarack, Ralston, and Angora Lakes. Most of the watershed is in U.S. Forest Service ownership. The upper reach of the Upper Truckee River, above Christmas Valley, has been recommended for inclusion in the federal Wild and Scenic Rivers system. Water is diverted out of the Lake Tahoe Basin to the American River from Lower Echo Lake.

The Upper Truckee River watershed was severely disturbed in the 19th and early 20th Centuries by logging and grazing, and in the later 20th Century by hydromodification and urban development. The river has been channelized near the South Lake Tahoe airport and near its confluence with Lake Tahoe, and a large portion of the Truckee Marsh near its mouth has been developed as the Tahoe Keys subdivision. The *Lake Tahoe Watershed Assessment* gave the river an Aquatic Ecosystem Rating of "imperiled."

Water Quality Objectives Not Attained

The water quality objective for total iron in the Upper Truckee River is 0.03 milligrams per liter (mg/L) as an annual mean.

Evidence of Impairment

The Tahoe Regional Planning Agency's (1999) summary of data from the Lake Tahoe Interagency Monitoring Program shows that annual mean concentrations of total iron in the Upper Truckee River violated the water quality objective during every water year of sampling (Water Year 1989 through Water Year 1996). The highest annual mean concentration was 0.849 mg/L in Water Year 1995. Rowe's (1998) analysis of LTIMP data collected between 1988 shows that the range of "total bioreactive iron" concentrations was 53-4210 mg/L in the Upper Truckee River, with a median value of 394 mg/L. (Rowe expresses iron concentrations in micrograms per liter [ug/L] in the text of his report, and the use of mg/L in his summary table is probably a typographical error.)

Iron is measured in the LTIMP as "total biologically available iron (BaFe)" or "total bioreactive iron." It is monitored because of its importance as a plant nutrient. Water quality objectives for iron in tributaries of Lake Tahoe were based on limited data collected before 1980 and probably do not reflect natural background concentrations.

Extent of Impairment

The entire Upper Truckee River is recommended for listing.

Potential Sources

Iron is naturally present in soils of the Upper Truckee River watershed. Loading of iron to the river has probably increased over natural background levels due to watershed disturbance. Additional iron may be contributed from stormwater.

TMDL Priority

A medium priority is recommended for this TMDL, which is projected for completion after 2015. Revision of water quality objectives for iron in tributaries of Lake Tahoe may be considered before that date.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Rowe, T.G., 1998. *Loads and Yields of Sediment and Nutrients for Selected Watersheds in the Lake Tahoe Basin, California and Nevada.* U.S. Geological Survey, paper presented at Water Quality Monitoring Council 1998 Conference. Available on the Internet: http://204.87.241.11/98proceedings/Papers/50-ROWE.html.

Rowe, T.G., and K.K. Allander, 2000. *Surface- and Ground-Water Characteristics in the Upper Truckee River and Trout Creek Watersheds, South Lake Tahoe, California and Nevada, July-December 1996.* U.S. Geological Survey Water-Resources Investigations Report 00-4001. Available on the Internet: http://water.usgs.gov/pubs/wri/wri004001/.

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

UPPER TRUCKEE RIVER, PATHOGENS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of the Upper Truckee River upstream of Christmas Valley is proposed to be listed for "pathogens" due to violations of the water quality objective for coliform bacteria. Fecal coliform bacteria in water are indicators of contamination from the feces of warm-blooded animals and of the possible presence of many different kinds of pathogenic microorganisms.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Upper Truckee River	**Pollutant(s)**	Pathogens
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Livestock, human recreational users, dogs, wildlife.
Total Length	21.5 miles	**TMDL Priority**	High
Size Affected	~9 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.942°N, 119.995° W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The Upper Truckee River is the largest stream tributary to Lake Tahoe in terms of flow and watershed size, and it may be delivering some of the largest nutrient and sediment loads to the lake. The Upper Truckee River watershed, with an area of 56.5 square miles, is almost entirely within El Dorado County; about 3 square miles of the upper watershed is in Alpine County. Land surface elevations range from lake level (about 6,625 feet above sea level) to 10,063 feet at Red Lake Peak. Slopes range from nearly flat at lake level to as much as 50% in the upper elevations. There are 24 tributary streams to the Upper Truckee River. The main tributary drainages to the Upper Truckee River, with watershed areas, are as follows: Grass Lake Creek (6.4 square miles), Angora Creek (5.7 square miles), Echo Creek (5.4 square miles), and Big Meadow Creek (5.1 square miles). Major wetlands include Grass Lake, Osgood Swamp, Truckee Marsh, Benwood Meadow, and Big Meadow. Grass Lake is the largest quaking bog in California. Major lakes in the watershed include Upper and Lower Echo Lakes, and smaller lakes include Dardanelles, Round, Showers, Elbert, Tamarack, Ralston, and Angora Lakes. Most of the watershed is in U.S. Forest Service ownership. The upper reach of the Upper Truckee River, above Christmas Valley, has been recommended for inclusion in the federal Wild and Scenic Rivers system. Water is diverted out of the Lake Tahoe Basin to the American River from Lower Echo Lake.

The Upper Truckee River watershed was severely disturbed in the 19th and early 20th Centuries by logging and grazing, and in the later 20th Century by hydromodification and urban development. The river has been channelized near the South Lake Tahoe airport and near its confluence with Lake Tahoe, and a large portion of the Truckee Marsh near its mouth has been developed as the Tahoe Keys subdivision. The *Lake Tahoe Watershed Assessment* gave the river an Aquatic Ecosystem Rating of "imperiled."

The Meiss grazing allotment covers 11,000 acres near the headwaters of the Upper Truckee River. Meiss Meadows, near Carson Pass, has been used for grazing since 1868. Currently up to 200 cow-calf pairs graze the area each year.

Water Quality Objectives Not Attained

The water quality objective for coliform bacteria in surface waters of the Lahontan Basin Plan states:

> *"Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.*
>
> *The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml."*

The units used in the water quality objective are the numbers of bacterial colonies per 100 milliliters (ml), sometimes referred to as the "Most Probable Number" or MPN. This objective applies to all surface waters of the Lahontan Region.

Evidence of Impairment

Through analysis of data collected in a cooperative U.S. Forest Service/Regional Board monitoring program, Regional Board staff have documented violations of the water quality objective during years of grazing since 1991. Staff's analysis of data collected in the Dardanelles (Meiss) grazing allotment in 1999 when no grazing occurred, ~~and~~ in 2000 when grazing was allowed, showed violations of the water quality objective at two stations during the late grazing season when livestock were present. No violations were found at a third station during either year. Log means of fecal coliform data collected at the Regional Board's Station 1 in upper Christmas Valley in July and August 2001 ranged from 24 to 33 colonies per 100 ml, in violation of the objective. The 40/100 ml limit was also exceeded in September 2001.

Extent of Impairment

The segment proposed for listing extends from the headwaters of the Upper Truckee River to Lahontan Regional Board staff's monitoring Station 1 at Hawley Grade.

TMDL Priority

This TMDL is recommended for high priority because of the resource value of the Upper Truckee River watershed and the potential for human health problems. However, it is recommended for completion after 2015 because of other high priorities. The U.S. Forest Service has made a commitment to control grazing so as to ensure attainment of the standard, and Regional Board staff

have requested that a recreation strategy be developed to reduce the loading of fecal coliform bacteria from other anthropogenic sources. Monitoring will continue, and if the standard is attained, this water body/pollutant combination will be recommended for delisting during a future cycle.

Information Sources

Bourelle, A. 1999. Regulations may force cattle out. *Tahoe Daily Tribune*, November 23, 1999.

California Regional Water Quality Control Board, Lahontan Region, 1975. *Water Quality Control Plan for the North Lahontan Basin.*

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. Letter dated February 23, 2001, from Lauri Kemper, Chief, Lake Tahoe Watershed Unit, to Maribeth Gustafson, Forest Supervisor, Lake Tahoe Basin Management Unit, "Summary of Fecal Coliform Statistics on Meiss Grazing Allotment-1999 and 2000 Seasons, and Recommendations for 2001 Season."

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

California Regional Water Quality Control Board, Lahontan Region and U.S. Forest Service, Lake Tahoe Basin Management Unit, 2000-2001. Unpublished fecal coliform data for the Upper Truckee River.

BIG MEADOW CREEK, PATHOGENS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

A segment of Big Meadow Creek, in the Lake Tahoe Basin, is proposed to be listed for "pathogens" due to violations of the water quality objective for coliform bacteria. Fecal coliform bacteria in water are indicators of contamination from the feces of warm-blooded animals, and of the possible presence of many different kinds of pathogenic microorganisms.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Big Meadow Creek	**Pollutant(s)**	Pathogens
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	livestock, humans, dogs, wildlife, etc.
Total Length	~3.5 miles	**TMDL Priority**	High
Size Affected	~2 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.779°N, 119.998°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Big Meadow Creek is a tributary of the Upper Truckee River, which in turn is tributary to Lake Tahoe. Its watershed area is 5.1 square miles. Most of the watershed is in El Dorado County, but there is one tributary stream with its headwaters in Alpine County. The main creek is about 3.5 miles long. The watershed is mostly forested, but includes a large meadow and smaller riparian/meadow areas. The watershed has been heavily disturbed by historic and recent grazing. It is currently used for dispersed recreation including summer hiking and camping and winter cross-country skiing.

Water Quality Objectives Not Attained

The water quality objective for coliform bacteria in surface waters of the Lahontan Basin Plan states:

> *"Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.*
>
> *The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml."*

The units used in the water quality objective are the numbers of bacterial colonies per 100 milliliters (ml), sometimes referred to as the "Most Probable Number" or MPN. This objective applies to all surface waters of the Lahontan Region.

Evidence of Impairment

Regional Board staff compared monitoring data from three stations on Big Meadow Creek during 1999 (when grazing occurred) and 2000 (when there was no grazing). At the downstream station, BM-1, there was a nearly 10-fold increase in fecal coliform bacteria during the grazing season. However, the objective was violated four times during the July 16-October 1, 2000 (non-grazing) period, indicating probable influence of horses, hikers, campers, dogs, wildlife, etc.). The middle station, BM-2 showed consistent violations with grazing and no violations without grazing. The upstream station, BM-3, had violations in four out of six samples with grazing, and two out of ten samples without grazing. During the grazing season in 1999, samples collected when livestock were present had violations from 50-70% of the time, while the corresponding period in 2000 had only 0-9% violations. The U.S. Forest Service's raw data for 2001 show that violations of the 40/100 ml objective occurred in August and September.

Extent of Impairment

The segment of Big Meadow Creek proposed for listing extends from the headwaters to just below the U.S.Forest Service foot bridge at lower Big Meadow (U.S. Forest Service monitoring station BM-1).

TMDL Priority

This TMDL is recommended for high priority because of the resource value of the Upper Truckee River watershed and the potential for human health problems. However, it is recommended for completion after 2015 because of other high priorities. The U.S. Forest Service has made a commitment to control grazing so as to ensure attainment of the standard within the Meiss Grazing Allotment, and Regional Board staff have requested that a recreation strategy be developed to reduce the loading of fecal coliform bacteria from other anthropogenic sources. Monitoring will continue, and if the standard is attained, this water body/pollutant combination will be recommended for delisting during a future cycle.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. Letter dated February 23, 2001, from Lauri Kemper, Chief, Lake Tahoe Watershed Unit, to Maribeth Gustafson, Forest Supervisor, Lake Tahoe Basin Management Unit, "Summary of Fecal Coliform Statistics on Meiss Grazing Allotment—1999 and 2000 Seasons, and Recommendations for 2001 Season."

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Rowe, T.G., and K.K. Allander, 2000. *Surface- and Ground-Water Characteristics in the Upper Truckee River and Trout Creek Watersheds, South Lake Tahoe, California and Nevada, July-December 1996.* U.S. Geological Survey Water-Resources Investigations Report 00-4001. Available on the Internet: http://water.usgs.gov/pubs/wri/wri004001/.

TROUT CREEK, PHOSPHORUS
2002 303(d) Fact Sheet
Listing

Summary of Proposed Action

Trout Creek, a tributary of Lake Tahoe, is proposed to be added to the Section 303(d) list for violations of the water quality objective for total phosphorus.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Trout Creek	**Pollutant(s)**	Phosphorus
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Erosion, stormwater, atmospheric deposition, fertilizer use.
Total Length	10.7 miles	**TMDL Priority**	High
Size Affected	10.7 miles	**TMDL End Date**	After 2015
Latitude/Longitude	39.941°N, 119.996°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The Trout Creek watershed is located within El Dorado County, east of the Upper Truckee River watershed. It is the second largest watershed in the Lake Tahoe basin, with an area of 41.2 square miles. Elevation ranges from lake level (about 6225 feet) to 10,811 feet at Freel Peak. Slopes ranges from nearly flat to 50% at higher elevations. Major tributaries with watershed areas include Cold Creek (12.8 square miles), Saxon Creek (8.2 square miles), Heavenly Valley Creek (3.0 square miles), and Hidden Valley Creek (1.7 square miles). Major wetlands include the Truckee Marsh, High Meadows, and Hell Hole. The only lake in this watershed is Star Lake.

The Trout Creek watershed has been disturbed by historic logging and livestock grazing, ski resort development in the Heavenly Valley Creek watershed, and urban development near Lake Tahoe. The watershed includes a closed municipal landfill, older subdivisions which formerly used septic systems, an area formerly used for land disposal of secondary effluent, and the current South Tahoe Public Utility District wastewater treatment plant and storage facilities.

Water Quality Objectives Not Attained

The water quality objective for total phosphorus in Trout Creek is 0.015 milligrams per liter (mg/L) as an annual mean.

Evidence of Violation

Annual mean phosphorus concentrations for Trout Creek from Lake Tahoe Interagency Monitoring Program (LTIMP) data violated the water quality objectives in all 14 of the water years between 1980 and 1996 during which Trout Creek was sampled. (Data are summarized in the Tahoe Regional Planning Agency's Annual Report.) Rowe's (1998) analysis of LTIMP data collected between 1988 and 1996 shows a range in concentration from 0.003 to 0.393 mg/L, with a median value of 0.041 mg/L.

Extent of Violation

The entire creek is proposed for listing.

Potential Sources

The major sources of phosphorus in the Trout Creek watershed are probably erosion, stormwater and atmospheric deposition, and fertilizer use. Development and disturbance of wetlands and riparian areas in the Trout Creek watershed has reduced their former natural filtering capacity for nutrients and probably increased phosphorus loading to Lake Tahoe.

TMDL Priority

This TMDL is recommended for a high priority ranking. Phosphorus loading from the Trout Creek watershed will be addressed during development of the Lake Tahoe phoshorus TMDL. If a more specific TMDL for Trout Creek is needed, it will be completed after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Liu, M.S., J.E. Reuter, and C.R. Goldman, 2001. Seasonal Significance of Atmospheric Deposition of Phosphorus and the Sources of Deposition for Lake Tahoe, CA-NV. Abstract of paper presented at meeting of American Society of Limnology and Oceanography, Albuquerque NM, February 2001.

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

Rowe, T.G., 1998. *Loads and Yields of Sediment and Nutrients for Selected Watersheds in the Lake Tahoe Basin, California and Nevada.* U.S. Geological Survey, paper presented at Water Quality Monitoring Council 1998 Conference. Available on the Internet: <http://204.87.241.11/98proceedings/Papers/50-ROWE.html>

Rowe, T.G., and K.K. Allander, 2000. *Surface- and Ground-Water Characteristics in the Upper Truckee River and Trout Creek Watersheds, South Lake Tahoe, California and Nevada, July-December 1996.* U.S. Geological Survey Water-Resources Investigations Report 00-4001. Available on the Internet: <http://water.usgs.gov/pubs/wri/wri004001/>

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

TROUT CREEK, NITROGEN
2002 303(d) Fact Sheet
Listing

Summary of Proposed Action

Trout Creek, a tributary of Lake Tahoe, is proposed to be added to the Section 303(d) list due to violation of the water quality objective for total nitrogen.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Trout Creek	**Pollutant(s)**	Nitrogen
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Erosion, stormwater, atmospheric deposition, fertilizer use
Total Length	10.7 miles	**TMDL Priority**	High
Size Affected	10.7 miles	**TMDL End Date**	After 2015
Latitude/Longitude	39.941°N, 119.996°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The Trout Creek watershed is located within El Dorado County, east of the Upper Truckee River watershed. It is the second largest watershed in the Lake Tahoe basin with an area of 41.2 square miles. Elevation ranges from lake level (about 6225 feet) to 10,811 feet at Freel Peak. Slopes range from nearly flat to 50 percent at higher elevations. Major tributaries with watershed areas include Cold Creek (12.8 square miles), Saxon Creek (8.2 square miles), Heavenly Valley Creek (3.0 square miles), and Hidden Valley Creek (1.7 square miles). Major wetlands include the Truckee Marsh, High Meadows, and Hell Hole. The only lake in this watershed is Star Lake.

The Trout Creek watershed has been disturbed by historic logging and livestock grazing, ski resort development in the Heavenly Valley Creek watershed, and urban development near Lake Tahoe. The watershed includes a closed municipal landfill, older subdivisions which formerly used septic systems, an area formerly used for land disposal of secondary effluent, and the current South Tahoe Public Utility District wastewater treatment plant and storage facilities.

Water Quality Objectives Not Attained

The water quality objective for total nitrogen in Trout Creek is 0.19 milligrams per liter (mg/L) as an annual mean.

Evidence of Impairment

Lake Tahoe Interagency Monitoring Program (LTIMP) data summarized by the Tahoe Regional Planning Agency (1999) show that annual mean concentrations of total nitrogen in Trout Creek were in violation of the water quality objective during six of the 8 water years of sampling between 1989 and 1996. The highest annual mean value reported was 0.275 mg/L during Water Year 1995. Rowe (1998) summarized LTIMP data separately for total ammonia plus organic nitrogen

and for dissolved nitrate plus nitrite, for the period between 1998 and 1996. During that time, the concentration of total ammonia plus organic nitrogen in Trout Creek ranged from 0.02 to 2.1 mg/L with a median value of 0.21 mg/L, and dissolved nitrate plus nitrate ranged from 0.002 to 0.060 mg/L with a median value of 0.008 mg/L.

Extent of Impairment

The entire creek is recommended for listing.

Potential Sources

Nitrogen in the Trout Creek watershed comes from natural sources such as nitrogen fixation by plants, and from anthropogenic sources including atmospheric deposition, urban stormwater and fertilizer use, past livestock grazing, and past septic system use and wastewater disposal to land.

TMDL Priority

A high priority is recommended for this TMDL. Nitrogen loading from the Trout Creek watershed will be addressed during the development of the Lake Tahoe nitrogen TMDL. If a more specific nitrogen TMDL for Trout Creek is needed, it will be completed after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

Rowe, T.G., 1998. *Loads and Yields of Sediment and Nutrients for Selected Watersheds in the Lake Tahoe Basin, California and Nevada.* U.S. Geological Survey, paper presented at Water Quality Monitoring Council 1998 Conference. Available on the Internet: http://204.87.241.11/98proceedings/Papers/50-ROWE.html.

Rowe, T.G., and K.K. Allander, 2000. *Surface- and Ground-Water Characteristics in the Upper Truckee River and Trout Creek Watersheds, South Lake Tahoe, California and Nevada, July-December 1996.* U.S. Geological Survey Water-Resources Investigations Report 00-4001. Available on the Internet: http://water.usgs.gov/pubs/wri/wri004001/.

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

TROUT CREEK, IRON
2002 303(d) Fact Sheet
Listing

Summary of Proposed Action

Trout Creek, a tributary of Lake Tahoe, is proposed to be listed for violation of the water quality objective for total iron.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Trout Creek	**Pollutant(s)**	Iron
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Erosion, stormwater, atmospheric deposition
Total Length	10.7 miles	**TMDL Priority**	Medium
Size Affected	10.7 miles	**TMDL End Date**	After 2015
Latitude/Longitude	39.941°N, 119.996°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The Trout Creek watershed is located within El Dorado County, east of the Upper Truckee River watershed. It is the second largest watershed in the Lake Tahoe basin with an area of 41.2 square miles. Elevation ranges from lake level (about 6225 feet) to 10,811 feet at Freel Peak. Slopes range from nearly flat to 50 percent at higher elevations. Major tributaries with watershed areas include Cold Creek (12.8 square miles), Saxon Creek (8.2 square miles), Heavenly Valley Creek (3.0 square miles), and Hidden Valley Creek (1.7 square miles). Major wetlands include the Truckee Marsh, High Meadows, and Hell Hole. The only lake in this watershed is Star Lake.

The Trout Creek watershed has been disturbed by historic logging and livestock grazing, ski resort development in the Heavenly Valley Creek watershed, and urban development near Lake Tahoe. The watershed includes a closed municipal landfill, older subdivisions which formerly used septic systems, an area formerly used for land disposal of secondary effluent, and the current South Tahoe Public Utility District wastewater treatment plant and storage facilities.

Water Quality Objectives Not Attained

The water quality objective for total iron in Trout Creek is 0.03 milligrams per liter (mg/L) as an annual mean.

Evidence for Impairment

Data from the Lake Tahoe Interagency Monitoring Program (LTIMP) summarized by the Tahoe Regional Planning Agency (TRPA) in 1999 show that annual average concentrations of total iron from Trout Creek violated the water quality objective every year between Water Years 1989 and 1996. Rowe's (1998) analysis of LTIMP data reported "total bioreactive iron" concentrations ranging from 137 to 8,750 mg/L in Trout Creek between 1988 and 1996, with a median value of 620 mg/L. (Rowe expresses iron concentrations in micrograms per liter [ug/L] in the text of his report, and the use of mg/L in his summary table is probably a typographical error.)

Iron is measured in the LTIMP as "total biologically available iron (BaFe)" or "total bioreactive iron." It is monitored because of its importance as a plant nutrient. Water quality objectives for iron in tributaries of Lake Tahoe were based on limited data collected before 1980 and probably do not reflect natural background concentrations.

Extent of Impairment

The entire creek is recommended for listing.

Potential Sources

Iron is naturally present in soils of the Trout Creek watershed. Loading of iron to the creek has probably increased over natural background levels due to increases in erosion and stormwater runoff.

TMDL Priority

A medium priority is recommended for this TMDL, which is projected for completion after 2015. Revision of water quality objectives for iron in tributaries of Lake Tahoe may be considered before that date.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 2001. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

Rowe, T.G., 1998. *Loads and Yields of Sediment and Nutrients for Selected Watersheds in the Lake Tahoe Basin, California and Nevada.* U.S. Geological Survey, paper presented at Water Quality Monitoring Council 1998 Conference. Available on the Internet: http://204.87.241.11/98proceedings/Papers/50-ROWE.html

Rowe, T.G., and K.K. Allander, 2000. *Surface- and Ground-Water Characteristics in the Upper Truckee River and Trout Creek Watersheds, South Lake Tahoe, California and Nevada, July-December 1996.* U.S. Geological Survey Water-Resources Investigations Report 00-4001. Available on the Internet: <http://water.usgs.gov/pubs/wri/wri004001/>

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

TROUT CREEK, PATHOGENS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

A one-mile segment of Trout Creek is proposed to be listed for "pathogens" due to violations of the water quality objective for coliform bacteria. Fecal coliform bacteria in water are indicators of contamination from the feces of warm-blooded animals and of the possible presence of many different kinds of pathogenic microorganisms.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Trout Creek	**Pollutant(s)**	Pathogens
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	livestock, humans, dogs, wildlife, etc.
Total Length	10.7 miles	**TMDL Priority**	High
Size Affected	~ 1 mile	**TMDL End Date**	After 2015
Latitude/Longitude	39.941°N, 119.996°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The Trout Creek watershed is located within El Dorado County, east of the Upper Truckee River watershed. It is the second largest watershed in the Lake Tahoe basin with an area of 41.2 square miles. Elevation ranges from lake level (about 6225 feet) to 10,811 feet at Freel Peak. Slopes range from nearly flat to 50 percent at higher elevations. Major tributaries with watershed areas include Cold Creek (12.8 square miles), Saxon Creek (8.2 square miles), Heavenly Valley Creek (3.0 square miles), and Hidden Valley Creek (1.7 square miles). Major wetlands include the Truckee Marsh, High Meadows, and Hell Hole. The only lake in this watershed is Star Lake.

The Trout Creek watershed has been disturbed by historic logging and livestock grazing, ski resort development in the Heavenly Valley Creek watershed, and urban development near Lake Tahoe. The watershed includes a closed municipal landfill, older subdivisions which formerly used septic systems, an area formerly used for land disposal of secondary effluent, and the current South Tahoe Public Utility District wastewater treatment plant and storage facilities.

Water Quality Objectives Not Attained

The water quality objective for coliform bacteria in surface waters of the Lahontan Basin Plan states:

> *"Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.*
>
> *The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml."*

The units used in the water quality objective are the numbers of bacterial colonies per 100 milliliters (ml), sometimes referred to as the "Most Probable Number" or MPN. This objective applies to all surface waters of the Lahontan Region.

Evidence of Impairment

At Regional Board Station 7, "Trout Creek at Highway 50," one samples exceeded the 20/100 ml log mean objective in June 2001, and all samples exceeded this objective in July 2001. The 40/100 ml objective was exceeded in every month between June and September, 2001.

At Regional Board Station 10, "Lower Trout Creek", the 20/100 ml log mean objective was exceeded in July 2001. The 40/100 ml objective was exceeded in July and August.

Violations of both objectives were also documented in 2000.

Extent of Impairment

The segment of Trout Creek proposed for listing extends downstream from the Highway 50 bridge in South Lake Tahoe to the creek's confluence with the Upper Truckee River/Lake Tahoe backwater, and is about one mile long..

Potential Sources

Livestock wastes are probably the major source of fecal coliform bacteria. Other possible sources include wildlife, pets, and human (transient or recreational) users of the Trout Creek meadow.

TMDL Priority

This TMDL is recommended for a high priority with completion projected to occur after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2000-2001. Unpublished fecal coliform data for Trout Creek

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Rowe, T.G., and K.K. Allander, 2000. *Surface- and Ground-Water Characteristics in the Upper Truckee River and Trout Creek Watersheds, South Lake Tahoe, California and Nevada, July-December 1996.* U.S. Geological Survey Water-Resources Investigations Report 00-4001. Available on the Internet: http://water.usgs.gov/pubs/wri/wri004001/.

TALLAC CREEK, PATHOGENS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

A segment of Tallac Creek, a tributary of Lake Tahoe, is proposed to be listed for "pathogens" due to violations of the narrative water quality objective for fecal coliform bacteria. Fecal coliform bacteria in water are indicators of contamination from the feces of warm-blooded animals and of the possible presence of many different kinds of pathogenic microorganisms.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Tallac Creek	**Pollutant(s)**	Pathogens
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Livestock, human recreational users, pets, wildlife
Total Length	~3 miles	**TMDL Priority**	High
Size Affected	~0.5 mile	**TMDL End Date**	After 2015
Latitude/Longitude	38.941°N, 120.058°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Tallac Creek originates in the Desolation Wilderness on the slopes of Mount Tallac, and flows into Lake Tahoe in the Baldwin Beach area. The watershed area is 2932 acres. Tallac Creek has two small tributary streams, and Floating Island Lake is located within its watershed. The U.S. Forest Service Baldwin Grazing Allotment is located on 210 acres along lower Tallac Creek near the Baldwin and Ski Beach recreation areas. The allotment supports grazing by 50 horses and mules from Cascade Stables between July 1 and September 1. The Tallac Creek watershed also includes the U.S. Forest Service Spring Creek summer home tract.

Water Quality Objectives Not Attained

The narrative water quality objective for fecal coliform bacteria in the Lahontan Basin Plan states:

> *"Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.*
>
> *The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml."*

The units used in the water quality objective are the numbers of bacterial colonies per 100 milliliters (ml), sometimes referred to as the "Most Probable Number" or MPN. This objective applies to all surface waters of the Lahontan Region.

Evidence of Impairment

Extent of Impairment

The reach of Tallac Creek proposed for listing extends downstream from the Highway 89 bridge (U.S. Forest Service monitoring station B-2) to Lake Tahoe (below U.S.Forest Service station B-1).

Potential Sources

Livestock wastes are probably the major sources of fecal coliform loading to the segment of Tallac Creek proposed for listing. Wildlife, human recreational users of the watershed and their pets are other possible sources.

TMDL Priority

This TMDL is recommended for a high priority, with completion projected to occur after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region and U.S. Forest Service, Lake Tahoe Basin Management Unit, 2000-2001. Unpublished fecal coliform data for Tallac Creek..

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

U.S. Forest Service, Lake Tahoe Basin Management Unit, 2001. Wildlife/Range Management. Available on the Internet: www.r5.fs.fed.us/ltbmu/management/wildlife/range

WARD CREEK, NITROGEN
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Ward Creek, a tributary of Lake Tahoe, is currently listed for sediment. An additional listing for nitrogen is proposed.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Ward Creek	**Pollutant(s)**	Nitrogen
Hydrologic Unit	Lake Tahoe (634.20)	**Sources**	Erosion, stormwater, atmospheric deposition
Total Length	5.90 miles	**TMDL Priority**	High
Size Affected	5.90 miles	**TMDL End Date**	After 2015
Latitude/Longitude	39.120° N, 120.154 °W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Ward Creek, in Placer County, is tributary to Lake Tahoe on its western shore, near the community of Sunnyside. It has one tributary stream. Ward Creek has a watershed area of 9.75 square miles and a main channel length of 5.90 miles. Its average annual runoff between 1993 and 1996 was 23,200 acre-feet; the average annual mean daily streamflow for this period was 32.1 cubic feet per second. In addition to the development near its mouth, the Alpine Peaks subdivision and roads and lifts from the Alpine Meadows ski resort are located in Ward Creek's upper watershed. It is one of the streams which has received long term sampling under the Lake Tahoe Interagency Monitoring Program (LTIMP), and it has been the site of a number of University of California, Davis Tahoe Research Group research projects.

Water Quality Objectives Not Attained

The water quality objective for total nitrogen in Ward Creek is 0.15 mg/L (milligrams per liter) as an annual mean.

Evidence of Impairment

The Tahoe Regional Planning Agency's (1999) summary of data from the LTIMP shows that annual mean concentrations of total nitrogen in Ward Creek exceeded the water quality objective in seven of eight water years between Water Years 1989 and 1996. Rowe (1998) also analyzed LTIMP data collected between 1988 and 1996. He found that "total ammonia plus organic nitrogen" (total Kjeldahl nitrogen) concentrations in Ward Creek ranged from 0.2-1.2 mg/L with a median concentration of 0.12 mg/L, and "dissolved nitrite plus nitrate" ranged from 0.001 to 0.072 mg/L with a median concentration of 0.010 mg/L. Rowe's analysis of mean daily yields of nitrogen showed Ward Creek to have the highest total Kjeldahl nitrogen yield of the ten LTIMP streams studied.

Extent of Impairment

The entire creek is recommended for listing.

Potential Sources

Nitrogen in Ward Creek probably comes from natural sources such as nitrogen fixation, and from atmospheric deposition, erosion, and stormwater.

TMDL Priority

A high priority is recommended for the Ward Creek nitrogen TMDL. Nitrogen loading from the Ward Creek watershed will be addressed as part of the Lake Tahoe nitrogen TMDL. If a more specific TMDL is needed for Ward Creek, it will be completed after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 2001. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

Rowe, T.G., 1998. *Loads and Yields of Sediment and Nutrients for Selected Watersheds in the Lake Tahoe Basin, California and Nevada.* U.S. Geological Survey, paper presented at Water Quality Monitoring Council 1998 Conference. Available on the Internet: http://204.87.241.11/98proceedings/Papers/50-ROWE.html.

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

WARD CREEK, PHOSPHORUS
2002 303(d) Fact Sheet
Listing

Summary of Proposed Action.

Ward Creek, a tributary of Lake Tahoe, is proposed to be added to the Section 303(d) List for violations of the water quality objective for Total Phosphorus.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Ward Creek	**Pollutant(s)**	Phosphorus
Hydrologic Unit	Lake Tahoe (634.20)	**Sources**	Erosion, atmospheric deposition
Total Length	5.90 miles	**TMDL Priority**	High
Size Affected	5.90 miles	**TMDL End Date**	After 2015
Latitude/Longitude	39.120° N, 120.154 °W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Ward Creek, in Placer County, is tributary to Lake Tahoe on its northwestern shore, near the community of Sunnyside. It has one tributary stream. Ward Creek has a watershed area of 9.75 square miles and a main channel length of 5.90 miles. Its average annual runoff between 1993 and 1996 was 23,200 acre-feet; the average annual mean daily streamflow for this period was 32.1 cubic feet per second. In addition to the development near its mouth, the Alpine Peaks subdivision and roads and lifts from the Alpine Meadows ski resort are located in Ward Creek's upper watershed. The Ward Creek watershed has been disturbed by past logging and grazing. It is one of the streams which has received long term sampling under the Lake Tahoe Interagency Monitoring Program (LTIMP), and has been the site of a number of University of California, Davis Tahoe Research Group research projects.

Water Quality Objectives Not Attained

The numerical water quality objective for total phosphorus in Ward Creek is 0.015 milligrams per liter (mg/L), as an annual mean.

Evidence of Impairment

A summary of data from the LTIMP by the Tahoe Regional Planning Agency (1999) shows that concentrations of total phosphorus in Ward Creek violated the water quality objective in 15 of 17 water years between Water Years 1980 and 1996. Rowe's (1998) analysis of LTIMP data collected between 1988 and 1996 showed that phosphorus concentrations in Ward Creek ranged from 0.008 mg/L to 20.02 mg/L, with a median value of 0.032.

Extent of Impairment

The entire creek is recommended for listing.

Potential Sources

Phosphorus in the Ward Creek watershed is probably associated largely with eroded sediment, but may also come from atmospheric deposition, from sources such as wood ash and windblown dust. Erosion from streambanks and from the "badlands" area near the headwaters of Ward Creek has been cited as a significant sediment source; the University of California, Davis Tahoe Research Group is conducting research to identify source areas more precisely.

TMDL Priority

A high priority is recommended for the Ward Creek phosphorus TMDL. Nutrient loading from the Ward Creek watershed to will be addressed as part of the Lake Tahoe phosphorus TMDL. If a more specific TMDL is needed for Ward Creek, it will be completed after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 2001. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Liu, M.S., J.E. Reuter, and C.R. Goldman, 2001. Seasonal Significance of Atmospheric Deposition of Phosphorus and the Sources of Deposition for Lake Tahoe, CA-NV. Abstract of paper presented at meeting of American Society of Limnology and Oceanography, Albuquerque NM, February 2001.

Rowe, T.G., 1998. *Loads and Yields of Sediment and Nutrients for Selected Watersheds in the Lake Tahoe Basin, California and Nevada.* U.S. Geological Survey, paper presented at Water Quality Monitoring Council 1998 Conference. Available on the Internet: http://204.87.241.11/98proceedings/Papers/50-ROWE.html.

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

WARD CREEK, IRON
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Ward Creek, a tributary of Lake Tahoe, is proposed to be listed for violations of the water quality objective for total iron.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Ward Creek	**Pollutant(s)**	Iron
Hydrologic Unit	Lake Tahoe (634.20)	**Sources**	Erosion, stormwater
Total Length	5.90 miles	**TMDL Priority**	Medium
Size Affected	5.90 miles	**TMDL End Date**	After 2015
Latitude/Longitude	39.120° N, 120.154 °W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Ward Creek, in Placer County, is tributary to Lake Tahoe on its northwest shore, near the community of Sunnyside. It has one tributary stream. Ward Creek has a watershed area of 9.75 square miles and a main channel length of 5.90 miles. Its average annual runoff between 1993 and 1996 was 23,200 acre-feet; the average annual mean daily streamflow for this period was 32.1 cubic feet per second. In addition to the development near its mouth, the Alpine Peaks subdivision and roads and lifts from the Alpine Meadows ski resort are located in Ward Creek's upper watershed. It is one of the streams which has received long term sampling under the Lake Tahoe Interagency Monitoring Program (LTIMP), and has been the site of a number of University of California, Davis Tahoe Research Group research projects.

Water Quality Objectives Not Attained

The numerical water quality objective for total iron in Ward Creek is 0.03 milligrams per liter (mg/L), annual mean.

Evidence of Impairment

The Tahoe Regional Planning Agency's (1999) summary of data from the LTIMP shows that annual mean concentrations of total iron exceeded the water quality objective during every water year from Water Year 1989 to 1996. The highest annual mean concentration was 1.690 mg/L in Water Year 1996. Rowe's (1998) analysis of LTIMP data collected between 1988 and 1996 showed that instantaneous concentrations of total bioreactive iron ranged from 8 mg/L to 33,900 mg/L in Ward Creek, with a median concentration of 159 mg/L. (Rowe expresses iron concentrations in micrograms per liter [ug/L] in the text of his report, and the use of mg/L in his summary table is probably a typographical error.)

Iron is measured in the LTIMP as "total biologically available iron (BaFe)" or "total bioreactive iron." It is monitored because of its importance as a plant nutrient. Water quality objectives for iron in tributaries of Lake Tahoe were based on limited data collected before 1980 and probably do not reflect natural background concentrations.

Extent of Impairment

The entire creek is recommended for listing.

Potential Sources

Iron is naturally present in soils of the Ward Creek watershed. Loading of iron to the creek has probably increased over natural background levels due to watershed disturbance.

TMDL Priority

A medium priority is recommended for this TMDL, which is projected for completion after 2015. Revision of water quality objectives for iron in tributaries of Lake Tahoe may be considered before that date.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 2001. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

Rowe, T.G., 1998. *Loads and Yields of Sediment and Nutrients for Selected Watersheds in the Lake Tahoe Basin, California and Nevada.* U.S. Geological Survey, paper presented at Water Quality Monitoring Council 1998 Conference. Available on the Internet: http://204.87.241.11/98proceedings/Papers/50-ROWE.html.

Tahoe Regional Planning Agency, 1999. *Annual Water Quality Report.*

Water Body Fact Sheets for 2002
Section 303(d) List Update
Lahontan Region

WEST FORK AND EAST FORK CARSON RIVER HYDROLOGIC UNITS

California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Boulevard
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November 2001

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WEST FORK CARSON RIVER, HEADWATERS TO WOODFORDS, PHOSPHORUS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of the West Fork Carson River between its headwaters and the community of Woodfords is proposed to be listed for phosphorus.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	West Fork Carson River	**Pollutant(s)**	Phosphorus
Hydrologic Unit	West Fork Carson River (633.00)	**Sources**	Erosion, stormwater, atmospheric deposition
Total Length	~ 21 miles (in CA)	**TMDL Priority**	High
Size Affected	~15 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.778° N 119.821°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The East and West Forks of the Carson River are located in Alpine County. The forks join to form the Carson River near Genoa, Nevada. Both the East and West Forks originate on the eastern side of the Sierra Nevada in or near federal wilderness areas. Most of the California portion of the Carson River watershed is in public ownership, and the local economy depends heavily on tourism. The watershed also includes lands of the Washoe Tribe of California and Nevada. The Carson River watershed is popular for sport fishing, rafting, and other outdoor recreation activities which depend on high water quality.

The West Fork originates in the Lost Lakes and flows through scenic Hope Valley, where public funds have recently been spent to acquire important wetland/riparian habitat and a restoration project to address the impacts of historic (pre-1989) grazing is under way. There are several small lakes at the headwaters of the West Fork, some of which are managed as reservoirs to support irrigation in the lower watershed. Water diversions are limited by the California-Nevada Interstate Water Compact and managed by a federal watermaster under a court decree. The drainage area of the West Fork Carson River upstream of the USGS gaging station near Woodfords is 65.40 square miles.

Development in the upper watershed includes campgrounds, Sorensen's Resort, a small subdivision, roads, and two inactive mines. At lower elevations, the river passes through the communities of Woodfords and Paynesville. Highway 88 is located near the West

Fork from Hope Valley to the state line. Near Woodfords, the watershed is still recovering from the impacts of wildfire. Cattle ranching is important in the lower section of West Fork watershed, where pasturelands are irrigated with secondary wastewater effluent exported from the Lake Tahoe Basin.

Water Quality Objectives Not Attained

The water quality objective for total phosphorus in this segment of the West Fork Carson River is 0.02 milligrams per liter (mg/L), expressed as an annual mean of monthly means. This a running average incorporating historical data. The phosphorus objective is based on data collected in 1981 and 1982. The staff report for the 1983 Basin Plan update states that Regional Board staff did not use storm event data collected by the U.S. Geological Survey in computing the objective.

Evidence of Impairment

Regional Board staff computed the mean of monthly means for phosphorus using data collected by the South Tahoe Public Utility District near Woodfords between 1981 and 2000. The means of monthly means during the assessment period beginning in 1997 were as follows: 1997, 0.09 mg/L; 1998, 0.03 mg/L; 1999, 0.02 mg/L, 2000, 0.03 mg/L. The 1997 figure and subsequent annual means were presumably skewed by the influence of the January 1997 flood, which was greater than a 100 year flood for this reach.

Extent of Impairment

The segment of the Carson River from its headwaters to Woodfords is proposed for listing. (There are some historical water quality data for Hope Valley, but there is currently no routine water quality monitoring above Woodfords.)

Potential Sources

Sources of phosphorus loading to the upper West Fork Carson River may include eroded sediment (from streambanks and from other sources such as road and highway maintenance, construction sites, and slopes denuded by forest fires), stormwater, and atmospheric deposition. (In the Lake Tahoe Basin, atmospheric deposition of phosphorus from road dust and wood ash has been identified as an important nonpoint source.) Zonge and Swanson (1996) measured stream bank erosion in Hope Valley and showed that incised stream banks retreated more than 10 inches during a wet year.

TMDL Priority

This TMDL is recommended for a high priority, with completion after 2015. Revision of water quality objectives for the West Fork Carson River, to express them as annual

means rather than means of monthly means, may be considered before that time.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1983. *West Fork Carson River and Indian Creek Watersheds Water Quality Control Plan Update: 1983.*

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region 2001. Internal Memo from John Steude and Alan Miller to Judith Unsicker, *Summary of water quality analysis for potential CWA listing of the lower [sic] of the West Fork of the Carson River, Alpine County.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Nevada Division of Water Planning, no date. *The Flood of 1997, Final Report.* Available on the Internet: http://www.state.nv.us/cnr/ndwp/flood-97/floodana.htm.

Liu, M.S., J.E. Reuter, and C.R. Goldman, 2001. *Seasonal Significance of Atmospheric Deposition of Phosphorus and the Sources of Deposition for Lake Tahoe, CA-NV.* Abstract of paper presented at meeting of American Society of Limnology and Oceanography, Albuquerque NM, February 2001.

South Tahoe Public Utility District. Unpublished water quality data.

Zonge, L. and S. Swanson, 1996. Changes in Streambanks in the Sierra Nevada Mountains: Perspectives from a Dry and a Wet Year. *Restoration Ecology* 4(2): 192-199.

WEST FORK CARSON RIVER, HEADWATERS TO WOODFORDS, NITROGEN

2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of the West Fork Carson River upstream from Woodfords is proposed to be listed for violation of the water quality objective for total nitrogen.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	West Fork Carson River	**Pollutant(s)**	Nitrogen
Hydrologic Unit	West Fork Carson River (633.00)	**Sources**	Erosion, stormwater, atmospheric deposition
Total Length	~21 miles (in CA)	**TMDL Priority**	High
Size Affected	~15 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.778° N, 119.821°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The East and West Forks of the Carson River are located in Alpine County. The forks join to form the Carson River near Genoa, Nevada. Both the East and West Forks originate on the eastern side of the Sierra Nevada in or near federal wilderness areas. Most of the California portion of the Carson River watershed is in public ownership, and the local economy depends heavily on tourism. The watershed also includes lands of the Washoe Tribe of California and Nevada. The Carson River watershed is popular for sport fishing, rafting, and other outdoor recreation activities which depend on high water quality.

The West Fork originates in the Lost Lakes and flows through scenic Hope Valley, where public funds have recently been spent to acquire important wetland/riparian habitat and a restoration project to address the impacts of historic (pre-1989) grazing is under way. There are several small lakes at the headwaters of the West Fork, some of which are managed as reservoirs to support irrigation in the lower watershed. Water diversions are limited by the California-Nevada Interstate Water Compact and managed by a federal watermaster under a court decree. The drainage area of the West Fork Carson River upstream of the USGS gaging station near Woodfords is 65.40 square miles.

Development in the upper watershed includes campgrounds, Sorensen's Resort, a small subdivision, roads, and two inactive mines. At lower elevations the river passes through the communities of Woodfords and Paynesville. Highway 88 is located near the West

Fork from Hope Valley to the state line. Near Woodfords, the watershed is still recovering from the impacts of wildfire. Cattle ranching is important in the lower section of the West Fork watershed, where pastures are irrigated with secondary wastewater effluent exported from the Lake Tahoe Basin.

Water Quality Objectives Violated

Water quality objectives for nitrogen in this segment of the West Fork Carson River, in milligrams per liter (mg/L), are as follows: Total Kjeldahl nitrogen, 0.13 mg/L; nitrate 0.02 mg/L, and total nitrogen, 0.15 mg/L. All objectives are expressed as "means of monthly means"; these are running averages incorporating historical data.

Evidence of Impairment

Regional Board staff calculated means of monthly means based on data collected by the South Tahoe Public Utility District at Woodfords between 1981 and 2000. (Total Kjeldahl N samples were available only since 1991.) For the Woodfords station, the current means of monthly means were as follows: total Kjeldahl N = 0.20 mg/L; nitrate (as N) =0.04 mg/L; total N = 0.20. All of these values exceed the objectives.

Extent of Impairment

The reach of the river above Woodfords is recommended for listing.

Potential Sources

Scientific research in the Lake Tahoe Basin, to the north of the Carson River watershed, has shown that much of the nitrogen loading to Lake Tahoe comes from long distance transport and deposition from upwind sources. It is probable that similar nitrogen loading to the Carson River watershed is occurring. Local sources of nitrogen loading to this segment may include septic systems, erosion, stormwater, historic livestock grazing, and natural nitrogen fixation by plants and soil bacteria.

TMDL Priority.

This TMDL is recommended for high priority with completion after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1983. *West Fork Carson River and Indian Creek Watersheds Water Quality Control Plan Update: 1983.*

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region 2001. Internal Memo from John Steude and Alan Miller to Judith Unsicker, *Summary of water quality analysis for potential CWA listing of the lower [sic] of the West Fork of the Carson River, Alpine County.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

South Tahoe Public Utility District. Unpublished water quality data.

WEST FORK CARSON RIVER, HEADWATERS TO WOODFORDS, PERCENT SODIUM
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of the West Fork Carson River upstream of Woodfords is proposed to be listed for violations of the narrative water quality objective for "Percent Sodium."

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	West Fork Carson River	**Pollutant(s)**	Percent Sodium
Hydrologic Unit	West Fork Carson River (633.00)	**Sources**	Road salt, septic systems, natural
Total Length	~21 miles (in CA)	**TMDL Priority**	Medium
Size Affected	~15 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.778° N, 119.821°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The East and West Forks of the Carson River are located in Alpine County. The forks join to form the Carson River near Genoa, Nevada. Both the East and West Forks originate on the eastern side of the Sierra Nevada in or near federal wilderness areas. Most of the California portion of the Carson River watershed is in public ownership, and the local economy depends heavily on tourism. The watershed also includes lands of the Washoe Tribe of California and Nevada. The Carson River watershed is popular for sport fishing, rafting, and other outdoor recreation activities which depend on high water quality.

The West Fork originates in the Lost Lakes and flows through scenic Hope Valley, where public funds have recently been spent to acquire important wetland/riparian habitat and a restoration project to address the impacts of historic (pre-1989) grazing is under way. There are several small lakes at the headwaters of the West Fork, some of which are managed as reservoirs to support irrigation in the lower watershed. Water diversions are limited by the California-Nevada Interstate Water Compact and managed by a federal watermaster under a court decree. The drainage area of the West Fork Carson River upstream of the USGS gaging station near Woodfords is 65.40 square miles.

Development in the upper watershed includes campgrounds, Sorensen's Resort, a small subdivision, roads, and two inactive mines. At lower elevations the river passes through the communities of Woodfords and Paynesville. Highway 88 is located near the West Fork from Hope Valley to the state line. Near Woodfords, the watershed is still

recovering from the impacts of wildfire. Cattle ranching is important in the lower section of the West Fork watershed, where pasturelands are irrigated with secondary wastewater effluent exported from the Lake Tahoe Basin.

Water Quality Objectives Violated

The "percent sodium" objective is meant to protect crops against the impacts of excess sodium, which can damage soils and interfere with water uptake. It reflects the amount of sodium (Na) present in relation to the amounts of calcium (Ca), magnesium (Mg) and potassium (K). Percent sodium is computed as follows:

$$\frac{(Na \times 100)}{Na + Ca + Mg + K}$$

Concentrations of the above elements are expressed as milliequivalents per liter. Percent sodium has been superseded as an agricultural criterion by "Sodium Absorption Ratio," which is calculated differently.

The "percent sodium" objective for the West Fork Carson River (20 percent expressed as a mean of monthly means) dates from the 1975 *Water Quality Control Plan for the North Lahontan Basin* and is based on a historic database of 114 samples collected at Woodfords. It is below the recommended criteria for irrigation (30-60 percent) available at the time the objective was last updated in 1983-84.

Evidence of Impairment

Regional Board staff calculated annual means of monthly means for percent sodium using data collected by the South Tahoe Public Utility District between 1981 and 2000. The figure for 2000 was 21.7 %.

Potential Sources

Possible anthropogenic sources of sodium in the upper West Fork watershed are road salt used on Highway 88 and wastewater disposed to septic systems.

TMDL Priority

This TMDL is recommended for a medium priority, with completion projected to occur after 2015 if a TMDL is still needed. It may be possible to ensure attainment of the objective before that time through source controls. Alternatively, Regional Board staff may consider revising the percent sodium objective to reflect current agricultural criteria.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1975. *Water Quality Control Plan for the North Lahontan Basin.*

California Regional Water Quality Control Board, Lahontan Region, 1983. *West Fork Carson River and Indian Creek Watersheds Water Quality Control Plan Update: 1983.*

California Regional Water Quality Control Board, Lahontan Region, 1995. Water Quality Control Plan for the Lahontan Region.

California Regional Water Quality Control Board, Lahontan Region 2001. Internal Memo from John Steude and Alan Miller to Judith Unsicker, Summary of water quality analysis for potential CWA listing of the lower [sic] of the West Fork of the Carson River, Alpine County.

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

South Tahoe Public Utility District. Unpublished water quality data.

WEST FORK CARSON RIVER, WOODFORDS TO PAYNESVILLE, PERCENT SODIUM

2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of the West Fork Carson River between Woodfords and Paynesville is proposed to be listed for violations of the water quality objective for "percent sodium."

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	West Fork Carson River	**Pollutant(s)**	Percent Sodium
Hydrologic Unit	West Fork Carson River (633.00)	**Sources**	Road salt, septic systems, natural
Total Length	~21 miles (in CA)	**TMDL Priority**	Medium
Size Affected	~ 4 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.809° N, 119.778°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The East and West Forks of the Carson River are located in Alpine County. The forks join to form the Carson River near Genoa, Nevada. Both the East and West Forks originate on the eastern side of the Sierra Nevada in or near federal wilderness areas. Most of the California portion of the Carson River watershed is in public ownership, and the local economy depends heavily on tourism. The watershed also includes lands of the Washoe Tribe of California and Nevada. The Carson River watershed is popular for sport fishing, rafting, and other outdoor recreation activities which depend on high water quality.

Development in the upper watershed includes campgrounds, Sorensen's Resort, a small subdivision, roads, and two inactive mines. At lower elevations, the river passes through the communities of Woodfords and Paynesville. Highway 88 is located near the West Fork from Hope Valley to the state line. Near Woodfords, the watershed is still recovering from the impacts of wildfire.

Cattle ranching is important in the lower section of the West Fork watershed, where pasturelands are irrigated with secondary wastewater effluent exported from the Lake Tahoe Basin. Ranchers using effluent are under reclamation waste discharge requirements from the Lahontan Regional Board. Diversions from the West Fork occur at and below Woodfords and can significantly affect instream flows from Woodfords to the state line. Most diversions are for irrigation; however, the South Tahoe Public Utility District diverts water to maintain the level of Indian Creek Reservoir.

Water Quality Objectives Not Attained

The "percent sodium" objective is meant to protect crops against the impacts of excess sodium, which can damage soils and interfere with water uptake. It reflects the amount of sodium (Na) present in relation to the amounts of calcium (Ca), magnesium (Mg) and potassium (K). Percent sodium is computed as follows:

$$\frac{(Na \times 100)}{Na + Ca + Mg + K}$$

Concentrations of the above elements are expressed as milliequivalents per liter. Percent sodium has been superseded as an agricultural criterion by "Sodium Absorption Ratio", which is calculated differently.

The "percent sodium" objective for the West Fork Carson River (20% expressed as a mean of monthly means) dates from the 1975 *Water Quality Control Plan for the North Lahontan Basin*, and is based on a historic database of 114 samples collected at Woodfords. It is below the recommended criteria for irrigation (30-60 percent) available at the time the objective was last updated in 1983-84.

Evidence of Impairment

The mean of monthly means percent sodium value calculated for the West Fork at Paynesville, using data collected by the South Tahoe Public Utility District between 1981 and 2000, was 23 percent.

Extent of Impairment

The proposed listing is for the segment of the river about 4 miles long between Woodfords and Paynesville. (There are no recent water quality data for the segment of the river between Paynesville and the state line. Due to agricultural diversions, this segment may dry up completely during dry years. The State of Nevada uses data collected at Paynesville to represent conditions at the state line.)

Potential Sources

In addition to sources mentioned for the upstream segment (road salt and wastewater disposed to septic systems), potential sources of sodium include irrigation with wastewater effluent, livestock wastes, and septic systems tributary to the lower segment.

TMDL Priority

This TMDL is recommended for a medium priority, with completion projected to occur after 2015 if a TMDL is still needed. It may be possible to ensure attainment of the objective before that time through source controls. Alternatively, Regional Board staff may consider revising the percent sodium objective to reflect current agricultural criteria.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1975. *Water Quality Control Plan for the North Lahontan Basin.*

California Regional Water Quality Control Board, Lahontan Region, 1983. *West Fork Carson River and Indian Creek Watersheds Water Quality Control Plan Update: 1983.*

California Regional Water Quality Control Board, Lahontan Region, 1995. Water Quality Control Plan for the Lahontan Region.

California Regional Water Quality Control Board, Lahontan Region 2001. Internal Memo from John Steude and Alan Miller to Judith Unsicker, Summary of water quality analysis for potential CWA listing of the lower [sic] of the West Fork of the Carson River, Alpine County.

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Nevada Division of Environmental Protection, Bureau of Water Quality Planning. 2001. State of Nevada Surface Water Monitoring Network, Carson River Basin. Available on the Internet: http://ndep.state.nv.us/bwqp/C9.html.

South Tahoe Public Utility District. Unpublished water quality data.

WEST FORK CARSON RIVER, WOODFORDS TO PAYNESVILLE, NITROGEN
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of the West Fork Carson River between Woodfords and Paynesville is proposed to be Section 303(d) listed for violations of the water quality objectives for nitrate and total nitrogen.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	West Fork Carson River	**Pollutant(s)**	Nitrogen
Hydrologic Unit	West Fork Carson River (633.00)	**Sources**	Pasture runoff, stormwater, erosion, atmospheric deposition
Total Length	~21 miles (in CA)	**TMDL Priority**	High
Size Affected	~4 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.809° N, 119.778°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The East and West Forks of the Carson River are located in Alpine County and join to form the Carson River near Genoa, Nevada. Both the East and West Forks originate on the eastern side of the Sierra Nevada in or near federal wilderness areas. Most of the California portion of the Carson River watershed is in public ownership, and the local economy depends heavily on tourism. The watershed also includes lands of the Washoe Tribe of California and Nevada. The Carson River watershed is popular for sport fishing, rafting, and other outdoor recreation activities which depend on high water quality.

Development in the upper watershed includes campgrounds, Sorensen's Resort, a small subdivision, roads, and two inactive mines. At lower elevations the river passes through the communities of Woodfords and Paynesville. Highway 88 is located near the West Fork from Hope Valley to the state line. Near Woodfords, the watershed is still recovering from the impacts of wildfire. Cattle ranching is important in the lower section of the West Fork watershed, where pasturelands are irrigated with secondary wastewater effluent exported from the Lake Tahoe Basin. Ranchers using effluent are under reclamation waste discharge requirements from the Lahontan Regional Board. Diversions from the West Fork occur at and below Woodfords and can significantly affect instream flows from Woodfords to the state line. Most diversions are for irrigation; however, the South Tahoe Public Utility District diverts water to maintain the level of Indian Creek Reservoir.

Water Quality Objectives Violated

For the Woodfords to Paynesville segment of the West Fork, the water quality objectives for nitrate (as N), total Kjeldahl nitrogen, and total nitrogen, in milligrams per liter (mg/L), are 0.03, 0.22, and 0.25 mg/L, expressed as means of monthly means. (These are running averages incorporating historic data.) The Regional Board's 1983 Basin Plan staff report noted higher nutrient concentrations and agricultural impacts on water quality in this reach of the river.

Evidence of Impairment

Staff calculated means of monthly means using data collected by the South Tahoe Public Utility District between 1981 and 2000. Means of monthly means for nitrate (as N), total Kjeldahl nitrogen, and total nitrogen were 0.06 mg/L, 0.21 mg/L, and 0.27 mg/L. The means of monthly means for nitrate and total nitrogen exceeded the water quality objectives.

Extent of Impairment

The reach of the West Fork Carson River between Woodfords and Paynesville is recommended for listing.

Potential Sources

In addition to the upstream sources causing violation of objectives at Woodfords (atmospheric deposition, septic systems, erosion, stormwater, grazing, and natural fixation by plants and soil bacteria), this reach of the river is affected by agricultural stormwater. Data for total and fecal coliform bacteria in this reach indicate that livestock wastes are affecting the river. Floodwaters from the severe January 1997 storm event may also have affected nutrient concentration in the river.

TMDL Priority

This TMDL is recommended for high priority, with completion projected to occur after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1983. *West Fork Carson River and Indian Creek Watersheds Water Quality Control Plan Update: 1983.*

California Regional Water Quality Control Board, Lahontan Region, *1995. Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region 2001. Internal Memo from John Steude and Alan Miller to Judith Unsicker, Summary of water quality analysis for potential CWA listing of the lower [sic] of the West Fork of the Carson River, Alpine County.

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Murphy, D.M., and C.M. Knopp, editors, 2000. *Lake Tahoe Watershed Assessment.* Gen. Tech. Rep. PSW-GTR-176, USDA Forest Service, Pacific Southwest Research Station, Albany, CA, Vols. I and II.

Nevada Division of Environmental Protection, Bureau of Water Quality Planning. 2001. State of Nevada Surface Water Monitoring Network, Carson River Basin. Available on the Internet: http://ndep.state.nv.us/bwqp/C9.html.

South Tahoe Public Utility District. Unpublished water quality data.

WEST FORK CARSON RIVER, WOODFORDS TO PAYNESVILLE, PATHOGENS
2002 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of the West Fork Carson River between Woodfords and the California-Nevada state line is proposed to be listed for "pathogens" due to violations of the water quality objective for fecal coliform bacteria. Fecal coliform bacteria in water are indicators of contamination from the feces of warm-blooded animals, and of the possible presence of many different kinds of pathogenic microorganisms.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	West Fork Carson River	**Pollutant(s)**	Pathogens
Hydrologic Unit	West Fork Carson River (633.00)	**Sources**	Livestock, wildlife
Total Length	~21 miles (in CA)	**TMDL Priority**	Medium
Size Affected	~4 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.809° N, 119.778°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The East and West Forks of the Carson River are located in Alpine County. The forks join to form the Carson River near Genoa, Nevada. Both the East and West Forks originate on the eastern side of the Sierra Nevada in or near federal wilderness areas. Most of the California portion of the Carson River watershed is in public ownership, and the local economy depends heavily on tourism. The watershed also includes lands of the Washoe Tribe of California and Nevada. The Carson River watershed is popular for sport fishing, rafting, and other outdoor recreation activities which depend on high water quality.

Development in the upper watershed includes campgrounds, Sorensen's Resort, a small subdivision, roads, and two inactive mines. At lower elevations, the river passes through the communities of Woodfords and Paynesville. Highway 88 is located near the West Fork from Hope Valley to the state line. Near Woodfords, the watershed is still recovering from the impacts of wildfire. Cattle ranching is important in the lower section of the West Fork watershed, where pasturelands are irrigated with secondary wastewater effluent exported from the Lake Tahoe Basin. Ranchers using effluent are under reclamation waste discharge requirements from the Lahontan Regional Board. Diversions from the West Fork occur at and below Woodfords, and can significantly affect instream flows from Woodfords to the state line. Most diversions are for irrigation; however, the

South Tahoe Public Utility District diverts water to maintain the level of Indian Creek Reservoir.

Water Quality Objectives Violated

The regionwide narrative water quality objective for coliform bacteria in surface waters of the Lahontan Basin Plan states:

> *"Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.*
>
> *The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml."*

The units used in the water quality objective are the numbers of bacterial colonies per 100 milliliters (ml), sometimes referred to as the "Most Probable Number" or MPN.

This objective applies to all surface waters of the Lahontan Region. Because the South Tahoe Public Utility District's Alpine County monitoring program involves monthly sampling, the 40/100 ml limit in the last part of the objective was the criterion used in assessment for update of the Section 303(d) list.

The Lahontan Basin Plan does not currently include water quality objectives for fecal streptococci. However, these bacteria are also indicators of fecal pollution and therefore of impairment. Fecal streptococci can be used to assess sources of contamination. If the ratio of fecal coliform numbers to fecal streptococcus numbers is greater than 4, a human source is generally indicated, and a ratio of less than 0.7 points to animal sources. } Ref?

Evidence of Impairment

/100ml

Samples collected at Woodfords by the South Tahoe Public Utility District (STPUD) between June 2000 and May 2001 had no violations of the fecal coliform objective. Colony numbers ranged from <3 to <30/ml. Fecal streptococcus were detected, at 30/ml, on two out of ten sampling dates. Table 2 summarizes data for total coliform, fecal coliform, and fecal streptococcus bacteria in the West Fork Carson River at Paynesville, from samples collected by the STPUD in 2000-2001. Violations of the fecal coliform objective occurred in four of the ten months sampled. Numbers of total and fecal coliform bacteria were higher during the summer grazing season.

100

Table 2. South Tahoe Public Utility District Monitoring Data for Bacteria, West Fork Carson River at Paynesville (colonies per 100 ml).

Sampling date	Total coliform	Fecal Coliform	Fecal streptococcus
Paynesville (SW05)			
06/06/00	430	430	-
07/05/00	430	40	-
08/01/00	390	230	-
09/05/00	430	30	-
10/03/00	430	90	-
11/01/00	390	40	30
12/05/00	23	4	-
03/06/01	93	4	-
04/03/01	43	<3	-
05/01/01	43	43	40
Stateline (SW06)			
06/06/00	430	230	
07/05/00	230	40	-
08/01/00	11,000	430	-
09/05/00	150	90	-
10/03/00	140	140	-
11/01/00	750	40	<30
12/05/00	-	-	-
03/06/01	93	3	-
04/03/01	43	9	-
05/01/01	230	23	230

The Nevada Division of Environmental Protection samples water quality at the Paynesville station every other month (six times per year). Data for 1997 and 1998 are summarized in Table 3. These data are not directly comparable with the fecal coliform bacteria data summarized above. However, the high numbers occurring during the summer indicate the probable impacts of livestock wastes and pasture runoff.

Table 3. Nevada Division of Environmental Protection Monitoring Data for Bacteria, West Fork Carson River at Paynesville (Most Probable Number [of colonies] per 100 ml).

Sampling Date	Fecal Streptococcus	E. coli
14 Jan 1997	<10	<10
12 Mar 1997	<10	10
28 May 1997	30	10
22 July 1997	170	99
16 Sep 1997	10	31
12 Nov 1997	40	<10
14 Jan 1998	<10	<10
17 March 1998	<10	31
26 May 1998	20	<10
21 July 1998	230	87
15 Sep 1998	110	530
17 Nov 1998	40	75

Extent of Impairment

The segment of the West Fork Carson River between Woodfords and the California-Nevada state line is recommended for listing.

Potential Sources

The primary source of fecal coliform bacteria in the West Fork is probably livestock wastes. Wildlife and recreational users of the watershed may also be sources. Bacteria are monitored in the lower West Fork Carson River watershed because of public concern about the impacts of irrigation with secondary effluent. However, the effluent is disinfected and is not likely to be the source of the violations.

TMDL Priority

This TMDL is recommended for a medium priority, with completion projected after 2015. Management practices for irrigation and grazing in this watershed are expected to change as a result of ongoing watershed planning activities for the Carson River watershed, and the Regional Board's nonpoint source program. If these practices are successful, it may be possible to delist this segment of the river instead of developing a TMDL.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Menon, A.S., 2001. *Shellfish Safety: Bacterial Indicators on [sic] Shellfish Water Quality. Canadian Shellfish Quality Resource.* Available on the Internet: <http:www.shellfishquality.ca/indicators.htm>.

Nevada Division of Environmental Protection, Bureau of Water Quality Planning. 2001. State of Nevada Surface Water Monitoring Network, Carson River Basin. Available on the Internet: http://ndep.state.nv.us/bwqp/C9.html

South Tahoe Public Utility District. Unpublished water quality data.

EAST FORK CARSON RIVER, NUTRIENTS
2002 Section 303(d) Fact Sheet
Delisting

Rationale for Delisting

The East Fork Carson River is recommended for removal from the Section 303(d) list because the original listing was done on the mistaken assumptions by Regional Board staff, and there is no current evidence of impairment by nutrients in California. The river was listed for nutrients in the 1980s because the State of Nevada had listed it for violations of pH criteria in a reach beginning at the state line. (Increases in pH can result indirectly from algae blooms, which in turn result from high levels of nutrients and warm temperatures. The pH violations were probably connected to the drought of the late 1980s and early 1990s.) Nevada subsequently removed this water body/pollutant combination from its 303(d) list, and the current (1998) Nevada list does not include it. Nevada's online monitoring data for the Carson River watershed show that the reach beginning at the state line is monitored at the Riverview Mobile Home Park (Latitude 38°52'22", Longitude 119°41' 20") south of Gardnerville near Highway 395, which is about 12-13 miles downstream from the California state line. Data for pH at the Riverview station should not be assumed to be representative of conditions in California at the state line. The reach above the mobile home park probably receives nutrients from Indian Creek and from agricultural runoff, septic systems, and stormwater in Nevada, and river pH will be influenced by local algal productivity. (This reach of the river also receives inflow on the Nevada side of the state line from Bryant Creek, which is affected by acid mine drainage.)

Samples collected at the Riverview station between March 12, 1997 and May 29, 2001 had laboratory pH values ranging from 7.02 to 8.5, and field pH values ranging from 6.32 to 8.7. None of the 24 laboratory pH measurements taken during this period exceeded the California water quality objective (6.5-8.5 units). Four of the 26 field pH measurements were higher than 8.5 units and one was lower than 6.5. Even if the Riverview station were representative of conditions at the state line, the deviations from the California standard are not great enough to affect beneficial uses, and Lahontan Regional Board staff would not recommend listing on the basis of the current data.

Watershed Conditions

The East and West Forks of the Carson River are located in Alpine County, south of Lake Tahoe. The forks join to form the Carson River near Genoa, Nevada. Several tributaries, including Indian Creek and Bryant Creek, cross the California-Nevada state line separately from the main forks. Both the East and West Forks originate in the upper reaches of the eastern side of the Sierra Nevada in or near federal wilderness areas. The watershed is popular for sport fishing, rafting, and other outdoor recreation activities which depend on high water quality. A segment of the East Fork between Hangman's Bridge and the Nevada state line is designated as a State Wild and Scenic River, and is a

popular river rafting area. Some reaches of the East Fork are under study for possible inclusion in the federal Wild and Scenic River system. The watershed supports two subspecies of threatened trout, the Lahontan and Paiute cutthroat trout.

Most of the California portion of the watershed is in public ownership, and the local economy depends heavily on tourism. The watershed also includes lands of the Washoe Tribe of California and Nevada. Cattle ranching is important in the lower sections of the East and West Fork watersheds, and grazing on rangeland extends to the upper watersheds. The East Fork Carson River watershed has also been disturbed by historic logging, grazing, and mining. State Highways 89 and 4 are located close to the river and its tributaries. Water diversions in the Carson River watershed are limited by the California-Nevada Interstate Water Compact and a court decree.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Nevada Division of Environmental Protection, Bureau of Water Quality Planning. 1998. Nevada's 1998 303(d) List. Available on the Internet: http://ndep.state.nv.us/bwqp/riv303d98.pdf.

Nevada Division of Environmental Protection, Bureau of Water Quality Planning. 2001. State of Nevada Surface Water Monitoring Network, Carson River Basin. Available on the Internet: http://ndep.state.nv.us/bwqp/C9.html.

MONITOR CREEK, METALS
2002 Section 303(d) Fact Sheet
Clarification

Summary of Proposed Action

Monitor Creek, a tributary of the East Fork Carson River in Alpine County (Hydrologic Unit No. 632.10), is currently Section 303(d)-listed for "metals." Regional Board staff used this term to cover overall impairment of the creek by acid mine drainage, including impacts on instream beneficial uses. Since staff's current approach is to be more specific about the nature of impairment, the "metals" listing is proposed to be replaced by separate entries for iron, silver, aluminum, and manganese, to reflect the individual pollutants which currently appear to be affecting beneficial uses. (Separate new listings are proposed for two non-metallic pollutants, sulfate and total dissolved solids, which are also related to the acid mine drainage problem.) If further monitoring shows that listings for different metals are warranted, the list will be revised during the next (2004) update cycle.

Watershed Characteristics

Monitor Creek is located in eastern Alpine County (latitude 38.66°N, longitude 119.73°W). Monitor Creek (about 4 miles long) originates near Monitor Pass as Heenan Creek (about 2 miles long), which is impounded by Heenan Reservoir. Releases from the reservoir are made for irrigation in Nevada. Heenan Reservoir is used by the California Department of Fish and Game as rearing habitat and a catch-and-release fishery for the threatened Lahontan cutthroat trout. The Heenan Creek watershed is used for grazing. Monitor Creek joins the East Fork Carson River near the junction of State Highways 4 and 89, and the creek runs near Highway 89 for most of its length.

The Monitor Creek watershed includes altered and unaltered Pliocene volcanic rocks, with zones of silicification and intrusion containing gold, silver, copper, lead, zinc, antimony, arsenic, barite and manganese in complex, high-sulfide ores. Monitor Creek has been affected by mining since the Comstock era in the 1860s. ("Monitor" refers to the water cannons formerly used for hydraulic mining, and it was the name of a mining town in the watershed which existed from about 1863-1911.) There are a number of inactive mines in the Colorado Hill area to the north of the creek, and tailings from an inactive ore mill are located within the creek. There are currently no active mines in the watershed; most of the land is within U.S. Forest Service ownership.

Water Quality Standards Not Attained

In California, water quality standards include designated beneficial uses and narrative or numerical water quality objectives, equivalent to federal "criteria," established to protect those uses. Monitor Creek is designated for a variety of uses, including municipal, recreational, and aquatic life uses. Because of the presence of Lahontan cutthroat trout, it is also designated for the Rare, Threatened, or Endangered Species Habitat use.

The water quality objectives applicable to Monitor Creek that apply to metals in acid mine drainage include: (1) narrative objectives for nondegradation, chemical constituents, color, settleable materials, toxicity, and turbidity, and (2) numerical objectives for metals in the U.S. Environmental Protection Agency's California Toxics Rule. The narrative objective for "chemical constituents" references the California Department of Health Services' Maximum Contaminant Levels (MCLs) for drinking water. The narrative objective for "settleable materials" provides that:

> *"Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water for beneficial uses. For natural high quality waters, the concentrations of settleable materials shall not be raised by more than 0.1 milliliter per liter."*

Evidence of Impairment

A Section 205(j)-funded study of the chemistry and biology of Monitor Creek was done by University of Nevada researchers in 1990-91. It showed that **iron** levels immediately below the Zaca Mine adit may regularly exceed the USEPA freshwater aquatic life chronic exposure criterion (1 milligrams per liter or mg/L). "Biologically available iron" concentrations from four sampling runs ranged from 1-3 mg/L. The study report observed that the reach below several tailings piles and drainage from the Zaca Mine adit was affected by a reddish-brown precipitate, possibly ferric sulfate.

The study also indicated, based on one sampling run, that the chronic exposure criterion for **silver** may be exceeded at stations throughout Monitor Creek. The values ranged from 0.2-0.7 mg/L, compared to a criterion of 0.12 mg/L. (Silver concentrations in samples from the East Fork Carson River upstream and downstream of Monitor Creek were comparable to those in the creek.) Elevated silver was observed in one Toxic Substances Monitoring Program sample of fish tissue from Monitor Creek.

An **aluminum** sample taken by Western States Minerals Corporation just above the confluence of Monitor Creek with the East Fork Carson River had a concentration of 0.4 mg/L, compared to the EPA chronic toxicity criterion of 0.087 mg/L. **Manganese** in Monitor Creek may exceed the federal and state drinking water MCL of 0.05 mg/L.

The Section 205(j) study showed a number of impacts on **beneficial uses**. The lowest mean algal chlorophyll a, carotenoid, and phaeopigment concentrations were found at stations below the mine tailings and Zaca Mine adit. Benthic invertebrate numbers and diversity were lower in Monitor Creek than in the East Fork Carson River. Station M2, below the Zaca mine adit, had the lowest species richness and numbers and was "nearly devoid of benthos during most samples." These adverse impacts on beneficial uses are probably related to the physical impacts of metal precipitates.

Extent of Impairment

Indicators of impairment increase downstream in Monitor Creek, and worsen below the Zaca Mine adit. The entire creek (below Heenan Reservoir) is currently listed for metals, and the proposed revised listings for separate metals and settleable solids will cover the same segment.

Potential Sources

The primary source of metals is believed to be acid drainage from inactive mines, millsites and tailing piles. There may be some contribution from natural erosion from undisturbed portions of the watershed.

TMDL Priority

The Monitor Creek metals problem is currently assigned a "High" priority with TMDL completion projected in 2011. It is likely that TMDLs for all of the pollutants associated with acid mine drainage will be coordinated as one set of Basin Plan amendments.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

California Regional Water Quality Control Board, Lahontan Region, 2001. Email from Jason Churchill to Judith Unsicker, Monitor Creek 303(d) Listing, October 12, 2001.

California State Water Resources Control Board, Toxic Substances Monitoring Program database.

Vinyard, G.L, and R.W. Watts, 1992. *Wasteload Allocation Study, Monitor Creek, East Fork Carson River Hydrologic Unit.* Aquatic Ecology Laboratory, University of Nevada, Reno.

MONITOR CREEK, SULFATE
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Monitor Creek, a tributary of the East Fork Carson River that is already listed for metals, is proposed to be listed for sulfate.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Monitor Creek	**Pollutant(s)**	Sulfate
Hydrologic Unit	East Fork Carson River, 632.10	**Sources**	Acid mine drainage, erosion
Total Length	4 miles	**TMDL Priority**	High
Size Affected	4 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.658°N, 119.725°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Monitor Creek is located in eastern Alpine County. It originates near Monitor Pass as Heenan Creek (about 2 miles long), which is impounded by Heenan Reservoir. Releases from the reservoir are made for irrigation in Nevada. Heenan Reservoir is used by the California Department of Fish and Game as rearing habitat and a catch-and-release fishery for the threatened Lahontan cutthroat trout. The Heenan Creek watershed is used for grazing. Monitor Creek joins the East Fork Carson River near the junction of State Highways 4 and 89, and the creek runs near Highway 89 for most of its length.

The Monitor Creek watershed includes altered and unaltered Pliocene volcanic rocks, with zones of silicification and intrusion containing gold, silver, copper, lead, zinc, antimony, arsenic, barite and manganese in complex, high sulfide ores. Monitor Creek has been affected by mining since the Comstock era in the 1860s. ("Monitor" refers to the water cannons formerly used for hydraulic mining, and it was the name of a mining town in the watershed which existed from about 1863-1911.) There are a number of inactive mines in the Colorado Hill area to the north of the creek, and tailings from an inactive ore mill are located within the creek. There are currently no active mines in the watershed; most of the land is within U.S. Forest Service ownership.

Water Quality Objectives Violated

The water quality objectives for sulfate in the East Fork Carson River and its tributaries are 4.0 milligrams per liter (mg/L) as an annual mean and 8.0 mg/L as an annual 90th percentile level. The state drinking water Secondary Maximum Contaminant Level for sulfate (250 mg/L) also applies under the "Chemical Constituents" objective.

Evidence of Impairment

During the 1990-91 Section 205(j) study, the mean values of sulfate at 6 of 7 sampling stations in Monitor Creek exceeded 100 mg/L, with maximum values of about 800 mg/L at a station below the Zaca Mine adit and 700 mg/L at the creek's confluence with the East Fork Carson River.

Violations of the pH objective (6.5 to 8.5 pH units), presumed to come from sulfuric acid, occur near the discharge from the Zaca Mine adit. A separate listing for "pH" is not being proposed, since it is assumed that control of acid mine drainage, including sulfate, will address the pH problem.

Extent of Impairment

The segment of the creek between Heenan Reservoir and the confluence with the East Fork Carson River is proposed for listing.

Potential Sources

The major source of sulfate loading to Monitor Creek is assumed to be acid mine drainage.

TMDL Priority

This TMDL is recommended for high priority. The sulfate problem in Monitor Creek will likely be addressed through the CERCLA cleanup process. If a separate TMDL seems necessary after completion of the TMDLs for metals, it will be completed after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. Water Quality Control Plan for the Lahontan Region.

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Vinyard, G.L, and R.W. Watts, 1992. *Wasteload Allocation Study, Monitor Creek, East Fork Carson River Hydrologic Unit.* Aquatic Ecology Laboratory, University of Nevada, Reno.

MONITOR CREEK, TOTAL DISSOLVED SOLIDS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Monitor Creek, a tributary of the East Fork Carson River that is already listed for metals, is proposed to be listed for total dissolved solids (TDS).

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Monitor Creek	**Pollutant(s)**	Total dissolved solids
Hydrologic Unit	East Fork Carson River (632.10)	**Sources**	Acid mine drainage, etc.
Total Length	4 miles	**TMDL Priority**	High
Size Affected	4 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.658°N, 119.725°W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Monitor Creek is located in eastern Alpine County. It originates near Monitor Pass as Heenan Creek (about 2 miles long), which is impounded by Heenan Reservoir. Releases from the reservoir are made for irrigation in Nevada. Heenan Reservoir is used by the California Department of Fish and Game as rearing habitat and a catch-and-release fishery for the threatened Lahontan cutthroat trout. The Heenan Creek watershed is used for grazing. Monitor Creek joins the East Fork Carson River near the junction of State Highways 4 and 89, and the creek runs near Highway 89 for most of its length.

The Monitor Creek watershed includes altered and unaltered Pliocene volcanic rocks, with zones of silicification and intrusion containing gold, silver, copper, lead, zinc, antimony, arsenic, barite and manganese in complex, high sulfide ores. Monitor Creek has been affected by mining since the Comstock era in the 1860s. ("Monitor" refers to the water cannons formerly used for hydraulic mining, and it was the name of a mining town in the watershed which existed from about 1863-1911.) There are a number of inactive mines in the Colorado Hill area to the north of the creek, and tailings from an inactive ore mill are located within the creek. There are currently no active mines in the watershed; most of the land is within U.S. Forest Service ownership.

Water Quality Objectives Not Attained

The numerical water quality objectives for total dissolved solids for the East Fork Carson River and its tributaries are 80 milligrams per liter (mg/L) as an annual mean, and 100

mg/L as an annual 90th percentile level. The drinking water Secondary Maximum Contaminant Level (500 mg/L for TDS) also applies under the "Chemical Constituents" objective.

Evidence of Impairment

During a 1990-91 Section 205 (j) study (Vinyard and Watts, 1992), mean values of TDS exceeded the objective at all stations, and mean values above 500 mg/L occurred at 4 of 7 stations. Maximum values over 1000 mg/L were recorded at stations below mine tailings and the Zaca Mine adit.

Extent of Impairment

The segment of Monitor Creek between Heenan Reservoir and the confluence with the East Fork Carson River is proposed for listing.

Potential Sources

Sulfate from acid mine drainage probably accounts for most of the TDS loading. Other possible sources are erosion, stormwater (i.e., including road salt applied to Highway 89), and releases from Heenan Reservoir.

TMDL Priority

This TMDL is recommended for high priority. The total dissolved solids problem will likely be addressed through the CERCLA cleanup process. If a separate TMDL for total dissolved solids is needed after completion of TMDLs for metals, it will be completed after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Vinyard, G.L, and R.W. Watts, 1992. *Wasteload Allocation Study, Monitor Creek, East Fork Carson River Hydrologic Unit.* Aquatic Ecology Laboratory, University of Nevada, Reno.

INDIAN CREEK, PATHOGENS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Indian Creek, in the East Fork Carson River watershed, is recommended to be listed for "pathogens" due to violations of the water quality objective for fecal coliform bacteria. Fecal coliform bacteria in water are indicators of contamination from the feces of warm-blooded animals and of the possible presence of many different kinds of pathogenic microorganisms.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Indian Creek	**Pollutant(s)**	Pathogens
Hydrologic Unit	East Fork Carson River (632.20)	**Sources**	Livestock, wildlife
Total Length	~17 miles (10 in CA)	**TMDL Priority**	Medium
Size Affected	~7 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38.885° N, 119.702° W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Indian Creek, in Alpine County, is a tributary of the East Fork Carson River that crosses the California State Line separately from the main East Fork. Its headwaters are on National Forest land west of State Highway 89 between Woodfords and Markleeville. There are several small tributaries of Indian Creek. Indian Creek flows through irrigated pasture in Diamond and Dutch Valleys in California, and Long Valley in Nevada, and joins the East Fork Carson River near Dresslerville, Nevada. Some of the water from the creek enters Mud Lake, Nevada. The main channel of the creek has been routed beneath Harvey Place Reservoir within a pipe. Indian Creek Reservoir, which formerly stored treated wastewater exported from the Lake Tahoe Basin, was constructed on a tributary of Indian Creek, and discharges from this reservoir currently reenter the main channel of Indian Creek east of Harvey Place Reservoir.

The main land use in the Indian Creek watershed in California and Nevada is agriculture. Pastures are irrigated with water diverted from Indian Creek and the West Fork Carson River and with secondary wastewater effluent exported from South Lake Tahoe and stored in Harvey Place Reservoir. The U.S. Bureau of Land Management manages a recreation area surrounding the reservoir, including a campground, boat ramps, and day use facilities.

Water Quality Objectives Not Attained

The water quality objective for coliform bacteria in surface waters of the Lahontan Basin Plan states:

> *"Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.*
>
> *The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml."*

The units used in the water quality objective are the numbers of bacterial colonies per 100 milliliters (ml), sometimes referred to as the "Most Probable Number" or MPN.

This objective applies to all surface waters of the Lahontan Region. Because the South Tahoe Public Utility District's Alpine County monitoring program involves monthly sampling, the 40/100 ml limit in the last part of the objective was the criterion used in assessment for update of the Section 303(d) list.

The Lahontan Basin Plan does not currently include specific water quality objectives for E. coli or fecal streptococci. However, these bacteria are also indicators of fecal pollution and therefore of impairment. Fecal streptococci can be used to assess sources of contamination. If the ratio of fecal coliform numbers to fecal streptococcus numbers is greater than 4, a human source is generally indicated, and a ratio of less than 0.7 points to animal sources.

Evidence of Impairment

Table 2 below summarizes data collected by the South Tahoe Public Utility District at three stations on Indian Creek between June 2000 and May 2001. Violations of the water quality objective for fecal coliform bacteria occurred at all three stations. Fecal coliform numbers were highest during the summer and early fall months, during the grazing-irrigation season.

Potential Sources

The primary source of fecal coliform bacteria in Indian Creek is probably livestock wastes. Wildlife and recreational users of the watershed may also be sources. Bacteria are monitored in the Indian Creek watershed because of public concern about the impacts of irrigation with secondary effluent. However, the effluent is disinfected and is not likely to be the source of the violations.

Table 2. South Tahoe Public Utility District Monitoring Data for Bacteria in Indian Creek (Most Probable Number [colonies] per 100 ml). Shaded rows indicate different stations in upstream to downstream order.

Sampling Date	Total Coliform	Fecal Coliform	Fecal Streptococcus
SWO2			
06/06/00	<30	<30	-
07/05/00	230	40	-
08/01/00	930	90	-
09/05/00	930	430	-
10/03/00	70	30	-
11/01/00	40	40	-
12/05/00	93	43	-
03/06/01	43	3	-
04/03/01	15	<3	-
05/01/01	43	9	90
SWO3			
06/06/00	430	430	-
07/05/00	2400	930	-
08/01/00	4600	2400	-
09/05/00	90	40	-
10/03/00	40	40	-
11/01/00	930	430	150
12/05/00	-	-	-
03/06/01	43	<31	-
04/03/01	43	43	-
05/01/01	43	9	150
SWO4			
06/06/00	2400	930	
07/05/00	90	90	
08/01/00	1500	230	
09/05/00	4600	30	
10/03/00	930	150	
11/01/00	390	230	40
12/05/00	-	-	
03/06/01	9	3	
04/03/01	9	9	
05/01/01	43	15	430

TMDL Priority

This TMDL is recommended for a medium priority, with completion projected after 2015. Management practices for irrigation and grazing in this watershed are expected to change as a result of ongoing watershed planning activities for the Carson River watershed, and the Regional Board's nonpoint source program. If these practices are successful, it may be possible to delist Indian Creek instead of developing a TMDL.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1983. *West Fork Carson River and Indian Creek Watersheds Water Quality Control Plan Update: 1983.*

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Menon, A.S., 2001. *Shellfish Safety: Bacterial Indicators on [sic] Shellfish Water Quality. Canadian Shellfish Quality Resource.* Available on the Internet: <http:www.shellfishquality.ca/indicators.htm>.

Nevada Division of Environmental Protection, Bureau of Water Quality Planning. 1998. Nevada's 1998 303(d) List. Available on the Internet: http://ndep.state.nv.us/bwqp/riv303d98.pdf.

South Tahoe Public Utility District. Unpublished water quality data.

Water Body Fact Sheets for 2002
Section 303(d) List Update
Lahontan Region

EAST AND WEST WALKER RIVER HYDROLOGIC UNITS

California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Boulevard
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November 2001

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Note: This packet contains water body-specific fact sheets for ten water body/pollutant combinations in the East Walker River watershed. Two additional water bodies in the West Walker River watershed, Hot Creek and Fales Hot Springs, are proposed for delisting. See the entries for these water bodies in the summary fact sheet for "Nine Naturally Impaired Waters."

Notes on Numerical Water Quality Objectives for Nitrogen and Phosphorus in the East Walker River Watershed

This group of fact sheets summarizes the rationale for recommendations that the East Walker River and some of its tributaries be placed on the Section 303(d) list for nitrogen and/or phosphorus. The numerical water quality objectives for the East Walker River watershed, in Table 3-15 on page 3-42 of the 1995 *Water Quality Control Plan for the Lahontan Region* (Basin Plan), need clarification. The Basin Plan has two sets of numerical objectives for the East Walker River watershed, one for the "East Walker River at Bridgeport" and the other for "Robinson Creek and all tributaries above Bridgeport Valley." The objectives for tributaries above Bridgeport Valley are more stringent than those for the East Walker at Bridgeport. Both sets of objectives date from the 1975 *Water Quality Control Plan for the North Lahontan Basin*, which was superseded by the 1995 Basin Plan. Objectives for the East Walker River were apparently based on water quality data collected at the U.S. Geological Survey gaging station downstream of Bridgeport Reservoir, and they apply to waters both upstream and downstream of this station.

The boundaries of "Bridgeport Valley," as used in the second set of objectives, apparently coincide with those of Hydrologic Subunit 630.30. The major tributary streams originate near the Sierra Nevada crest within Hydrologic Subunit 630.40. Thus the more stringent water quality objectives apply to the upstream reaches of the tributary streams, and the less stringent objectives for the East Walker River apply to tributary reaches within Bridgeport Valley. Numerical objectives based on high concentrations of nutrients released from eutrophic Bridgeport Reservoir are not necessarily appropriate for protection of beneficial uses for either reach of the East Walker River (upstream and downstream of Bridgeport Reservoir) or for the lower reaches of tributary streams. (The narrative water quality objective for "nondegradation" precludes lowering of water quality in waters with better quality than that required by standards, unless specific findings can be made.)

Most of the current water quality objectives for the East Walker River and its tributaries are set at levels higher than the U.S. Environmental Protection Agency (USEPA's) recommended nutrient criteria for rivers and streams of the "Mountainous West" nutrient ecoregion which includes the Sierra Nevada. (A table summarizing these criteria is available at: http://www.epa.gov/waterscience/criteria/nutrient/ecoregions/sumtable.pdf.) The USEPA's recommended numbers are 0.12 milligrams per liter (mg/L) for total nitrogen, and 0.01 mg/L for total phosphorus, both expressed as annual medians. The Lahontan Regional Board is participating in a statewide process that could result in development of more specific Sierra Nevada nutrient criteria. Water quality objectives for the East Walker River watershed should be updated when resources are available and set at levels which will ensure protection of all beneficial uses.

EAST WALKER RIVER ABOVE BRIDGEPORT RESERVOIR, PATHOGENS
Section 2002 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of the East Walker River upstream of Bridgeport Reservoir is proposed to be listed for "pathogens" as a result of violations of the narrative water quality objective for fecal coliform bacteria. Fecal coliform bacteria in water are indicators of contamination from the feces of warm-blooded animals, and of the possible presence of many different kinds of pathogenic microorganisms.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	East Walker River	**Pollutant(s)**	Pathogens
Hydrologic Unit	East Walker River (630.30)	**Sources**	Livestock, stormwater, wildlife
Total Length	~18 miles	**TMDL Priority**	Medium
Size Affected	~10 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38 °15' 20" N, 119° 13' 30" W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The East Walker River, in Mono County, originates in the Hunewill Hills, east of the Sierra Nevada crest, and flows about 10 miles through Bridgeport Valley above Bridgeport Reservoir. Other streams tributary to the East Fork or directly to Bridgeport Reservoir are Virginia, Green, Robinson, Buckeye, and Swauger Creeks. The headwaters of these creeks, which include a number of small lakes, are within the Hoover Wilderness. Upper and Lower Twin Lakes are the largest natural lakes in the watershed. The river flows through the town of Bridgeport before entering Bridgeport Reservoir near U.S. Geological Survey station No.10290200. The reservoir is about 5 miles long. The segment of the East Fork below Bridgeport Reservoir, about eight miles long, is joined by several smaller tributaries coming from the Sweetwater Mountains to the north and the Bodie Hills to the South. The East and West Walker Rivers join in Nevada to form the Walker River which has its terminus in Walker Lake. There are extensive wetlands in Bridgeport Valley that are used for livestock grazing. Bridgeport Reservoir is eutrophic, and TMDLs for nitrogen and phosphorus are currently under development.

Water Quality Objectives Not Attained

The narrative water quality objective for fecal coliform bacteria in the Lahontan Basin Plan states:

> *"Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.*
>
> *The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml."*

The units used in the water quality objective are the numbers of bacterial colonies per 100 milliliters (ml), sometimes referred to as the "Most Probable Number" or MPN.

This objective applies to all surface waters of the Lahontan Region. Because the current U.S. Geological Survey (USGS) monitoring program for bacteria in the East Walker River watershed involves monthly sampling, the 40/100 ml limit in the last part of the objective was the criterion used in assessment for update of the Section 303(d) list.

The Lahontan Basin Plan does not currently include water quality objectives for fecal streptococci. However, these bacteria are also indicators of fecal pollution and, therefore, of impairment. Fecal streptococci can be used to assess sources of contamination. If the ratio of fecal coliform numbers to fecal streptococcus numbers is greater than 4, a human source is generally indicated. A ratio of less than 0.7 indicates non-human (animal) sources.

Evidence of Impairment

The results of bacterial sampling by the U.S. Geological Survey at Station 10290200, above Bridgeport Reservoir, are shown in Table 2. At least eight of seventeen fecal coliform samples exceeded the 40/100 ml limit in the narrative water quality objective. According to USGS staff, the "K" code indicates that the bacteria count was outside the acceptable range or ideal count. An ideal count for fecal coliform is 20-60 colonies plate. For fecal streptococcus the ideal count is 20-100 per plate. Table 2 shows that high bacterial counts at both stations coincide with months when livestock are present in the upper East Walker River watershed.

Table 2. Monitoring data for bacteria in the East Walker RIver above Bridgeport Reservoir (colonies per 100 ml)

Sampling Date	Fecal coliform	Fecal streptococci
04-12-00	K3	34
05-10-00	82	200
06-07-00	K360	300
06-07-00	K270	250
06-07-00	270	280
07-11-00	170	76
08-08-00	130	54
09-12-00	93	K22
10-11-00	210	58
11-13-00	K10	K32
12-11-00	K4	K2
01-11-01	K3	15
02-13-01	K2	
03-12-01	K2	60
04-10-01	8	-
05-09-01	63	59
06-05-01	170	240

Extent of Impairment

The entire segment of the East Walker River above Bridgeport Reservoir is recommended for listing.

Potential Sources

Inspection of the relative numbers of fecal coliform and fecal streptococcus in Table 2 indicates that fecal contamination is from animal sources. Livestock wastes are probably the major source of fecal bacteria. There may be some contribution of bacteria from pet wastes in stormwater from Bridgeport; however, the highest numbers of bacteria are found during the summer, when there is relatively little precipitation. Other possible sources include birds, wildlife, and human recreational users of the watershed.

TMDL Priority

This TMDL is recommended for medium priority, with completion projected to occur after 2015. Problems with bacteria from livestock wastes will be addressed to some extent through the development and implementation of nutrient TMDLs for Bridgeport Reservoir, and through implementation of agricultural Best Management Practices under the Regional Board's nonpoint source program. Monitoring by Regional Board staff in the Lake Tahoe Basin shows that management practices that restrict livestock access to surface waters lead to significant reductions in numbers of fecal coliform bacteria.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Menon, A.S., 2001. *Shellfish Safety: Bacterial Indicators on [sic] Shellfish Water Quality.* Canadian Shellfish Quality Resource. Available on the Internet: <http:www.shellfishquality.ca/indicators.htm>.

Honeywell, P.D., 2001. Email from Paul Honeywell, U.S. Geological Survey to Kim Gorman of Regional Board staff, dated 3/13/01 "Re: Bridgeport Data." Email explains error codes.

U.S. Geological Survey, 2001. Unpublished water quality data.

EAST WALKER RIVER BELOW BRIDGEPORT RESERVOIR, NITROGEN
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of the East Walker River between the Bridgeport Reservoir outlet and the California-Nevada State line is proposed to be listed for violation of the water quality objective for total nitrogen. (This segment of the East Walker River is currently Section 303(d) listed for sediment and metals. Delisting for metals is being recommended.)

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	East Walker River	**Pollutant(s)**	Nitrogen
Hydrologic Unit	East Walker River (630.10)	**Sources**	Reservoir releases, stormwater, erosion
Total Length	~18 miles	**TMDL Priority**	High
Size Affected	~8 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38°19'40" N, 119°12'50" W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The East Walker River, in Mono County, originates in the Hunewill Hills, east of the Sierra Nevada crest, and flows about 12 miles through Bridgeport Valley above Bridgeport Reservoir. Other streams tributary to the East Fork or directly to Bridgeport Reservoir are Virginia, Green, Robinson, Buckeye, and Swauger Creeks. The headwaters of these creeks, which include a number of small lakes, are within the Hoover Wilderness. Upper and Lower Twin Lakes are the largest natural lakes in the watershed. The river flows through the town of Bridgeport before entering Bridgeport Reservoir. The reservoir is about 5 miles long. The segment of the East Fork below Bridgeport reservoir, about eight miles long, is joined by several smaller tributaries coming from the Sweetwater Mountains to the north and the Bodie Hills to the South. The East and West Walker Rivers join in Nevada to form the Walker River, which has its terminus in Walker Lake. Extensive wetlands in Bridgeport Valley are used for livestock grazing. Bridgeport Reservoir is eutrophic, and TMDLs for nitrogen and phosphorus are currently under development. The segment of the river below Bridgeport Reservoir is a trophy trout fishery, and lands adjoining this segment have been acquired by the California Department of Fish and Game. This reach of the river flows parallel to State Highway 182 and is probably affected by stormwater runoff from the highway.

Water Quality Objectives Not Attained

The numerical water quality objectives for total nitrogen in the East Walker River are 0.50 milligrams per liter (mg/L) as an annual mean and 0.80 mg/L as a 90th percentile level. (Objectives expressed as 90th percentiles mean that only 10 % of all samples are allowed to be higher than the stated number.)

Evidence of Impairment

The mean total nitrogen concentration for nine samples collected by the U.S. Geological Survey at the gaging station below Bridgeport Reservoir was 0.64 mg/L, exceeding the annual mean objective. The range of total nitrogen concentrations was 0.109-1.32 mg/L. Three of nine samples (33%) exceeded the 90th percentile limit.

In the 1999 North Mono County Resource Conservation District (RCD) study, the mean concentration of total nitrogen for eight samples collected below the reservoir was 0.75 mg/L, with a range of 0.1 to 2.2. Four of these samples (50%) exceeded the 90th percentile value.

The mean total nitrogen concentration for seven samples collected by the Nevada Division of Environmental Protection at its East Walker River "Stateline" station between March 1997 and November 1998 was 0.72 mg/L; concentrations ranged from 0.46 to 1.19 mg/L. The "Stateline" station is actually in California about four miles upstream from the state line.

Extent of Impairment

The segment of the East Walker River below Bridgeport Reservoir and above the California – Nevada State Line is recommended to be listed for nitrogen.

Potential Sources

Releases from Bridgeport Reservoir are the major sources of nutrient loading to the lower East Walker River in California. Some additional nutrient loading presumably comes from tributary streams (Murphy Creek, Fryingpan Creek, and other unnamed streams), stormwater runoff from Highway 182, atmospheric deposition, and nonpoint sources such as range livestock grazing.

TMDL Priority

This TMDL is recommended for a high priority. Nutrient loading from Bridgeport Reservoir to the lower segment of the East Walker River will be addressed during development of TMDLs for the reservoir. If a more specific TMDL is needed for the lower river, it will be completed after 2015. Regional Board staff may consider developing separate sets of water quality objectives for the segments of the East Walker River upstream and downstream of Bridgeport Reservoir.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Nevada Division of Environmental Protection, Bureau of Water Quality Planning. State of Nevada Surface Water Monitoring Network, Walker River Basin, 1997-98 data for East Fork at Stateline. Available on the Internet: http://ndep.state.nv.us/bwqp/mon_w5.htm.

North Mono County Resource Conservation District, 2000. *Report on the Upper Walker River Water Quality Study, 1999.*

U.S. Geological Survey, 2001. Unpublished water quality data provided via FTP.

EAST WALKER RIVER BELOW BRIDGEPORT RESERVOIR, PHOSPHORUS
2002 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of the East Walker River between eutrophic Bridgeport Reservoir and the California-Nevada state line is proposed to be listed for violation of the water quality objective for total phosphorus. This segment of the East Walker River is currently listed for sediment and metals. Delisting for metals is being recommended.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	East Walker River	Pollutant(s)	Phosphorus
Hydrologic Unit	East Walker River (630.10)	Sources	Reservoir releases, stormwater, erosion
Total Length	~18 miles	TMDL Priority	High
Size Affected	~8 miles	TMDL End Date	After 2015
Latitude/Longitude	38°19'40" N, 119°12'50" W	Original 303(d) Listing Year	2002

Watershed Characteristics

The East Walker River, in Mono County, originates in the Hunewill Hills, east of the Sierra Nevada crest, and flows about 12 miles through Bridgeport Valley above Bridgeport Reservoir. Other streams tributary to the East Fork or directly to Bridgeport Reservoir are Virginia, Green, Robinson, Buckeye, and Swauger Creeks. The headwaters of these creeks, which include a number of small lakes, are within the Hoover Wilderness. Upper and Lower Twin Lakes are the largest natural lakes in the watershed. The segment of the East Fork below Bridgeport reservoir, about eight miles long, is joined by several smaller tributaries coming from the Sweetwater Mountains to the north and the Bodie Hills to the South. Some streams (e.g., Bodie and Rough Creeks) flow eastward from the Bodie Hills and Sweetwater Mountains and join the East Walker River in Nevada. The East and West Walker Rivers join in Nevada to form the Walker River, which has its terminus in Walker Lake. There are extensive wetlands in Bridgeport Valley that are used for livestock grazing. Bridgeport Reservoir is eutrophic, and TMDLs for nitrogen and phosphorus are currently under development. The segment of the river below Bridgeport Reservoir is a trophy trout fishery, and lands adjoining this segment have been acquired by the California Department of Fish and Game. This reach of the river flows parallel to State Highway 182 and is probably affected by stormwater runoff from the highway.

Water Quality Objectives Not Attained

The numerical water quality objectives for total phosphorus in the East Walker River are 0.06 milligrams per liter (mg/L) as an annual mean and 0.10 mg/L as a 90th percentile level. (Objectives expressed as 90th percentiles mean that only 10 % of all samples are allowed to be higher than the stated number.)

Evidence of Impairment

The mean concentration of total phosphorus in eleven samples collected by the U.S. Geological Survey (USGS) at the gaging station below the reservoir between April 2000 and February 2001 was 0.083 mg/L. The mean annual concentration in nine USGS samples for 2000 was 0.094 mg/L. Four of the nine samples collected in 2000 exceeded the 90th percentile value.

Extent of Impairment

The reach of the East Walker River between Bridgeport Reservoir and the California-Nevada State line is recommended for listing.

Potential Sources

Releases from Bridgeport Reservoir are the major sources of nutrient loading to the lower East Walker River in California. Some additional nutrient loading presumably comes from tributary streams (Murphy Creek, Fryingpan Creek, and other unnamed streams), stormwater runoff from Highway 182, atmospheric deposition, and nonpoint sources such as range livestock grazing.

TMDL Priority

This TMDL is recommended for a high priority. Nutrient loading from Bridgeport Reservoir to the lower segment of the East Walker River will be addressed during development of TMDLs for the reservoir. If a more specific TMDL is needed for the lower river, it will be completed after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

U.S. Geological Survey, 2001. Unpublished water quality data provided via FTP.

EAST WALKER RIVER, METALS
2002 Section 303(d) Fact Sheet
Delisting

Evidence to Support Delisting

The East Walker River in Mono County (Hydrologic Subunit Nos. 630.10 and 6.30.30) is currently Section 303(d) listed for sediment and metals. It was listed for metals based on "elevated" concentrations of metals in fish tissue samples collected in the segment of the river downstream of Bridgeport Reservoir as under the statewide Toxic Substances Monitoring Program (TSMP). During the 1997-98 Section 303(d) list update process, the State Water Resources Control Board and Regional Boards agreed that TSMP "elevated data level" statistics, calculated from statewide data involving many different fish species, should not be grounds for listing unless tissue levels exceeded human fish consumption criteria, or unless there was other evidence of impairment due to toxics. The Lahontan Regional Board recommended delisting of other water bodies listed on the basis of TSMP data during the 1997-1998 Section 303(d) list update process. The East Walker River was not included in this recommendation because of insufficient time for discussion among Regional Board staff. During the 2001-2002 list update cycle, Lahontan Regional Board staff are recommending that water bodies not be listed for TSMP data if those data are the only evidence of impairment, even if tissue levels exceed human fish consumption criteria, because TSMP sample numbers are small and not statistically representative of local fish populations.

The "elevated" TSMP results for the East Walker River were for metals in fish livers, which are not generally consumed. Liver data included detectable cadmium, copper, lead, selenium, silver, and zinc; the liver concentrations of copper, lead, silver and zinc were at levels that were considered "elevated" in the 1980s. (TSMP "elevated data levels" are the 85th and 95th percentile levels of all historic data collected statewide, and thus change from year to year.)

Table 1 summarizes TSMP data from edible fish filet tissue for metals with analytical results above detection levels. The historic mercury levels do not exceed the current "Maximum Tissue Residue Level" human consumption criterion issued by the California Office of Environmental Health Hazard Assessment (0.37 parts per million or ppm). However, they are high enough to warrant additional monitoring of mercury when resources permit. An inactive mill for

Table 1. Toxic Substances Monitoring Program Results: Mercury and Selenium Concentrations in Fish Filet Tissue Sampled at East Walker River at Bridgeport, in parts per million (ppm)

Sampling Date	Species	Mercury (ppm)	Selenium (ppm)
11/06/80	Brown Trout	0.09	
10/27/83	Brown Trout	0.32	
10/27/83	Brown Trout	0.15	
10/16/84	Brown Trout	0.10	
10/30/85	Brown Trout	0.22	
10/30/85	Mountain Whitefish	0.04	
10/23/86	Brown Trout	0.20	0.16
10/28/87	Sucker	0.31	0.14
10/28/87	Brown Trout	0.05	0.18
10/18/88	Brown Trout	0.12	0.14

processing of mercury ore in the nearby Aurora Canyon Creek watershed is a CERCLA (Superfund) site. Aurora Canyon Creek is tributary to the East Walker River above Bridgeport Reservoir and can receive stormwater from the millsite during periods of high runoff. Mercury levels in limited soil and sediment samples downstream of the millsite exceeded some criteria used in the CERCLA assessment process. The East Walker River watershed is highly mineralized and includes inactive mines in both the Sweetwater Mountains and the Bodie Hills. Metals may enter the river naturally through erosion and stormwater from undisturbed sites or may be contributed from accelerated erosion and surface runoff as a result of human activities.

Watershed Characteristics

The East Walker River, in Mono County, originates in the Hunewill Hills, east of the Sierra Nevada crest, and flows about 12 miles through Bridgeport Valley above Bridgeport Reservoir. Other streams tributary to the East Fork or directly to Bridgeport Reservoir are Virginia, Green, Robinson, Buckeye, and Swauger Creeks. The headwaters of these creeks, which include a number of small lakes, are within the Hoover Wilderness. Upper and Lower Twin Lakes are the largest natural lakes in the watershed. The segment of the East Fork below Bridgeport reservoir, about eight miles long, is joined by several smaller tributaries coming from the Sweetwater Mountains to the north and the Bodie Hills to the south. Some streams (e.g., Bodie and Rough Creeks) flow eastward from the Bodie Hills and Sweetwater Mountains and join the East Walker River in Nevada. The East and West Walker Rivers join in Nevada to form the Walker River, which has its terminus in Walker Lake.

Recommendation

The East Walker River is recommended to be delisted for metals, and to be placed on a "watch list" for further monitoring and assessment.

Information Sources

Brown and Root Environmental, 1996. *Draft Final Site Inspection Report, Aurora Canyon Millsite, Bakersfield District, California.* Contract No. 1422-N651-C4-3049, January 19, 1996.

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

California State Water Resources Control Board, 2001. Toxic Substances Monitoring Program database printout for Walker River watershed, March 2001.

VIRGINIA CREEK, PATHOGENS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Virginia Creek, a tributary of the East Walker River, is proposed to be listed for "pathogens" as a result of violations of the narrative water quality objective for fecal coliform bacteria. Fecal coliform bacteria in water are indicators of contamination from the feces of warm-blooded animals and of the possible presence of many different kinds of pathogenic microorganisms.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Virginia Creek	**Pollutant(s)**	Pathogens
Hydrologic Unit	East Walker River (630.30 and 630.40)	**Sources**	Livestock, wildlife
Total Length	~17 miles	**TMDL Priority**	Medium
Size Affected	~17 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38°11'30"N, 119°12'30"W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Virginia Creek, in Mono County, has headwaters in the Virginia Lakes near the Sierra Nevada crest. It flows northeast for about 8 miles to the vicinity of Conway Summit, and then flows about 9 miles north, in close proximity to Highway 395, before joining the East Walker River south of Bridgeport. Its tributaries include Dog and Clearwater Creeks. There is roaded access to the Virginia Lakes from the Conway Summit area. The lower watershed is used for livestock grazing.

Water Quality Objectives Not Attained

The narrative water quality objective for fecal coliform bacteria in the Lahontan Basin Plan states:

> *"Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.*
>
> *The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml."*

The units used in the water quality objective are the numbers of bacterial colonies per 100 milliliters (ml), sometimes referred to as the "Most Probable Number" or MPN.

This objective applies to all surface waters of the Lahontan Region. Because the current U.S. Geological Survey (USGS) monitoring program for bacteria in the East Walker River watershed involves one monthly sample, the 40/100 ml limit in the last part of the objective was the criterion used in assessment for update of the Section 303(d) list.

The Lahontan Basin Plan does not currently include water quality objectives for fecal streptococci. However, these bacteria are also indicators of fecal pollution and therefore of impairment. Fecal

streptococci can be used to assess sources of contamination. If the ratio of fecal coliform numbers to fecal streptococcus numbers is greater than 4, a human source is generally indicated, and a ratio of less than 0.7 points to animal sources.

Evidence of Impairment

The results of bacterial sampling by the USGS at Virginia Creek are summarized in Table 2. At least six of fourteen fecal coliform samples exceeded the 40/100 ml limit in the narrative water quality objective. According to USGS staff, the "K" code indicates that the bacteria count was outside the acceptable range or ideal count. An ideal count for fecal coliform is 20-60 colonies per plate. For fecal streptococcus the ideal count is 20-100 colonies per plate. Table 2 shows that high bacterial counts at both stations coincide with months when livestock are present in the Virginia Creek watershed.

Table 2. Monitoring Data for Bacteria in Virginia Creek (colonies per 100 ml)

Sampling Date	Fecal coliform	Fecal streptococci
4/12/00	K7 K2	K2 K7
5/10/00	25 K1	K1 25
6/05/00	110 ✓ K11	K11 110
7/12/00	>100 ✓ 50 (50)	50 >100
8/09/00	68 ✓ K23	K23 68
9/13/00	62 ✓ K20	K20 62
10/10/00	59 ✓ K10	K10 59
11/13/00	110 ✓ K8	K8 110
12/13/00	39 K2	K2 39
01/10/01	6 K64 64	K64 6
02/15/01	- K2	K2 -
03/12/01	13 K2	K2 13
04/11/01	1 1	5 5
05/10/01	4 4	28 28
06/06/01	7 7	64 64

THESE THREE ROWS ARE OK

15 SAMPLES

14 SAMPLES

Extent of Impairment

Bacteria samples were collected at the USGS gage in Bridgeport Valley. Because no data are available for upstream reaches of Virginia Creek, the entire creek is recommended for listing.

Potential Sources

Bacteria colony numbers for the Virginia Creek samples were smaller than those for the other East Walker River tributaries sampled, and the large number of "K" codes does not permit evaluation of fecal coliform to fecal streptococcus ratios. Livestock wastes are probably the major source of bacteria. Wildlife, septic systems, and human recreational users of the watershed are other potential sources.

TMDL Priority

This TMDL is recommended for medium priority, with completion projected to occur after 2015. Problems with bacteria from livestock wastes will be addressed to some extent through the development and implementation of nutrient TMDLs for Bridgeport Reservoir, and through implementation of agricultural Best Management Practices under the Regional Board's nonpoint source program. Monitoring by Regional Board staff in the Lake Tahoe Basin shows that management practices that restrict livestock access to surface waters lead to significant reductions in numbers of fecal coliform bacteria.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Honeywell, P.D., 2001. Email from Paul Honeywell of U.S. Geological Survey to Kim Gorman of Regional Board staff, dated 3/13/01, "Re: Bridgeport Data." Email explains error codes.

Menon, A.S., 2001. *Shellfish Safety: Bacterial Indicators on [sic] Shellfish Water Quality.* Canadian Shellfish Quality Resource. Available on the Internet: <http:www.shellfishquality.ca/indicators.htm> .

U.S. Geological Survey, 2001. Unpublished water quality data.

ROBINSON CREEK, PATHOGENS
2002 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of Robinson Creek between Twin Lakes and Bridgeport Reservoir is proposed to be listed for "pathogens" as a result of violations of the narrative water quality objective for fecal coliform bacteria. Fecal coliform bacteria in water are indicators of contamination from the feces of warm-blooded animals, and of the possible presence of many different kinds of pathogenic microorganisms.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Robinson Creek	**Pollutant(s)**	Pathogens
Hydrologic Unit	East Walker River (630.30 and 630.40)	**Sources**	Livestock, wildlife, septic systems
Total Length	~16 miles	**TMDL Priority**	Medium
Size Affected	~9 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38°16' 23" N, 119°15'15" W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Robinson Creek, in Mono County, originates near the Sierra Nevada crest. There are several small lakes and streams near its headwaters. Upper and Lower Twin Lakes are "onstream" glacial lakes which have several other tributary streams of their own, and are managed as reservoirs. Below Lower Twin Lake, Robinson Creek flows about nine miles to Bridgeport Reservoir. The upper Twin Lakes watershed includes a resort and residential development on public and private lands; there are several U.S. Forest Service campgrounds along Lower Robinson Creek. Near Bridgeport Reservoir, the creek flows through wet meadows used for livestock grazing. Bridgeport Reservoir is eutrophic and will be the subject of TMDLs for nitrogen and phosphorus.

Water Quality Objectives Not Attained

The narrative water quality objective for fecal coliform bacteria in the Lahontan Basin Plan states:

> *"Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.*
>
> *The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 m."*

The units used in the water quality objective are the numbers of bacterial colonies per 100 milliliters (ml), sometimes referred to as the "Most Probable Number" or MPN.

This objective applies to all surface waters of the Lahontan Region. Because the current U.S. Geological Survey (USGS) monitoring program for bacteria in the East Walker River watershed involves one monthly sample, the 40/100 ml limit in the last part of the objective was the criterion used in assessment for update of the Section 303(d) list.

The Lahontan Basin Plan does not currently include water quality objectives for fecal streptococci. However, these bacteria are also indicators of fecal pollution and therefore of impairment. Fecal streptococci can be used to assess sources of contamination. If the ratio of fecal coliform numbers to fecal streptococcus numbers is greater than 4, a human source is generally indicated, and a ratio of less than 0.7 points to animal sources.

Evidence of Impairment.

The USGS sampled bacteria at three Robinson Creek stations in 2000 and early 2001. There was only one violation of the water quality objective for the upstream station (Robinson Creek at Twin Lakes, Station 10290500), with 47 fecal coliform colonies per 100 ml in June 2001, and one fecal streptococcus colony per 100 ml. Data for the two lower stations are summarized in Table 2. The 40/100 ml limit in the narrative water quality objective was exceeded at both stations during the summer. According to USGS staff, the "K" code indicates that the bacteria count was outside the acceptable range or ideal count. An ideal count for fecal coliform is 20-60 colonies per plate. For fecal streptococcus the ideal count is 20-100 colonies per plate. Table 2 shows that high bacterial counts at both stations coincide with months when livestock are present in the lower Robinson Creek watershed.

Table 2. Monitoring data for bacteria in Robinson Creek (colonies per 100 ml)

Sampling Month	Robinson Creek at Hwy 395 (Station 10291100)		Robinson Creek at Bridgeport Reservoir (Station 10291200)	
	Fecal coliform	Fecal streptococci	Fecal coliform	Fecal streptococci
April 2000	K7	130	K2	K8
May 2000	K7	61	K16	88
June 2000	K200	140	K250	130
June 2000	_	_	280	110
July 2000	450 ✓	100	>600	350
August 2000	2100 ✓	66	K50	K100
September 2000	3600 ✓	88	K670	260
October 2000	K33	K14	69	K18
November 2000	K5	K2	55	K6
December 2000	K2	K1	K5	K4
January 2001	K2	2	K2	3
February 2001	K6	-	<1	-
March 2001	K1	2	K3	59
April 2001	1 ✓	6	1	6
May 2001	47 ✓	140	50	120
June 2001	630 ✓	69	54	62

Extent of Impairment

Because there are no recent available data on bacteria in Robinson Creek above Twin Lakes or in the reach between the Twin Lakes gaging station and Highway 395, the Reach of Robinson Creek between the Twin Lakes outlet and Bridgeport Reservoir is recommended for listing.

Potential Sources

Inspection of the relative numbers of fecal coliform and fecal streptococcus bacteria in Table 2 indicates that fecal contamination at the Bridgeport Reservoir station, and at the Highway 395 site in June and July 2000, was from animal sources. The high ratios in the August and September 2000, and June 2001 samples at the Highway 395 station may indicate a human source. Livestock wastes are probably the major source of fecal bacteria loading to lower Robinson Creek. Other possible sources include birds, wildlife, failing septic systems, and human recreational users of the watershed.

TMDL Priority

This TMDL is recommended for medium priority, with completion projected to occur after 2015. Problems with bacteria from livestock wastes will be addressed to some extent through the development and implementation of nutrient TMDLs for Bridgeport Reservoir, and through implementation of agricultural Best Management Practices under the Regional Board's nonpoint source program. Monitoring by Regional Board staff in the Lake Tahoe Basin shows that management practices that restrict livestock access to surface waters lead to significant reductions in numbers of fecal coliform bacteria.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Honeywell, P.D., 2001. Email from Paul Honeywell, U.S. Geological Survey to Kim Gorman of Regional Board staff, dated 3/13/01 "Re: Bridgeport Data." Email explains error codes.

Menon, A.S., 2001. *Shellfish Safety: Bacterial Indicators on [sic] Shellfish Water Quality.* Canadian Shellfish Quality Resource. Available on the Internet: <http:www.shellfishquality.ca/indicators.htm>.

U.S. Geological Survey, 2001. Unpublished water quality data provided via FTP.

ROBINSON CREEK, HWY 395 TO BRIDGEPORT RESERVOIR, NITROGEN
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of Robinson Creek between Highway 395 and Bridgeport Reservoir is proposed for listing due to violation of the water quality objective for total nitrogen.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Robinson Creek	**Pollutant(s)**	Nitrogen
Hydrologic Unit	East Walker River (630.30 and 630.40)	**Sources**	Livestock wastes, wildlife, atmospheric deposition, erosion, stormwater
Total Length	~16 miles	**TMDL Priority**	High
Size Affected	~1.5 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38°16' 23" N, 119°15'15" W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Robinson Creek, in Mono County, originates near the Sierra Nevada crest. There are several small lakes and streams near its headwaters. Upper and Lower Twin Lakes are "onstream" glacial lakes which have several other tributary streams of their own, and are managed as reservoirs. Below Lower Twin Lake, Robinson Creek flows about nine miles to Bridgeport Reservoir. The upper Twin Lakes watershed includes a resort and residential development on public and private lands; there are several U.S. Forest Service campgrounds along Lower Robinson Creek. Near Bridgeport Reservoir, the creek flows through wet meadows used for livestock grazing. Bridgeport Reservoir is eutrophic and will be the subject of TMDLs for nitrogen and phosphorus.

Water Quality Objectives Not Attained

The numerical water quality objectives for total nitrogen in the East Walker River and its tributaries within Bridgeport Valley are 0.50 milligrams per liter (mg/L) as an annual mean and 0.80 mg/L as a 90th percentile level. (Objectives expressed as 90th percentiles mean that only 10 % of all samples are allowed to be higher than the stated number.)

Evidence of Impairment

Concentrations of total nitrogen in monthly samples collected by the U.S. Geological Survey in Robinson Creek at Bridgeport Reservoir between January and June, 2001 ranged from 0.115 mg/L to 0.807. One of 6 samples (16.7%) exceeded the 90th percentile value.

Extent of Impairment

The segment of Robinson Creek between Highway 395 and Bridgeport Reservoir, about 1.5 miles long, is recommended for listing.

Potential Sources

Livestock wastes are probably the major source of nitrogen loading to this segment of Robinson Creek. Other potential sources include wildife, atmospheric deposition, stormwater from Highway 395, erosion, and nitrogen fixation by wetland algae and and soil microorganisms.

TMDL Priority

This TMDL is recommended for high priority. Nitrogen loading from Robinson Creek will be addressed during development of a nitrogen TMDL for Bridgeport Reservoir. If a separate TMDL is necessary for the creek, it will be completed after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

U.S. Geological Survey, 2001. Unpublished water quality data.

BUCKEYE CREEK, PHOSPHORUS
Section 2002 303(d) Fact Sheet
Listing

Summary of Proposed Action

Buckeye Creek, a tributary of Bridgeport Reservoir, is proposed to be listed for violation of the water quality objective for total phosphorus.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Buckeye Creek	**Pollutant(s)**	Phosphorus
Hydrologic Unit	East Walker River (630.30 and 630.40)	**Sources**	Livestock waste, erosion, atmospheric deposition.
Total Length	~13 miles	**TMDL Priority**	High
Size Affected	~13 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38° 15' 50" N, 119° 16' 37" W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Buckeye Creek, in Mono County, originates within the Hoover Wilderness near the Sierra Nevada crest and flows northeast to Bridgeport Reservoir. It has a number of tributary streams including Eagle and Swauger Creeks. Buckeye Hot Spring is located near the creek above Bridgeport Valley; there is a campground near the spring. Within Bridgeport Valley, Buckeye Creek has a braided channel and flows through wetlands that are used for livestock grazing.

Water Quality Objectives Not Attained

The numerical water quality objectives for total phosphorus for tributaries of the East Walker River within Bridgeport Valley are those for the river itself. These objectives are 0.06 milligrams per liter (mg/L) as an annual mean and 0.10 mg/L as a 90th percentile level. (Objectives expressed as 90th percentiles mean that only 10 % of all samples are allowed to be higher than the stated number.)

Evidence of Impairment

Concentrations of total phosphorus in nine samples collected by the U.S. Geological Survey (USGS) from Buckeye Creek at Highway 395 in 2000 ranged from 0.116 mg/L in April to 0.008 mg/L in November, with a mean value of 0.029. The April sample exceeded the 90th percentile objective. Concentrations of total phosphorus in six samples collected by the USGS at this station in 2001 ranged from 0.008 mg/L in January to 0.115 mg/L in May, with a mean value of 0.0.029. The May sample exceeded the 90th percentile objective; however, it was reported as an "estimated" value.

Extent of Impairment

Because additional monitoring is needed to define the extent of phosphorus problems in Buckeye Creek upstream of Bridgeport Valley, the entire creek is recommended for listing at this time.

Potential Sources

Phosphorus is present in soils and may reach Buckeye Creek through erosion. Other possible sources are livestock wastes, atmospheric deposition of phosphorus suspended in wood smoke (e.g., from forest fires) or road dust, and potential natural inputs from Buckeye Hot Springs.

TMDL Priority

This TMDL is recommended for a high priority. Phosphorus loading from Buckeye Creek will be addressed to some extent during the development of a phosphorus TMDL for Bridgeport Reservoir. A separate TMDL for the creek, if needed, will be completed after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Honeywell, P.D., 2001. Email from Paul Honeywell, U.S. Geological Survey to Kim Gorman of Regional Board staff, dated 3/13/01 "Re: Bridgeport Data." Email explains error codes.

U.S. Geological Survey, 2001. Unpublished water quality data provided via FTP.

BUCKEYE CREEK, PATHOGENS
Section 2002 303(d) Fact Sheet
Listing

Summary of Proposed Action

Buckeye Creek, a tributary of Bridgeport Reservoir, is proposed to be listed for "pathogens" as a result of violations of the narrative water quality objective for fecal coliform bacteria. Fecal coliform bacteria in water are indicators of contamination from the feces of warm-blooded animals, and of the possible presence of many different kinds of pathogenic microorganisms.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Buckeye Creek	**Pollutant(s)**	Pathogens
Hydrologic Unit	East Walker River (630.30 and 630.40)	**Sources**	Livestock waste, wildlife
Total Length	~13 miles	**TMDL Priority**	Medium
Size Affected	~13 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38°15' 50" N, 119°16' 37" W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Buckeye Creek, in Mono County, originates within the Hoover Wilderness near the Sierra Nevada crest and flows northeast to Bridgeport Reservoir. It has a number of tributary streams including Eagle and Swauger Creeks. Buckeye Hot Spring is located near the creek above Bridgeport Valley; there is a campground near the spring. Within Bridgeport Valley, Buckeye Creek has a braided channel and flows through wetlands that are used for livestock grazing.

Water Quality Objectives Not Attained

The narrative water quality objective for fecal coliform bacteria in the Lahontan Basin Plan states:

> *"Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.*
>
> *The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml."*

The units used in the water quality objective are the numbers of bacterial colonies per 100 milliliters (ml), sometimes referred to as the "Most Probable Number" or MPN.

This objective applies to all surface waters of the Lahontan Region. Because the current U.S. Geological Survey (USGS) monitoring program for bacteria in the East Walker River watershed involves one monthly sample, the 40/100 ml limit in the last part of the objective was the criterion used in assessment for update of the Section 303 (d) list.

The Lahontan Basin Plan does not currently include water quality objectives for fecal streptococci. However, these bacteria are also indicators of fecal pollution and therefore of impairment. Fecal streptococci can be used to assess sources of contamination. If the ratio of fecal coliform numbers to fecal streptococcus numbers is greater than 4, a human source is generally indicated, and a ratio of less than 0.7 points to animal sources.

Evidence of Impairment

The results of bacterial sampling by the USGS at two Buckeye Creek stations are summarized in Table 2. At least five of ten fecal coliform samples at the Highway 395 station, and at least six of 14 samples at the Bridgeport Reservoir station, exceeded the 40/100 ml limit in the narrative water quality objective. According to USGS staff, the "K" code indicates that the bacteria count was outside the acceptable range or ideal count. An ideal count for fecal coliform is 20-60 colonies per plate. For fecal streptococcus the ideal count is 20-100 colonies per plate. Table 2 shows that high bacterial counts at both stations coincide with months when livestock are present in the Buckeye Creek watershed.

Table 2. Monitoring data for bacteria in Buckeye Creek (colonies per 100 ml)

Sampling Month	Buckeye Creek at Hwy 395		Buckeye Creek at Bridgeport Reservoir	
	Fecal coliform	Fecal streptococci	Fecal coliform	Fecal streptococci
April 2000	-	-	K2	K4
May 2000	73	38	K13	23
June 2000	K180	120	>200	300
June 2000	-	-	>300	160
June 2000	-	-	190	120
July 2000	>600	380	>600	260
August 2000	K290	560	K55	K71
September 2000	530	K40	>600	520
October 2000	100	K58	110	52
November 2000	41	28	37	38
December 2000	K11	K2	K7	K20
January 2001	K6	4	K2	7
February 2001	K3	-	K2	-
March 2001	-	-	K1	6
April 2001	1	1	1	-
May 2001	15	58	120	120
June 2001	50	44	1600	150

There was one violation of the objective at a third station (Buckeye Creek near Bridgeport) in June 2001, with 47 fecal coliform colonies per 100 ml and 14 fecal streptococcus colonies per 100 ml.

Extent of Impairment

Because impairment is evident at two stations on Buckeye Creek, and because grazing occurs in much of the watershed, the entire creek is recommended for listing.

Potential Sources

Inspection of the relative numbers of fecal coliform and fecal streptococcus in Table 2 indicates that fecal contamination is from animal sources. Livestock wastes are probably the major source of fecal bacteria. Other possible sources include birds, wildlife, and human recreational users of the watershed.

TMDL Priority

This TMDL is recommended for medium priority, with completion projected to occur after 2015. Problems with bacteria from livestock wastes will be addressed to some extent through the development and implementation of nutrient TMDLs for Bridgeport Reservoir and through implementation of agricultural Best Management Practices under the Regional Board's nonpoint source program. Monitoring by Regional Board staff in the Lake Tahoe Basin shows that management practices that restrict livestock access to surface waters lead to significant reductions in numbers of fecal coliform bacteria.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Honeywell, P.D., 2001. Email from Paul Honeywell, U.S. Geological Survey to Kim Gorman of Regional Board staff, dated 3/13/01 "Re: Bridgeport Data." Email explains error codes.

Menon, A.S., 2001. *Shellfish Safety: Bacterial Indicators on [sic] Shellfish Water Quality. Canadian Shellfish Quality Resource.* Available on the Internet: <http:www.shellfishquality.ca/indicators.htm>.

U.S. Geological Survey, 2001. Unpublished water quality data provided via FTP.

SWAUGER CREEK, PHOSPHORUS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Swauger Creek, a tributary of Buckeye Creek in the East Walker River watershed, is recommended to be listed for violation of the water quality objective for total phosphorus.

TYPO, SHOULD BE PHOSPHORUS CHANGE SOURCES

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Swauger Creek	**Pollutant(s)**	Pathogens
Hydrologic Unit	East Walker River (630.30 and 630.40)	**Sources**	~~Livestock~~, wildlife
Total Length	~13 miles	**TMDL Priority**	High
Size Affected	~13 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38 °17' 00" N, 119°17'55" W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Swauger Creek, in Mono County, originates in the Sweetwater Mountains and flows south and southeast near Highway 395 before joining Buckeye Creek, west of Bridgeport Reservoir. It has several tributaries including Huntoon Creek, Long Valley Creek, and Harvey Creek. Livestock grazing is the main land use in the watershed.

Water Quality Objectives Not Attained

The numerical water quality objectives for total phosphorus for tributaries of the East Walker River within Bridgeport Valley are those for the river itself. These objectives are 0.06 milligrams per liter (mg/L) as an annual mean and 0.10 mg/L as a 90th percentile level. (Objectives expressed as 90th percentiles mean that only 10 % of all samples are allowed to be higher than the stated number.)

Evidence of Impairment

Concentrations of total phosphorus in nine samples collected in Swauger Creek in 2000 ranged from 0.023 to 0.107 mg/L, with a mean value of 0.068 mg/L. . Concentrations of total phosphorus in six samples collected in 2001 ranged from 0.047 to .0.117 mg/L, with a mean value of 0.73 mg/L. The creek was in violation of both the annual mean and 90th percentile objectives during each of the two years of sampling.

Extent of Impairment

Because additional monitoring is needed to define the extent of phosphorus problems in Swauger Creek, the entire creek is recommended for listing at this time.

Potential Sources

Phosphorus is present in soils and may reach Swauger Creek through erosion. Other possible sources are livestock wastes, stormwater from Highway 395, and atmospheric deposition of phosphorus suspended in wood smoke (e.g., from forest fires) or road dust.

TMDL Priority

This TMDL is recommended for a higher priority. Phosphorus loading from Swauger Creek will be addressed to some extent during the development of a phosphorus TMDL for Bridgeport Reservoir. A separate TMDL for the creek, if needed, will be completed after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

U.S. Geological Survey, 2001. Unpublished water quality data.

SWAUGER CREEK, PATHOGENS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Swauger Creek, a tributary of Buckeye Creek in the East Walker River watershed, is proposed to be listed for "pathogens" as a result of violations of the narrative water quality objective for fecal coliform bacteria. Fecal coliform bacteria in water are indicators of contamination from the feces of warm-blooded animals and of the possible presence of many different kinds of pathogenic microorganisms.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Swauger Creek	**Pollutant(s)**	Pathogens
Hydrologic Unit	East Walker River (630.30 and 630.40)	**Sources**	Livestock, wildlife, septic system, human recreational users.
Total Length	~13 miles	**TMDL Priority**	Medium
Size Affected	~13 miles	**TMDL End Date**	After 2015
Latitude/Longitude	38 °17' 00" N, 119°17'55" W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Swauger Creek, in Mono County, originates in the Sweetwater Mountains and flows south and southeast near Highway 395 before joining Buckeye Creek west of Bridgeport Reservoir. It has several tributaries including Huntoon Creek, Long Valley Creek, and Harvey Creek. Livestock grazing is the main land use in the watershed.

Water Quality Objectives Not Attained

The narrative water quality objective for fecal coliform bacteria in the Lahontan Basin Plan states:

> *"Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.*
>
> *The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml."*

The units used in the water quality objective are the numbers of bacterial colonies per 100 milliliters (ml), sometimes referred to as the "Most Probable Number" or MPN.

This objective applies to all surface waters of the Lahontan Region. Because the current U.S. Geological Survey (USGS) monitoring program for bacteria in the East Walker River watershed involves one monthly sample, the 40/100 ml limit in the last part of the objective was the criterion used in assessment for update of the Section 303(d) list.

The Lahontan Basin Plan does not currently include water quality objectives for fecal streptococci. However, these bacteria are also indicators of fecal pollution and therefore of impairment. Fecal streptococci can be used to assess sources of contamination. If the ratio of fecal coliform numbers to fecal streptococcus numbers is greater than 4, a human source is generally indicated, and a ratio of less than 0.7 points to animal sources.

Evidence of Impairment

The results of bacterial sampling by the USGS at Swauger Creek are shown in Table 2. At least five of sixteen fecal coliform samples exceeded the 40/100 ml limit in the narrative water quality objective. According to USGS staff, the "K" code indicates that the bacteria count was outside the acceptable range or ideal count. An ideal count for fecal coliform is 20-60 colonies per plate. For fecal streptococcus the ideal count is 20-100 per plate. Table 2 shows that high bacterial counts at both stations coincide with months when livestock are present in the Swauger Creek watershed.

Table 2. Monitoring data for bacteria in Swauger Creek (colonies per 100 ml)

Sampling Date	Fecal Coliform	Fecal Streptococcus
03-13-00	K2	11
04-13-00	K6	55
05-11-00	K2	K8
06-06-00	59	91
07-12-00	50	>1000
08-09-00	73	K94
09-13-00	250	310
10-12-00	K28	160
11-14-00	K8	96
12-12-00	K8	55
01-09-01	K2	88
02-14-01	K1	-
03-13-01	K1	30
04-12-01	1	16
05-09-01	3	73
06-05-01	130	330

Extent of Impairment

Because data on bacteria are available for only one station, and because grazing occurs throughout the watershed, the entire length of Swauger Creek is recommended for listing.

Potential Sources

Because so many of the data have "K" codes, it is difficult to compare ratios of fecal coliform to fecal streptococcus to determine possible sources for fecal bacteria at this station. The ratios point to animal sources on some sampling dates and human sources on others. Livestock wastes are probably the major source of fecal bacteria. Other possible sources include wildlife, failing septic systems, and human recreational users of the watershed.

TMDL Priority

This TMDL is recommended for medium priority, with completion projected to occur after 2015. Problems with bacteria from livestock wastes will be addressed to some extent through the development and implementation of nutrient TMDLs for Bridgeport Reservoir and through implementation of agricultural Best Management Practices under the Regional Board's nonpoint source program. Monitoring by Regional Board staff in the Lake Tahoe Basin shows that management practices that restrict livestock access to surface waters lead to significant reductions in numbers of fecal coliform bacteria.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

Honeywell, P.D., 2001. Email from Paul Honeywell, U.S. Geological Survey to Kim Gorman of Regional Board staff, dated 3/13/01 "Re: Bridgeport Data." Email explains error codes.

Menon, A.S., 2001. *Shellfish Safety: Bacterial Indicators on [sic] Shellfish Water Quality.* Canadian Shellfish Quality Resource. Available on the Internet: <http:www.shellfishquality.ca/indicators.htm>.

U.S. Geological Survey, 2001. Unpublished water quality data.

NINE NATURALLY IMPAIRED WATERS, SALINITY, METALS, AND ARSENIC
2002 Section 303(d) Fact Sheet
Delisting

Rationale for Delisting

The nine water bodies listed in Tables 1 and 2 are saline or geothermal surface waters which were listed in the late 1980s or early 1990s for salinity and/or toxic trace metals. Although constituents exceed drinking water standards, all of these water bodies were given potential Municipal and Domestic Supply (MUN) beneficial use designations as a result of Basin Plan amendments which applied the MUN use to almost all waters in the Lahontan Region. The Regional Board amended its Basin Plan in 2000 to remove the MUN use, and the conflict with drinking water standards, for the waters in Table 1. These amendments have been approved by the State Board and are pending final approvals from other agencies. Regional Board staff conducted a scientific literature review and prepared a detailed Use Attainability Analysis which shows that:

- These waters meet the "Sources of Drinking Water Policy" (State Board Resolution 88-63) criteria for exclusion from the MUN use due to their poor quality, and are unlikely to be in demand as drinking water due to the relatively small amounts of water available;

- The salts and trace elements affecting these water bodies come from natural sources (volcanic, geothermal, and/or evaporative concentration in closed basins over geologic time);

- Saline and geothermal waters support unique biological communities adapted to their extreme environmental conditions, and should not be considered "impaired" in relation to freshwater aquatic life criteria. The USEPA's (1997) guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

These waters, and other "naturally impaired" waters in the Lahontan Region, are recommended for removal from the Section 303(d) list because the salts and trace elements in question are not "pollutants" under the definition in the Clean Water Act. See the Regional Board staff report on the Section 303(d) List update for further discussion of naturally impaired waters in relation to listing.

Because of the extensive documentation already provided in the Use Attainability Analysis, separate fact sheets have not been prepared for these waters.

Table 1. Naturally Impaired Waters Addressed in Lahontan Region's 2000 Basin Plan Amendments

Water Body Name	County	HU No.	Reason for Listing
Wendel Hot Springs	Lassen	637.20	Metals
Amedee Hot Springs	Lassen	637.20	Metals
Hot Creek	Mono	631.40	Metals
Fales Hot Springs	Mono	631.40	Metals
Little Hot Creek	Mono	603.10	Arsenic
Little Alkali Lake	Mono	603.10	Arsenic
Deep Springs Lake	Inyo	605.00	Salinity/TDS/Chlorides
Keough Hot Springs	Inyo	603.00	Metals
Amargosa River	Inyo/San Bernardino	609.00	Salinity/TDS/Chlorides

Table 2. Summary of Compliance With Drinking Water Criteria for Nine "Naturally Impaired" Waters (from Use Attainability Analysis report).

Water Body Name	Sources of Drinking Water Policy TDS Threshold (3000 mg/L) Exceeded?	Parameters for Which Other Standards or Criteria are Exceeded	Water Quantity Considerations
Wendel Hot Springs	No	TDS, specific conductance, arsenic, sulfate, fluoride, sodium	Flow in natural springs reduced due to nearby geothermal development.
Amedee Hot Springs	No	TDS, sulfate, fluoride, boron, sodium	Flow in natural springs reduced due to nearby geothermal development.
Fales Hot Springs	No	TDS, specific conductance, sulfate, fluoride, arsenic, copper, molybdenum, lead, aluminum	
Hot Creek	No	Specific conductance, fluoride, boron	
Little Hot Creek	No	Arsenic, beryllium, specific conductance, boron, lead, fluoride, antimony.	Annual flow ca. 1000 afa; evaporation increases salinity
Little Alkali Lake	Yes	TDS, Arsenic	Ephemeral
Keough Hot Springs	No	TDS	Flow 600 gallons per minute
Deep Springs Lake	Yes	TDS, specific conductance, pH	Ephemeral
Amargosa River	Yes (in Death Valley)	TDS, specific conductance, arsenic, sulfate, sodium, chloride, fluoride, boron.	Intermittent, variable annual flows

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2000. *Use Attainability Analysis for Nine "Naturally Impaired" Waters of the Lahontan Region*, April 2000.

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

California State Water Resources Control Board, 1988. Resolution 88-63, Sources of Drinking Water Policy.

U.S. Environmental Protection Agency, 1997. Establishing Site Specific Aquatic Life Criteria Equal to Natural Background. Memorandum dated November 5, 1997 from Tudor T. Davies, Director, Office of Science and Technology, USEPA Office of Water.

Water Body Fact Sheets for 2002
Section 303(d) List Update
Lahontan Region

MONO HYDROLOGIC UNIT

California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Boulevard
South Lake Tahoe CA 96150

November 2001

Contact Person:

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MONO LAKE, SALINITY/TDS/CHLORIDES
2002 Section 303(d) Fact Sheet
Delisting

Evidence to Support Delisting

Mono Lake is proposed for delisting because (1) its high concentrations of salts and trace elements come from natural sources, and thus are not "pollutants" as defined in the Clean Water Act, and (2) the State Water Resources Control Board's 1994 Water Rights Decision 1631 establishes conditions to control the lake level, and thus salt concentrations, to ensure attainment of water quality objectives and protection of beneficial uses.

Mono Lake, a designated Outstanding National Resource Water under the Clean Water Act, is nationally and internationally recognized for its unique ecological and recreational values. Mono Lake was listed based on exceedance of the water quality objective for total dissolved solids (76 grams/liter [g/L]) and the potential harm to beneficial uses as a result of projected future increases in salinity. These problems resulted from diversions from streams tributary to Mono Lake by the City of Los Angeles Department of Water and Power.

Mono Lake has accumulated salts and trace elements such as arsenic and boron over geologic time through evaporative concentration of chemicals from natural sources (erosion from its watershed, and volcanic and geothermal sources). Salt concentrations are directly related to lake volume. At an arbitrary "reference" total dissolved solids (TDS) concentration of 100 g/L cited by the National Academy of Sciences, the boron concentration is 475 milligrams per liter (mg/L), one of the highest concentrations in any saline lake. The fluoride concentration is 65 mg/L and the arsenic concentration is 17 mg/L (arsenic concentrations have ranged from 4 to 28 mg/L). Other trace elements concentrations at this TDS level include bromide 50 mg/L, lithium 10 mg/L, iodine 7 mg/L and tungsten 4 mg/L. At the lower TDS level represented by the water quality objective, concentrations of other constituents would be proportionally lower, but there would still be exceedances of drinking water and freshwater aquatic life criteria. Mono Lake is not designated for the municipal and domestic supply (MUN) use, and violations of drinking water standards are not of concern. Regional Board staff's literature review of scientific literature on saline lakes worldwide shows that, while these lakes may have concentrations of chemicals such as arsenic which exceed freshwater aquatic life criteria, native organisms are adapted to their extreme environmental conditions. Such lakes have their own degree of biological integrity and should not be considered "impaired" in relation to aquatic life and wildlife uses. USEPA (1997) guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

Watershed Characteristics

Mono Lake is an internally drained lake in Mono County (latitude 38.017°N, longitude 119.008°W). It receives runoff from a number of perennial streams and small lakes originating near the Sierra Nevada crest. The major tributaries were historically Mill, Lee Vining, and Rush Creeks; diversions from Mill Creek have led to larger inflows from Wilson Creek to the north.

Diversions from tributaries of Mono Lake by the Los Angeles Department of Water and Power between 1941 and 1982 resulted in a decline in lake level of about 45 feet and about a 30 percent reduction in lake volume, and substantial environmental damage. Water Rights Decision 1631 will lead to attainment and maintenance of a higher lake level that scientific evidence indicates will protect nesting habitat, maintain long term productivity of brine shrimp and brine fly populations, enhance the scenic quality of the basin, meet applicable water quality standards and ensure compliance with federal air quality standards related to blowing dust.

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GRANT LAKE, ARSENIC
2002 Section 303(d) Fact Sheet
Delisting

Evidence to Support Delisting

Grant Lake in Mono County (HU No. 601.00) is recommended for delisting because the arsenic present comes from natural sources and thus is not a "pollutant" as defined in the Clean Water Act.

Grant Lake was placed on the Section 303(d) list for arsenic based on data summarized in the State Board's Mono Basin EIR. The historical mean concentration of arsenic from the Grant Lake outlet between 1940 and 1990 was 10.80 micrograms per liter (ug/L); the minimum value was 2.00 ug/L and the maximum 20.00 ug/L. The mean concentration exceeded the then-current California Inland Surface Waters Plan standard of 5 ug/L. (This plan was subsequently rescinded because of a court decision.) The historic mean and maximum values exceed the 10 ug/L drinking water standard standard recently approved by the U.S. Environmental Protection Agency (USEPA). Sacramento perch liver tissue sampled in Grant Lake in 1991 under the State Board's Toxic Substances Monitoring Program had an "elevated" concentration of arsenic when compared with statewide data, but fish livers are not generally consumed, and no fish consumption criterion was exceeded.

The Grant Lake watershed has been affected by past volcanic eruptions from Long Valley Caldera and the Mono and Inyo Craters, which are the probable sources of arsenic. There are no known past or present industrial or agricultural discharges of arsenic in the watershed. Naturally high concentrations of arsenic are present in other waters of the Mono Lake and Owens River watersheds which are not themselves used as drinking water sources but which contribute to the City of Los Angeles municipal supply. The water system "at the tap" meets the current drinking water MCL due to blending. If a lower arsenic standard is adopted, treatment may be needed in the future.

While fishing is an important beneficial use in the June Lakes watershed, the Mono Basin was historically fishless, and current game fish are introduced species. USEPA (1997) guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."* Although delisting is recommended, arsenic should continue to be monitored in Grant Lake and upstream waters. Its effects on beneficial uses such as fish consumption and local domestic water supplies should be assessed further.

Watershed Characteristics

Grant Lake is located in the Mono Basin, at latitude 37.862° N, longitude 119.104°W. It is a reservoir constructed by enlarging a natural lake through an early irrigation dam and then through a larger dam constructed in 1941 by the Los Angeles Department of Water and Power (LADWP). The lake's surface acreage was increased from 150 to 1094 acres. The current maximum potential storage is 45, 575 acre-feet. Grant Lake stores water from the Rush Creek watershed and water exported from Parker, Walker, and Lee Vining Creeks for export to the Owens River Basin through the Mono Craters Tunnel. The export volume was formerly about 83,000 afa. Releases are now

subject to conditions in State Board Water Rights Decision No. 1631 for the protection of Mono Lake and Rush Creek.

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Water Body Fact Sheets for 2002
Section 303(d) List Update
Lahontan Region

OWENS AND DEEP SPRINGS HYDROLOGIC UNITS

California Regional Water Quality Control Board, Lahontan Region
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November 2001

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Note: This packet contains water body-specific fact sheets for six surface waters of the Owens Hydrologic Unit. Four additional water bodies (Little Hot Creek, Little Alkali Lake, and Keough Hot Springs in the Owens HU, and Deep Springs Lake in the Deep Springs HU), are proposed for delisting. See the summary fact sheet for "Nine Naturally Impaired Waters."

BIG SPRINGS, ARSENIC
2002 Section 303(D) Fact Sheet
Delisting

Rationale for Delisting

Delisting is being proposed for Big Springs because the arsenic comes entirely from natural sources and is, thus, not a "pollutant" under the definition in the Clean Water Act. The springs are located in the volcanic Long Valley Caldera at the headwaters of the Owens River, and elements such as arsenic and fluoride are believed to be indicators of geothermal sources.

The springs were Section 303(d)-listed for arsenic based on data reported in 1991 (mean arsenic concentration 17 micrograms per liter or ug/L; range 12-20 ug/L). These concentrations exceeded the then-current standard of 5 ug/L in the *California Inland Surface Waters Plan.* This plan was subsequently invalidated by a court decision and rescinded. Historic arsenic concentrations in Big Springs exceed the revised drinking water standard (10 ug/L) recently approved by the U.S. Environmental Protection Agency (USEPA).

Arsenic is removed from the Owens Valley water supply before it is delivered for use. The Los Angeles Aqueduct filtration plant is located just north of the terminus in Van Norman Reservoir in the northern San Fernando Valley, and additional arsenic removal occurs within the Los Angeles Aqueduct system. In 2000, the Los Angeles Department of Water and Power reported arsenic concentrations of 2.1-2.3 ug/L in treated water.

There is no current information on aquatic life associated with Big Springs. The USEPA's 1997 guidance for the development of site-specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

Watershed Characteristics

The Big Springs are located in Mono County at the headwaters of the Owens River, downstream of the confluence of Deadman and Glass Creeks and upstream of the East Portal of the Mono Craters Tunnel. They provide baseflow for the Owens River; the average annual flow is approximately 50 cubic feet per second (cfs), based on historical Los Angeles Department of Water and Power data.

Information Sources

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CROWLEY LAKE, ARSENIC
2002 Section 303(d) Fact Sheet
Delisting

Rationale for Delisting

Crowley Lake is proposed for delisting because the arsenic comes entirely from natural sources and is, thus, not a "pollutant" as defined in the Clean Water Act. Crowley Lake is also currently listed for nutrients, and it is proposed to remain listed with separate entries for nitrogen and phosphorus. A Section 319 grant-funded study of nonpoint source nutrient inputs to Crowley Lake, including some arsenic sampling, is ongoing.

Historical samples collected between 1940 and 1990 for the Crowley Lake outlet had a mean arsenic concentration of 45.47 micrograms per liter (ug/L), with a maximum concentration of 150 ug/L and a minimum of 4 ug/L. The mean value exceeded the then-current *California Inland Surface Waters Plan* standard of 5 ug/L. That plan has since been invalidated a court order and rescinded. The historic mean arsenic concentration in Crowley Lake exceeds the revised drinking water standard (10 ug/L) recently approved by the U.S. Environmental Protection Agency (USEPA).

Arsenic is removed from the Owens Valley water supply before it is delivered for use. The Los Angeles Aqueduct filtration plant is located just north of the terminus in Van Norman Reservoir in the northern San Fernando Valley, and additional arsenic removal occurs within the Los Angeles Aqueduct system. In 2000, the Los Angeles Department of Water and Power (LADWP) reported arsenic concentrations of 2.1-2.3 ug/L in treated water.

The arsenic in Crowley Lake comes from natural (geothermal, volcanic, and perhaps evaporative) sources in the Long Valley Caldera and Mono Basin, including Grant Lake, Big Springs, Hot Creek and Little Hot Creek, the Alkali Lakes, and the Owens River in Long Valley. Most of these waters are currently listed for arsenic, and are proposed for delisting in 2002. See the fact sheet for Hot Creek for more information about Long Valley Caldera.

The native fishes and other aquatic life of the Owens River system are presumed to be adapted to local arsenic concentrations. The USEPA's (1997) guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

Watershed Characteristics

Crowley Lake (also known as Long Valley Reservoir) is located in Mono County in the eastern Sierra Nevada. It is the largest reservoir in the Los Angeles Aqueduct system, about 6 miles long and 3 miles wide. Its maximum surface area is 5,272 acres. It was created by the LADWP in 1941 to store water imported from the Mono Basin and the upper Owens River (Long Hydrologic Area) drainage. Tributaries include the Owens River, Leighton Springs, and McGee, Hilton, Whiskey,

and Crooked Creeks. Land ownership in the watershed is mostly public (Inyo National Forest, U.S. Bureau of Land Management, and LADWP). Land use near the reservoir is largely for livestock grazing. Recreational use is important in the upper watershed. The watershed also includes the Town of Mammoth Lakes and several geothermal power plants. The Department of Fish and Game has identified Crowley Lake as the "dominant fishery in the eastern Sierra in terms of angler use and fish production." Total estimated angler hours were 310,061 in 1992, with 47,280 hours of use on the opening week of fishing season.

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TINEMAHA RESERVOIR, ARSENIC
2002 Section 303(d) Fact Sheet
Delisting

Rationale for Delisting

Tinemaha Reservoir is proposed for delisting because the arsenic is entirely from natural sources and, thus, is not a "pollutant" as defined in the Clean Water Act. Arsenic enters the Owens River and Los Angeles Aqueduct systems from volcanic and geothermal sources in the Long Valley Caldera and elsewhere (see the fact sheets for Hot Creek and Crowley Lake). The separate listing of Tinemaha Reservoir for metals is proposed to remain unchanged due to concern about the impacts of copper sulfate use for algae control on water quality and beneficial uses.

Available data for the Owens River below Tinemaha Reservoir show a mean arsenic concentration of 22 micrograms per liter (ug/L). The Owens River mean is higher than the *California Inland Surface Waters Plan* standard (5 ug/L) in effect in the early 1990s when a number of waters in the Owens Valley were Section 303(d)-listed for arsenic. (That plan has since been rescinded.) The historic mean concentration also exceeds the revised drinking water standard for arsenic (10 ug/L) recently approved by the U.S. Environmental Protection Agency (USEPA).

Arsenic is removed from the Owens Valley water supply before it is delivered for use. The Los Angeles Aqueduct filtration plant is located just north of the terminus in Van Norman Reservoir in the northern San Fernando Valley, and additional arsenic removal occurs within the Los Angeles Aqueduct system. In 2000, the Los Angeles Department of Water and Power (LADWP) reported arsenic concentrations of 2.1-2.3 ug/L in treated water.

The native fishes and other aquatic life of the Owens River system are presumed to be adapted to local arsenic concentrations. The USEPA's (1997) guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

Watershed Characteristics

Tinemaha Reservoir is located in Inyo County southeast of Big Pine (latitude 37.055 ° N, longitude 118.226 °W). It is one of several reservoirs in the LADWP's Owens River/Los Angeles Aqueduct municipal supply system. It receives inflow from the Middle Owens River and Tinemaha Creek. It was constructed to provide short term-regulation of Owens River flows to allow the maximum amount of flow to be diverted into the Los Angeles Aqueduct. It has a surface area of 2098 acres and a drainage area of 1915 square miles. The maximum storage is about 16,000 acre feet, although earthquake safety concerns have limited the useable storage to 10,000 acre feet in recent years. Releases from Tinemaha Reservoir are usually diverted into the Los Angeles Aqueduct intake at Aberdeen, but excess water occasionally flows down the Owens River channel toward Owens Lake.

Information Sources

California Department of Water Resources, 1993. Dams Within the Jurisdiction of the State of California. Bulletin 17. Available on the Internet: http://elib.cs.berkeley.edu/kopec;/b17/html/home.html.

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OWENS RIVER, ARSENIC
2002 Section 303(d) Fact Sheet
Delisting

Rationale for Delisting

The Owens River is recommended to be delisted for arsenic because the arsenic comes entirely from natural sources and is, thus, not a "pollutant" under the definition in the Clean Water Act. The Owens River is also Section 303(d)-listed for habitat alterations, and this listing is proposed to remain unchanged during the 2002 listing cycle.

The headwaters of the Owens River are located within the Long Valley Caldera, and their water quality is significantly influenced by volcanic and geothermal sources of trace elements such as arsenic. Although listing was done primarily on the basis of data for the segment of the river within Long Valley, arsenic from geothermal sources in Long Valley is carried to other parts of the watershed. In 83 samples collected by the Los Angeles Department of Water and Power (LADWP) for the Owens River at Benton Crossing, arsenic concentrations ranged from 10 to 170 micrograms per liter (ug/L) with a mean concentration of 60 ug/L. The mean arsenic concentration measured in the lower Owens River below Tinemaha Reservoir is 22 ug/L. Historic arsenic concentrations in both reaches exceed the revised drinking water standard (10 ug/L) recently approved by the U.S. Environmental Protection Agency (USEPA).

Arsenic is removed from the Owens Valley water supply before it is delivered for use. The Los Angeles Aqueduct filtration plant is located just north of the terminus in Van Norman Reservoir in the northern San Fernando Valley, and additional arsenic removal occurs within the Los Angeles Aqueduct system. In 2000, the LADWP reported arsenic concentrations of 2.1-2.3 ug/L in treated water.

The upper and middle reaches of the Owens River support very popular trout fisheries. The Fish Slough wetland provides habitat for threatened/endangered fish species. Regarding native aquatic life, the USEPA's (1997) guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

Watershed Characteristics

The Owens River is about 120 miles long, with headwaters at Deadman Creek and Big Springs in Mono County and its terminus in Owens Lake in Inyo County. It has many tributary streams flowing from the Sierra Nevada and the White and Inyo Mountains. Tributaries from the Sierra are mostly perennial and those from the White/Inyo Mountains mostly ephemeral. The headwaters of the Sierra streams, including many small lakes, are within several federal wilderness areas, and the Inyo National Forest receives more recreational use than Yellowstone, Glacier and Grand Canyon National Parks combined. The upper Owens River watershed (within the Long Hydrologic Area) is

a Lahontan Regional Board Watershed Management Initiative (WMI) planning area. Surface water is diverted from the Owens River and several tributary streams and ground water of the Owens Valley supplement this flow to the Los Angeles Aqueduct. Reservoirs in the Owens River/Los Angeles Aqueduct system include Crowley Lake, Pleasant Valley Reservoir, and Tinemaha Reservoir.

Information Sources

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OWENS LAKE, SALINITY/TDS/CHLORIDES
2002 Section 303(d) Fact Sheet
Delisting

Rationale for Delisting

Owens Lake is proposed for delisting because the salts and trace elements present in its brine come from natural sources and are, thus, not "pollutants" under the definition in the Clean Water Act. It is the terminal lake for a large internally drained river system, and has accumulated materials from volcanic and geothermal sources and from concentration in a closed basin over geologic time.

Until the early 20th Century, Owens Lake was a permanent inland saline lake and probably supported an aquatic ecosystem similar to that at Mono Lake. Diversions from tributary streams for municipal use in the Los Angeles area led to almost complete drying of the lake. The brine pool at Owens Lake currently supports a simple ecosystem of salt tolerant halobacteria and algae. The total dissolved solids (TDS) concentration of Owens Lake increased from 120,000 parts per million (ppm) prior to 1913 to about 320,000 ppm in 1995. The pH of the brine is about 10.5, and it includes high concentrations of arsenic (110 ppm), boron (278 ppm), fluoride (31 ppm), phosphorus (206 ppm), and other trace elements. The brine is near saturation and a large "ore body" of sodium salts, up to 9 feet thick, has precipitated out. Owens Lake has historically been mined for these salts.

Owens Lake is not used as a drinking water source, and its surface waters are not expected to be in demand for municipal supply. Regional Board staff are currently drafting Basin Plan amendments to remove the potential municipal use designation from the brine pool.

The U.S. Environmental Protection Agency's (USEPA's) 1997 guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

Watershed Characteristics

Owens Lake in Inyo County is the internally drained, terminal lake for the Owens River system. It historically received water from the Owens River and from perennial and ephemeral tributary streams. Before diversions of tributary streams began in the 1870s, Owens Lake had an area of about 72,000 acres. By 1924, the lake had dried to brine pool an area of about 20,000 acres. The surface waters of the lake include both the brine pool and ephemeral waters that collect on the lakebed from precipitation and surface runoff. The Owens River watershed is largely in public ownership (U.S. Forest Service, U.S. Bureau of Land Management, and Los Angeles Department of Water and Power.) Small communities near Owens Lake include Cartago, Olancha, and Keeler. Most of the Owens Lake Bed is owned by the State of California and controlled by the State Lands Commission.

The dry Owens Lake bed has been called the single largest source of particulate air pollutants in the United States. In 1998, the Los Angeles Department of Water and Power agreed with the Great Basin Unified Air Pollution Control District to control windblown dust on at least 22 square miles of dry lakebed by a mixture of three methods: shallow flooding, revegetation, and gravel cover. The flooding will not refill the lake, but 10 square miles may be permanently wetted with a few inches of water.

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HOT CREEK, METALS
2002 Section 303(d) Fact Sheet
Delisting

Rationale for Delisting

Hot Creek in the Owens River watershed (HU No. 603.10) is recommended for delisting because the toxic trace elements found in ambient water and fish tissue come from natural geothermal and volcanic sources and, thus, are not "pollutants" as defined in the Clean Water Act. (Little Hot Creek, a tributary of this Hot Creek, and a second geothermally-influenced Hot Creek in the Walker River watershed are also recommended for delisting in 2002; see the "Nine Naturally Impaired Waters" fact sheet.)

Hot Creek is located within the volcanic Long Valley Caldera. Evidence of past and resurgent volcanism in the caldera includes fumaroles, hot springs, geysering, and hydrothermally altered rock. Several new springs appeared in Hot Creek in 1973 following an earthquake. The "metals" listing for Hot Creek includes arsenic and other elements such as antimony, beryllium, germanium, barium, strontium, iron, manganese, boron, and fluoride. Statistically "elevated" concentrations of silver and zinc have been observed in fish sampled in Hot Creek under the State Water Resources Control Board's Toxic Substances Monitoring Program. Arsenic has been the element of greatest concern in Hot Creek because the creek contributes a substantial amount of water to the Owens River water supply for the City of Los Angeles. The hot springs tributary to Hot Creek have concentrations of arsenic up to 1100 micrograms per liter (ug/L). In 1991, the mean arsenic concentration in the creek below the hot springs was 220 ug/L . The mean concentration at the County Road station, based on 201 samples collected between 1965 and 1991, was 172 ug/L. Further dilution occurs downstream; in 1976 the concentration in the Owens River upstream of Benton Crossing was less than 100 mg/L. These arsenic concentrations are significantly higher than the revised drinking water standard (10 ug/L) recently approved by the U.S. Environmental Protection Agency (USEPA). Hot Creek is the source of about 60 percent of the arsenic discharged to Crowley Lake.

Arsenic is removed from the Owens Valley water supply before it is delivered for use. The Los Angeles Aqueduct filtration plant is located just north of the terminus in Van Norman Reservoir in the northern San Fernando Valley, and additional arsenic removal occurs within the Los Angeles Aqueduct system. In 2000, the Los Angeles Department of Water and Power reported arsenic concentrations of 2.1-2.3 ug/L in treated water.

Hot Creek is popular for recreation, but the boiling springs have caused a number of deaths and injuries. A group of warm springs near the transition between Hot and Mammoth Creeks provide water for the Hot Creek fish hatchery. The hatchery supplies trout for planting throughout the southeastern Sierra Nevada. Significant diversions are made from Hot Creek for irrigation of pasturelands.

The USEPA's (1997) guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

Watershed Characteristics

Hot Creek (latitude 37.71° N, longitude 118.78°W) is located in Mono County in the Long Hydrologic Area of the Owens Hydrologic Unit; it is tributary to the Owens River upstream of Crowley Lake. Hot Creek is the name given to the lower segment of Mammoth Creek, downstream of a group of hot springs. The headwaters of Mammoth Creek are in the John Muir Wilderness near the Sierra Nevada crest; they include the "Mammoth Lakes" and other small lakes. The annual flow of Hot Creek is about 40,630 acre-feet, including about 11,500 acre-feet from the hot springs.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 2000. *Use Attainability Analysis for Nine "Naturally Impaired" Waters of the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

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Los Angeles Department of Water and Power, unpublished water quality data.

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U.S. Environmental Protection Agency, 2001. EPA to Implement 10ppb [sic] Standard for Arsenic in Drinking Water. USEPA Office of Water, EPA 815-F-01-010, October 2001. Available on the Internet: http://www.epa.gov/safewater/ars/ars-oct-factsheet.html.

U.S. Geological Survey, 1976. *Sources of Arsenic in Streams Tributary to Lake Crowley, California*, Water-Resources Investigations 76-36.

NINE NATURALLY IMPAIRED WATERS, SALINITY, METALS, AND ARSENIC
2002 Section 303(d) Fact Sheet
Delisting

Rationale for Delisting

The nine water bodies listed in Tables 1 and 2 are saline or geothermal surface waters listed in the late 1980s or early 1990s for salinity and/or toxic trace metals. Although constituents exceed drinking water standards, all of these water bodies were given potential Municipal and Domestic Supply (MUN) beneficial use designations as a result of Basin Plan amendments that applied the MUN use to almost all waters in the Lahontan Region. The Regional Board amended its Basin Plan in 2000 to remove the MUN use, and the conflict with drinking water standards, for the waters in Table 1. These amendments have been approved by the State Board and are pending final approvals from other agencies. Regional Board staff conducted a scientific literature review and prepared a detailed Use Attainability Analysis to show that:

- These waters meet the "Sources of Drinking Water Policy" (State Water Resources Control Board Resolution 88-63) criteria for exclusion from the MUN use due to their poor quality, and they are unlikely to be in demand as drinking water due to the relatively small amounts of water available;

- The salts and trace elements affecting these water bodies come from natural sources (volcanic, geothermal, and/or evaporative concentration in closed basins over geologic time);

- Saline and geothermal waters support unique biological communities adapted to their extreme environmental conditions and should not be considered "impaired" in relation to freshwater aquatic life criteria. The U.S. Environmental Protection Agency's (USEPA's) 1997 guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

These waters, and other "naturally impaired" waters in the Lahontan Region, are recommended for removal from the Section 303(d) list because the salts and trace elements in question are not "pollutants" under the definition in the Clean Water Act. See the Regional Board staff report on the Section 303(d) List update for further discussion of naturally impaired waters in relation to listing.

Because of the extensive documentation already provided in the Use Attainability Analysis, separate fact sheets have not been prepared for these waters.

Table 1. Naturally Impaired Waters Addressed in Lahontan Region's 2000 Basin Plan Amendments

Water Body Name	County	HU No.	Reason for Listing
Wendel Hot Springs	Lassen	637.20	Metals
Amedee Hot Springs	Lassen	637.20	Metals
Hot Creek	Mono	631.40	Metals
Fales Hot Springs	Mono	631.40	Metals
Little Hot Creek	Mono	603.10	Arsenic
Little Alkali Lake	Mono	603.10	Arsenic
Deep Springs Lake	Inyo	605.00	Salinity/TDS/Chlorides
Keough Hot Springs	Inyo	603.00	Metals
Amargosa River	Inyo/San Bernardino	609.00	Salinity/TDS/Chlorides

Table 2. Summary of Compliance With Drinking Water Criteria for Nine "Naturally Impaired" Waters (from Use Attainability Analysis report).

Water Body Name	Sources of Drinking Water Policy TDS Threshold (3000 mg/L) Exceeded?	Parameters Exceeding Other Standards or Criteria	Water Quantity Considerations
Wendel Hot Springs	No	TDS, specific conductance, arsenic, sulfate, fluoride, sodium	Flow in natural springs reduced due to nearby geothermal development.
Amedee Hot Springs	No	TDS, sulfate, fluoride, boron, sodium	Flow in natural springs reduced due to nearby geothermal development.
Fales Hot Springs	No	TDS, specific conductance, sulfate, fluoride, arsenic, copper, molybdenum, lead, aluminum	
Hot Creek	No	Specific conductance, fluoride, boron	
Little Hot Creek	No	Arsenic, beryllium, specific conductance, boron, lead, fluoride, antimony.	Annual flow ca. 1000 acre-feet; evaporation increases salinity
Little Alkali Lake	Yes	TDS, Arsenic	Ephemeral
Keough Hot Springs	No	TDS	Flow 600 gallons per minute
Deep Springs Lake	Yes	TDS, specific conductance, pH	Ephemeral
Amargosa River	Yes (in Death Valley)	TDS, specific conductance, arsenic, sulfate, sodium, chloride, fluoride, boron.	Intermittent, variable annual flows

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2000. *Use Attainability Analysis for Nine "Naturally Impaired" Waters of the Lahontan Region*, April 2000.

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

California State Water Resources Control Board, 1988. Resolution 88-63, Sources of Drinking Water Policy.

U.S. Environmental Protection Agency, 1997. Establishing Site Specific Aquatic Life Criteria Equal to Natural Background. Memorandum dated November 5, 1997 from Tudor T. Davies, Director, Office of Science and Technology, USEPA Office of Water.

Water Body Fact Sheets for 2002
Section 303(d) List Update
Lahontan Region

MOJAVE, TRONA, AND AMARGOSA HYDROLOGIC UNITS

California Regional Water Quality Control Board, Lahontan Region
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November 2001

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Note: This packet contains water body-specific fact sheets for certain waters of the Mojave and Trona Hydrologic Units. The Amargosa River, in the Amargosa Hydrologic Unit, is also proposed for delisting. See the information on the Amargosa River in the summary fact sheet for "Nine Naturally Impaired Waters."

MOJAVE RIVER, PRIORITY ORGANICS
2002 Section 303(d) Fact Sheet
Delisting

Evidence to Support Delisting

A ten-mile segment of the Mojave River in San Bernardino County (HU No.628.00) is currently Section 303(d)-listed for "priority organics" due to the impacts of the "Barstow Slug" of subsurface pollutants. The Mojave River is an intermittent stream and normally flows on the surface for only part of its length; however, the entire river was considered a surface water for purposes of the initial assessment. Delisting of the segment affected by the "Barstow Slug" (latitude 34.899 °N, longitude 117.022 °W) is proposed for two reasons: (1) a scientific study has shown that priority pollutants are no longer present in concentrations of concern in the area affected by the groundwater plume; and (2) Regional Board staff's current approach is to recommend listing only for impairment of surface flows in ephemeral and intermittent streams.

The "Barstow Slug" was attributed to industrial discharges, largely from railroad activities, and municipal discharges from the local wastewater treatment plant. Beginning about 1910, waste fuel oil and solvents from the railroad were discharged to the dry riverbed. Beginning in 1938, municipal wastewater was also discharged to the riverbed, and the treatment plant was enlarged in 1953 and 1968. By 1972, the groundwater plume from the 1910 disposal area was over 1800 feet wide and extended about 4.5 miles downgradient. Its upper surface was about 60 feet below ground. A study completed in 1990 showed that the plume of subsurface pollutants had attenuated, apparently naturally, to levels that no longer posed threats to beneficial uses. Subsequent USGS studies indicate that ongoing municipal wastewater discharges to groundwater, and nonpoint source discharges from a golf course, are violating the numerical water quality objectives for total dissolved solids (TDS) and nitrate in the subsurface portion of the Mojave River near Barstow. However, because there are no applicable numerical objectives for surface water in this segment of the river, it is not recommended to be listed for TDS and nitrate. Surface water objectives may be developed in the future as part of the Regional Board's ongoing Watershed Management Initiative process.

Watershed Characteristics

The Mojave River watershed, in San Bernardino County, has an area of about 1600 square miles. Its headwaters are in the San Bernardino Mountains with an elevation of about 8500 feet. The river has two large perennial tributaries, the West Fork of the Mojave River and Deep Creek. These streams converge immediately upstream of the Mojave Forks dam, a flood control facility, to form the main Mojave River. The river channel is about 120 miles long and ends at Soda and Silver Dry Lakes near the town of Baker. The U.S. Geological Survey has divided the watershed into five sub-basins based on hydrologic characteristics: Headwaters, or tributaries above Mojave Forks dam; Upper Basin, from Mojave Forks dam to Lower Narrows at Victorville: Middle Basin, from Lower Narrows to Waterman Fault at Barstow; Lower Basin, from Waterman Fault to Afton Canyon, and Tailwater, from Afton Canyon to Silver Dry Lake. Most of the baseflow in the main Mojave River channel is underground. Impermeable bedrock forces ground water to the surface

of the channel at the Upper and Lower Narrows near Victorville and at Afton Canyon, below Barstow.

Information Sources

CEPIS, no date. Ground-Water Pollution, In: Seminar Publication: Protection of public water supplies from ground-water contamination, Environmental Protection Agency. Available on the Internet: <http://www.cepis.ops-oms.org/muwww/fulltext/repind46/ground/ground.html>

Maxwell, C.R. 2000. A Watershed Management Approach to Assessment of Water Quality and Development of Revised Water Quality Standards for the Ground Waters of the Mojave River Floodplain. Paper presented at National Water Quality Monitoring Council Conference, April 25-27, 2000, Austin TX.

MOJAVE RIVER BETWEEN UPPER AND LOWER NARROWS, TOTAL DISSOLVED SOLIDS
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The surface water segment of the Mojave River between the Upper and Lower Narrows near Victorville is recommended for addition to the 2002 Section 303(d) list for violations of the drinking water Maximum Contaminant Level for total dissolved solids. (A different segment of the Mojave River near Barstow was previously listed for priority organics and is currently recommended for delisting.)

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Mojave River	**Pollutant(s)**	Total Dissolved Solids
Hydrologic Unit	628.00	**Sources**	Natural (geothermal), imported water, wastewater
Total Length	120 miles	**TMDL Priority**	High
Size Affected	2 miles	**TMDL Start Date**	After 2015
Upstream Extent Latitude	34.573° N, 117.318° W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The Mojave River watershed, in San Bernardino County, has an area of about 1,600 square miles. Its headwaters are in the San Bernardino Mountains at an elevation of about 8,500 feet above sea level. The river has two large perennial tributaries, the West Fork of the Mojave River and Deep Creek. These streams converge immediately upstream of the Mojave Forks dam, a flood control facility, to form the main Mojave River. The river channel is about 120 miles long and ends at Soda and Silver Dry Lakes near the town of Baker. The USGS has divided the watershed into five sub-basins based on hydrologic characteristics: Headwaters, or tributaries above Mojave Forks Dam; Upper Basin, from Mojave Forks dam to Lower Narrows at Victorville; Middle Basin, from Lower Narrows to Waterman Fault at Barstow; Lower Basin, from Waterman Fault to Afton Canyon; and Tailwater, from Afton Canyon to Silver Dry Lake. Most of the baseflow in the main Mojave River channel is underground. Impermeable bedrock forces ground water to the surface of the channel at the Upper and Lower Narrows near Victorville and at Afton Canyon, below Barstow. The Mojave River is one of the Lahontan Regional Board's priority watersheds for the Watershed Management Initiative.

Water Quality Standards Not Attained

There is no site-specific numerical water quality objective for total dissolved solids in this segment of the Mojave River. However, the state drinking water Maximum

Contaminant Level (MCL), 500 milligrams per liter (mg/L), applies under the narrative objective for "Chemical Constituents."

Evidence of Impairment

Concentrations of total dissolved solids in 5 samples collected at the Upper Narrows between March 2000 and June 2001 ranged from 840 to 1100 mg/L, with a mean concentration of 962 mg/L. All of these values exceeded the drinking water MCL.

Extent of Impairment

The segment proposed for listing is between the Upper and Lower Narrows, about two miles in length.

Potential Sources

Potential upstream sources of total dissolved solids loading to the groundwater that surfaces at the Upper Narrows include geothermal springs tributary to Deep Creek, wastewater discharges from communities in the upper watershed, and imported (California Water Project) water stored in Silverwood Lake.

TMDL Priority

This TMDL is recommended for high priority, with completion projected to occur after 2015.

Information Sources

California Regional Water Quality Control Board, Central Valley Region, 2000. *A Compilation of Water Quality Goals.*

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region. Mojave River and D Street data.

MOJAVE RIVER BETWEEN UPPER AND LOWER NARROWS, SULFATE
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The surface water segment of the Mojave River between the Upper and Lower Narrows near Victorville is recommended for addition to the 2002 Section 303(d) list for violations of water quality objectives for sulfate. (A different segment of the Mojave River near Barstow was previously listed for priority organics and is currently recommended for delisting.)

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Mojave River	**Pollutant(s)**	Sulfate
Hydrologic Unit	628.00	**Sources**	Natural (geothermal), imported water, wastewater
Total Length	120 miles	**TMDL Priority**	High
Size Affected	2 miles	**TMDL Start Date**	After 2015
Upstream Extent Latitude	34.573° N, 117.318° W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The Mojave River watershed, in San Bernardino County, has an area of about 1,600 square miles. Its headwaters are in the San Bernardino Mountains with an elevation of about 8,500 feet above sea level. The river has two large perennial tributaries, the West Fork of the Mojave River and Deep Creek. These streams converge immediately upstream of the Mojave Forks dam, a flood control facility, to form the main Mojave River. The river channel is about 120 miles long and ends at Soda and Silver Dry Lakes near the town of Baker. The USGS has divided the watershed into five sub-basins based on hydrologic characteristics: Headwaters, or tributaries above Mojave Forks Dam; Upper Basin, from Mojave Forks dam to Lower Narrows at Victorville; Middle Basin, from Lower Narrows to Waterman Fault at Barstow; Lower Basin, from Waterman Fault to Afton Canyon; and Tailwater, from Afton Canyon to Silver Dry Lake. Most of the baseflow in the main Mojave River channel is underground. Impermeable bedrock forces ground water to the surface of the channel at the Upper and Lower Narrows near Victorville and at Afton Canyon, below Barstow. The Mojave River is one of the Lahontan Regional Board's priority watersheds for the Watershed Management Initiative.

Water Quality Standards Not Attained

The numerical water quality objectives for sulfate applicable to this segment of the river are 40 milligrams per liter (mg/L) as an annual mean and 100 mg/L as a 90th percentile value. (Under a 90th percentile objective, no more than 10 percent of all samples during a

given year are allowed to exceed the stated concentration.) These water quality objectives date from 1975 and were probably based on limited historical sampling data.

Evidence of Impairment

Sulfate concentrations in five samples collected at the Upper Narrows between March 2000 and June 2001 ranged from 47 to 260 mg/L, with a mean concentration of 191 mg/L. Four out of five samples exceeded the 90th percentile value. Sulfate concentrations in samples collected at the Lower Narrows during the same period ranged from 22 to 62 mg/L, with a mean concentration of 40.4; this value slightly exceeds the annual mean objective.

Extent of Impairment

The segment proposed for listing is between the Upper and Lower Narrows, about two miles in length.

Potential Sources

Potential upstream sources of sulfate loading to the groundwater that surfaces at the Upper Narrows include geothermal springs tributary to Deep Creek, wastewater discharges from communities in the upper watershed, and imported (California Water Project) water stored in Silverwood Lake.

TMDL Priority

This TMDL is recommended for high priority with completion projected to occur after 2015.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1975. *Water Quality Control Plan for the South Lahontan Basin.*

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region. Mojave River and D Street data.

MOJAVE RIVER BETWEEN UPPER AND LOWER NARROWS, CHLORIDE
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The surface water segment of the Mojave River between the Upper and Lower Narrows near Victorville is recommended for addition to the 2002 Section 303(d) list for violations of water quality objectives for chloride. (A different segment of the Mojave River near Barstow was previously listed for priority organics and is currently recommended for delisting.)

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Mojave River	**Pollutant(s)**	Chloride
Hydrologic Unit	628.00	**Sources**	Natural (geothermal), imported water, wastewater
Total Length	120 miles	**TMDL Priority**	High
Size Affected	2 miles	**TMDL Start Date**	After 2015
Upstream Extent Latitude	34.573° N, 117.318° W	**Original 303(d) Listing Year**	2002

Watershed Characteristics

The Mojave River watershed, in San Bernardino County, has an area of about 1,600 square miles. Its headwaters are in the San Bernardino Mountains with an elevation of about 8,500 feet above sea level. The river has two large perennial tributaries, the West Fork of the Mojave River and Deep Creek. These streams converge immediately upstream of the Mojave Forks Dam, a flood control facility, to form the main Mojave River. The river channel is about 120 miles long and ends at Soda and Silver Dry Lakes near the town of Baker. The USGS has divided the watershed into five sub-basins based on hydrologic characteristics: Headwaters, or tributaries above Mojave Forks dam; Upper Basin, from Mojave Forks dam to Lower Narrows at Victorville; Middle Basin, from Lower Narrows to Waterman Fault at Barstow; Lower Basin, from Waterman Fault to Afton Canyon; and Tailwater, from Afton Canyon to Silver Dry Lake. Most of the baseflow in the main Mojave River channel is underground. Impermeable bedrock forces ground water to the surface of the channel at the Upper and Lower Narrows near Victorville and at Afton Canyon, below Barstow. The Mojave River is one of the Lahontan Regional Board's priority watersheds for the Watershed Management Initiative.

Water Quality Standards Not Attained

The numerical water quality objectives for chloride applicable to this segment of the river are 75 milligrams per liter (mg/L) as an annual mean and 100 mg/L as a 90th percentile value. (Under a 90th percentile objective, no more than 10 percent of all samples during a

given year are allowed to exceed the stated concentration.) These water quality objectives date from 1975 and were probably based on limited historical sampling data.

Evidence of Impairment

Chloride concentrations in five samples collected at the Upper Narrows between March 2000 and June 2001 ranged from 190 to 290 mg/L, with a mean concentration of 238 mg/L. The mean value, and three of five sample values, exceed the federal 4-day average continuous concentration criterion for freshwater aquatic life (230 mg/L). (This station is in a transition zone between mountain and desert ecoregions, and freshwater criteria may not necessarily be applicable to local native aquatic species.)

Extent of Impairment

The segment proposed for listing is between the Upper and Lower Narrows, about two miles in length.

Potential Sources

Potential upstream sources of chloride loading to the groundwater that surfaces at the Upper Narrows include geothermal springs tributary to Deep Creek, wastewater discharges from communities in the upper watershed, and imported (California Water Project) water stored in Silverwood Lake.

TMDL Priority

This TMDL is recommended for high priority with completion projected to occur after 2015.

Information Sources

California Regional Water Quality Control Board, Central Valley Region, 2000. *A Compilation of Water Quality Goals.*

California Regional Water Quality Control Board, Lahontan Region, 1975. *Water Quality Control Plan for the South Lahontan Basin.*

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region. Mojave River and D Street data.

SEARLES LAKE, SALINITY/TDS/CHLORIDES
2002 Section 303(d) Fact Sheet
Delisting

Rationale for Delisting

The ephemeral waters of Searles Lake, including the ponds containing waste brine from mineral extraction operations by IMC Chemical, Inc. (IMCC), are proposed to be delisted for "Salinity/TDS/Chlorides" because the "impairment" is natural and the lake is supporting aquatic life uses to the extent possible under its extreme environmental conditions. The high concentrations of salts in surface waters, and brine deposited in surface waters, come ultimately from natural sources including evaporative concentration in a closed hydrologic basin over geologic time.

Concentrations of total dissolved solids (about 250,000 to 400,000 milligrams per liter or mg/L) and trace elements such as arsenic (60 to 170 mg/L) in Searles Lake brine greatly exceed state and federal criteria for protection of drinking water and freshwater aquatic life uses. However, the surface waters of Searles Lake are not designated for the Municipal and Domestic Supply beneficial use, and the designated aquatic habitat use is Inland Saline Water Habitat, not freshwater habitat. Naturally occurring salts and trace elements are not "pollutants" under the definition in the Clean Water Act. A staff literature review indicates that the desert playa lakes of California support aquatic life and wildlife uses by organisms adapted to their extreme environmental conditions and should not be considered "impaired" for these uses in spite of their high salt and trace element concentrations. The U.S. Environmental Protection Agency's (USEPA's) 1997 guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."* See the Lahontan Regional Board's 2001 staff report for further discussion of natural impairment in relation to listing and TMDLs.

Regional Board staff analyzed the beneficial uses of Searles Lake and its watershed in connection with Basin Plan Amendments in 2000. Further amendments, under development, could define beneficial uses for the IMCC brine ponds separately from those of the remainder of the lakebed.

Watershed Characteristics

Searles Lake is a Mojave Desert playa lake whose internally drained watershed is located in the Trona Hydrologic Unit (No. 621.00) in portions of Kern, Inyo, and San Bernardino Counties. The entire Searles Lake bed (about 40 square miles in area) is listed although the actual amount and area of surface water vary over time. The lake is a remnant of a much larger Pleistocene drainage system. The lake has a current surface elevation of about 1620 feet and a current drainage area of about 751 square miles. There are numerous ephemeral tributary streams and some perennial springs and streams in the Argus Mountains north of the lakebed. The lakebed is a "moist playa" with saturated brine near the surface in some areas; ephemeral water may collect on the surface following periods of high precipitation and runoff. Most of the surface water currently on the lakebed is brine extracted from beneath the lakebed by IMCC and returned to the lakebed following

the extraction of minerals. IMCC owns or leases about half of the lakebed, and the remainder of the watershed is mostly under the jurisdiction of the U.S. Bureau of Land Management and China Lake Naval Weapons Center. Wells, pipelines, roads, power lines, and other facilities are located on the lakebed; industrial facilities are located on the west side of the lakebed at Westend, Trona and Argus.

Information Sources:

California Regional Water Quality Control Board, Central Valley Region, 2000. *A Compilation of Water Quality Goals.*

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2000. *Staff Report/Draft Environmental Document for Proposed Amendments to the Water Quality Control Plan for the Lahontan Region (Basin Plan), State Clearinghouse Number 98092052.* April, 2000.

California Regional Water Quality Control Board, Lahontan Region, 2000. *Use Attainability Analysis for Nine "Naturally Impaired" Waters of the Lahontan Region,* April 2000.

California Regional Water Quality Control Board, Lahontan Region, 2000. *Analysis of the Beneficial Uses REC-1, REC-2, SAL, and WILD with respect to Searles Dry Lake, IMC Chemicals Inc., Trona, San Bernardino County, and Response to IMCC Comments made during the July 2000 Regional Board Meeting.*

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

U.S. Environmental Protection Agency, 1997. Establishing Site Specific Aquatic Life Criteria Equal to Natural Background. Memorandum dated November 5, 1997 from Tudor T. Davies, Director, Office of Science and Technology, USEPA Office of Water.

SEARLES LAKE, PETROLEUM HYDROCARBONS
2002 303(d) Fact Sheet
Listing

Summary of Proposed Action

The ephemeral surface waters of Searles Dry Lake, including ponds containing waste brine from IMC Chemical's mineral extraction operations, are proposed for Section 303(d) listing due to adverse impacts on beneficial uses, and violations of narrative objectives, from petroleum products in industrial waste discharges. (The surface waters of Searles Lake are currently listed for salinity, total dissolved solids, and chlorides, but are being proposed for delisting for those parameters since the naturally occurring salts and trace elements are not "pollutants" within the definition in the Clean Water Act. See the separate fact sheet for delisting.)

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Searles (Dry) Lake	**Pollutants/Stressors**	Petroleum hydrocarbons
Hydrologic Unit	621.00	**Sources**	Industrial waste
Total Area	40 square miles	**TMDL priority**	Low
Size Affected	Surface waters of lake; area is variable	**TMDL End Date**	After 2015
Latitude/Longitude	35.733° W, 117.333°N	**Original 303(d) Listing Year**	2002

Watershed Characteristics

Searles Lake is a Mojave Desert playa lake whose internally drained watershed is located in the Trona Hydrologic Unit (No. 621.00) in portions of Kern, Inyo, and San Bernardino Counties. The entire Searles Lake bed (about 40 square miles in area) is listed although the actual amount and area of surface water vary over time. The lake is a remnant of a much larger Pleistocene drainage system. The lake has a current surface elevation of about 1620 feet and a current drainage area of about 751 square miles. There are numerous ephemeral tributary streams and some perennial springs and streams in the Argus Mountains north of the lakebed. The lakebed is a "moist playa" with saturated brine near the surface in some areas; ephemeral water may collect on the surface following periods of high precipitation and runoff. Most of the surface water currently on the lakebed is brine extracted from beneath the lakebed by IMCC and returned to the lakebed following the extraction of minerals. IMCC owns or leases about half of the lakebed, and the remainder of the watershed is mostly under the jurisdiction of the U.S. Bureau of Land Management and China Lake Naval Weapons Center. Wells, pipelines, roads, power lines, and other facilities are located on the lakebed; industrial facilities are located on the west side of the lakebed at Westend, Trona and Argus. The brine ponds on the lakebed are not lined and there are no fixed boundaries between them and other surface and subsurface waters of Searles Lake.

Water Quality Standards Not Attained

Searles Lake is located on the Pacific Flyway and serves as resting habitat for several species of migratory birds including Brown Pelican, Common Snipe, Whitefaced Ibis, Mallard, and American Coot. Documented bird kills are considered impairment of the Wildlife Habitat (WILD) beneficial use for surface waters of the lake. Lahontan Regional Board Cleanup and Abatement Order No. 6-00-64 also cites impairments of the Non-Contact Water Recreation (REC-2), Water Contact Recreation (REC-1), and Saline Water Habitat (SAL) uses, and violations of narrative water quality objectives for chemical constituents, floating material, oil and grease and toxicity.

Evidence of Impairment

Lahontan Regional Board Cleanup and Abatement Order No. 6-00-64 describes the problem as follows:

> *"There have been numerous spills of kerosene and non-kerosene hydrocarbon[s] from the facilities to Searles Lake, which is a hydrologically closed basin. Any discharge of petroleum hydrocarbons and other non-native constituents accumulates in the lake. Specifically, petroleum hydrocarbon constituents have concentrated to a point that a visible oily sheen is periodically present in the Searles Lake waters. At times, oily globules coat the bank of the lake. Observations by both Regional Board staff and California Department of Fish and Game (DFG) staff during site inspections have confirmed numerous dead waterfowl that were encrusted with brine and oil. These conditions indicate that discharges from the IMCC facilities have created a condition of pollution in Searles Lake waters and impaired its beneficial uses. ... During numerous site inspections since February 17, 2000 (total of 13 inspections up to June 23, 200), Board staff observed visible black floating oil on the discharge channels, dredge pond, and percolation ponds of Searles Lake. Board staff collected samples of the floating oil, and analysis reveled the material had 156,000 ppm of TPH [Total Petroleum Hydrocarbons]. ...Board staff has observed numerous dead waterfowl encrusted with brine and oil, which the DFG has collected. The DFG testified during the June 2000 Regional Board meeting that oil was found in the internal organs of the waterfowl. To date, the DFG has collected over 150 dead waterfowl. "*

The Regional Board order also states that the Department of Fish and Game issued its own Cleanup and Abatement Order on February 18, 2000.

Extent of Impairment

All surface waters of the entire lakebed are recommended for listing, since the locations and areas of naturally ponded surface runoff and waste brine ponds are variable over time. The Searles Lake Bed has an area of 40 square miles.

Potential Sources

Petroleum hydrocarbons (including kerosene) in surface waters of Searles Lake have been linked to waste discharges from the IMCC industrial facilities at Trona, Argus, and Westend. IMCC uses a petroleum hydrocarbon-based solvent similar to kerosene in its mineral extraction process; the solvent can be present in effluent from the Trona Plant. The Argus Plant effluent also contains non-kerosene hydrocarbons from machine oil drippings. Other chemicals used by IMCC, such as monoethanolamine (MEA), formaldehyde, and phenols, are present in Searles Lake brine.

TMDL Priority

The problem is being addressed through permits and cleanup orders. Identification of sources of contaminants is ongoing. Regional Board staff are proposing Basin Plan amendments to define beneficial uses for the brine ponds separate from the uses of the natural ephemeral surface waters of the lake as a whole. Because the end date for abatement of petroleum product discharges is unknown and full cleanup may not be achieved by the next (2004) 303(d) listing cycle, listing is being proposed in 2002. The problem will need to be addressed through the Regional Board's permitting and enforcement programs whether or not a TMDL is developed. Searles Lake may be recommended for delisting in the future if ongoing cleanup activities and/or Basin Plan amendments lead to attainment of the wildlife use.

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2000. *Staff Report/Draft Environmental Document for Proposed Amendments to the Water Quality Control Plan for the Lahontan Region (Basin Plan), State Clearinghouse Number 98092052,* April, 2000.

California Regional Water Quality Control Board, Lahontan Region, 2000. *Analysis of the Beneficial Uses REC-1, REC-2, SAL, and WILD with Respect to Searles Dry Lake, IMC Chemicals, Inc., Trona, San Bernardino County, and Response to IMCC Comments made during the July 2000 Regional Board meeting.*

California Regional Water Quality Control Board, Lahontan Region, 2000. Amended Cleanup and Abatement Order No. 6-00-64A1, WDID Nos.: 6B368020001, 6B368905004, and 6B368905005, Requiring IMC Chemicals and the U.S. Department of the Interior, Bureau of Land Management, To Clean Up and Abate the Effects of Waste Discharges to Searles Lake From the Trona, Argus, and Westend Facilities, San Bernardino County.

California Regional Water Quality Control Board, Lahontan Region, 2000. Amended Cease and Desist Order No. 6-00-61A1, WDID: 6B368020001/6B368905004-Consideration of an Amended Cease and Desist Order-IMC Chemicals, Inc. and the U.S. Department of Interior, Bureau of Land Management, Trona and Argus Operations, Searles Lake.

NINE NATURALLY IMPAIRED WATERS, SALINITY, METALS, AND ARSENIC
2002 303(d) Fact Sheet
Delisting

Rationale for Delisting

The nine water bodies listed in Tables 1 and 2 are saline or geothermal surface waters listed in the late 1980s or early 1990s for salinity and/or toxic trace metals. Although constituents exceed drinking water standards, all of these water bodies were given potential Municipal and Domestic Supply (MUN) beneficial use designations as a result of Basin Plan amendments which applied the MUN use to almost all waters in the Lahontan Region. The Regional Board amended its Basin Plan in 2000 to remove the MUN use, and the conflict with drinking water standards, for the waters in Table 1. These amendments have been approved by the State Board and are pending final approvals from other agencies. Regional Board staff conducted a scientific literature review and prepared a detailed Use Attainability Analysis to show that:

- These waters meet the "Sources of Drinking Water Policy" (State Water Resources Control Board Resolution 88-63) criteria for exclusion from the MUN use due to their poor quality, and are unlikely to be in demand as drinking water due to the relatively small amounts of water available;

- The salts and trace elements affecting these water bodies come from natural sources (volcanic, geothermal, and/or evaporative concentration in closed basins over geologic time);

- Saline and geothermal waters support unique biological communities adapted to their extreme environmental conditions, and should not be considered "impaired" in relation to freshwater aquatic life criteria. The U.S. Environmental Protection Agency's 1997 guidance for the development of site specific aquatic life criteria states: *"For aquatic life uses, where the natural background concentration for a specific parameter is documented, by definition that concentration is sufficient to support the level of aquatic life expected to occur naturally at the site absent any interference by humans."*

These waters, and other "naturally impaired" waters in the Lahontan Region, are recommended for removal from the Section 303(d) list because the salts and trace elements in question are not "pollutants" under the definition in the Clean Water Act. See the Regional Board staff report on the Section 303(d) List update for further discussion of naturally impaired waters in relation to listing.

Because of the extensive documentation already provided in the Use Attainability Analysis, separate fact sheets have not been prepared for these waters.

Table 1. Naturally Impaired Waters Addressed in Lahontan Region's 2000 Basin Plan Amendments

Water Body Name	County	HU No.	Reason for Listing
Wendel Hot Springs	Lassen	637.20	Metals
Amedee Hot Springs	Lassen	637.20	Metals
Hot Creek	Mono	631.40	Metals
Fales Hot Springs	Mono	631.40	Metals
Little Hot Creek	Mono	603.10	Arsenic
Little Alkali Lake	Mono	603.10	Arsenic
Deep Springs Lake	Inyo	605.00	Salinity/TDS/Chlorides
Keough Hot Springs	Inyo	603.00	Metals
Amargosa River	Inyo/San Bernardino	609.00	Salinity/TDS/Chlorides

Table 2. Summary of Compliance With Drinking Water Criteria for Nine "Naturally Impaired" Waters (from Use Attainability Analysis report)

Water Body Name	Sources of Drinking Water Policy TDS Threshold (3000 mg/L) Exceeded?	Parameters Exceeding Other Standards or Criteria	Water Quantity Considerations
Wendel Hot Springs	No	TDS, specific conductance, arsenic, sulfate, fluoride, sodium	Flow in natural springs reduced due to nearby geothermal development.
Amedee Hot Springs	No	TDS, sulfate, fluoride, boron, sodium	Flow in natural springs reduced due to nearby geothermal development.
Fales Hot Springs	No	TDS, specific conductance, sulfate, fluoride, arsenic, copper, molybdenum, lead, aluminum	
Hot Creek	No	Specific conductance, fluoride, boron	
Little Hot Creek	No	Arsenic, beryllium, specific conductance, boron, lead, fluoride, antimony.	Annual flow ca. 1000 acre-feet; evaporation increases salinity
Little Alkali Lake	Yes	TDS, Arsenic	Ephemeral
Keough Hot Springs	No	TDS	Flow 600 gallons per minute
Deep Springs Lake	Yes	TDS, specific conductance, pH	Ephemeral
Amargosa River	Yes (in Death Valley)	TDS, specific conductance, arsenic, sulfate, sodium, chloride, fluoride, boron.	Intermittent, variable annual flows

Information Sources

California Regional Water Quality Control Board, Lahontan Region, 1995. *Water Quality Control Plan for the Lahontan Region.*

California Regional Water Quality Control Board, Lahontan Region, 2000. *Use Attainability Analysis for Nine "Naturally Impaired" Waters of the Lahontan Region*, April 2000.

California Regional Water Quality Control Board, Lahontan Region, 2001. *Staff Report on Recommended Changes to Lahontan Region's Section 303(d) List of Impaired Surface Water Bodies.*

California State Water Resources Control Board, 1988. Resolution 88-63, Sources of Drinking Water Policy.

U.S. Environmental Protection Agency, 1997. Establishing Site Specific Aquatic Life Criteria Equal to Natural Background. Memorandum dated November 5, 1997 from Tudor T. Davies, Director, Office of Science and Technology, USEPA Office of Water.

Enclosure 4

Written Public Comments

From: <Stanley_Wiemeyer@r1.fws.gov>
To: <unsij@rb6s.swrcb.ca.gov>
Date: 12/5/01 1:56PM
Subject: Water body fact sheets - Walker River

I have reviewed the fact sheets for this basin because of our recent interest in possible mercury source areas in the basin related to past mining. This came about as the result of finding (by others) elevated concentrations of mercury in blood of common loons that use Walker Lake as a migratory stop over during both spring and fall. We have collected samples of macroinvertebrates and some fish from various sites throughout the Walker River basin, including sites in California, and have had the samples analyzed for total mercury. The field work was conducted primarily in the Fall of 2000. We will provide you with a copy of the report upon its completion. In the interim I have a few questions in relation to the fact sheets and other information you may be aware of for this basin.

1. In reviewing USGS topographic maps of the basin, I noted the presence of tailings along Dog Creek which flows into Virginia Creek, south of Bridgeport, CA. Do you have any information as to their source, including type of mining that may have been involved as well as when the mining may have occurred? We found slightly elevated (above background) mercury concentrations in stonefly larvae and juvenile crayfish from Virginia Creek. We also found an even higher mercury concentration in a sample of stonefly larvae from Green Creek, south of Bridgeport. However, I saw little evidence of mining activity in Green Creek's watershed from examination of topographic maps. Are you aware of any mining inputs into this watershed?

2. Do you have additional information on the Superfund site on Aurora Canyon Creek where you indicated that a mercury ore mill was present. Is active cleanup ongoing at this site or is it just on the CERCLA list and not an active Superfund site? Who in EPA is the project manager for this site if it is active?

3. I was aware of the mining activity in the Bodie area, the Aurora area to the east of Bodie in Nevada, mining on the east side of the Sweetwater Range, and also the Masonic Gulch area (to the east or NW of Bridgeport). Do you have information on mining in any other areas of the basin, especially where mercury may have been involved, either involving its use in precious metal recovery (as was the case in the Carson River basin in Nevada during the 1860s to 1900) or in mercury mining?

USGS has also collected water and sediment samples in relation to the concern regarding mercury source areas in the Walker River basin. Many of their sampling sites correspond with those where we collected biota. Their field work was conducted in both 2000 and 2001. EPA REMAP also collected water and sediment throughout the basin in the fall of 2000 for various metal and trace element analyses.

Is Toxic Substance Monitoring Program data available on the web? How recent have samples been collected in the Walker River Basin? I noted the mercury results for fish from the Bridgeport area for samples collected in the 1980s in the fact sheet. Have there been more recent collections? If so, how can I obtain access to the data?

Thanks for your help. I look forward to hearing from you.

Stan Wiemeyer
Resource Contaminants Specialist
U.S. Fish and Wildlife Service
Nevada Fish and Wildlife Office
1340 Financial Blvd., Ste. 234
Reno, NV 89502-7147
Phone: (775) 861-6326
stanley_wiemeyer@fws.gov

From: Judith Unsicker
To: "Stanley_Wiemeyer@r1.fws.gov".mime.Internet
Date: 12/6/01 8:59AM
Subject: Re: Water body fact sheets - Walker River

Thanks for your email. I have responded to some of your questions below in bold type, and I am copying this response to Alan Miller, the chief of our Carson/Walker Watersheds Unit, with the hope that he and his staff can answer the others or amplify on my responses. We would appreciate a copy of your report when it is available.

On mercury in general, the Toxic Substances Monitoring Program has found high mercury levels in fish from several areas in the Lahontan Region with volcanic geology/soils but without significant known mining activity (e.g.,June Lake, Susan River). The California Department of Water Resources is monitoring mercury in water, sediment and tissue from Eagle Lake in Lassen County, and has found fairly high levels. The Eagle Lake watershed is relatively undisturbed, and I'm not aware of any significant mining history. The U.C. Davis Tahoe Research Group has documented increased mercury in sediment cores from Lake Tahoe since the mid 19th Century, probably from atmospheric deposition. Also possibly relevant is a recent news item on a study of mercury volatilization in wildfires:

http://www.enn.com/direct/display-release.asp?id=5159

I have also come across an anecdotal report that early ornithologists in the Mono Basin shot birds with 22 shells filled with mercury so that the resulting "mist" would kill them without damaging their skins. See http://www.monobasinresearch.org/historical/interviews/mcphersonint.htm

and use your browser's "Edit >Find" feature to search for "mercury". I don't know how widespread this practice was, but it might account for some mercury loading to streams and riparian areas away from mines.

Judith Unsicker
Staff Environmental Scientist
Lahontan Regional Water Quality Control Board
Phone: (530) 542-5462
FAX: (530) 542-5470
Email: unsij@rb6s.swrcb.ca.gov

>>> <Stanley_Wiemeyer@r1.fws.gov> 12/04/01 05:00PM >>>
I have reviewed the fact sheets for this basin because of our recent interest in possible mercury source areas in the basin related to past mining. This came about as the result of finding (by others) elevated concentrations of mercury in blood of common loons that use Walker Lake as a migratory stop over during both spring and fall. We have collected samples of macroinvertebrates and some fish from various sites throughout the Walker River basin, including sites in California, and have had the samples analyzed for total mercury. The field work was conducted primarily in the Fall of 2000. We will provide you with a copy of the report upon its completion. In the interim I have a few questions in relation to the fact sheets and other information you may be aware of for this basin.

1. In reviewing USGS topographic maps of the basin, I noted the presence of tailings along Dog Creek which flows into Virginia Creek, south of Bridgeport, CA. Do you have any information as to their source, including type of mining that may have been involved as well as when the mining may have occurred?

Placer gold was discovered at Dog Creek in 1857, and there was a settlement called Dogtown that lasted only a few years. The tailings are probably from a dredge mining operation in the 1930s. A Google Internet search for the keywords "Dogtown" and "Mono" will take you to several sites with additional historical information.

We found slightly elevated (above background) mercury concentrations in stonefly larvae and juvenile crayfish from Virginia Creek. We also found an even higher mercury concentration in a sample of stonefly larvae from Green Creek, south of Bridgeport. However, I saw little evidence of mining activity in Green Creek's watershed from examination of topographic maps. Are you aware of any mining inputs into this watershed?

I'm not aware of anything specific- there may have been small scale prospecting that didn't result in mines large enough to show on a topo map.

2. Do you have additional information on the Superfund site on Aurora Canyon Creek where you indicated that a mercury ore mill was present. Is active cleanup ongoing at this site or is it just on the CERCLA list and not an active Superfund site? Who in EPA is the project manager for this site if it is active? **As far as I know it is an inactive site; the report I cited was the latest detailed information in our files. The Regional Board's watershed unit may have more information. I can send you a copy of the report if you wish.**

3. I was aware of the mining activity in the Bodie area, the Aurora area to the east of Bodie in Nevada, mining on the east side of the Sweetwater Range, and also the Masonic Gulch area (to the east or NW of Bridgeport). Do you have information on mining in any other areas of the basin, especially where mercury may have been involved, either involving its use in precious metal recovery (as was the case in the Carson River basin in Nevada during the 1860s to 1900) or in mercury mining?

Around 1998 Toiyabe National Forest conducted a survey of inactive mines in the upper Carson and Walker River watersheds in California to identify potential acid mine drainage problems. Maureen Joplin of the USFS was the contact person. I believe that she is now with their Reno headquarters office. There may be additional information in some of the mineral resources publications of the California Division of Mines and Geology; see:

http://www.consrv.ca.gov/dmg/pubs/pub_idx/mno.htm

USGS has also collected water and sediment samples in relation to the concern regarding mercury source areas in the Walker River basin. Many of their sampling sites correspond with those where we collected biota. Their field work was conducted in both 2000 and 2001. EPA REMAP also collected water and sediment throughout the basin in the fall of 2000 for various metal and trace element analyses.

Is Toxic Substance Monitoring Program data available on the web? How recent have samples been collected in the Walker River Basin? I noted the mercury results for fish from the Bridgeport area for samples collected in the 1980s in the fact sheet. Have there been more recent collections? If so, how can I obtain access to the data?

There have been a few more recent TSMP samples in this area.
In addition to the East Walker River, we have had sampling done at Twin Lakes, Virginia Creek, Dog Creek, Robinson Creek, and Bodie Creek. All had "elevated" levels of one or more metals; I don't remember whether mercury was analyzed in all of them. There were also elevated metals in trout from Slinkard Creek in the West Walker River watershed; there is a large inactive mine on the

saddle between the Slinkard Creek and Mill Creek watersheds.

Here is the address for TSMP results through 1996. They are in Lotus or dBase format but can be opened in Excel.

http://www.swrcb.ca.gov/programs/smw/index.html

These are statewide files; they are very large and it's time consuming to find the Lahontan Region data. (Identification numbers for our sites start with "6"). You might want to call the database administrator, Del Rasmussen of the California State Water Resources Control Board, at (916) 341-5545 to see whether he can provide you with a file or printout of data (through 2000) for the Walker River watershed only.

Thanks for your help. I look forward to hearing from you.

Stan Wiemeyer
Resource Contaminants Specialist
U.S. Fish and Wildlife Service
Nevada Fish and Wildlife Office
1340 Financial Blvd., Ste. 234
Reno, NV 89502-7147
Phone: (775) 861-6326
stanley_wiemeyer@fws.gov

CC: Curtis, Chuck; Miller, Alan; Suk, Thomas

From: <Sean_Penders@dot.ca.gov>
To: <unsij@rb6s.swrcb.ca.gov>
Date: 12/11/01 11:04AM
Subject: TMDL's

Ms. Unsicker,

I received the Notice of Availability of and Request for Comments on Draft Recommendations for Changes in Lahontan Region's Section 303-D list. In regards to the Lake Tahoe HU 634.00, many of the tributary streams are listed for Iron. The Comments line mentions the standard needs revision. I hope this means that Iron will be removed from the list of impairments because most of the iron is generated from background sources and the levels do not cause impairment to any beneficial uses. In fact many of the possible stormwater treatment BMP's use Iron media to remove phosphorous. It would be very helpful to the regulated community if Iron was removed from the list 303-D pollutant list, because it would allow the use of Iron media as one possible stormwater treatment device.

I am also curious on the listing of pathogens in some of the streams in the Lake Tahoe Unit and I am wondering if the sources have been indentified and if so are they naturally occuring pathogens?

In some of the Northern Units (Surprise Valley, Susanville), why are water bodies with naturally occuring pollutants listed at all? and some of these have TMDL end dates, which does not seem logical?

Thanks, Sean Penders
Caltrans Dist 3, NPDES

CC: <Jeff_Pizzi@dot.ca.gov>

From: Judith Unsicker
To: "Sean_Penders@dot.ca.gov".mime.Internet
Date: 12/12/01 2:05PM
Subject: Re: TMDL's

Thank you for your comments. I have responded to specific questions and comments in bold type within the text of your comments below. Copies of your comments and this response will be placed in the administrative record of the Section 303(d) list update process.

Judith Unsicker
Staff Environmental Scientist
Lahontan Regional Water Quality Control Board
2501 Lake Tahoe Boulevard
South Lake Tahoe CA 96150
Phone: (530) 542-5462
Email: unsij@rb6s.swrcb.ca.gov

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our web site at http://www.swrcb.ca.gov

>>> <Sean_Penders@dot.ca.gov> 12/11/01 11:03AM >>>

Ms. Unsicker,

I received the Notice of Availability of and Request for Comments on Draft Recommendations for Changes in Lahontan Region's Section 303-D list. In regards to the Lake Tahoe HU 634.00, many of the tributary streams are listed for Iron. The Comments line mentions the standard needs revision. I hope this means that Iron will be removed from the list of impairments because most of the iron is generated from background sources and the levels do not cause impairment to any beneficial uses. In fact many of the possible stormwater treatment BMP's use Iron media to remove phosphorous. It would be very helpful to the regulated community if Iron was removed from the list 303-D pollutant list, because it would allow the use of Iron media as one possible stormwater treatment device.

A number of water bodies in the Lake Tahoe watershed are proposed to be listed for iron because the current water quality objectives are consistently being violated. The iron is believed to come largely from natural sources, since violations occur even in General Creek, with a relatively undisturbed watershed. Once the iron standards are revised, it should be possible to remove these waters from the Section 303(d) list.

I am also curious on the listing of pathogens in some of the streams in the Lake Tahoe Unit and I am wondering if the sources have been identified and if so are they naturally occurring pathogens?

As indicated in the water body fact sheets for these waters, monitoring by Regional Board and U. S. Forest Service staff shows the highest bacteria numbers at times when livestock grazing occurs. (Most sites involve cattle grazing; Tallac Creek is affected by horses and mules.) Human backcountry users or transients, dogs, pack animals, and wildlife are possible sources of the bacteria observed in much lower numbers when intensive grazing is not a factor.

In some of the Northern Units (Surprise Valley, Susanville), why are water bodies with naturally occurring pollutants listed at all? and some of these have TMDL end dates, which does not seem logical?

State and federal guidance for listing has varied over time since the Regional Boards first became involved in the listing process in the 1980s. At one time, listing was mandated for all water

bodies where violations of standards occurred, even if the sources were entirely natural. During this list update cycle, Regional Board staff's position is that, because the Clean Water Act defines "pollutants" in terms of human sources, previously listed "naturally impaired" waters can be delisted. (See the staff report on the Regional Board's webpage at <http://www.swrcb.ca.gov/rwqcb6> for additional discussion.)

Honey Lake and several associated water bodies in Lassen County are impaired largely by natural sources of salts and trace elements. However, the situation is complicated because these waters are also affected by discharges from geothermal power plants. We are recommending that they continue to be listed with tentative TMDL end dates, pending further study.

Thanks, Sean Penders
Caltrans Dist 3, NPDES

From: "Elizabeth Tenney" <tenney@qnet.com>
To: <unsij@rb6s.swrcb.ca.gov>
Date: 12/12/01 6:36PM
Subject: 1) query re: impaired waters / 2) PLEASE FORWARD - mailing list update

Dear Ms. Unsicker:
1) We have received the Draft Recommendations for Changes in Lahontan Region's Section 303(D) List. Could you please tell us what TMDL refers to? Not knowing that makes the list of recommendations difficult to interpret.

2) Would you also please forward this message to your mailing list person? Our Board of Directors voted in November to change our name from P.E.S.T.E.R. (Preserving the Eastern Sierra Tradition of Environmental Responsibility) to ESAN (Eastern Sierra Advocates Network). Please update your records as follows:

ESAN
PO Box 3511
Mammoth Lakes, CA 93546-3511
Ph/FAX: 760-924-8475
Web: www.easternsierraadvocates.org
Email: et@easternsierraadvocates.org
or tenney@qnet.com

The Website is under construction. The new email address will be activated shortly.

Thank you.

Elizabeth Tenney

From: Judith Unsicker
To: "tenney@qnet.com".mime.Internet
Date: 12/14/01 12:21PM
Subject: 1) query re: impaired waters / 2) PLEASE FORWARD - mailing list update

Thank you for your email. Our mailing list will be updated as you requested.

Total Maximum Daily Loads (TMDLs) are a complex subject. Basically, they are strategies required by the Clean Water Act to ensure the attainment of water quality standards in significantly impaired surface waters. The most important components of a TMDL involve: (1) calculating the amount of existing pollutant loading from all point and nonpoint sources; (2) determining the maximum amount of pollutant loading which can be permitted if standards are to be attained; (3) dividing the allowable maximum load among all sources, with a margin of safety to account for uncertainty in the analysis; and (4) providing "reasonable assurance" that existing pollutant loads will be reduced over time to ensure attainment of standards. Federal regulations do not currently require TMDL implementation plans, but California law requires that they be included in Regional Board TMDLs. These plans summarize control actions and schedules, and include monitoring programs.

More detailed background information on TMDLs is available on the California State Water Resources Control Board's webpage at:

http://www.swrcb.ca.gov/tmdl/tmdl.html

In particular, see the "Background" and "Total Maximum Daily Loads Questions and Answers" links.

The links to Lahontan Region TMDL documents on the State Water Board's "TMDL Documents" page are currently not functioning. You can view the November 2000 drafts of two of our "in progress" TMDLs on the Regional Board's webpage at:

http://www.swrcb.ca.gov/rwqcb6/files/BPA2000.pdf

The Heavenly Valley Creek TMDL has been approved by the Lahontan Regional Board and State Water Resources Control Board (with several changes from the November 2000 draft) and is awaiting final approvals from other agencies. Regional Board consideration of the Indian Creek Reservoir TMDL was postponed due to lack of a quorum. This TMDL may come before the Board in 2002.

Please contact me if you have further questions.

Judith Unsicker
Staff Environmental Scientist
Lahontan Regional Water Quality Control Board
2501 Lake Tahoe Boulevard
South Lake Tahoe CA 96150
Phone: (530) 542-5462
FAX: (530) 542-5470
Email: unsij@rb6s.swrcb.ca.gov

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our web site at http://www.swrcb.ca.gov

>>> "Elizabeth Tenney" <tenney@qnet.com> 12/12/01 06:33PM >>>
Dear Ms. Unsicker:

1) We have received the Draft Recommendations for Changes in Lahontan Region's Section 303(D) List. Could you please tell us what TMDL refers to? Not knowing that makes the list of recommendations difficult to interpret.

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ESAN
PO Box 3511
Mammoth Lakes, CA 93546-3511
Ph/FAX: 760-924-8475
Web: www.easternsierraadvocates.org
Email: et@easternsierraadvocates.org
or tenney@qnet.com

The Website is under construction. The new email address will be activated shortly.

Thank you.

Elizabeth Tenney

CC: Chuck Curtis

From: David Senesac <dsenesac@cisco.com>
To: <unsij@rb6s.swrcb.ca.gov>
Date: 12/12/01 2:38PM
Subject: public comments for Clean Water Act

Lahontan Regional Water Quality Control Board
Judith Unsicker,

Hello,

I have a few comments per the public comments for the federal Clean Water Act under Section 303(d) as shown on your web site. After looking at the current list I noticed an area I am concerned about which is not so included. My concern is with some of the headwater areas of Silver Creek which probably have water that has been measured as clean but which has grazing which is degrading the area and which will eventually end up effecting water quality. Currently cattle are allowed to graze the headwaters of Silver Creek. This includes Raymond Meadows Creek, Eagle Creek, Pennsylvania Creek, and Silver Creek itself. Each summer cattle are allowed to range freely in this Mokelumne Wilderness zone which does not have fences and they trample wet riparian zones next to streams and in meadows, particularly Raymond Meadow. And of course they being the animals they are, pollute the streams where ever they stand. Now my reason for bringing up this particularly area versus the many other lower national forest areas where they also graze is that it is an absolutely spectacular scenic treasure though little known. For example the volcanic formations of Eagle Ridge. Additionally there are areas of considerable wildflower displays and the trampling hooves of cattle make an absolute ruined mess of some of them. Some of the streams contain trout.

I would like to see grazing eliminated from both sides of the Sierra Crest in that area and realize it is a Toyabe National Forest Issue and not one involving your agency. However I am bringing this up as impacts to water quality in these streams is in fact impacted by grazing. If cattle people wish to graze their live stock in lower areas that is fine with me but they ought to prevent cattle from entering these higher areas whether that might require fencing or whatever.
-David Senesac davesenesac@msn.com (408) 8666094

CC: <davesenesac@msn.com>

From: Judith Unsicker
To: "dsenesac@cisco.com".mime.Internet
Date: 12/17/01 11:35AM
Subject: Re: public comments for Clean Water Act

Thank you for your comments, recommending Section 303(d) listing for the headwaters of Silver Creek in the Carson River watershed, due to the impacts of cattle grazing on water quality and riparian habitat. I have forwarded your message to Alan Miller, the head of the Lahontan Regional Board's Carson/Walker Watersheds Unit, and to Thomas Suk, the coordinator of the Regional Board's monitoring programs. Your message will also be sent to California State Water Resources Control Board staff for consideration in the statewide Section 303(d) list update.

Whether or not TMDLs are developed, the Lahontan Regional Board has the authority and responsibility to ensure that Best Management Practices to control the impacts of livestock grazing in the Carson River watershed are implemented under the statewide California Nonpoint Source Management Plan. Regional Board staff are also working with U.S. Forest Service staff and other stakeholders in a Carson River watershed planning effort, the "Watershed Management Initiative".

During this Section 303(d) list update cycle, we are recommending listing only on the basis of quantitative data showing violations of water quality standards, such as chemical/physical monitoring, fecal coliform bacteria monitoring, invertebrate biomonitoring, or scientific indices of riparian/wetland impairment (e.g., the "Properly Functioning Condition" method). Listing is recommended for a number of waters affected by livestock grazing (in the Lake Tahoe, Carson River, and Walker River watersheds) on the basis of such data. Unfortunately, we do not currently have equivalent data for the upper Silver Creek watershed. If additional data become available before the next Section 303(d) list update cycle in 2004, Regional Board staff will consider recommending listing at that time. Meanwhile, our watershed staff will continue to investigate and deal with the water quality impacts of livestock grazing under the nonpoint source plan and Carson River Watershed Management Initiative.

Please contact me if you have any questions about the Regional Board's water quality assessment program.

Judith Unsicker
Staff Environmental Scientist
Lahontan Regional Water Quality Control Board
2501 Lake Tahoe Boulevard
South Lake Tahoe CA 96150
Phone: (530) 542-5462
Email: unsij@rb6s.swrcb.ca.gov

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our web site at http://www.swrcb.ca.gov

>>> David Senesac <dsenesac@cisco.com> 12/12/01 02:41PM >>>
Lahontan Regional Water Quality Control Board
Judith Unsicker,

Hello,

I have a few comments per the public comments for the federal Clean Water Act under Section 303(d) as shown on your web site. After looking at the current list I noticed an area I am concerned about which is not so
included. My concern is with some of the headwater areas of Silver Creek
which probably have water that has been measured as clean but which has grazing which is degrading the

area and which will eventually end up
effecting water quality. Currently cattle are allowed to graze the
headwaters of Silver Creek. This includes Raymond Meadows Creek, Eagle Creek, Pennsylvania Creek, and Silver Creek itself. Each summer cattle are allowed to range freely in this Mokelumne Wilderness zone which does not have fences and they trample wet riparian zones next to streams and in meadows, particularly Raymond Meadow. And of course they being the animals they are, pollute the streams where ever they stand. Now my reason for bringing up this particularly area versus the many other lower national forest areas where they also graze is that it is an absolutely spectacular scenic treasure though little known. For example the volcanic formations of Eagle Ridge. Additionally there are areas of considerable wildflower displays and the trampling hooves of cattle make an absolute ruined mess of some of them. Some of the streams contain trout.

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in that area and realize it is a Toyabe National Forest Issue and not one
involving your agency. However I am bringing this up as impacts to water
quality in these streams is in fact impacted by grazing. If cattle people
wish to graze their live stock in lower areas that is fine with me but they
ought to prevent cattle from entering these higher areas whether that might require fencing or whatever.
-David Senesac davesenesac@msn.com (408) 8666094

CC: Alan Miller; Chuck Curtis; Thomas Suk

From: "Sue Burak" <sburak@qnet.com>
To: <Unsij@rb6s.swrcb.ca.gov>
Date: 12/15/01 12:35PM
Subject: TMDL for Mammoth Creek

Hello Judith;
I am in charge of the citizen's water quality monitoring group in Mammoth Lakes. I am thinking of applying for some grant money to do an in depth study of turbidity in Mammoth Creek. Our WQ monitoring shows turbidity levels spike to 10-24 times background levels whenever there is a summer rainstorm event, or as happened over Thanksgiving, a rain on snow event. I am very interested in learning about what is required to get Mammoth Creek into the TMDL program.
Thank you very much,
Sue burak

Sue Burak
Snow Survey Associates
P.O. Box 8544
Mammoth Lakes, CA 93546
760.934.1707

From: Judith Unsicker
To: "sburak@qnet.com".mime.Internet
Date: 12/19/01 9:38AM
Subject: Re: TMDL for Mammoth Creek

Thank you for your email. You requested information on how Mammoth Creek can be made part of the Total Maximum Daily Loads (TMDL) program.

To be made part of the TMDL program, a water body must first be placed on the Clean Water Act Section 303(d) list of impaired water bodies. Mammoth Creek is already on the Section 303(d) list for metals, with TMDL development tentatively scheduled between 2005 and 2008. If there is evidence to show that the turbidity standard for Mammoth Creek is being violated, the Creek could also be listed for turbidity, with TMDL development scheduled at a later date. (Because of resource constraints and a backlog of waters needing TMDLs, TMDL development for water body-pollutant combinations added to the Lahontan Region's Section 303(d) list in 2002 will probably not begin until after 2011.) Because turbidity units are not concentration units, it would be difficult to calculate loads for turbidity per se. The TMDL would probably need to be developed for suspended sediment concentration or some other sediment- related parameter.

The applicable water quality objective for turbidity in Mammoth Creek is the regionwide narrative objective, as follows:

"Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. Increases in turbidity shall not exceed natural levels by more than 10 percent".

To assess compliance with this objective, it would be necessary to collect enough monitoring data at a reference station to define natural turbidity levels (including seasonal and annual variations) and/or reference aquatic life conditions (e.g., benthic invertebrate, periphyton and fish communities) for Mammoth Creek. The Regional Board is sponsoring a study of eastern Sierra benthic invertebrate communities by Dr. David Herbst of the University of California to define reference conditions and aid the development of "biocriteria" water quality standards that define desirable aquatic life conditions, but it will be several years until we can consider adopting such standards. Very high turbidity could affect other beneficial uses, including the drinking water use and the "aesthetic enjoyment" component of the Non-Contact Water Recreation use.

Your email references large increases in turbidity over background levels during storm events. Such variation can occur naturally. In order to separate the impacts of natural stormwater runoff from those of stormwater from disturbed areas, it would be desirable to collect samples above and below disturbed areas during the same storm event.

As part of the Lahontan Regional Board's Surface Water Ambient Monitoring Program (SWAMP), the U.S. Geological Survey is sampling suspended sediment and turbidity quarterly at two stations above and below the town of Mammoth Lakes (Twin Lakes and Highway 395). You may want to coordinate your proposed in-depth turbidity study with the SWAMP program. The Regional Board's regionwide monitoring/SWAMP coordinator is Tom Suk; his telephone number is (530) 542-5419, and his email address is Sukt@rb6s.swrcb.ca.gov .

Please contact me if you have further questions about the Regional Board's Section 303(d) list update process. I will be on vacation from December 20-January 1, and will be back at work on January 2.

Judith Unsicker
Staff Environmental Scientist
Lahontan RWQCB
2501 Lake Tahoe Boulevard
South Lake Tahoe CA 96158
Phone: (530) 542-5462

Email: unsij@rb6s.swrcb.ca.gov

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our web site at http://www.swrcb.ca.gov

>>> "Sue Burak" <sburak@qnet.com> 12/15/01 12:34PM >>>
Hello Judith;
I am in charge of the citizen's water quality monitoring group in Mammoth Lakes. I am thinking of applying for some grant money to do an in depth study of turbidity in Mammoth Creek. Our WQ monitoring shows turbidity levels spike to 10-24 times background levels whenever there is a summer rainstorm event, or as happened over Thanksgiving, a rain on snow event. I am very interested in learning about what is required to get Mammoth Creek into the TMDL program.

Thank you very much,
Sue burak

Sue Burak
Snow Survey Associates
P.O. Box 8544
Mammoth Lakes, CA 93546
760.934.1707

CC: Chuck Curtis; Cindi Mitton; Thomas Suk

From: "Surprise Valley Resource Conservation District" <svrcd@hdo.net>
To: <unsij@rb6s.swrcb.ca.gov>
Date: 12/18/01 10:47AM
Subject: Comments on Recommendations for Update of Section 303(d) list for the Lahontan Region

Dear Ms. Unsiker,

As facilitator for the Surprise Valley Watershed Group, and as Watershed Coordinator for the Surprise Valley Resource Conservation District, I would like to express the support of both groups for the proposed changes for the Upper, Middle and Lower Alkali Lakes and for Mill Creek in Surprise Valley HU 641.00.

Salinity/TDS/Chlorides are factors that are naturally high in these lakes. To the best of our knowledge, the condition of water quality in the lakes remains substantially the same as it has for many hundreds and probably thousands of years. Thus, their de-listing seems appropriate.

As for Mill Creek, the Surprise Valley Watershed Group, in cooperation with the Surprise Valle RCD, is seeking funding to support further study of the Creek and to identify, fund and implement projects that will address any shortcomings in water quality for the creek.

Thank you for your time,

Matt Brown - Watershed Coordinator
Surprise Valley Resource Conservation District
PO Box B
Cedarville, CA 96104

Phone: (530) 279-8324
Fax: (530) 279-8309
email: svrcd@hdo.net

"Serving Surprise Valley since 1956"

California Regional Water Quality Control Board
Lahontan Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov/rwqcb6
2501 Lake Tahoe Boulevard, South Lake Tahoe, California 96150
Phone (530) 542-5400 • FAX (530) 544-2271

Gray Davis
Governor

December 20, 2001

Logan Olds, General Manager
Susanville Consolidated Sanitary District
P.O. Box 152
Susanville, CA 96130

RESPONSE TO COMMENTS ON DRAFT RECOMMENDATIONS FOR LAHONTAN SECTION 303(D) LIST

Thank you for your letter of December 6, 2001, mentioning the availability of bioassay data for Jensen Slough for possible use in a Total Maximum Daily Load (TMDL) for the Susan River. The Susan River is one of many water bodies recommended for high priority ranking. However, the Regional Board's schedule for development of TMDLs depends on the availability of staff and contract resources. Work on the Susan River TMDL is tentatively planned to begin in 2004. Your letter will be placed in our files for future reference, and Regional Board staff will contact your office to obtain the latest bioassay data once TMDL development begins.

Please contact me at (530) 542-5462 or unsij@rb6s.swrcb.ca.gov, if you have any questions on the Lahontan Regional Board's Section 303(d) list recommendations or the list update process.

Sincerely,

Judith Unsicker
Staff Environmental Scientist

JEU/cgT: 303d/scsdresp

SUSANVILLE CONSOLIDATED SANITARY DISTRICT

45 South Roop Street
P.O. Box 152
Susanville, California 96130
(530) 257-5665

6 December 2001

Lahontan Region Water Quality Control Board
Attn: Judith Unsicker
2501 Lake Tahoe Blvd
South Lake Tahoe, CA 96150

Re: Draft Recommendations for Lahontan Section 303 (D) List

Dear Mrs. Unsicker,

Susanville Consolidated Sanitary District is currently undergoing a revisal of its NPDES permit to account for changes which will be made during its WWTP expansion. Currently the outfall exits our facility and flows through an agricultural ditch then through a portion of the Jensen Slough prior to entering the Susan River. The Susan River is listed as a high priority ranking. If it would assist you we have over ten years of bioassay results on the outfall prior to the agricultural ditch. Thank you for your time.

Sincerely,

Logan Olds
General Manager

Enclosure 5

Draft Resolution

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD,
LAHONTAN REGION

RESOLUTION NO. R6S-2002-PROPOSED

APPROVING RECOMMENDATIONS TO THE STATE WATER RESOURCES CONTROL BOARD FOR UPDATE OF THE SECTION 303(D) LIST AND TOTAL MAXIMUM DAILY LOADS PRIORITY LIST FOR THE LAHONTAN REGION

WHEREAS, THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, LAHONTAN REGION, FINDS:

1. Section 303(d) of the federal Clean Water Act requires states to identify surface waters that are not meeting standards and are not expected to meet standards, even with the application of technology based effluent limitations or other pollution controls such as Best Management Practices, and

2. Section 303(d) also requires states to develop Total Maximum Daily Loads (TMDLs) to ensure attainment of standards, and

3. California's list of impaired waters and its priorities for developing TMDLs are generally updated every two years, and

4. The California State Water Resources Control Board (State Board) has requested that Regional Boards develop recommendations for update of the Section 303(d) list and TMDL priorities in 2002, and

5. The State Board will conduct its own public participation process before adopting a statewide Section 303(d) list and TMDL priorities for submission to the U.S. Environmental Protection Agency, and

6. Lahontan Regional Board staff developed draft recommendations and made them available for public review between November 27 and December 28, 2001. The rationale for proposed changes was discussed in a staff report and water body fact sheets, and

7. The Regional Board heard and considered all public comments made during its January 9 and 10, 2002 meeting in South Lake Tahoe.

NOW THEREFORE BE IT RESOLVED:

1. The Regional Board approves staff's recommendations for changes in the Section 303(d) list and TMDL priorities, summarized in Table 1.

2. Copies of this resolution, and of the administrative record for the Section 303(d) list/TMDL priority update process, shall be transmitted to the State Board.

I, Harold J. Singer, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of a resolution adopted by the California Regional Water Quality Control Board, Lahontan Region, on January 9, 2002.

Table 1. Recommendations for Update of the Section 303(d) List for the Lahontan Region

Waterbody Name	Proposed Action	Pollutant(s)/Stressor(s)	TMDL Priority Ranking[1]	TMDL End Date [2]	Comments
Surprise Valley HU 641.00					
Upper Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Middle Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Lower Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Mill Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2011	Needs study to verify need for TMDL
Susanville HU 637.00					
Eagle Lake	Retain on 303(d) List[4]	Nitrogen	High	2008	
Eagle Lake	Retain on 303(d) List[4]	Phosphorus	High	2008	
Pine Creek	Retain on 303(d) List	Sedimentation/Siltation [actual problem: Fish Habitat Alterations]	High	2011[5]	TMDL probably not needed[5]
Lassen Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Susan River	Retain on 303(d) List	Unknown Toxicity	High	2007	Listed for toxic bioassay results
Top Spring	Remove from 303(d) List	Radiation	NA	NA	Impairment is natural; no "pollutants"
Amedee Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Wendel Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Honey Lake	Retain on 303(d) List	Arsenic	Medium	2005	Natural sources plus geothermal discharges
Honey Lake	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2005	Natural sources plus geothermal discharges
Honey Lake Area Wetlands	Retain on 303(d) List	Metals	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Flow Alterations	Low	2007[5]	TMDL probably not needed[5]
Honey Lake Wildfowl Mgmt Ponds	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Metals	Medium	2007	Natural sources plus geothermal discharges
Honey Lake Wildfowl Mgmt. Ponds	Retain on 303(d) List	Trace Elements	Medium	2007	Natural sources plus geothermal discharges
Skedaddle Creek	Retain on 303(d) List	High Coliform Count	Low	2006	Further study may lead to delisting
Little Truckee River HU 636.00					
Stampede Reservoir	Remove from 303(d) List	Pesticides [Lindane][6]	NA	NA	TSMP- insufficient data for listing[6]
Truckee River HU 635.00					
Donner Lake	Remove from 303(d) List	Priority Organics [PCBs, Chlordane][6]	NA	NA	TSMP- insufficient data for listing[6]
Truckee River	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Bear Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Bronco Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Gray Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
Squaw Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2003	TMDL development in progress
Cinder Cone Springs	Retain on 303(d) List	Nutrients	Medium	2007	Further study may lead to delisting
Cinder Cone Springs	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007	Further study may lead to delisting
Lake Tahoe HU 634.00					
Snow Creek	Remove from 303(d) List	Habitat Alterations	NA	NA	Restoration program implemented
Lake Tahoe	Retain on 303(d) List[4]	Phosphorus	High	2007	TMDL development in progress
Lake Tahoe	Retain on 303(d) List[4]	Nitrogen	High	2007	TMDL development in progress
Lake Tahoe	Retain on 303(d) List	Sedimentation/Siltation	High	2007	TMDL development in progress

Upper Truckee River	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Upper Truckee River	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL

Table 1. Lahontan Region 303(d) List Update, continued					
Waterbody Name	**Proposed Action**	**Pollutant(s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
Lake Tahoe HU 634.00 continued					
Upper Truckee River above Christmas Valley	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Big Meadow Creek	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Heavenly Valley Creek above USFS property line	Retain on 303(d) List	Sediment	High	2001	TMDL completed 2001, awaiting final approvals
Heavenly Valley Creek below USFS property line	Add to 303(d) List	Sediment	Medium	After 2015	Restoration progam may eliminate need for TMDL
Heavenly Valley Creek	Add to 303(d) list	Chloride	Low	After 2015	Standard needs revision
Heavenly Valley Creek above USFS property line	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Hidden Valley Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Hidden Valley Creek	Add to 303(d) List	Chloride	Low	After 2015	Standard needs revision
Trout Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Trout Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Trout Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Trout Creek below Hwy 50 in S. Lake Tahoe	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Tallac Creek below Hwy 89	Add to 303(d) List	Pathogens	High	After 2015	Standard for fecal coliform bacteria violated
Ward Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Ward Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
General Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
General Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
Blackwood Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007	TMDL development in progress
Blackwood Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with Lake Tahoe TMDL
Blackwood Creek	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with Lake Tahoe TMDL
Blackwood Creek	Add to 303(d) List	Iron	Medium	After 2015	Standard needs revision
West Fork Carson River HU 633.00					
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Phosphorus	High	After 2015	
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Percent Sodium	Medium	After 2015	Standard needs revision
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Nitrogen	High	After 2015	
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Percent Sodium	Medium	After 2015	Standard needs revision
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Nitrogen	High	After 2015	
West Fork Carson R., Woodfords to State Line	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
East Fork Carson River HU 632.00					
East Fork Carson River	Remove from 303(d) List	Nutrients	NA	NA	Incorrect assumption led to listing
Indian Creek Reservoir	Retain on 303(d) List	Nutrients	High	2002[7]	
Indian Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Indian Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Monitor Creek	Retain on 303(d) List[4]	Iron	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Retain on 303(d) List[4]	Silver	High	2011	TMDL to be coordinated with CERCLA remediation

Table 1. Lahontan Region 303(d) List Update, continued					
Waterbody Name	**Proposed Action**	**Pollutant(s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
East Fork Carson River HU 632.00 continued					
Monitor Creek	Retain on 303(d) List[4]	Aluminum	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Retain on 303(d) List[4]	Manganese	High	2011	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Add to 303(d) List	Sulfate	High	After 2015	TMDL to be coordinated with CERCLA remediation
Monitor Creek	Add to 303(d) List	Total Dissolved Solids	High	After 2015	TMDL to be coordinated with CERCLA remediation
Wolf Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2011	
Aspen Creek	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
Bryant Creek	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
Leviathan Creek, at and below Leviathan Mine	Retain on 303(d) List	Metals	High	2011	TMDL to be coordinated with CERCLA remediation
West Walker River HU 631.00					
Topaz Lake	Retain on 303(d) list	Sedimentation/Siltation	High	2007	
West Walker River	Retain on 303(d) List	Sedimentation/Siltation	High	2009	
Fales Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Hot Creek	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
East Walker River HU 630.00					
Bridgeport Reservoir	Retain on 303(d) List[4]	Nitrogen	High	2005	TMDL development in progress
Bridgeport Reservoir	Retain on 303(d) List[4]	Phosphorus	High	2005	TMDL development in progress
Bridgeport Reservoir	Retain on 303(d) List	Sedimentation/Siltation	High	2005	TMDL development in progress
East Walker River above Bridgeport Reservoir	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
East Walker River below Bridgeport Reservoir	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
East Walker River below Bridgeport Reservoir	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
East Walker River below Bridgeport Reservoir	Remove from 303(d) List	Metals	NA	NA	TSMP- insufficient data for listing[8]
East Walker River below Bridgeport Reservoir	Retain on 303(d) List	Sedimentation/Siltation	High	2009	
Robinson Creek, Hwy 395 to Bridgeport Res.	Add to 303(d) List	Nitrogen	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Robinson Creek, Twin Lakes to Bridgeport Res.	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Swauger Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Swauger Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Buckeye Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Buckeye Creek	Add to 303(d) List	Phosphorus	High	After 2015	To be coordinated with TMDL for Bridgeport Res.
Virginia Creek	Add to 303(d) List	Pathogens	Medium	After 2015	Standard for fecal coliform bacteria violated
Green Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Rough Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Aurora Canyon Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Hot Springs Canyon Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005	Needs study to verify need for TMDL
Clark Canyon Creek	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Clearwater Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005	Needs study to verify need for TMDL
Bodie Creek	Retain on 303(d) List	Metals	High	2004	Impairment probably related to past mining activity

Table 1. Lahontan Region 303(d) List Update, continued					
Waterbody Name	**Proposed Action**	**Pollutant (s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
Mono HU 601.00					
Lee Vining Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Mill Creek	Retain on 303(d) List	Flow Alterations	Low	2011[5]	TMDL probably not needed[5]
Grant Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Mono Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Owens HU 603.00					
Haiwee Reservoir	Retain on 303(d) List	Copper	Low	2003	TMDL development in progress
Mammoth Creek	Retain on 303(d) List	Metals	High	2008	Needs study to verify need for TMDL
Hot Creek	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Little Hot Creek	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Twin Lakes (Mammoth)	Retain on 303(d) List[4]	Nitrogen	Low	2008	Needs study to verify need for TMDL
Twin Lakes (Mammoth)	Retain on 303(d) List[4]	Phosphorus	Low	2008	Needs study to verify need for TMDL
Little Alkali Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Big Springs	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Owens River	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Owens River (Long HA)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Owens River (Upper)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Owens River (Lower)	Retain on 303(d) List	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Crowley Lake	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Crowley Lake	Retain on 303(d) List[4]	Nitrogen	High	2005	Nutrient loading currently under study
Crowley Lake	Retain on 303(d) List[4]	Phosphorus	High	2005	Nutrient loading currently under study
Keough Hot Springs	Remove from 303(d) List	Metals	NA	NA	Impairment is natural; no "pollutants"
Tinemaha Reservoir	Remove from 303(d) List	Arsenic	NA	NA	Impairment is natural; no "pollutants"
Tinemaha Reservoir	Retain on 303(d) List	Metals [Copper]	Low	2004	Copper from algicide application
Pleasant Valley Reservoir	Retain on 303(d) List	Nitrogen	High	2006	
Pleasant Valley Reservoir	Retain on 303(d) List[4]	Phosphorus	High	2006	
Tuttle Creek	Retain on 303(d) List[4]	Habitat Alterations	Low	2011[5]	TMDL probably not needed[5]
Goodale Creek	Retain on 303(d) List	Sedimentation/Siltation	Low	2009	Further study may lead to delisting
Owens Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Cottonwood Creek below LADWP diversion	Retain on 303(d) List	Water/Flow Variability	Low	2011[5]	TMDL probably not needed[5]
Deep Springs HU 605.00					
Deep Springs Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Deep Springs Lake	Remove from 303(d) List	Trace Elements	NA	NA	Impairment is natural; no "pollutants"

Table 1. Lahontan Region 303(d) List Update, continued					
Waterbody Name	**Proposed Action**	**Pollutant (s)/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**	**Comments**
Amargosa HU 609.00					
Amargosa River	Remove from 303(d) List	Salinity/TDS/chlorides	NA	NA	Impairment is natural; no "pollutants"
Trona HU 621.00					
Searles Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA	Impairment is natural; no "pollutants"
Searles Lake	Add to 303(d) List	Petroleum Hydrocarbons	Low	After 2015	Documented bird kills from industrial pollutants
Mojave HU 628.00					
Mojave River near Barstow	Remove from 303(d) List	Priority Organics	NA	NA	Ground water, not surface water impairment
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Total Dissolved Solids	High	After 2015	Exceeds drinking water standard
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Chloride	High	After 2015	Exceeds water quality objectives
Mojave River between Upper and Lower Narrows	Add to 303(d) List	Sulfate	High	After 2015	Exceeds water quality objectives
Horseshoe Lake	Retain on 303(d) List	Sedimentation/Siltation	Low	2007	Further study may lead to delisting
Green Valley Lake Creek	Retain on 303(d) List	Priority Organics	Low	2006	Further study may lead to delisting

[1]TMDL priority rankings and end dates are shown only for water bodies recommended for inclusion in the 2002 list. The entry "NA" means "not applicable."

[2] TMDL end dates are the estimated years for Regional Board adoption of Basin Plan amendments. Plan amendments incorporating TMDLs will not take effect unless and until they receive further approvals from the California State Water Resources Control Board, the California Office of Administrative Law, and the U.S. Environmental Protection Agency.

[3] Water bodies are grouped by watersheds in north-to-south order. Watershed (Hydrologic Unit or HU) numbers are Department of Water Resources numbers used in the maps in the Lahontan Basin Plan, and do not run in north-to-south order.

[4] The entry "Retain on 303(d) List" in the "Proposed Action" column means that this water body/pollutant combination is on the 1998 Section 303(d) list and is proposed to remain on the 2002 list. In some cases the nature of the pollutants or the extent of the impaired segment has been clarified. For example, earlier listings for "nutrients" or "organic enrichment/Low D.O." may now be changed to separate listings for individual pollutants (nitrogen and phosphorus), and an earlier single entry for habitat alterations in the Owens River has been changed to three separate entries to reflect different segments of the river. Changes are recommended in priority rankings and TMDL end dates for many of the water body/pollutant combinations from the 1998 list.

[5] Pending revisions to federal regulations for the implementation of Section 303(d) of the Clean Water Act would clarify that TMDLs are not required for waters impaired by flow alterations, water/flow variability and habitat alterations, unless specific "pollutants" are also involved. (Load calculations are not feasible in cases where there are no pollutants.) Under the proposed new regulations, waters impaired by habitat or flow alterations, or by flow variability, would be placed on a separate list of impaired waters to highlight the need for control strategies other than TMDLs.

[6]Clarification of the nature of the pollutants has been added in brackets for some water bodies recommended for removal from the Section 303(d) list. See the fact sheets for these water bodies for further information.

[7]Regional Board staff completed draft Basin Plan amendments incorporating a phosphorus TMDL for Indian Creek Reservoir in November 2000. The Regional Board has been unable to act on these amendments due to lack of a quorum for a vote.

[8]Some waters were listed based on Toxic Substances Monitoring Program (TSMP) fish tissue data. Because sample numbers were small, TSMP data alone are not considered sufficient grounds for listing.