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

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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." The current (1998) Section 303(d) list for the Lahontan Region includes 86 water body/pollutant combinations. Staff's recommendations would remove 34 water body/pollutant combinations from the list, add _____ new water body/pollutant combinations, and clarify the basis for listing for _____ currently listed waters. An **additional 151** 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 90^{th} 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 which were then identified as "threatened" or "partially meeting beneficial uses" due to pollutants, but were not on the Section 303(d) list. Other waters in Table 2 will be recommended for classification 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.

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 which are newly recommended for listing. Lower priorities may 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 2010 (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.

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. Additions to the list are shown in bold type; deletions are shown as strikeouts. 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. 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 in 1998 Section 303(d) list	86
Number of water body/pollutant combinations recommended for delisting in 2002	30
Number of TMDLs completed (through Regional Board approval) from 1998 list	1
Number of water body/pollutant combinations recommended for addition to the list in 2002	
Number of water body/pollutant combinations to be placed on a "watch list" for further assessment and/or monitoring and possible future listing	

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

(DRAFT 11/13/01- Not for Public Distribution)

Waterbody Name	Proposed Action	Pollutant/Stressor(s)	TMDL Priority Ranking[1]	TMDL End Date [2]
Surprise Valley HU 641.00[3]				
Upper Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Middle Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Lower Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Mill Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2011
Susanville HU 637.00				
Eagle Lake	Retain on 303(d) List[4]	Nitrogen	High	2008
Eagle Lake	Retain on 303(d) List	Phosphorus	High	2008
Pine Creek	Remove from 303(d) List	Sedimentation/Siltation [Fish Habitat Alteration][5]	NA	NA
Lassen Creek	Retain on 303(d) List	Flow Alterations	Medium	2011
Susan River	Retain on 303(d) List	Unknown Toxicity	High	2007
Top Spring	Remove from 303(d) List	Radiation	NA	NA
Amedee Hot Springs	Remove from 303(d) List	Metals	NA	NA
Wendel Hot Springs	Remove from 303(d) List	Metals	NA	NA
Honey Lake	Retain on 303(d) List	Arsenic	Medium	2005
Honey Lake	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2005
Honey Lake Area Wetlands	Retain on 303(d) List	Metals	Medium	2007
Honey Lake Wildfowl Management Ponds	Retain on 303(d) List	Flow Alterations	Medium	2007
Honey Lake Wildfowl Management Ponds	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007
Honey Lake Wildfowl Management Ponds	Retain on 303(d) List	Metals	Medium	2007
Honey Lake Wildfowl Management Ponds	Retain on 303(d) List	Trace Elements	Medium	2007
Skedaddle Creek	Retain on 303(d) List	High Coliform Count	Low	2006
Little Truckee River HU 636.00				
Stampede Reservoir	Remove from 303(d) List	Pesticides [Lindane]	NA	NA

Table 1. Lahontan Region 303(d) List Update, continued DRAFT 11/13/01				
Waterbody Name	**Proposed Action**	**Pollutant/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**
Truckee River HU 635.00				
Donner Lake	Remove from 303(d) List	Priority Organics [PCBs, Chlordane]	NA	NA
Truckee River	Retain on 303(d) List	Sedimentation/Siltation	High	2005
Bear Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005
Bronco Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005
Gray Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2004
Squaw Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2003
Cinder Cone Springs	Retain on 303(d) List	Nutrients	Medium	2007
Cinder Cone Springs	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007
Lake Tahoe HU 634.00				
Snow Creek	Remove from 303(d) List	Habitat Alterations	NA	NA
Lake Tahoe	Retain on 303(d) List	Phosphorus	High	2007
Lake Tahoe	Retain on 303(d) List	Nitrogen	High	2007
Lake Tahoe	Retain on 303(d) List	Sedimentation/Siltation	High	2007
Upper Truckee River	Add to 303(d) List	Iron	Medium	After 2015
Upper Truckee River	Add to 303(d) List	Phosphorus	High	After 2015
Upper Truckee River above Hawley Grade	Add to 303(d) List	Pathogens	High	After 2015
Big Meadow Creek	Add to 303(d) List	Pathogens	High	After 2015
Heavenly Valley Creek above USFS property line	Retain on 303(d) List	Sediment	High	2001 (Completed)
Heavenly Valley Creek below USFS property line	Add to 303(d) List	Sediment	Medium	After 2015
Heavenly Valley Creek	Add to 303(d) list	Chloride	Low	After 2015
Heavenly Valley Creek above USFS property line	Add to 303(d) List	Phosphorus	High	After 2015
Hidden Valley Creek	Add to 303(d) List	Phosphorus	High	After 2015
Hidden Valley Creek	Add to 303(d) List	Chloride	Low	After 2015
Trout Creek	Add to 303(d) List	Phosphorus	High	After 2015
Trout Creek	Add to 303(d) List	Iron	Medium	After 2015
Trout Creek	Add to 303(d) List	Nitrogen	High	After 2015
Trout Creek below Hwy 50 in S. Lake Tahoe	Add to 303(d) List	Pathogens	High	After 2015
Tallac Creek below Hwy 89	Add to 303(d) List	Pathogens	High	After 2015

Table 1. Lahontan Region 303(d) List Update, continued DRAFT 11/13/01				
Waterbody Name	**Proposed Action**	**Pollutant/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**
Lake Tahoe HU 634.00 continued				
Ward Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007
Ward Creek	Add to 303(d) List	Phosphorus	High	After 2015
Ward Creek	Add to 303(d) List	Iron	Medium	After 2015
General Creek	Add to 303(d) List	Phosphorus	High	After 2015
General Creek	Add to 303(d) List	Iron	Medium	After 2015
Blackwood Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007
Blackwood Creek	Add to 303(d) List	Phosphorus	High	After 2015
Blackwood Creek	Add to 303(d) List	Iron	Medium	After 2015
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
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
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
East Fork Carson River HU 632.00				
East Fork Carson River	Remove from 303(d) List	Nutrients	NA	NA
Indian Creek Reservoir	Retain on 303(d) List	Nutrients	High	2002 [6]
Indian Creek	Retain on 303(d) List	Habitat Alterations	High	2011
Indian Creek	Add to 303(d) List	Pathogens	Medium	After 2015
Monitor Creek	Retain on 303(d) List	Iron	High	2011
Monitor Creek	Retain on 303(d) List	Silver	High	2011
Monitor Creek	Retain on 303(d) List	Aluminum	High	2011
Monitor Creek	Retain on 303(d) List	Manganese	High	2011
Monitor Creek	Retain on 303(d) List	Settleable Materials	High	2011
Monitor Creek	Add to 303(d) List	Sulfate	High	After 2015
Monitor Creek	Add to 303(d) List	Total Dissolved Solids	High	After 2015
Wolf Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2011
Aspen Creek	Retain on 303(d) List	Metals	High	2011
Bryant Creek	Retain on 303(d) List	Metals	High	2011
Leviathan Creek, at and below Leviathan Mine	Retain on 303(d) List	Metals	High	2011

Table 1. Lahontan Region 303(d) List Update, continued DRAFT 11/13/01				
Waterbody Name	**Proposed Action**	**Pollutant/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**
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
Hot Creek	Remove from 303(d) List	Metals	NA	NA
East Walker River HU 630.00				
Bridgeport Reservoir	Retain on 303(d) List	Nitrogen	High	2005
Bridgeport Reservoir	Retain on 303(d) List	Phosphorus	High	2005
Bridgeport Reservoir	Retain on 303(d) List	Sedimentation/Siltation	High	2005
East Walker River above Bridgeport Reservoir	Add to 303(d) List	Pathogens	Medium	After 2015
East Walker River below Bridgeport Reservoir	Add to 303(d) List	Nitrogen	High	After 2015
East Walker River below Bridgeport Reservoir	Add to 303(d) List	Phosphorus	High	After 2015
East Walker River below Bridgeport Reservoir	Remove from 303(d) List	Metals	NA	NA
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
Robinson Creek, Twin Lakes to Bridgeport Res.	Add to 303(d) List	Pathogens	Medium	After 2015
Swauger Creek	Add to 303(d) List	Pathogens	Medium	After 2015
Swauger Creek	Add to 303(d) List	Phosphorus	High	After 2015
Buckeye Creek	Add to 303(d) List	Pathogens	Medium	After 2015
Buckeye Creek	Add to 303(d) List	Phosphorus	High	After 2015
Virginia Creek	Add to 303(d) List	Pathogens	Medium	After 2015
Green Creek	Retain on 303(d) List	Habitat Alterations	Low	**2011**
Rough Creek	Retain on 303(d) List	Habitat Alterations	Medium	**2011**
Aurora Canyon Creek	Retain on 303(d) List	Habitat Alterations	Low	**2011**
Hot Springs Canyon Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005
Clark Canyon Creek	Retain on 303(d) List	Habitat Alterations	Medium	**2011**
Clearwater Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005
Bodie Creek	Retain on 303(d) List	Metals	High	2004

Table 1. Lahontan Region 303(d) List Update, continued DRAFT 11/13/01				
Waterbody Name	**Proposed Action**	**Pollutant/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**
Mono HU 601.00				
Lee Vining Creek	Retain on 303(d) List	Flow Alterations	High	2011
Mill Creek	Retain on 303(d) List	Flow Alterations	High	2011
Grant Lake	Remove from 303(d) List	Arsenic	NA	NA
Mono Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Owens HU 603.00				
Haiwee Reservoir	Retain on 303(d) List	Copper	Low	2003
Mammoth Creek	Retain on 303(d) List	Metals	High	2008
Hot Creek	Remove from 303(d) List	Metals	NA	NA
Little Hot Creek	Remove from 303(d) List	Arsenic	NA	NA
Twin Lakes	Retain on 303(d) List	Nitrogen	Low	2008
Twin Lakes	Retain on 303(d) List	Phosphorus	Low	2008
Little Alkali Lake	Remove from 303(d) List	Arsenic	NA	NA
Big Springs	Remove from 303(d) List	Arsenic	NA	NA
Owens River	Remove from 303(d) List	Arsenic	NA	NA
Owens River (Long HA)	Retain on 303(d) List	Habitat Alterations	High	2011
Owens River (Upper)	Retain on 303(d) List	Habitat Alterations	High	2011
Owens River (Lower)	Retain on 303(d) List	Habitat Alterations	High	2011
Crowley Lake	Remove from 303(d) List	Arsenic	NA	NA
Crowley Lake	Retain on 303(d) List	Nitrogen	High	2005
Crowley Lake	Retain on 303(d) List	Phosphorus	High	2005
Keough Hot Springs	Remove from 303(d) List	Metals	NA	NA
Tinemaha Reservoir	Remove from 303(d) List	Arsenic	NA	NA
Tinemaha Reservoir	Retain on 303(d) List	Metals [Copper]	Low	2004
Pleasant Valley Reservoir	Retain on 303(d) List	Nitrogen	High	2006
Pleasant Valley Reservoir	Retain on 303(d) List	Phosphorus	High	2006
Tuttle Creek	Retain on 303(d) List	Habitat Alterations	Low	2011
Goodale Creek	Retain on 303(d) List	Sedimentation/Siltation	Low	2009
Owens Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Cottonwood Creek below LADWP diversion	Retain on 303(d) List	Water/Flow Variability	Medium	2011

Table 1. Lahontan Region 303(d) List Update, continued DRAFT 11/13/01				
Waterbody Name	**Proposed Action**	**Pollutant/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**
Deep Springs HU 605.00				
Deep Springs Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Deep Springs Lake	Remove from 303(d) List	Trace Elements	NA	NA
Amargosa HU 609.00				
Amargosa River	Remove from 303(d) List	Salinity/TDS/chlorides	NA	NA
Trona HU 621.00				
Searles Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Searles Lake	Add to 303(d) List	Petroleum Hydrocarbons	Low	After 2015
Mojave HU 628.00				
Mojave River near Barstow	Remove from 303(d) List	Priority Organics	NA	NA
Horseshoe Lake	Retain on 303(d) List	Sedimentation/Siltation	Low	2007
Green Valley Lake Creek	Retain on 303(d) List	Priority Organics	Low	2006

[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] 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.

[6] 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.

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. **Internal Draft 11/13/01- Not for Public Distribution**

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 u/s of Susanville	Susan River	Nickel
Susan River d/s of Paiute Creek	Susan River	Mercury
Susan River d/s of Paiute Creek	Susan River	Nickel
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	Nickel
Buckeye Creek	**Walker River**	**Phosphorus**
Robinson Creek	Walker River	Total Dissolved Solids
Robinson Creek	Walker River	Nickel
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 above Bridgeport Reservoir	Walker River	Nickel
East Walker River below Bridgeport Reservoir	Walker River	Fuel oil (spill)
East Walker River below Bridgeport Reservoir	Walker River	Mercury, nickel, 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 Crk. 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 (Internal Draft, 11/13/01

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
West Fork Mojave River	Mojave River	Nitrogen
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: Connor, Valerie
Date: 10/23/01 10:51AM
Subject: Region 6 draft 303(d) documents

Here are:

(1) The draft staff report (filename 303dstaffr)

(2) A somewhat cleaned up version of my working draft of the main recommendations (Table 1 of the staff report, filename 303swrcbddraft). There are a couple of potential changes that I still need to get direction on.

(2) The "watchlist" file, Table 2 of the staff report

As I mentioned on the phone, all of these should be considered **drafts only** until they are approved for public distribution by our EO. I will send you some of our more-or-less finished fact sheets this afternoon.

CC: Curtis, Chuck

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

October 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." The current (1998) Section 303(d) list for the Lahontan Region includes 86 water body/pollutant combinations. Staff's recommendations would remove 34 water body/pollutant combinations from the list, add _____ new water body/pollutant combinations, and clarify the basis for listing for _____ currently listed waters. An additional 151 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 and Trout 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 expect 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 ssmall 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 which were then identified as "threatened" or "partially meeting beneficial uses" due to pollutants, but were not on the Section 303(d) list. Other waters in Table 2 will be recommended for classification 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.

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 which are newly recommended for listing. Lower priorities may 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 2010 (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.

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. Additions to the list are shown in bold type; deletions are shown as strikeouts. 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. 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 in 1998 Section 303(d) list	86
Number of water body/pollutant combinations recommended for delisting in 2002	34
Number of TMDLs completed (through Regional Board approval) from 1998 list	1
Number of water body/pollutant combinations recommended for addition to the list in 2002	
Number of water body/pollutant combinations to be placed on a "watch list" for further assessment and/or monitoring and possible future listing	151

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.)

Associated Press., 1997. "Pollution at Donner Lake Linked to Motorboat Use." *San Francisco Chronicle*, October 7, 1997.

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

(DRAFT 10/23/01- Not for Public Distribution)

Waterbody Name	Proposed Action	Pollutant/Stressor(s)	TMDL Priority Ranking[1]	TMDL End Date [2]
Surprise Valley HU 641.00[3]				
Upper Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Middle Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Lower Alkali Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Mill Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2011
Susanville HU 637.00				
Eagle Lake	Retain on 303(d) List[4]	Nitrogen	High	2008
Eagle Lake	Retain on 303(d) List	Phosphorus	High	2008
Pine Creek	Remove from 303(d) List	Sedimentation/Siltation [Fish habitat][5]	NA	NA
Lassen Creek	Retain on 303(d) List	Flow Alterations	Medium	After 2015
Susan River	Retain on 303(d) List	Unknown Toxicity	High	2007
Top Spring	Remove from 303(d) List	Radiation	NA	NA
Amedee Hot Springs	Remove from 303(d) List	Metals	NA	NA
Wendel Hot Springs	Remove from 303(d) List	Metals	NA	NA
Honey Lake	Retain on 303(d) List	Arsenic	Medium	After 2015
Honey Lake	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	After 2015
Honey Lake Area Wetlands	Retain on 303(d) List	Metals	Medium	After 2015
Honey Lake Wildfowl Mgmt Ponds	Retain on 303(d) List	Flow Alterations	Medium	After 2015
Honey Lake Wildfowl Mgmt Ponds	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	After 2015
Honey Lake Wildfowl Mgmt Ponds	Retain on 303(d) List	Metals, Trace Elements	Medium	After 2015
Skedaddle Creek	Retain on 303(d) List	High Coliform Count	Low	2006

Table 1. 303(d) List Update, continued DRAFT 10/23/01				
Waterbody Name	**Proposed Action**	**Pollutant/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**
Little Truckee River HU 636.00				
Stampede Reservoir	Remove from 303(d) List	Pesticides [Chlordane]	NA	NA
Truckee River HU 635.00				
Donner Lake	Remove from 303(d) List	Priority Organics [PCBs, Lindane]	NA	NA
Truckee River	Retain on 303(d) List	Sedimentation/Siltattion	High	2005
Bear Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005
Bronco Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2005
Gray Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2004
Squaw Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2003
Cinder Cone Springs	Retain on 303(d) List	**Nutrients**	Medium	2007
Cinder Cone Springs	Retain on 303(d) List	Salinity/TDS/Chlorides	Medium	2007
Lake Tahoe HU 634.00				
Snow Creek	Remove from 303(d) List	Habitat Alterations	NA	NA
Lake Tahoe	Retain on 303(d) List	Phosphorus	High	2007
Lake Tahoe	Retain on 303(d) List	Nitrogen	High	2007
Lake Tahoe	Retain on 303(d) List	Sedimentaton/Siltation	High	2007
Upper Truckee River	Add to 303(d) List	Iron	Medium	After 2015
Upper Truckee River	Add to 303(d) List	Phosphorus	High	After 2015
Upper Truckee River	Add to 303(d) List	Bacteria	High	After 2015
Big Meadow Creek	Add to 303(d) List	Bacteria	High	After 2015
Heavenly Valley Creek above USFS property line	Retain on 303(d) List	Sediment	High	2001 (Completed)
Heavenly Valley Creek below USFS property line	Add to 303(d) List	Sediment	Medium	After 2015
Heavenly Valley Creek	Add to 303(d) list	Chloride	Low	After 2015
Heavenly Valley Creek above USFS property line	Add to 303(d) List	Phosphorus	High	After 2015

Table 1. 303(d) List Update, continued DRAFT 10/23/01				
Waterbody Name	**Proposed Action**	**Pollutant/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**
Lake Tahoe HU 634.00 continued				
Hidden Valley Creek	Add to 303(d) List	Phosphorus	High	After 2015
Hidden Valley Creek	Add to 303(d) List	Chloride	Low	After 2015
Trout Creek	Add to 303(d) List	Phosphorus	High	After 2015
Trout Creek	Add to 303(d) List	Iron	Medium	After 2015
Trout Creek	Add to 303(d) List	Nitrogen	High	After 2015
Ward Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007
Ward Creek	Add to 303(d) List	Phosphorus	High	After 2015
Ward Creek	Add to 303(d) List	Iron	Medium	After 2015
General Creek	Add to 303(d) List	Phosphorus	High	After 2015
General Creek	Add to 303(d) List	Iron	Medium	After 2015
Blackwood Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2007
Blackwood Creek	Add to 303(d) List	Phosphorus	High	After 2015
Blackwood Creek	Add to 303(d) List	Iron	Medium	After 2015
West Fork Carson River HU 633.00				
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Phosphorus	Medium	After 2015
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Percent Sodium	Medium	After 2015
West Fork Carson R., headwaters to Woodfords	Add to 303(d) List	Nitrogen	Medium	After 2015
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Percent Sodium	Medium	After 2015
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Nitrogen	Medium	After 2015
West Fork Carson R., Woodfords to Paynesville	Add to 303(d) List	Bacteria	Medum	AFter 2015
East Fork Carson River HU 632.00				
East Fork Carson River	Remove from 303(d) List	Nutrients	NA	NA
Indian Creek Reservoir	Retain on 303(d) List	Nutrients	High	2002 [6]
Indian Creek	Retain on 303(d) List	Habitat Alterations	High	After 2015
Indian Creek	Add to 303(d) List	Nutrients	High	After 2015
Indian Creek	Add to 303(d) List	Bacteria	High	After 2015
Monitor Creek	Retain on 303(d) List	Silver	High	2011
Monitor Creek	Retain on 303(d) List	Aluminum	High	2011
Monitor Creek	Retain on 303(d) List	Manganese	High	2011
Monitor Creek	Retain on 303(d) List	Settleable Materials	High	2011

Monitor Creek	Add to 303(d) List	Sulfate	High	After 2015
Monitor Creek	Add to 303(d) List	Total Dissolved Solids	High	After 2015
Wolf Creek	Retain on 303(d) List	Sedimentation/Siltation	High	2011
Aspen Creek	Retain on 303(d) List	Metals	High	2011
Bryant Creek	Retain on 303(d) List	Metals	High	2011
Leviathan Creek, at and below Leviathan Mine	Retain on 303(d) List	Metals	High	2011

Table 1. 303(d) List Update, continued DRAFT 10/23/01				
Waterbody Name	**Proposed Action**	**Pollutant/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**
West Walker River HU 631.00				
Topaz Lake	Retain on 303(d) list	Sedimentation/Siltaton	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
Hot Creek (1)	Remove from 303(d) List	Metals	NA	NA
East Walker River HU 630.00				
Bridgeport Reservoir	Retain on 303(d) List	Nitrogen	High	2005
Bridgeport Reservoir	Retain on 303(d) List	Phosphorus	High	2005
Bridgeport Reservoir	Retain on 303(d) List	Sedimentation/Siltation	High	2005
Swauger Creek	Add to 303(d) List	Nutrients SPECIFY	Medium	After 2015
Swauger Creek	Add to 303(d) List	Bacteria	Medium	After 2015
Robinson Creek	Add to 303(d) List	Nutrients SPECIFY	Medium	After 2015
Robinson Creek	Add to 303(d) List	Bacteria	Medium	After 2015
Buckeye Creek	Add to 303(d) List	Nutrients SPECIFY	Medium	After 2015
Buckeye Creek	Add to 303(d) List	Bacteria	Medium	After 2015
Virginia Creek	Add to 303(d) List	Phosphorus	Medium	After 2015
East Walker River {SPECIFY SEGMENT)	Add to 303(d) List	Nutrients [SPECIFY	Medium	After 2015
East Walker River (SPECIFY SEGMENT)	Add to 303(d) List	Bacteria	Medium	After 2015
East Walker River (SPECIFY SEGMENT)	Remove from 303(d) List	Metals	NA	NA
East Walker River (SPECIFY SEGMENT)	Retain on 303(d) List	Sedimentation/Siltation	High	2009
Green Creek	Retain on 303(d) List	Habitat alterations		
Green Creek	Add to 303(d) List	Nitrogen	Medium	After 2015
East Walker River HU 630.00, continued				
Rough Creek	Retain on 303(d) List	Habitat Alterations	Medium	After 2015
Aurora Canyon Creek	Retain on 303(d) List	Habitat Alterations	Low	After 2015
Hot Springs Canyon Creek	Retain on 303(d) List	Sedimentation/Siltation	Medium	2005
Clark Canyon Creek	Retain on 303(d) List	Habitat aAterations	Medium	After 2015
Clearwater Creek	Retain on 303(d) List	Sedmentation/Siltation	Medium	2005
Bodie Creek	Retain on 303(d) List	Metals	High	2004

Table 1. 303(d) List Update, continued DRAFT 10/23/01				
Waterbody Name	**Proposed Action**	**Pollutant/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**
Mono HU 601.00				
Lee Vining Creek	Retain on 303(d) List	Flow alterations	High	After 2015
Mill Creek	Retain on 303(d) List	Flow alterations	High	After 2015
Grant Lake	Remove from 303(d) List	Arsenic	NA	NA
Mono Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Owens HU 603.00				
Haiwee Reservoir	Retain on 303(d) List	Copper	Low	2003
Mammoth Creek	Retain on 303(d) List	Metals	High	2008
Hot Creek	Remove from 303(d) List	Metals	NA	NA
Little Hot Creek	Remove from 303(d) List	Arsenic	NA	NA
Twin Lakes	Retain on 303(d) List	Nitrogen	Low	2008
Twin Lakes	Retain on 303(d) List	Phosphorus	Low	2008
Little Alkali Lake	Remove from 303(d) List	Arsenic	NA	NA
Big Springs	Remove from 303(d) List	Arsenic	NA	NA
Owens River (Long HA)	Remove from 303(d) List	Arsenic	NA	NA
Owens River (Long HA)	Retain on 303(d) List	Habitat Alterations	High	After 2015
Owens River (Upper)	Retain on 303(d) List	Habitat Alterations	High	After 2015
Owens River (Middle)	Retain on 303(d) List	Habitat Alterations	High	After 2015
Crowley Lake	Remove from 303(d) List	Arsenic	NA	NA
Crowley Lake	Retain on 303(d) List	Nitrogen	High	2005
Crowley Lake	Retain on 303(d) List	Phosphorus	High	2005
Keough Hot Springs	Remove from 303(d) List	Metals	NA	NA
Tinemaha Reservoir	Remove from 303(d) List	Arsenic	NA	NA
Tinemaha Reservoir	Retain on 303(d) List	Metals [Copper]	Low	2004
Pleasant Valley Reservoir	Retain on 303(d) List	Nitrogen	High	2006
Pleasant Valley Reservoir	Retain on 303(d) List	Phosphorus	High	2006
Tuttle Creek	Retain on 303(d) List	Habitat Alterations	Low	After 2015
Goodale Creek	Retain on 303(d) List	Sedimentation/siltation	Low	2009
Owens Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA

Table 1. 303(d) List Update, continued DRAFT 10/23/01				
Waterbody Name	**Proposed Action**	**Pollutant/Stressor(s)**	**TMDL Priority Ranking[1]**	**TMDL End Date[2]**
Owens HU 603.00				
Cottonwood Creek [below LADWP diversion]	Retain on 303(d) List	Water/Flow Variability	Medium	After 2015
Deep Springs HU 605.00				
Deep Springs Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Deep Springs Lake	Remove from 303(d) List	Trace Elements	NA	NA
Amargosa HU 609.00				
Amargosa River	Remove from 303(d) List	Salinity/TDS/chlorides	NA	NA
Trona HU 621.00				
Searles Lake	Remove from 303(d) List	Salinity/TDS/Chlorides	NA	NA
Searles Lake	Add to 303(d) List	Petroleum hydrocarbons	Low	After 2015
Mojave HU 628.00				
Mojave River [near Barstow]	Remove from 303(d) List	Priority organics	NA	NA
Mojave River, between Upper and Lower Narrows	Add to 303(d) List	TCE/PCE	Medium	After 2015
Horseshoe Lake	Retain on 303(d) List	Sedimentation/Siltation	Low	2007
Green Valley Lake Creek	Retain on 303(d) List	Priority Organics	Low	2006

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

[6] 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.

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	Nutrients
Susan River u/s of Susanville	Susan River	Mercury
Susan River u/s of Susanville	Susan River	Nickel
Susan River d/s of Paiute Creek	Susan River	Mercury
Susan River d/s of Paiute Creek	Susan River	Nickel
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	Chlordane
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	Lindane
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

Table 2, "Watch List", continued

Water Body Name	Watershed	Pollutant(s)
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
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
Fredericksburg Canyon Creek	Carson River	Sediment
Scotts Lake	Carson River	Sediment
Heenan Reservoir	Carson River	Nutrients
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
Buckeye Creek	Walker River	Total Dissolved Solids
Buckeye Creek	Walker River	Nickel
Robinson Creek	Walker River	Total Dissolved Solids

Table 2, "Watch List", continued

Water Body Name	Watershed	Pollutant(s)
Robinson Creek	Walker River	Nickel
Robinson Cr. above Barney Lake	Walker River	Nitrogen
Robinson Cr,. Barney Lake to Twin Lakes	Walker River	Nitrogen
East Walker River u/s Bridgeport Reservoir	Walker River	Nickel
East Walker River below Bridgeport Reservoir	Walker River	Fuel oil (spill)
East Walker River below Bridgeport Reservoir	Walker River	Mercury, nickel, other metals
Aurora Canyon Creek	Walker River	Total Dissolved Solids
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
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

Table 2. "Watch List", continued

Water Body Name	Watershed	Pollutant(s)
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 Crk. 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
Lake George	Owens River	Metals
Lake Mary	Owens River	Boat fuel constituents including MTBE
Los Angeles Aqueduct	Owens River	Copper
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
Ivanpah Dry Lake	Ivanpah HU	Radioactive elements (lanthanides)
Littlerock Reservoir	Antelope HU	Sediment
Littlerock Reservoir	Antelope HU	Iron
Littlerock Reservoir	Antelope HU	Manganese
West Fork Mojave River	Mojave River	Nitrogen
Mojave River @ Lower Narrows	Mojave River	Nutrients
Mojave River, Barstow to Waterman Fault	Mojave River	Nitrogen

Table 2. "Watch List", continued

Water Body Name	Watershed	Pollutant(s)
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 (imported water)
Spring Valley Lake	Mojave River	Sediment

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	Nutrients
Susan River u/s of Susanville	Susan River	Mercury
Susan River u/s of Susanville	Susan River	Nickel
Susan River d/s of Paiute Creek	Susan River	Mercury
Susan River d/s of Paiute Creek	Susan River	Nickel
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	Chlordane
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	Lindane
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

Table 2, "Watch List", continued

Water Body Name	Watershed	Pollutant(s)
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
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
Fredericksburg Canyon Creek	Carson River	Sediment
Scotts Lake	Carson River	Sediment
Heenan Reservoir	Carson River	Nutrients
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
Buckeye Creek	Walker River	Total Dissolved Solids
Buckeye Creek	Walker River	Nickel
Robinson Creek	Walker River	Total Dissolved Solids

Table 2, "Watch List", continued

Water Body Name	Watershed	Pollutant(s)
Robinson Creek	Walker River	Nickel
Robinson Cr. above Barney Lake	Walker River	Nitrogen
Robinson Cr,. Barney Lake to Twin Lakes	Walker River	Nitrogen
East Walker River u/s Bridgeport Reservoir	Walker River	Nickel
East Walker River below Bridgeport Reservoir	Walker River	Fuel oil (spill)
East Walker River below Bridgeport Reservoir	Walker River	Mercury, nickel, other metals
Aurora Canyon Creek	Walker River	Total Dissolved Solids
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
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

Table 2. "Watch List", continued

Water Body Name	Watershed	Pollutant(s)
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 Crk. 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
Lake George	Owens River	Metals
Lake Mary	Owens River	Boat fuel constituents including MTBE
Los Angeles Aqueduct	Owens River	Copper
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
Ivanpah Dry Lake	Ivanpah HU	Radioactive elements (lanthanides)
Littlerock Reservoir	Antelope HU	Sediment
Littlerock Reservoir	Antelope HU	Iron
Littlerock Reservoir	Antelope HU	Manganese
West Fork Mojave River	Mojave River	Nitrogen
Mojave River @ Lower Narrows	Mojave River	Nutrients
Mojave River, Barstow to Waterman Fault	Mojave River	Nitrogen

Table 2. "Watch List", continued

Water Body Name	Watershed	Pollutant(s)
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 (imported water)
Spring Valley Lake	Mojave River	Sediment

From: Judith Unsicker
To: Connor, Valerie
Date: 10/23/01 1:10PM
Subject: **Draft** Region 6 Fact Sheets

Attached are fact sheets, organized in files by watersheds or groups of watersheds, for about half of the waters we are recommending for listing or delisting. I have in-progress files on the rest. I still need to get more data on the Upper Truckee River bacteria situation and on the Mojave River from Regional Board staff, and discuss final recommendations with Chuck Curtis. Again, these are not yet public drafts.

CC: Curtis, Chuck

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

SUSANVILLE HYDROLOGIC UNIT

California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Boulevard
South Lake Tahoe CA 96150

November 2001

Contact Person:

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

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. Summary of Radiation Data for Top Spring

Sampling 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	Radium	1.3 (CHECK SOURCE)
4-5-86	Gross Alpha actvity	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

Table 1 summarizes radioactivity data from several sampling dates (see Koehne, 1998). In addition, a sample from the ranger station sink taken on 3/4/86, 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 counts in the top spring had decreased to 4.84 pCi/L, and that this parameter had been decreasing since the earlier tests.

In the 1980s, Top Spring was in violation of the water quality objective for radioactivity which references the state drinking water MCLs. 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 ug/L or 30 pCi/L; 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 ppb (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 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 Impaird 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.

PINE CREEK, SEDIMENTATION/SILTATION
2002 303(d) Fact Sheet
Delisting

Evidence of Attainment

Pine Creek, a tributary to Eagle Lake in Lassen County, is proposed for delisting because control measures have been implemented to address the problem. The restoration effort is summarized in a Regional Board staff report (MacDonald and Lutz, 2000), which concluded that there are sufficient control measures in place to ensure protection of the fish habitat use.

The identification of the problem as "sedimentation/siltation" in the 1998 Section 303(d) list comes from a limited "picklist" of problem descriptions associated with an earlier computer dabase used in water quality assessment. Although there are localized erosion problems in the Pine Creek watershed, the problem which led to listing was actually fish habitat degradation. Degradation was due to the combined impacts of logging practices, livestock grazing, stream channelization, hydromodification from road/railroad grade construction, overfishing, introduction of exotic species, changes in perennial streamflows (perhaps due to climate change) and most importantly, barriers to fish migration.

Pine Creek was historically the main spawning habitat for the unique Eagle Lake trout, a subspecies of rainbow trout adapted to the lake's high alkalinity. The trout fishery provides an estimated $10 million/year benefit to the local economy. Spawning fish may enter other Eagle Lake tributaries during high spring flows, but these streams dry before many adults can return to the lake and before eggs hatch. The trout population in Eagle Lake has been maintained since the 1950s through hatchery spawning. The Department of Fish and Gme has stated that restoration of the natural evolution of the Eagle Lake Trout depends on restoration of the spawning and rearing potential of Pine Creek.

Habitat impairment in Pine Creek is being addressed through a comprehensive watershed restoration program which began in 1991 under a Coordinated Resource Management Plan (CRMP). More than 40 restoration projects had been completed under the CRMP by 1997. The main barrier to fish migration was removed in 1999 when culverts under the state highway near the lake were reconstructed. . The CRMP restoration program (which has received Clean Water Act Section 205 (j) and Section 319 grant funding) also includes watershed/riparian restoration and grazing management changes at a number of sites upstream. Tagged trout are being released in the creek during the spawning season, and restoration of a spawning run is expected shortly. A monitoring program is in place to document successful spawning and rearing if and when it occurs.

The US Fish and Wildlife Service reviewed the restoration program in 1995 as part of its review of a petition to list the trout under the federal Endangered Species Act. Although the petition was denied on the basis of insufficient information, the decision notice states that the Eagle Lake rainbow trout will remain a species of concern to the Service, and that "the future status of the subspecies may improve because of the significant recovery efforts now ounderway and the ongoing stocking program."

Watershed Characteristics

Pine Creek is the largest tributary of Eagle Lake, about 43 miles long, with a watershed area of about 225 square miles and headwaters in the Caribou Wilderness east of Lassen Volcanic National Park. About 90 percent of the watershed is within Lassen National Forest; it also includes U.S. Bureau of Land Management and private lands. The creek contributes 75-85% of the inflow to Eagle Lake. Only about 10-20 percent of the stream is perennnial; downstream reaches are intermittent except during spring runoff.

Information Sources

Letter to Joyce Coakley, Lassen National forest from Richard L. Elliott, California Department of Fish and Game, dated March 30, 1995.

California Department of Fish and Game, 1995. Endangered Species Act Prelisting Proposal, March 1995..

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

MacDonald, C.D. and A. Lutz, 2000. Staff Report on Recommendation to Remove Pine Creek from the 303(d) List, California Regional Water Quality Control Board, Lahontan Region, April 14, 2000.

USDA Forest Service, Eagle Lake Ranger District, Lassen National Forest, 1995. Decision Nogtice and Finding of No Significant Impact for :Pine Creek Riparian and Fish Passage Improvement6 Project, June 9, 1995.

U.S. Department of the Interior, Fish andWildlife Service, 1995. 5 CFR Part 17: Endangered and Threatened Wildlife and Plants,: 90-Day Finding for a Petition to List the Eagle Lake Rainbow Trout and Designate Critical Habitat.

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." 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 (see separate fact sheet). Eagle Lake supports an endemic subspecies of rainbow trout adapted to its high alkalinity, and 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 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

SURPRISE VALLEY HYDROLOGIC UNIT

California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Boulevard
South Lake Tahoe CA 96150

November 2001

Contact Person:

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

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

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 DWR 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 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*

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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).

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)

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 DWR 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 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.

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
2501 Lake Tahoe Boulevard
South Lake Tahoe CA 96150

November 2001

Contact Person:

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

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. Listing of a different segment of the Mojave River for TCE and PCE is being recommended separately as part of the 2002 list update process; see the separate fact sheet for these pollutants.

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 which 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 which apply to the subsurface portion of the Mojave River in the Barstow area. However, because there are no applicable numerical objectives for surface water, this segment of the river 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.

ADD CONTAMINANT CONCENTRATION INFO FROM VVL

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 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.

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, TCE AND PCE
2002 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 (drinking water MCLs) for PCE and TCE. (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)**	PCE and TCE
Hydrologic Unit	628.00	**Sources**	Ground water plume, source(s) unknown
Total Length	120 miles	**TMDL Priority**	High
Size Affected	2 miles	**TMDL Start Date**	After 2015
Upstream Extent Latitude	34.533° N	**TMDL End Date**	After 2015
Downstream Extent Latitude	34.573° N	**Upstream Extent Longitude**	-117.284° W
Original 303(d) Listing Year	2002	**Downstream Extent Longitude**	-117.318° W

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 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.

Water Quality Standards Not Attained

PCE (tetrachlorothene or perchloroethylene) and its breakdown product TCE (trichlorethylene or trichloroethene) are volatile organic carbon compounds which were once widely used as industrial solvents, particularly for degreasing. PCE was the primary solvent used by commercial dry cleaners. Due to spills, leaks and improper disposal practices, PCE and TCE are now major groundwater pollutants. A large (2 miles) plume of TCE and PCE exists beneath the city of Victorville, and monitoring shows that it has entered surface waters of the Mojave River. One

station had a PCE concentration of 38 ug/L (0.038 mg/L) and a TCE concentration of 12 ug/L(0.012 mg.L) This PCE concentration violates the federal and state drinking water MCLs of 5 ug/L (0.005 mg/L), and the narrative Chemical Constituents and Toxicity objectives in the Lahontan Basin Plan. The California Office of Environmental Health Hazard Assessment has recently established a Public Health Goal for PCE in drinking water of 0.06 ug/L, based on carcinogenic effects observed in animals.

Extent of Impairment.

The segment proposed for listing is between the Upper and Lower Narrows.

Potential Sources

The sources of the plume have not yet been documented, but they probably include commercial and industrial sources such as dry cleaners and automobile repair facilities.

TMDL Priority

A "High" priority for TMDL development has been assigned to the Mojave River based on its resource value. However, due to other Regional Board priorities, this TMDL is not projected for completion until after 2015. Source(s) of PCE and TCE must be identified before loads can be calculated. Monitoring, source analysis, and cleanup and abatement activities are now in progress, and will continue under other Regional Board programs.

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.

California Office of Health Hazard Assessment, 2001. Public Health Goal for Tetrachloroethylene in Drinking Water, August 2001. Available on the Internet at:
http://www.oehha.ca.gov/water/phg/pdf/PDEAug2001.pdf

SEARLES LAKE, SALINITY/TDS/CHLORIDES
2002 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 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 exteme environmental conditions, and should not be considered "impaired" for these uses in spite of their high salt and trace element concentrations. 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."* 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, would 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 elvation 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. A*nalysis 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	40 square miles	**TMDL Start Date (Mo/Yr)**	After 2015
Extent of Impairment	Surface waters of lake; area is variable	**TMDL End Date (Mo/Yr)**	After 2015
Northern Extent Latitude	35°50'	Western Extent Longitude	117°30'
Southern Extent Latitude	35°40'	Eastern Extent Longitude	117°15'

Note: Latitude and longitude are estimated from a topographic map. More precise coordinates will be provided in the GeoWBS database

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 elvation 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. There are documented bird kills which constitute 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 consitutents, 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 [sic] from the facilities to Searles Lake, which is a hydrologically closed basin. Any discharge of petroleum hydrocarbons and other non-native constitutents 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 Searls 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. IMCC has also used other chemicals such as monothanolamine (MEA), formaldehyde, and phenols, which 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.

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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 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.

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 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 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 which 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.

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.*

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, 1994. Decision 1631, "Decision and Order Amending Water Right Licenses to Establish Fishery Protection Flows in Streams Tributary to Mono Lake and to Protect Public Trust Resources At Mono Lake and In the Mono Lake Basin," September 20, 1994.

California State Water Resources Control Board, 1998. Order WR 98-05 In the Matter of Stream and Waterfowl Habitat Restoration Plans and Grant Lake Operations and Management Plan Submitted by the Los Angeles Department of Water and Power Pursuant to the Requirements of Water Right Decision 1631 (Water Rights Licenses 10191 and 10192, Applications 8042 and 8043).

Jones & Stokes Associates, Inc., 1993. *Draft Environmental Impact Report for the Review of the Mono Basin Water Rights of the City of Los Angeles.* Prepared for California State Water Resources Control Board. May, 1993.

National Academy of Sciences, 1987. *The Mono Basin Ecosystem: Effects of Changing Lake Level.*

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.

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 is thus 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 water from the Grant Lake outlet between 1940 and 1990 was 10.80 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 value is in compliance with the current drinking water MCL of 50 ug/L, but would be in violation of lower standards currently under study by the U.S Environmental Protection Agency. 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.

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, Toxic Substances Monitoring Program database.

California State Water Resources Control Board, 1991. *California Inland Surface Waters Plan: Water Quality Control Plan for Inland Surface Waters of California*, 91-12 WQ, April 1991.

California State Water Resources Control Board, 1994. Decision 1631, "Decision and Order Amending Water Right Licenses to Establish Fishery Protection Flows in Streams Tributary to Mono Lake and to Protect Public Trust Resources At Mono Lake and In the Mono Lake Basin", September 20, 1994.

California State Water Resources Control Board, 1998. Order WR 98-05 In the Matter of Stream and Waterfowl Habitat Restoration Plans and Grant Lake Operations and Management Plan Submitted by the Los Angeles Department of Water and Power Pursuant to the Requirements of Water Right Decision 1631 (Water Rights Licenses 10191 and 10192, Applications 8042 and 8043)

Jones & Stokes Associates, Inc., 1993. *Draft Environmental Impact Report for the Review of the Mono Basin Water Rights of the City of Los Angeles.* Prepared for California State Water Resources Control Board. May, 1993.

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

LAKE TAHOE HYDROLOGIC UNIT

California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Boulevard
South Lake Tahoe CA 96150

November 2001

Contact Person:

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

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 10/01.

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 and 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:

Nondegradation
Algal Growth Potential
Biostimulatory Substances
Biological indicators, including 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 which 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

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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.

Water Quality Objectives Not Attained

Blackwood Creek is in violation of the numerical water quality objective for Total Nitrogen, 0.19 mg/L 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 Years1989 and 1996. Annual average concentrations ranted from 0.103 mg/L in 1994 to 0.0.293 mg/L in 1995. The range of single values concentrations for Total

Kjeldahl Nitrogen (ammonia plus organic N) reported by Rowe (1998) for the LTIMP period of record (through 1996) was .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.

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 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 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 Year1996 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 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.

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 and urban development in the watershed.

Water Quality Objectives Violated

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 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 Section 303(d) 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 and urban development in the watershed.

Water Quality Objectives Violated

Numerical water quality objectives for Trout Creek apply upstream to its tributaries. The chloride objectives for Trout Creek are 0.15 mg/L (annual mean) and 0.20 mg/L (90^{th} 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 and other paved streets and driveways.

Water Quality Objectives Violated

Numerical water quality objectives for Trout Creek apply upstream to its tributaries. The Total Phosphorus objective for Trout Creek is 0.015 mg/L (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 Section 303(d) 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 Violated

Numerical water quality objectives for Trout Creek apply upstream to its tributaries. The chloride objectives for Trout Creek are 0.15 mg/L (annual mean) and 0.20 mg/L (90^{th} 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 Section 303(d) 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 mg/L (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 northwest 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 Violated

The numerical water quality objective for total phosphorus in General Creek is 0.015 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 year 1981 and WY 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 northwest 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 Violated

The numerical water quality objective for total iron in General Creek is 0.03 mg/L.

Evidence of Impairment

Mention BAFe analysis, probability that standard was based on secondary MCL plus a margin of safety.. concern about iron as a plant nutrient..

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 Section 303(d) 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 is in Alpine County. Land surface elevations range from lake level (about 6625 feet) to 10,063 ft at Red Lake Peak. Percent slope ranges from near zero at lake level to as much as 50% in the upper altitudes. There are 24 tributary streams. The main tributary drainages to the Upper Truckee River, with watershed areas, are: 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 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 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 Year 1980 and Water Year 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

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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/>

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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 is in Alpine County. Land surface elevations range from lake level (about 6625 feet) to 10,063 ft at Red Lake Peak. Percent slope ranges from near zero at lake level to as much as 50% in the upper altitudes. There are 24 tributary streams. The main tributary drainages to the Upper Truckee River, with watershed areas, are: 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 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 Violated

The water quality objective for total iron in the Upper Truckee River is 0.03 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.

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

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

UPPER TRUCKEE RIVER, FECAL COLIFORM BACTERIA
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

The segment of the Upper Truckee River within the Meiss Grazing Allotment is proposed to be listed for violations of the water quality objective for coliform bacteria.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Upper Truckee River	**Pollutant(s)**	Fecal coliform bacteria
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	Livestock, human recreational users, dogs, wildlife.
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 is in Alpine County. Land surface elevations range from lake level (about 6625 feet) to 10,063 ft at Red Lake Peak. Percent slope ranges from near zero at lake level to as much as 50% in the upper altitudes. There are 24 tributary streams. The main tributary drainages to the Upper Truckee River, with watershed areas, are: 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 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 (including the reach proposed for listing), 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 Violated

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."*

Evidence of Impairment

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.

Extent of Impairment

ASK BRUCE WHICH SEGMENT (s) TO LIST

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, fecal coliform data for the Upper Truckee River.

BIG MEADOW CREEK, FECAL COLIFORM BACTERIA
2002 Section 303(d) Fact Sheet
Listing

Summary of Proposed Action

Big Meadow Creek, in the Lake Tahoe Basin, is proposed for listing due to violations of the water quality objective for coliform bacteria.

Table 1. 303(d) Listing/TMDL Information

Waterbody Name	Big Meadow Creek	**Pollutant(s)**	Fecal coliform bacteria
Hydrologic Unit	Lake Tahoe (634.10)	**Sources**	livestock, humans, dogs, wildlife, etc.
Total Length	3.5 miles	**TMDL Priority**	High
Size Affected	3.5 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 Violated

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."*

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.

Extent of Impairment

The entire creek is recommended for listing.

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

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

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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
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. Percent slope ranges from near zero to 50% at higher altitudes. 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 Violated

The water quality objective for total phosphorus in Trout Creek is 0.015 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 WY1980 and WY 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. 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.*

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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) 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
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. Percent slope ranges from near zero to 50% at higher altitudes. 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 Violated

The water quality objective for total nitrogen in Trout Creek is 0.19 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 WY 89 and WY 96. 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.*

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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/>

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. Percent slope ranges from near zero to 50% at higher altitudes. 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 Violated

The water quality objective for total iron in Trout Creek is 0.03 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.

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.*

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 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 afa; the average annual mean daily streamflow for this period was 32.1 cfs. 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, and has been the site of a number of University of California, Davis Tahoe Research Group research projects.

Water Quality Objectives Violated

The water quality objective for total nitrogen in Ward Creek is 0.15 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 (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 Year 1989 and Water Year 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 with a median concentration of 0.010. 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 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 afa; the average annual mean daily streamflow for this period was 32.1 cfs. 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, and has been the site of a number of University of California, Davis Tahoe Research Group research projects.

Water Quality Objectives Violated

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

Evidence of Impairment

A summary of data from the Lake Tahoe Interagency Monitoring Program (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 Year 1980 and Water Year 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 afa; the average annual mean daily streamflow for this period was 32.1 cfs. 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, and has been the site of a number of University of California, Davis Tahoe Research Group research projects.

Water Quality Objectives Violated

The numerical water quality objective for total iron in Ward Creek is 0.03 mg/L, 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 exceeded the water quality objective during every water year from Water Year 1989 to Water Year 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.

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*

From: Margie Lopez Read
To: Beaulaurier, Diane; Smith, Jessie
Date: 10/31/01 7:46AM
Subject: holiday day

Bob and I would like to invite you to join us
for a Holiday Open House at our home in Placerville.
Please come any time between 3 p.m. and 8 p.m.
on Sunday, November 11

(rsvp would be nice)

853 Holly Way*
Placerville
(530)626-8846

*Take Highway 50 east toward South Lake Tahoe
In Placerville, use the Spring Street exit to go North (left, towards Coloma)
Follow the curve of Highway 49 about 1/2 mile
Holly Way is on the right, just after the big yellow house (which is on the left)

We look forward to seeing your smiling face.

From: Sharon Waddell
To: Bill Johnson; brunetti@empm.cdpr.ca.gov; Celeste Cantu; Joe Karkoski; Jose Angel; Ken Theisen; Mark Angelo; Matthew Buffleben; Pete Michael; Raymond Jay; Stan Martinson; Susan-Marie Hagen; Walt Shannon
Date: 10/30/01 10:56AM
Subject: DPR request for comments

The attachments being sent today were faxed to all SWRCB Regional Board Executive Officers and Assistant Executive Officers on October 23. The people who were on the cc: list were inadvertently left out of that e-mail. We are sorry for the delay.

Please note that comments and revisions are due by November 9.

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.

State Water Resources Control Board

Executive Office
1001 I Street • Sacramento, California 95814 • (916) 341-5615
Mailing Address: P.O. Box 100 • Sacramento, California • 95812-0100
FAX (916) 341-5621 • Web Site Address: http://www.swrcb.ca.gov

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

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 website at http://www.swrcb.ca.gov.

TO: Regional Board Executive Officers

FROM: Tom Howard
Deputy Director
EXECUTIVE OFFICE

DATE:

SUBJECT: DEPARTMENT OF PESTICIDE REGULATION (DPR) REQUEST FOR COMMENTS ON DRAFT REGULATION POLICY FOR RESPONSE TO THE PRESENCE OF PESTICIDES IN SURFACE WATER (DRAFT POLICY)

DPR recently prepared a Draft Policy for regulation of pesticides pursuant to the Management Agency Agreement (MAA) between the State Water Resources Control Board (SWRCB) and DPR (Attachments 1 and 2). This policy statement was developed in response to a memorandum from Gary Carlton, Executive Officer, Central Valley Regional Water Quality Control Board (Attachment 3). The Draft Policy describes how DPR will respond to detection of pesticides in surface waters. You should have received, or you will receive shortly, a memorandum from DPR Executive Director Paul Helliker requesting comments on the Draft Policy.

I believe the SWRCB and Regional Water Quality Control Boards (Regional Boards) should submit a single, coordinated response to the Draft Policy. Therefore, I recommend that SWRCB staff prepare a preliminary response to the Draft Policy and distribute it to the Regional Boards for suggested revisions. The person assigned to this task is Walt Shannon, the MAA Coordinator in the Division of Water Quality. If your staffs have some initial thoughts regarding the Draft Policy, please contact Walt Shannon at (916) 341-5497 (CALNET 471-5497) or Mike Reid at (916) 341-5477 (CALNET 471-5477).

A draft response to the Draft Policy prepared by the Pesticide TMDL Workgroup has been distributed to Regional Board staff. We intend to use this draft response as a starting point for our coordinated response. We plan to distribute that preliminary response to the Regional Boards next week. We would like to have your comments and revisions by November 9, 2001.

Thank you for your cooperation. If you have any questions, please feel free to call me at (916) 341-5611 (CALNET 471-5611)

Attachment

cc: Celeste Cantú
Executive Director

Stan Martinson, Chief
Division of Water Quality

Walt Shannon
Division of Water Quality

Kathy Brunetti
Department of Pesticide Regulation

Regional Board Pesticide Contacts:
Mathew Buffleben, North Coast Regional Board
Bill Johnson, San Francisco Bay Regional Board
Mark Angelo, Central Coast Regional Board
Raymond Jay, Los Angeles Regional Board
Joe Karkoski, Central Valley Regional Board
Cindy Wise, Lahontan Regional Board
Jose Angel, Colorado River Basin Regional Board
Ken Theisen, Santa Ana Regional Board
Peter Michael, San Diego Regional Board

MREID/klh (10/19/01) (10/22/01)
E:\hursk\data\Water Pollution Prevention Section\
FILE: DPR Draft Pesticides Policy.doc

Attachment 1

Draft Provisions of a Process Describing How DPR Will Respond to the Presence of Pesticides in Surface Water

I. When Numeric Water Quality Objectives Are Established

- Numeric water quality objectives will help DPR define the terms "environmentally harmful" as it appears in FAC section 11501 and "endangers" as it appears in FAC section 12824. When a Regional Water Quality Control Board develops and adopts a numeric water quality objective for a pesticide, DPR will consider the objective to be equivalent to a concentration above which a pesticide is environmentally harmful and endangers the environment when the objective is adopted in accordance with Water Code sections 13240 *et seq.* and when the Board specifies
  - points of application
  - criteria for determining acceptable compliance with numeric objectives, including the frequency, magnitude, and duration of exceedences of the objective.

- DPR may invoke the following actions in the event that a numeric water quality objective for a pesticide is exceeded and considered an endangerment to the environment:
  - Reevaluate the pesticide.
  - Direct the registrant(s) to mitigate the problem or face action on the registration.
  - Add the pesticide to the list of restricted material and
    - direct County Agricultural Commissioners to issue permit conditions designed to bring pesticide concentrations into compliance with the numeric objective or
    - adopt use requirements that are designed to bring pesticide concentrations into compliance with the numeric objective.
  - Refuse to register the pesticide.
  - Cancel the registration of the pesticide.

II. When Numeric Water Quality Objectives Are Not Established

A. Maximum Contaminant Levels Are Established

- DPR will consider maximum contaminant levels to be equivalent to a concentration above which a pesticide is environmentally harmful and endangers the environment when the pesticide is present in surface drinking water supplies. The point of application shall be the drinking water supply.

- DPR may invoke the following actions in the event that a maximum contaminant level for a pesticide is exceeded and considered an endangerment to the environment:
  - Reevaluate the pesticide.

- Direct the registrant(s) to mitigate the problem or face action on the registration.
- Add the pesticide to the list of restricted material and
  - direct County Agricultural Commissioners to issue permit conditions designed to bring pesticide concentrations into compliance with the numeric objective or
  - adopt use requirements that are designed to bring pesticide concentrations into compliance with the numeric objective.
- Refuse to register the pesticide.
- Cancel the registration of the pesticide.

B. Specific Guidance Provided by Regional Boards

- Regional Board executive officer transmits to DPR a determination that narrative water quality objectives are exceeded for reasons related to currently-registered pesticides. The executive officer should also send:
  - A description of affected water bodies.
  - The beneficial uses affected.
  - Supporting evidence, including
    - data indicating that pesticide concentrations in surface water exceed those that cause adverse effects in sensitive aquatic organisms.
    - toxicity identification evaluation data implicating the pesticide with toxic conditions.
  - Criteria for determining acceptable compliance with narrative objectives, including the frequency, magnitude, and duration of toxic conditions or exceedences of relevant criteria values.
  - A date at which time the Regional Board seeks compliance with water quality objectives.

- The State Board will coordinate such transmittals from the Regional Boards to DPR and rank priorities for DPR's consideration.

- DPR and Regional Board staff will meet to discuss evidence, data gaps, pending research, and other data that will help DPR define environmental conditions and the sources of the pesticide.

- After reviewing available information, DPR will determine if evidence supports action using DPR's authorities. DPR will transmit its determination to the Regional Board.

- If DPR determines that conditions do not support DPR action:
  - DPR will recommend additional assessment and research that will support DPR action.
  - DPR will consider additional information, as it becomes available, that may further define environmental effects.

- If DPR determines that conditions support DPR action:
  - DPR will consult with stakeholders as appropriate to identify evidence that supports management practices as a means to reduce pesticide concentrations.
  - Data gaps and research needs will be identified.
  - DPR and the Regional Board will consider funding opportunities, including DPR funds, Prop. 13, CALFED, etc., that may address data gaps and research needs.
  - DPR will consider reevaluation as a means to obtain data that may demonstrate the effectiveness of management practices.

C. DPR's Own Investigations Suggest a Need for Actions to Reduce Pesticides in Surface Waters; No Specific Guidance Issued by Regional Boards

- Review monitoring data included in its surface water database.

- Compare detections and data from concomitant toxicity tests, if available, with toxicologically significant values.

- Rank priorities for proceeding to next investigative steps.

- Coordinate activities with stakeholders, including Regional Boards.

- Characterize sources using the pesticide use database, if the detections were the result of legal uses. Monitoring will confirm the sources, if necessary.

- Review potential management practices for applicability in reducing the presence of the pesticide in surface waters. Evidence to support the effectiveness of the practices will supplemented by additional research, if necessary, by DPR or by pesticide registrants. DPR will exercise its authorities under reevaluation provisions to collect data from registrants.

- Promote effective management practices. DPR will seek to collaborate with private and public entities on outreach activities. DPR reserves the option of using its regulatory steps (e.g., condition pesticide use permits) to achieve its water quality goals.

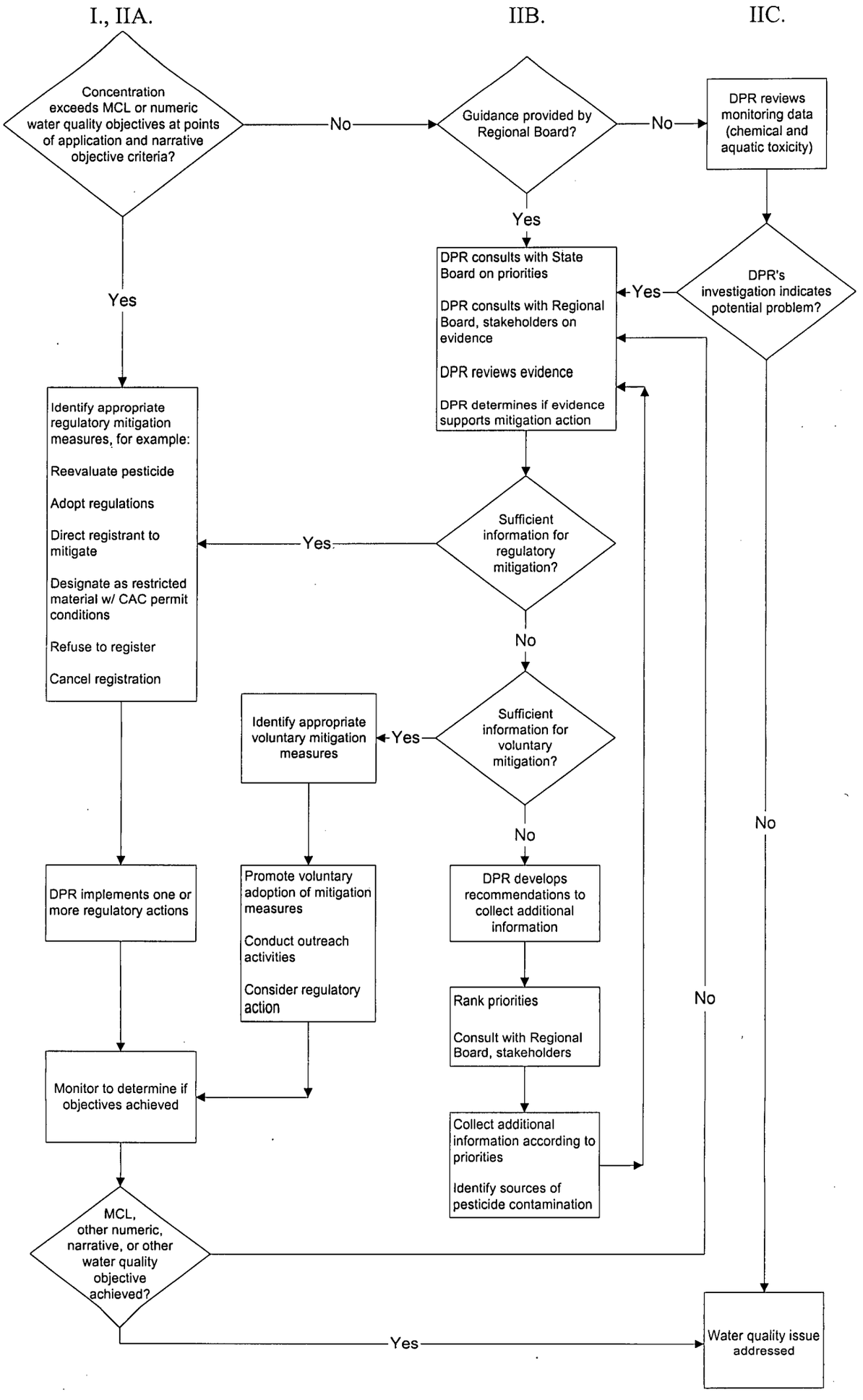
- Monitor to determine effectiveness of outreach activities in reducing the pesticide's presence in surface water.

- Evaluate previous outreach and regulatory activities to determine their appropriateness for achieving DPR's water quality goals.

DPR-H20.DOC

DRAFT 9/14/01

Process Describing How DPR Will Respond to the Presence of Pesticides in Surface Water



California Regional Water Quality Control Board

Central Valley Region

Robert Schneider, Chair

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

Sacramento Main Office
Internet Address: http://www.swrcb.ca.gov/rwqcb5
3443 Routier Road, Suite A, Sacramento, California 95827-3003
Phone (916) 255-3000 • FAX (916) 255-3015

Attachment 3

TO: Paul Helliker, Director
Dept. of Pesticide Regulation

FROM: Gary M. Carlton
Executive Officer

DATE: 7 May 2001

SIGNATURE: /s/

SUBJECT: STATUS OF THE DEPARTMENT OF PESTICIDE REGULATION'S ROLE IN CONTROL OF ORGANO-PHOSPHORUS (OP) PESTICIDE RUNOFF TO SURFACE WATERS

At a recent stakeholder meeting of the OP Pesticide Focus group (27 February 2001), Department of Pesticide Regulation (DPR) staff indicated that DPR would not be able to meet the commitments outlined in the Management Agency Agreement (MAA) and the California Pesticide Management Plan for Water Quality (PMP). Staff indicated that DPR does not have legal authority to control runoff of diazinon and chlorpyrifos into surface waters within the Central Valley region. The purposes of this memorandum are threefold: 1) to request confirmation that this is DPR's current policy with regard to controlling OP pesticide runoff, 2) to briefly describe the TMDL/Basin Planning process that is underway to meet our federal and state mandates to protect water quality and 3) to request that DPR identify what its role will be in helping reduce pesticide loads entering surface waters.

DPR's Current Policy on Diazinon and Chlorpyrifos Runoff into Surface Waters

The OP Pesticide Focus group, a working group of the Sacramento River Watershed Program, has been meeting to develop an OP Management Plan for the lower Feather and Sacramento Rivers. DPR accepted the lead, with Regional Board assistance, in developing the plan. The stakeholders have made significant contributions to many components of that plan.

As part of the evaluation of potential implementation frameworks, DPR staff reviewed the MAA and PMP relative to the available information on practices available to control diazinon loading into the rivers. Based on this review, DPR management apparently concluded that DPR does not have the authority to go from "Stage 2" to "Stage 3" as described in the MAA and PMP (see attached notes from 27 February 2001 OP Focus Group meeting). It appears that DPR has concluded it cannot act to regulate diazinon use. We are assuming that DPR has reached similar conclusions for other surface waters that have been identified as impaired by chlorpyrifos and diazinon, including the San Joaquin River and Delta. We would appreciate clarification or confirmation of our understanding of DPR's current policy on the potential use of its authorities for control of surface runoff of diazinon and chlorpyrifos.

Regional Board TMDL/Basin Planning Process

As you know, the Regional Board has determined that the Delta, Sacramento River, Feather River, San Joaquin River and other bodies of water are impaired due to the presence of organo-phosphorus pesticides (diazinon and or chlorpyrifos). These water bodies are included on the Clean Water Act Section 303(d) list of impaired water bodies. The Regional Board is responsible for seeing that steps are taken to correct these impairments. Staff is in the process of preparing for Regional Board consideration a load reduction program to correct water quality impairments associated with the presence of chlorpyrifos and diazinon. The regulatory elements of the program (water quality objective, time schedule, implementation plan and monitoring program) will be incorporated into the Basin Plan. The Basin Plan amendment will be structured to satisfy federal requirements, including those related to Section 303(d) of the Clean Water Act.

The Basin Planning process requires, among other things, that there be an evaluation of alternative strategies for solving the problems. Regional Board staff has been working with stakeholder groups to evaluate potential strategies. The Basin Plan amendment process does not require us to follow a particular regulatory path to achieve water quality objectives.

The State Board's Non-point Source Management Plan outlines several options with varying degrees of regulatory involvement or oversight (from self-determined implementation on the part of dischargers to waste discharge requirements). The Regional Board will attempt to identify the implementation option that has the greatest chance of successfully attaining water quality objectives with the least amount of regulatory direction. Knowing whether DPR will play any role by modifying pesticide use regulations will help us evaluate alternative implementation options.

DPR's Role in OP Basin Plan Amendment Process

As Regional Board staff evaluates the various implementation alternatives, we need to consider the regulatory authorities that could be brought to bear to help control OP runoff into surface waters. We also want to ensure that our actions or recommendations do not result in changes in pest management practices that could cause unanticipated problems in other areas (e.g. worker or food safety, air quality, ground water quality). We believe that DPR's involvement and counsel as we develop our Basin Plan Amendment will be critical to ensuring the development of a program that protects the environment, humans, and crops. We would like you to describe the role that DPR will be able to play as we go through our OP Basin Plan Amendment process and subsequent implementation. Your description of your role will help us determine the extent to which DPR will be able to participate in a program of implementation.

I look forward to receiving your response. Should you have any questions, I can be reached at (916) 255-3039. Your staff may contact Jerry Bruns at (916) 255-3093.

Attachments

cc: Stan Martinson, DWQ, SWRCB
Walt Shannon, DWQ, SWRCB
Kathy Brunetti, DPR
Marshall Lee, DPR

From: Judith Unsicker
To: Beaulaurier, Diane
Date: 8/20/01 8:06AM
Subject: Region 6 Comments on draft "Listing Considerations"

The attached file "730consid" includes my comments on the draft "Listing Considerations" distributed at the July 30 TMDL roundtable.

The second file, "listingissues3", is the result of discussion with Region 6 management on our proposed direction for listing/delisting waters under specific circumstances. This file will be included in our Executive Officer's report for discussion with the Lahontan Regional Board at its September 12-13 meeting. We will follow the Board's direction on these issues in preparing our public report and fact sheets with final staff recommendations. The list of issues was discussed at the August AEO's meeting, and according to our AEO, Bob Dodds, was "well received".

Let me know if you have any questions about either file.

Judith Unsicker
E.S. IV Specialist
Phone (530) 542-5462
Fax (530) 542-5470
Email unsij@rb6s.swrcb.ca.gov

To: Diane Beaulaurier
From: Judith Unsicker

REGION 6 COMMENTS ON "DRAFT 303 (d) LISTING CONSIDERATIONS, JULY 30, 2001"

The following are comments on the draft "listing considerations" summary distributed at the July 30 TMDL Roundtable.

Page 3, Item A.2. Since the "new" TMDL rule, which would have extended the listing cycle from two to four years, will now not be in effect in October 2001, the reference to the listing cycle in parentheses should be changed from four to two years.

Page 3, Item A.5. This item directs that waters be listed if "Data indicate tissue concentrations in consumable body parts of fish or shellfish exceed applicable tissue criteria or guidelines". No direction is given on the number of tissue samples or exceedances needed for making such a determination. Region 6 staff currently plan not to use Toxic Substances Monitoring Program (TSMP) tissue data as the basis for listing even if they exceed published fish consumption criteria, because the TSMP involves small samples which are not designed to be statistically representative of fish populations. We recommend that the sentence in quotes above be changed to read "Data.... exceed applicable tissue criteria or guidelines and a fish consumption advisory has been issued by state or local authorities."

Page 3, Item B.5. This item states that waters may be removed from the list if a TMDL has been approved by the U.S. Environmental Protection Agency (USEPA). At Region 6's January 2001 hearing for adoption of the Heavenly Valley Creek TMDL, David Smith of USEPA Region IX stated that, under the current federal TMDL regulations, it is up to the state to decide whether or not to remove such waters from the list. Region 6 currently has no EPA-approved TMDLs, so this issue is moot for us, but you may wish to seek agreement among all regions on which approach to take.

Page 3, Item B.6. For consistency with Item A.5. on page 3, this item should be changed to require evidence that beneficial uses will be attained by the next listing cycle (within two years) for delisting on the grounds that controls are in place.

Page 5, Section D. Priority Ranking. If the final "considerations" are to be made available to the PAG and the public, they should distinguish between priority ranking for TMDLs and schedules for TMDL development, and emphasize that it is not feasible to schedule development for all "high" priority TMDLs in the near future with current resources. Most currently listed waters in Region 6 were given "high" priority in 1998 under a ranking system similar to that in Section D, and most waters in our recommended new listings will probably also be ranked as high priority.

Page 8, Item V.3. This item directs Regional Boards to provide information including

"a summary for each request for listing or de-listing that were (sic) considered but not recommended". Does this refer only to requests by outside parties, or do we need to provide "fact sheet level" information on water bodies for which staff found some evidence of impairment but did not consider it conclusive enough to warrant listing?

YES →

Page 8, Item 7.f. This item states that administrative records of Regional Board list update processes should include "Copy of transcripts of public workshops or meetings". Is this a mandate for verbatim transcripts? Region 6 normally audiotapes its regular board meetings. In the past, audiotapes and/or minutes have been considered adequate for records of 303(d) list updates. We recommend that transcripts not be required. Since some Regional Boards will not be taking action on list update recommendations until January 2002, all transcripts (especially court reporters' transcripts) would probably not available by the time the State Board takes action.

CHECK AUDIOTAPES SUFFICIENT?

Additional Comments: There needs to be direction/agreement (not necessarily in the final "considerations" document) on the minimum amount of information to be included in public mailings. Most Regional Boards probably have 303(d) mailing lists with hundreds, if not thousands of addresses. Most parties on these lists will probably not want several hundred pages of information including lengthy staff reports and fact sheets for all water bodies. Sending the full information packet to all of these people will be costly in terms of paper, postage, and wear and tear on photocopy machines.

We plan to send a letter including a hearing/workshop notice, and a short (up to 10-15 pages) table summarizing listing/delisting recommendations to our full mailing list, with information about the availability of the staff report and fact sheets to people who are interested. The table will include waterbody name, county and or watershed names, the pollutant involved, and a short field for comments (e.g., "nitrogen standard violated") More detailed information (including the staff report and fact sheets) will be posted on our webpage.

In the past, Region 6 has sent relatively short water quality assessment staff reports to a mailing list of about 400 parties, with a letter noting the availability of fact sheets. We have received fewer than ten written comment letters per listing cycle, and not many requests for fact sheets. Based on a preliminary estimate of the number of water body/pollutant combinations involved in listing /delisting, Region 6's staff report/fact sheet package may be 300-400 pages long. We do not plan to send this package to our entire mailing list.

(The following should be added at the end of the current Item 4)

The State Board does not plan to issue any formal guidance to Regional Boards on criteria to be used in the 2001-2002 listing/delisting recommendations. However, justification for proposed changes must be provided in the administrative record. Region 6 staff have discussed and reached tentative agreement on several issues related to listing and delisting, as summarized below.

Data quantity and quality. Some states establish minimum requirements for the quality and quantity of data for use in listing decisions. Developing specific data quantity/quality thresholds for the Lahontan Region would be a lengthy, complex process. Such thresholds could probably better be addressed in the listing criteria policy which the State Board plans to adopt before the 2004 list update cycle. Region 6 staff will evaluate the data available for the current list update on a case by case basis, and make recommendations using a weight of evidence approach. A single spill or brief discharge event will generally not be considered grounds for listing. However, an ongoing discharge whose impacts will probably not be fully abated before the next listing cycle may warrant listing.

Antidegradation. U.S. Environmental Protection Agency (USEPA) guidance directs that antidegradation be considered in listing decisions. It could be argued that the presence of <u>any</u> non-natural chemicals in a water body is degradation (assuming that findings to allow degradation have not been made), and that such waters should be listed. Examples include monitored boat fuel chemicals from boat fuel in Lake Tahoe, and Donner Lake, and the presence of pesticides and PCBs, probably from atmospheric deposition, in some "pristine" waters of the Lake Tahoe Basin. Regional Board staff propose not to recommend listing for violations of the nondegradation objective unless a pollutant is present in a concentration which violates another water quality objective or adversely affects beneficial uses. For example, detectable pesticides are in violation of the narrative pesticide objective.

"Pollution" vs. "pollutants". The Clean Water Act distinguishes between "pollutants" (measurable physical or chemical parameters including sediment, and thermal discharges) and "pollution" ("the man-made or man-induced alteration of the chemical, physical, and biological, and radiological integrity of a waterbody"). "Pollution" may not always involve "pollutants"; for example, channelization of a stream, or human alteration of streamflows, may impair its biological integrity without involving pollutants, assuming that sediment is not a problem. Current federal TMDL regulations (40 CFR 130.7) indicate that TMDLs are required only for waters impaired by <u>pollutants</u>, Staff's conclusion is that waters impaired by "pollution" (including flow alterations) without "pollutants" should not be listed.

Toxic Substances Monitoring Program (TSMP) results. Under the State Board's TSMP, fish tissue samples are collected annually and analyzed for a variety of toxic metals and organic compounds. TSMP samples involve a relatively small number of fish and are not statistically representative of the entire fish population. Previous State Board guidance resulted in listing of some waters where TSMP tissue concentrations exceeded human fish consumption criteria. Staff's belief is that waters should <u>not</u> be listed for TSMP results alone, and that additional monitoring (of water, sediment and fish tissue) should be done to verify whether impairment exists.

ADDITIONAL MONITORING, NOT HEALTH ADVISORY

"Natural" impairment. The Clean Water Act definitions of "pollutants" and "pollution" reference human causes. These definitions appear to justify not listing water bodies which are impaired entirely by natural (e.g., geothermal) sources of chemicals, by the impacts of natural phenomena such as floods or drought. Where there are no known human sources of pollutants in a watershed but it is unknown whether the impairment is natural, recommendations for listing will be made on a case-by-case basis.

Adequacy of standards. Some of Region 6's numerical water quality objectives were established in 1975 based on very limited monitoring data or on older published water quality criteria, and may not reflect 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 objectives as "means of monthly means". Staff's proposed approach is to recommend listing for waters where objectives have been consistently exceeded, but to consider update of the objectives, and possibly delisting, when resources permit..

Listing when attainment is likely. There are violations of the fecal coliform bacteria objective in streams of the Upper Truckee River watershed which appear to be strongly linked to the presence of cattle. The U.S. Forest Service, Lake Tahoe Basin Management Unit, has made a commitment in writing to manage grazing in this area so as to prevent future violations of standards. Since this commitment should lead to attainment of standards by the next listing cycle (in 2004) staff will not recommend listing the monitored streams. A similar approach will be taken with other impaired waters where attainment of standards by 2004 seems probable.

Intermittent waters. The Mojave River was listed in the 1980s due to the subsurface impacts of the "Barstow slug". Staff's current recommendation is that intermittent streams be listed *only* on the basis of data from water flowing on the surface. Available data indicate that certain surface water segments of the Mojave River could be listed for PCE/TCE and for inorganics including TDS and nitrate.