

Chapter 5

WATER QUALITY STANDARDS AND CONTROL MEASURES FOR THE LAKE TAHOE BASIN

Introduction

Lake Tahoe is a designated Outstanding National Resource Water¹ (ONRW), which is renowned for its extraordinary clarity and purity, and deep blue color. Since the 1960s, Lake Tahoe has become impaired by declining transparency and increasing phytoplankton productivity due to increased sediment and nutrient loading attributable to human activities (Figures 5-1 and 5-2). Further increases in algal growth could change the clear blue color of the Lake. Under federal and state antidegradation regulations and guidelines, no further degradation of Lake Tahoe can be permitted. Attainment of clarity and productivity standards requires control of nutrient and sediment loading, which in turn requires (1) export of domestic wastewater and solid waste from the Lake Tahoe watershed, (2) restrictions on new development and land disturbance, and (3) remediation of a variety of point and nonpoint source problems related to past human activities in the Tahoe Basin. This Chapter summarizes a variety of control measures for the protection and enhancement of Lake Tahoe which in many cases are more stringent than those applicable elsewhere in the Lahontan Region.

Control of environmental problems at Lake Tahoe was initially difficult because the Lake is partly in California and partly in Nevada. The State Water Resources Control Board (State Board) adopted a special *Lake Tahoe Basin Water Quality Plan* in 1980 for the California side of the watershed. In recognition of the national importance of environmental protection at Lake Tahoe, a bistate Tahoe Regional Planning Agency (TRPA) was formed by act of Congress (P.L. 96-551). The TRPA was directed to adopt a regional land use plan based on "environmental threshold carrying capacities," to preserve a variety of environmental values in addition to water quality, including air quality, vegetation, wildlife and fisheries, and scenic quality. TRPA adopted regional environmental threshold standards in 1982. Its *Regional Plan for the Lake Tahoe Basin* (TRPA 1987), which includes Goals and Policies, a Code of Ordinances, and Plan Area Statements, received final approval in 1987.

TRPA was also designated by California, Nevada, and the USEPA as the areawide water quality planning agency under Section 208 of the federal Clean Water Act. It adopted a bistate plan, currently entitled *Water Quality Management Plan for the Lake Tahoe Region* (TRPA 1988), which is referred to as the "208 Plan" throughout this Chapter. As part of its 1989 conditional certification of TRPA's 1988 revision to the 208 Plan (Resolution 89-32), the State Board directed the Lahontan Regional Board to incorporate the most appropriate provisions of the 208 Plan and the *Lake Tahoe Basin Water Quality Plan* into the *Water Quality Control Plan for the North Lahontan Basin*. This Chapter of the Lahontan Basin Plan fulfills that direction. The State Board rescinded the separate *Lake Tahoe Basin Water Quality Plan* in January 1996. The regulatory language from this plan which was incorporated into the Lahontan Basin Plan remains in effect.

Most of the changes in this Chapter in relation to earlier water quality plans are editorial. Since the two Lake Tahoe water quality plans together comprise more than 1700 pages, the information which follows has been greatly condensed. Some plan language has been carried over verbatim. Some language has been edited for consistency with the rest of this Basin Plan (e.g., with respect to capitalization and acronyms). The reader is referred to the original plans for more detailed discussions and background information on water quality problems, the history of planning at Lake Tahoe, implementing agencies and schedules for implementation, and the rationale for specific control measures.

More substantial changes in this Chapter in relation to earlier water quality plans include: new beneficial use designations, revised narrative water quality objectives, new numerical water quality objectives for Fallen Leaf Lake, incorporation of provisions of the USEPA's National Toxics Rule, update of some language to reflect current state laws, and some changes in control measures to resolve differences between the State Board and TRPA plans.

For the reader's convenience, this Chapter contains copies of some information on water quality objectives, beneficial use designations, and waste discharge prohibitions for waters of the Lake Tahoe

¹ **Note:** ONRWs are described in Chapter 4. See the subsection entitled "Special Designations to Protect Water Resources" within Section 4.9, "Resources Management and Restoration."

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Basin which is also included in Chapters 2, 3, and 4 of this Basin Plan.

Water Quality Problems and Control Needs

Steep slopes, erodible soils, and a short growing season make the Lake Tahoe Basin acutely sensitive to human activities. Development practices which may have little impact elsewhere can cause severe erosion in the Tahoe Basin, increasing sediment and nutrient loads to Lake Tahoe. Relatively small nutrient loadings can seriously affect Lake Tahoe's water quality. The level of algal growth in the lake is limited by the availability of nutrients; the concentration of nutrients in the lake at present is extremely low. The primary source of additional nutrients is erosion resulting from land development and land management practices. Lake Tahoe has historically been considered nitrogen limited; recent bioassays indicate that phosphorus is also becoming limiting in some situations. It is important to control **all** controllable sources of both nitrogen and phosphorus. Development disturbs vegetation and soils, and creates impervious surface coverage which interferes with natural nutrient removal mechanisms. Other sources of nutrients include fertilizers, sewer exfiltration and sewage spills, leachate from abandoned septic systems, and atmospheric deposition.

Erosion and surface runoff related to rapid development of the Lake Tahoe Basin in the 1960s and 1970s caused deterioration of the water quality of Lake Tahoe. Phytoplankton productivity in Lake Tahoe increased more than 200 percent, and water clarity decreased by 22 percent, between 1968 and 1991. (Water quality standards for clarity and productivity are based on 1968-1971 levels.) Increased growth of attached algae in nearshore waters has been linked to the level of onshore development.

Because of its large size compared to its small watershed, Lake Tahoe has a very long residence time. The typical drop of water resides in Lake Tahoe for about 700 years. Thus, the flushing action of precipitation and runoff that benefits many other lakes cannot be relied upon to preserve Lake Tahoe. For practical purposes, one may employ the approximation that sediments and nutrients discharged to Lake Tahoe remain there forever, either suspended in the water column, or settled on the bottom.

Although recent changes in the water quality of Lake Tahoe are drastic, they do not reflect the *full* impact of the increases in erosion rates caused by recent development. There is a long lag time between disturbances in the Basin and the complete expression of their impacts on Lake Tahoe. Increased nutrient loading rates exert their full effect through a gradual buildup of nutrient concentrations over many years. Thus, preventing future increases in erosion rates will not be enough to protect the water quality of Lake Tahoe. A major reduction in the quantities of nutrients reaching Lake Tahoe is required.

Although the primary purpose of the implementation program in this Chapter is to protect and enhance the water quality and beneficial uses of Lake Tahoe, it will also protect tributary waters. There are 170 other lakes, 63 tributary streams, and numerous wetlands in the Lake Tahoe Basin; most of the lakes and about half of the streams are in California. There are also two named ground water basins in the California portion of the watershed. Most of these waters have naturally high quality, and state and federal antidegradation regulations apply. The Upper Truckee River, and the lower Truckee River downstream of the Lake Tahoe dam are under study for inclusion in the National Wild and Scenic Rivers System. Although many of the lakes are within wilderness areas, they are threatened by heavy recreational use and atmospheric deposition. Other tributary waters have been adversely affected by erosion, stormwater, diversion, channelization, or filling. In particular, wetlands have been drastically disturbed by human activities; see the section on Stream Environment Zones (SEZs) below.

The water quality control program for the Lake Tahoe Basin treats erosion and surface runoff (stormwater) as different facets of the same problem. Reducing nutrient loads will require both remedial measures to correct existing erosion/runoff problems and strict controls on future development. The principal control measures are:

- Large-scale remedial erosion and drainage control (Capital Improvements Program) and SEZ restoration projects.
- Installation and maintenance of onsite erosion and surface runoff (stormwater) control measures in connection with all new and existing development.
- Controls on nonpoint source discharges from new development, including new subdivisions, new development in SEZs, new development with

excess impervious surface coverage, and new development not offset by remedial measures.

- Controls on discharges related to other activities including timber harvest, livestock confinement and grazing, and recreational facilities (including golf courses, dredging, and shorezone construction to support water-related recreational activities).

In addition to the control measures for sediment and nutrients which were the main focus of the two earlier Lake Tahoe plans, regionwide control measures for toxic pollutants, needed for attainment of the water quality objectives in the USEPA's National Toxics Rule, section 131.36 of 40 CFR (10/22/92), which is incorporated by reference, apply to the Lake Tahoe Basin. Because the Lake Tahoe program emphasizes the use of wetlands (SEZs) for stormwater treatment, the attainment of objectives for toxic metals and whole effluent toxicity in waters affected by stormwater discharges must be given special consideration. Control measures to ensure attainment of the objective for nondegradation of biological communities and populations are also of concern in relation to stormwater discharges.

Implementation Authority

Implementation of the water quality control programs discussed in this Chapter is a bistate, interagency effort. These control measures, and the authority for their implementation, are summarized in Table 5-1. Many of the control measures can best be implemented by local governments or the Tahoe Regional Planning Agency, but the Lahontan Regional Board and State Water Resources Control Board are ultimately responsible for implementation. To the extent that other agencies do not make and fulfill implementation commitments, the Regional Board will carry out these control measures. Similar control measures are being implemented by TRPA and the Nevada Division of Environmental Protection in Nevada.

The Lahontan Regional Board's authority for planning, regulation, and enforcement is discussed in greater detail in Chapters 1 and 4 of this Basin Plan. The Regional Board implements the federal Clean Water Act, the California Water Code (including the Porter-Cologne Act) and a variety of laws related to control of solid waste and toxic and hazardous wastes. The Regional Board has authority to set and revise water quality standards and discharge prohibitions. It may issue permits, including federal NPDES permits and Section 401 water quality certifications, and State waste discharge requirements or waivers of waste

discharge requirements. Its planning and permitting actions require compliance with the California Environmental Quality Act (CEQA). The Regional Board has broad enforcement authority; actions may range from staff enforcement letters, through cleanup and abatement or cease and desist orders, to civil penalties or referral to the California Attorney General.

The State Board has authority to review Regional Board planning and permitting actions. It sets statewide water quality policy. It may also adopt water quality standards and control measures on its own initiative, as it did in the *Lake Tahoe Basin Water Quality Plan*. Other State Board functions which may affect the Lake Tahoe Basin include loan and grant funding for wastewater treatment facilities and nonpoint source control projects, and water rights permitting authority.

The Tahoe Regional Planning Agency's authority comes from P.L. 96-551 and from the water quality planning functions delegated by California, Nevada, and the USEPA under Section 208 of the Clean Water Act. TRPA has a bistate Governing Body with appointed members, an Advisory Planning Commission which includes the Executive Officer of the Lahontan Regional Board, and a technical staff under an Executive Director. It may set regional environmental standards, issue land use permits including conditions to protect water quality, and take enforcement actions. TRPA is directed to ensure attainment of the most stringent state or federal standards for a variety of environmental parameters in addition to water quality; for example, it is a designated air quality and transportation planning agency in California. TRPA has delegated authority to review certain types of new development to local governments under Memoranda of Understanding (MOUs). P.L. 96-551 establishes a TRPA environmental review process which is legally separate from CEQA and from the National Environmental Policy Act (NEPA). TRPA's Code of Ordinances, and its MOUs with federal, state and local governments identify categories of projects and activities which are exempt from TRPA's review. Further direction for TRPA's activities is included in a 1987 settlement of litigation by the California Attorney General and the League to Save Lake Tahoe against TRPA over the adequacy of its regional land use plan.

TRPA's approach to water quality control involves a combination of voluntary and regulatory aspects. As noted in the section on Best Management Practices (BMPs), below, TRPA sets conditions for protection and enhancement of water quality in its land use

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permits for new projects or projects involving remodeling, and relies initially on voluntary BMP implementation by landowners who are not seeking permits. All landowners are expected to implement BMPs over the 20-year lifetime of the 208 Plan. Local governments have incentives for voluntary implementation of remedial water quality control projects in that TRPA may limit allocations for new development based on accomplishment of remedial work. If TRPA identifies significant water quality problems, it may request or require remedial action plans, including implementation schedules. TRPA's enforcement authority is narrower than the Lahontan Regional Board's. Noncompliance with permit conditions may result in forfeiture of required security funds, or revocation of the permit. However, TRPA cannot levy fines for noncompliance with permit or action plan conditions without going to court. The 208 Plan expresses TRPA's reliance on Regional Board authority to accomplish its water quality-related goals in California.

The Regional Board and TRPA implement their water quality plans in a complementary manner. The two agencies entered into a Memorandum of Understanding in 1994 in order to increase the level of coordination and the avoidance of duplication of effort. (See Chapter 6 of this Basin Plan for more information.)

The U.S. Forest Service (USFS), Lake Tahoe Basin Management Unit (LTBMU), controls over 70 percent of the land in the Lake Tahoe Basin. It implements a land and resource management plan (USFS 1988) and the statewide USFS 208 Plan (USFS 1979). In contrast to some National Forest plans which emphasize resource extraction activities such as timber harvest, the major emphasis of the LTBMU plan is water quality protection. The LTBMU has an ongoing watershed restoration program, and implements a land acquisition program to prevent development of sensitive private lands. It has permitting and enforcement authority over activities by other parties on National Forest lands. USFS activities and permits are subject to environmental review under NEPA. The Lahontan Regional Board reviews but does not issue permits for timber harvest activities by the LTBMU in the Tahoe Basin, under the statewide Management Agency Agreement summarized in Chapter 6. It may issue permits for other activities on National Forest land (e.g., ski area expansion).

Local governments in the Lake Tahoe Basin have been delegated authority by TRPA to implement its plans for certain types of development projects. They

also have major responsibility for implementing the remedial projects for water quality problems which are discussed later in this Chapter. Local governments have prepared "community plans" in cooperation with TRPA, the business community, and other community interest groups, for most of the urban areas in the Tahoe Basin. These plans are expected to coordinate the accomplishment of remedial projects with new commercial development and redevelopment.

Other agencies involved in implementation of water quality control measures in the California portion of the Tahoe Basin include the U.S. Soil Conservation Service, the U.S. Army Corps of Engineers, the U.S. Natural Resources Conservation Service, the California Department of Transportation (Caltrans), the California Tahoe Conservancy, the California State Lands Commission, the California Department of Parks and Recreation, the California Department of Fish and Game, the California Department of Forestry and Fire Protection, and the Tahoe Resource Conservation District. Monitoring carried out by the LTBMU, the U.S. Geological Survey, the University of California Tahoe Research Group, the California Department of Water Resources, and other agencies continues to be important in assessing progress on implementation. The 208 Plan (Vol. I) provides a more detailed discussion of water quality implementation authority in the Tahoe Basin.

Jurisdictional Boundaries

The California water quality standards and discharge prohibitions, and most of the control measures discussed later in this Chapter apply to the "Lake Tahoe Basin" or "Lake Tahoe Hydrologic Unit (HU)," which is the entire watershed tributary to and including Lake Tahoe in California. This area (Figure 5-3) includes portions of Alpine, El Dorado, and Placer Counties. The 208 Plan applies to the "Lake Tahoe Region," which is defined by P.L. 96-551. The Lake Tahoe Region includes lands in El Dorado and Placer Counties (California) and Douglas, Carson City, and Washoe Counties (Nevada) which are tributary to Lake Tahoe. It does not include the Alpine County portion of the Lake Tahoe watershed, but does include part of the Truckee River HU, between the Lake Tahoe outlet dam and the Bear Creek confluence (Figure 5-4). These differences in State and TRPA jurisdictional boundaries may create some confusion in implementation.

The Alpine County portion of the watershed is almost all National Forest land, but includes some State highway right-of-way and part of the South Tahoe

Public Utility District (STPUD) wastewater export pipeline. The Regional Board has reviewed fisheries management activities, grazing permits, and proposed watershed restoration activities in this portion of the Tahoe Basin. It is a popular recreation area which includes a segment of the Pacific Crest Trail. All of the control measures discussed below for construction and other activities on National Forest lands, or for road and right-of-way construction and maintenance, apply in this area, even though TRPA permits may not apply. The Regional Board will consider issuing or revising waste discharge permits for activities in this area as necessary to protect water quality.

In the portion of the Truckee River watershed which is within TRPA's jurisdiction, the Lahontan Regional Board implements a separate set of water quality standards, discharge prohibitions, and exemption criteria. This area includes existing residential, commercial, and highway development. Proposals for its redevelopment have been made by Placer County under California redevelopment law, and through the joint Placer County/TRPA community planning process. The Truckee River watershed downstream of Lake Tahoe is also a priority watershed in the Regional Board's Watershed Management Initiative (WMI).

Compliance Schedules

Regionwide schedules for obtaining compliance with water quality objectives are discussed in Chapter 4 of this Basin Plan. The regional Geospatial Waterbody System (GeoWBS) database (described in Chapter 7) is revised periodically to reflect the current status of compliance with objectives and the current degree of support of beneficial uses. The USEPA requires reporting every two years under Section 305(b) of the Clean Water Act on whether a specific water body fully supports, partially supports, or does not support all designated beneficial uses. The Regional Board reviews the adequacy of all Basin Plan standards and control programs to protect water quality at least once every three years through the "Triennial Review" process, and sets priorities for further Basin Plan revisions accordingly (see Chapter 1).

Lake Tahoe is listed as a "Water Quality Limited Segment" under Section 303(d) of the federal Clean Water Act. When better information becomes available on sediment and nutrient budgets for Lake Tahoe, and on the efficiency of Best Management Practices, the Regional Board will use this information, and estimates of expected water quality improvements due to the control measures outlined in

this Chapter, to establish Total Maximum Daily Loads (TMDLs) of pollutants to Lake Tahoe. Section 303(d) requires TMDLs to be set for Water Quality Limited Segments in order to ensure the attainment of surface water quality standards. A TMDL must be adopted as a Basin Plan amendment, and must be approved by the USEPA. (See Chapter 4 for additional information on TMDLs).

The water quality control programs for the Lake Tahoe Basin which are outlined below (including major remedial erosion/stormwater control and SEZ restoration programs) are expected to be implemented over a 20-year period ending in 2007. Implementation will involve coordinated actions by state, federal, regional, and local agencies, and by private landowners. TRPA projects attainment of all water quality standards for Lake Tahoe and its tributaries by that date. In coordination with regional environmental monitoring programs, the TRPA Regional Plan and 208 Plan (Vol. I, pages 179-186) include a tracking system for measuring attainment of environmental standards. It identifies "benchmarks" or indicators of progress, narrative or numerical interim performance targets for state and regional standards which are not being attained, and a variety of in-place and potential supplemental "compliance measures" for attainment of these targets.

TRPA is required to identify, for each water quality control measure, the size and rate of its contribution to attainment of the threshold or standard, and to ensure that the control measures are adequate to attain and maintain the threshold standards. Based on results of scientific studies, TRPA may also adjust the targets to make them consistent with the latest scientific information.

The 1988 208 Plan incorporates TRPA's interim targets for turbidity in the shallow waters of Lake Tahoe, winter clarity in pelagic Lake Tahoe, phytoplankton productivity in pelagic Lake Tahoe, tributary water quality (including suspended sediment), runoff water quality (for discharges to surface waters and ground waters), water quality of "other lakes" than Lake Tahoe, acreage of naturally functioning Stream Environment Zones, vehicle miles travelled (as a means of reducing atmospheric deposition), reductions in atmospheric nutrient loading, implementation of the Capital Improvements Program, and implementation of Best Management Practices.

At five-year intervals, beginning in 1991, TRPA is required to issue progress reports covering: (1) the amount and rate of progress toward the targets

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above, (2) the cumulative impacts on each indicator of projects approved by TRPA from the date of approval of the 208 Plan, (3) the extent to which the Tahoe Region and applicable sub-regions are making progress toward the thresholds and standards for the parameters listed above, and (4) recommendations for implementation of supplemental or contingency measures necessary to attain and maintain the targets and standards, or (5) recommendations for modification or elimination of compliance measures in place to attain and maintain the targets and standards. Lists of supplemental compliance measures were included in the Technical Appendices (Vol. VII) of the 208 Plan.

If an interim target is not attained, adjustments must be made to TRPA's regional land use plan to ensure progress toward attainment; this may involve implementation of previously identified "supplemental" compliance measures. TRPA conducted its first five-year review of standards attainment in 1991-92, and adopted, or is in the process of adopting, changes to its Code of Ordinances affecting implementation programs. Interim targets for a number of the parameters listed above were also revised, without changes in the 208 Plan. (Substantial changes in compliance schedules or compliance measures could require amendments to the 208 Plan.) For example, TRPA's 1991 interim target for Stream Environment Zone (SEZ) restoration was 400 acres; actual restoration was about 100 acres. TRPA is revising SEZ restoration goals for each local government, to be implemented by the next (1996) major review of progress toward attainment of standards.

The 1988 208 Plan also includes a number of internal deadlines for implementation of specific tasks, not all of which have been met. In its 1989 conditional certification of the 208 Plan (Resolution 89-32; see Appendix B), the State Board set additional deadlines for a number of actions by TRPA, including preparation of a financial plan for implementation of key programs, and reports on water quality monitoring data and progress toward plan implementation.

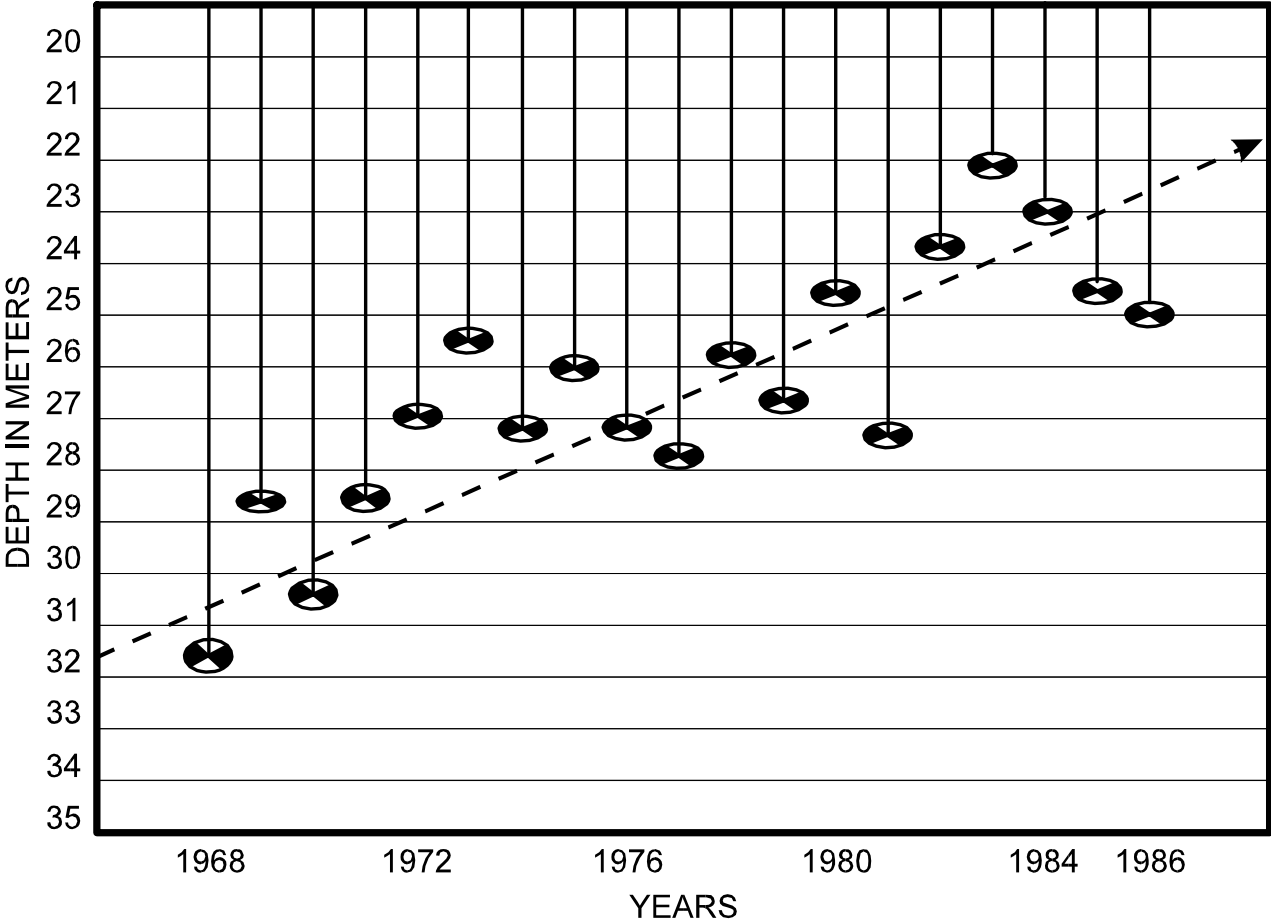
Plan Amendment Procedures

As noted above, the Lahontan Regional Board sets priorities for Basin Plan revisions as part of its Triennial Review process. The Regional Board may also initiate Basin Plan amendments at any time in response to other issues of concern. As more information becomes available about the water quality and beneficial uses of waters of the Lake Tahoe HU, the Regional Board may consider changes in water quality standards such as adoption of numerical

objectives for tributary streams which do not currently have them. The control measures set forth in this Chapter have been determined to be the **minimum** needed to prevent further degradation of Lake Tahoe due to sediment and nutrient loading, and to ensure eventual attainment of clarity and productivity standards. Additional controls on sediment and nutrient loading may need to be developed in the future to offset the impacts of unforeseen factors such as the mortality of forest trees due to drought-related stresses in the late 1980s and early 1990s. Additional control measures may also need to be developed to ensure attainment of the standards contained in the USEPA's National Toxics Rule. Any substantial future changes in provisions of the TRPA 208 Plan which have been incorporated into this Lahontan Basin Plan may trigger consideration of corresponding Basin Plan amendments.

Before they take effect, Basin Plan amendments adopted by the Regional Board must be approved by the State Board and the California Office of Administrative Law. Amendments requiring scientific justification must undergo scientific peer review.

Figure 5-1
ANNUAL AVERAGE SECCHI DISK DEPTH

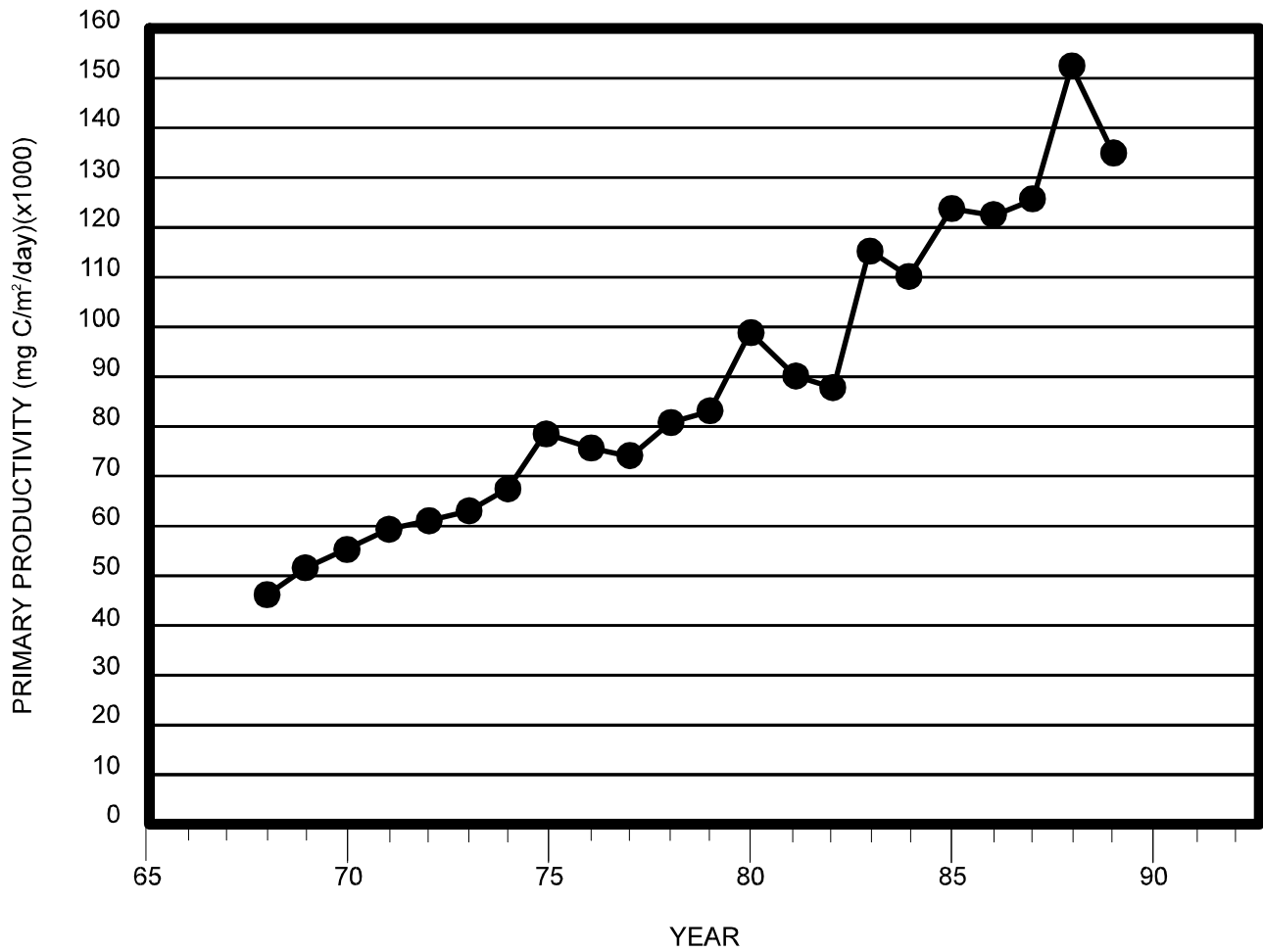


--> Trend

At the Index Station, Lake Tahoe

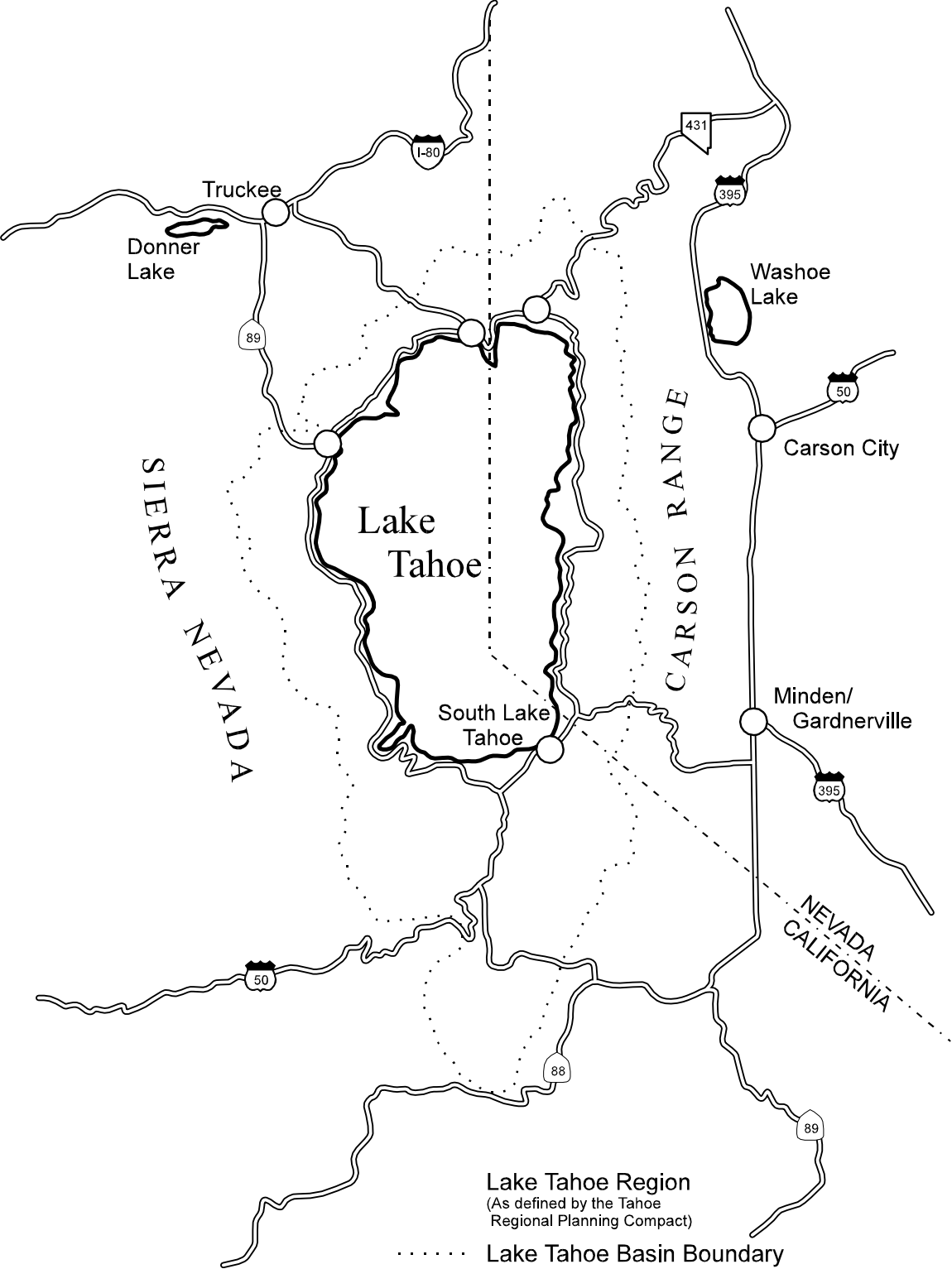
Figure 5-2
PRIMARY PRODUCTIVITY

At the Index Station, Lake Tahoe



At the Index Station, Lake Tahoe

Figure 5-3
LOCATION MAP, LAKE TAHOE REGION



Redrawn from TRPA, 1988, Vol.1

Figure 5-4
LAHONTAN AND TRPA VARIATIONS
IN JURISDICTIONAL BOUNDARIES FOR THE
LAKE TAHOE BASIN

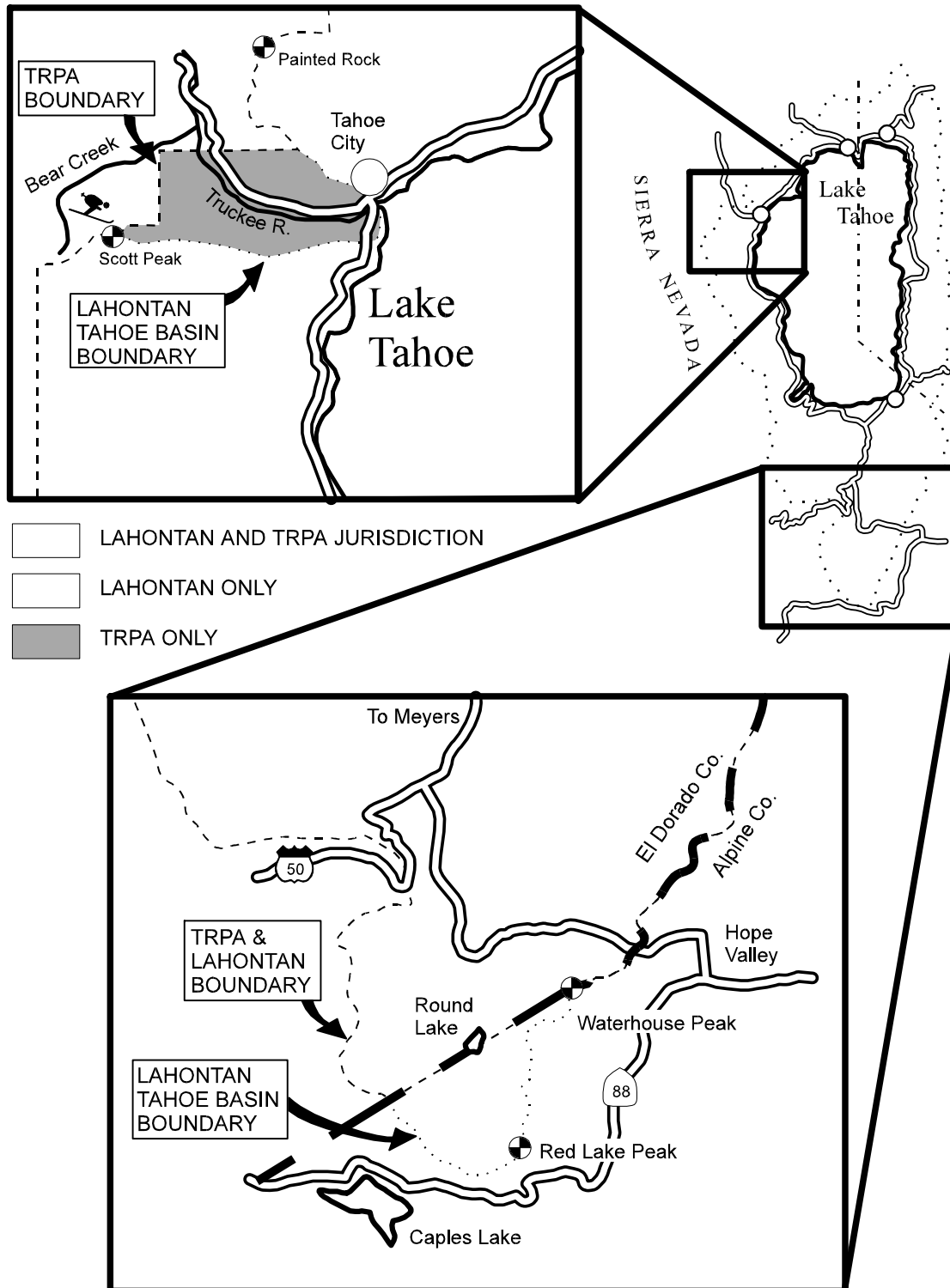


Table 5-1
SUMMARY OF LAKE TAHOE BASIN WATER QUALITY CONTROL PROGRAM

<p>Program implemented jointly by Regional Board, TRPA, USFS, local governments, other parties. Similar program implemented in Nevada by TRPA, USFS, local governments and Nevada Division of Environmental Protection. Regional Board and TRPA programs have different jurisdictional boundaries in California. 20 year implementation schedule for 208 Plan, ending in 2007. Other compliance schedules for specific types of activities.</p>	
WATER QUALITY STANDARDS	<p>State standards, including designated beneficial uses and water quality objectives, implemented by State and Regional Boards.</p> <p>Regional "environmental threshold" standards, implemented by TRPA</p>
WASTE DISCHARGE PROHIBITIONS	<p>State prohibitions against discharges of sewage, industrial waste, solid wastes, earthen materials, etc., including prohibitions related to new subdivisions, land capability, Stream Environment Zones, development not offset by remedial measures, and new piers in significant fish spawning habitat. Implemented by Regional Board. TRPA implements similar land use restrictions.</p>
BEST MANAGEMENT PRACTICES	<p>Use of BMPs mandatory for all new development. Implementation through State and TRPA permits and enforcement programs. Retrofit of BMPs required by Regional Board for existing development. BMPs also required for resource management uses such as timber harvest and livestock grazing. Plan endorses TRPA BMP Handbook.</p>
STORMWATER CONTROLS	<p>State stormwater effluent limitations for direct discharges to surface water and stormwater infiltrated into soils; similar TRPA thresholds. State stormwater NPDES permits and waste discharge requirements issued by Regional Board. Stormwater controls required in TRPA permits. Areawide stormwater treatment systems to be implemented by local governments in some areas.</p>
REMEDIAL OFFSET PROGRAMS	<p>Offset of impacts of existing development needed in addition to controls on new development. TRPA 208 Plan includes requirements for implementation of \$300 million Capital Improvements Program (remedial erosion and stormwater control projects along public rights of way) and Stream Environment Zone Restoration Program. California projects to be implemented by Caltrans and local governments with oversight from TRPA and Regional Board. Separate USFS watershed restoration program. Regional Board BMP retrofit strategy for existing development. TRPA also requires retrofit for existing development and water quality mitigation fees or performance of remedial work for individual development projects.</p>
LAND COVERAGE RESTRICTIONS	<p>Land capability system limits allowable impervious surface coverage, especially on high erosion hazard lands and in Stream Environment Zones. Provision for field verification of coverage and "man-modified" reclassification. Land coverage rules implemented in Regional Board, TRPA permits. Limited exceptions for public projects, coverage transfer, coverage relocation. Mitigation of existing excess coverage required. TRPA also implements alternative Individual Parcel Evaluation System for vacant single family parcels.</p>

Table 5-1 (continued)
SUMMARY OF LAKE TAHOE BASIN WATER QUALITY CONTROL PROGRAM

CONTROLS FOR SEZS AND SIMILAR RESOURCES	Development, disturbance strictly limited in SEZs and setback areas, 100-year flood plains, shorezone areas. Limits implemented through Regional Board discharge prohibitions, TRPA land use restrictions, Clean Water Act Section 401 and 404 programs. Some exceptions for public projects, coverage relocation; specific exemption findings required. 1.5:1 restoration requirement for permitted SEZ disturbance. Shorezone projects must meet TRPA development standards. TRPA 208 Plan includes SEZ Restoration Program expected to restore 25% of disturbed/developed SEZs. Control measures for other problems also serve to protect ground water.
DEVELOPMENT RESTRICTIONS	TRPA land use plan limits total development in watershed ; Regional Board and TRPA implement discharge prohibitions and land use restrictions related to development as noted above. State and federal land purchase programs, and transfer of development rights programs provide relief for landowners affected by restrictions.
WASTEWATER AND SOLID WASTE CONTROLS	Export of sewage and solid waste from Tahoe Basin required, with limited exceptions, by state laws and regulations. Controls needed for sewage spills, infiltration/inflow, sewerline exfiltration; implemented by Regional Board and sewer districts in California. Interagency hazardous spill contingency plan, coordinated by USEPA.
WATER RIGHTS AND WATER USE	Limits on diversions for consumptive use from all sources within Lake Tahoe Basin, by act of Congress. WDRs for sewer districts include conditions to prevent use beyond limits. TRPA plans include minimum fireflow requirements, requirements for use of native/adapted plants in landscaping. Recommendations for State Board action on water rights policy update, water meter use.
ROADS AND RIGHTS-OF-WAY	Controls for problems related to erosion from new and existing roads, road maintenance activities, snow and ice control, implemented through Regional Board permits. Capital Improvements Program to be implemented by local governments and state highway departments.
TIMBER HARVEST	In addition to USFS BMPs and California Department of Forestry and Fire Protection Forest Practice Rules, restrictions apply on clearcut size and timber harvest activities in SEZs and on high erosion hazard lands. Regional Board reviews timber harvest activities on public and private lands.
LIVESTOCK GRAZING & CONFINEMENT	Controls on location, intensity, and season of livestock operations, and on manure storage and disposal to protect SEZs and ground water. Requirements for BMP retrofit for existing operations. Regional Board, TRPA, and USFS have authority to issue permits, enforce controls.

Table 5-1 (continued)
SUMMARY OF LAKE TAHOE BASIN WATER QUALITY CONTROL PROGRAM

OUTDOOR RECREATION	Controls for water quality impacts of outdoor recreation (dispersed recreation, campgrounds and day use areas, ski areas, golf courses, and boating and shorezone recreation), through Regional Board and TRPA permits, and USFS programs on National Forest Lands. Impacts related to erosion, SEZ disturbance, fertilizer use, dredging and underwater construction, wastewater disposal and fuel spills, etc.
MISC. WATER QUALITY PROBLEMS	Control measures for problems related to fertilizer use, pesticide use, and wet and dry atmospheric deposition. Fertilizer and pesticide controls through Regional Board and TRPA permits; atmospheric deposition control through TRPA traffic/air pollution controls and other 208 Plan commitments.

5.1 WATER QUALITY STANDARDS

The federal Clean Water Act defines “water quality standards” to include both “designated uses” (i.e., beneficial uses) and “water quality criteria” (i.e., water quality objectives). Thus, the designated beneficial uses and the water quality objectives listed below are the California water quality standards for waters of the Lake Tahoe Hydrologic Unit (HU).

Twenty-three beneficial uses and their definitions were developed by the State Board staff and recommended for use in the Regional Board Basin Plans. Three of those beneficial uses (Marine Habitat, Estuarine Habitat, and Shellfish Harvesting) are not found within the Region. Regional Board staff added two additional uses (Water Quality Enhancement, Flood Peak Attenuation/Flood Water Storage). Thus, the following nine beneficial use designations have been added since adoption of the 1975 Basin Plans: Industrial Process Supply, Fish Spawning, Fish Migration, Navigation, Commercial and Sport Fishing, Water Quality Enhancement, Preservation of Biological Habitats of Special Significance, Aquaculture, and Flood Peak Attenuation/Flood Water Storage. Specific wetland habitats and their associated beneficial uses has been added in recognition of the value of protecting wetlands. This Chapter contains two tables (Tables 5.1-1 and 5.1-2) designating the beneficial uses of surface waters and ground waters in the Lake Tahoe HU.

Definitions of Beneficial Uses

AGR Agricultural Supply. Beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing

AQUA Aquaculture. Beneficial uses of waters used for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, and harvesting of aquatic plants and animals for human consumption or bait purposes.

BIOL Preservation of Biological Habitats of Special Significance. Beneficial uses of waters that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, and Areas of Special Biological Significance (ASBS),

where the preservation and enhancement of natural resources requires special protection.

COLD Cold Freshwater Habitat. Beneficial uses of waters that support cold water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

COMM Commercial and Sportfishing. Beneficial uses of waters used for commercial or recreational collection of fish or other organisms including, but not limited to, uses involving organisms intended for human consumption.

FLD Flood Peak Attenuation/Flood Water Storage. Beneficial uses of riparian wetlands in flood plain areas and other wetlands that receive natural surface drainage and buffer its passage to receiving waters.

FRSH Freshwater Replenishment. Beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).

GWR Ground Water Recharge. Beneficial uses of waters used for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.

IND Industrial Service Supply. Beneficial uses of waters used for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.

MIGR Migration of Aquatic Organisms. Beneficial uses of waters that support habitats necessary for migration, acclimatization between fresh and salt water, or temporary activities by aquatic organisms, such as anadromous fish.

MUN Municipal and Domestic Supply. Beneficial uses of waters used for community, military, or individual water supply systems including, but not limited to, drinking water supply.

NAV Navigation. Beneficial uses of waters used for shipping, travel, or other transportation by private, military, or commercial vessels.

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- POW Hydropower Generation.** Beneficial uses of waters used for hydroelectric power generation.
- PRO Industrial Process Supply.** Beneficial uses of waters used for industrial activities that depend primarily on water quality.
- RARE Rare, Threatened, or Endangered Species.** Beneficial uses of waters that support habitat necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened or endangered.
- REC-1 Water Contact Recreation.** Beneficial uses of waters used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, and use of natural hot springs.
- REC-2 Non-contact Water Recreation.** Beneficial uses of waters used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.
- SAL Inland Saline Water Habitat.** Beneficial uses of waters that support inland saline water ecosystems including, but not limited to, preservation and enhancement of aquatic saline habitats, vegetation, fish, and wildlife, including invertebrates.
- SPWN Spawning, Reproduction, and Development.** Beneficial uses of waters that support high quality aquatic habitat necessary for reproduction and early development of fish and wildlife.
- WARM Warm Freshwater Habitat.** Beneficial uses of waters that support warm water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates

WILD Wildlife Habitat. Beneficial uses of waters that support wildlife habitats including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.

WQE Water Quality Enhancement. Beneficial uses of waters that support natural enhancement or improvement of water quality in or downstream of a water body including, but not limited to, erosion control, filtration and purification of naturally occurring water pollutants, streambank stabilization, maintenance of channel integrity, and siltation control.

Historical Beneficial Uses

The 1975 Basin Plans included brief discussions of the history of human water use in the Lahontan Region, and tables of “historical” beneficial use designations from earlier interstate water policies and “interim” final Basin Plans. Earlier beneficial use designations were primarily on a watershed basis; the 1975 Plans designated uses for specific water bodies. Copies of historical information from the 1975 Plans may be obtained by contacting Regional Board staff. The 1975 beneficial use designations were based on knowledge of the existing and potential water uses, with emphasis on the former. For example, many high quality surface waters of the North Lahontan Basin were not designated for municipal use because water supplies in these areas were taken from ground water sources. Historical beneficial uses have been incorporated into Tables 5.1-1 and 5.1-2 as potential uses (a use which once existed could potentially exist again).

No beneficial use designations adopted in the 1975 Basin Plans have been removed from waters of the Lake Tahoe HU. Removal of a use designation requires a “Use Attainability Analysis,” using U.S. Environmental Protection Agency methodology, to show that the use does not occur and cannot reasonably be attained.

Present and Potential Beneficial Uses

In the Basin Planning process, a number of beneficial uses are usually identified for a given body of water. Water quality objectives are established (see below) which are sufficiently stringent to protect the most sensitive use. The Regional Board reserves the right to resolve any conflicts among beneficial uses, based

on the facts in a given case. It should be noted that the assimilation of wastes is **not** a beneficial use.

In the tables of beneficial uses (Tables 5.1-1 and 5.1-2), an "X" indicates an existing or potential use. Many of the existing uses are documented by biological data or human use statistics; some are not. Lakes and streams may have potential beneficial uses established because: (1) plans already exist to put the water to those uses, (2) conditions (location, demand) make such future use likely, (3) the water has been identified as a potential source of drinking water based on the quality and quantity available (see Sources of Drinking Water Policy, in Appendix B), and/or (4) existing water quality does not support these uses, but remedial measures may lead to attainment in the future. The establishment of a potential beneficial use can have different purposes such as: (1) establishing a water quality goal which must be achieved through control actions in order to re-establish a beneficial use as in No. 4, above, or (2) serving to protect the existing quality of a water source for eventual use.

The water body listings in Tables 5.1-1 and 5.1-2 name all significant surface waters and ground water basins. Maps of the hydrologic units and the ground water basins are included as part of this Basin Plan (see Plates 1A and 2A). Hydrologic units and ground water basins are listed from north to south. Unit and basin numbers are provided in the tables for reference to the Department of Water Resources standardized maps. Unless otherwise specified, beneficial uses also apply to all tributaries of surface waters identified in Table 5.1-1 (i.e., specific surface waters which are not listed have the same beneficial uses as the streams, lakes, wetlands, or reservoirs to which they are tributary). Note that nondegradation objectives (see below) would supersede other objectives in instances where the tributary is of higher quality than its receiving water. Other minor surface waters, including wetlands, springs, streams, lakes, and ponds, are included under one heading for each hydrologic unit. These minor surface waters have an "X" to designate each potential or existing beneficial use. Also, ground waters which are not a part of the named basins are recognized as potential or existing "municipal and domestic water supply" (MUN). The beneficial uses for ground water which are contained in Table 5.1-2 are for each ground water basin or sub-basin as an entirety. Some ground water basins contain multiple aquifers or a single aquifer with varying water quality which may support different beneficial uses. Therefore, the placing of an "X" in Table 5.1-2 does not indicate that all of the ground

waters in that particular location are suitable (without treatment) for a designated beneficial use. However, all waters are designated as MUN unless they have been specifically exempted by the Regional Board through adoption of a Basin Plan amendment after consideration of substantial evidence to exempt such waters (see Sources of Drinking Water Policy in Appendix B). Also, certain surface waters, including internal drainage lakes, may have varying water quality from changes in natural conditions (e.g., change in water volume). The designation of multiple beneficial uses in Table 5.1-1, which may appear conflicting for a particular surface water, indicates existing or probable future beneficial uses that may occur only temporarily.

In most cases, removing a beneficial use designation from Table 5.1-1 will require a Use Attainability Analysis (UAA) to be conducted (using USEPA methodology). If there is substantial evidence to remove a use designation from a specific water body, the Regional Board will consider adoption of a Basin Plan amendment to remove a designated beneficial use. However, there are many beneficial uses which are not intended to apply to the entire length of a stream or to a surface water during certain temporal conditions (see above). The beneficial use designations that may be considered for temporary or site specific designation include: IND, PRO, GWR, FRSH, NAV, POW, COLD, MIGR, SPWN, and WQE. For these situations, Regional Board staff, in order to make a recommendation to the Regional Board, will rely on site-specific documentation which may include: water quality data, field data, professional opinions (from Regional Board staff or other state and federal agencies, also universities), and other evidence collected by a discharger. The most sensitive existing or probable future use will be protected. Uses that did not exist, do not exist and will not exist in the foreseeable future, will not be required to be protected. The MUN designation will not be considered for a site-specific designation since it is designated for all waters, unless specifically exempted by the Regional Board in accordance with the State Board's Sources of Drinking Water Policy.

Water Quality Objectives

The Porter-Cologne Water Quality Control Act defines "water quality objectives" as the allowable "limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." Thus, water quality objectives are intended to protect the public health and welfare, and to maintain or enhance water quality in relation to

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the existing and/or potential beneficial uses of the water. The objectives, when compared to future water quality data, will also provide the basis for detecting any future trend toward degradation or enhancement of basin waters.

Water quality objectives apply to “waters of the State” and “waters of the United States.” Some of the waters of the Lahontan Region are interstate waters, flowing into either Nevada or Oregon. The Lahontan Regional Board has a responsibility to ensure that waters leaving the state meet the water quality standards of the receiving state (see the discussion of “Interstate Issues” in the Introduction to Chapter 4).

Water Quality Objectives and Effluent Limits

It is important to recognize the distinction between ambient water quality objectives and “effluent limitations” or “discharge standards” which are conditions in state and federal waste discharge permits. Effluent limitations are established in permits both to protect water for beneficial uses within the area of the discharge, and to meet or achieve water quality objectives. Stormwater effluent limitations for the Lake Tahoe HU are discussed in Section 5.6.

Methodology For Establishing Water Quality Objectives

Water quality objectives are numerical or narrative. Narrative and numerical water quality objectives define the upper concentration or other limits that the Regional Board considers protective of beneficial uses.

The general methodology used in establishing water quality objectives involves, first, designating beneficial water uses; and second, selecting and quantifying the water quality parameters necessary to protect the most vulnerable (sensitive) beneficial uses. To comply with the Nondegradation Objective (see below), water quality objectives may be established at levels better than that necessary to protect the most vulnerable beneficial use.

In establishing water quality objectives, factors in addition to designated beneficial uses and the Nondegradation Objective are considered. These factors include environmental and economic considerations specific to each hydrologic unit, the need to develop and use recycled water, as well as the level of water quality which could be achieved through coordinated control of all factors which affect water quality in an area. Controllable water quality factors are those actions, conditions, or

circumstances resulting from human activities that may influence the quality of the waters of the State, and that may be reasonably controlled.

Water quality objectives can be reviewed and, if appropriate, revised by the Lahontan Regional Board. Revised water quality objectives would then be adopted as part of this Basin Plan by amendment. Opportunities for formal public review of water quality objectives will be available at a minimum of once every three years following the adoption of this Basin Plan to determine the need for further review and revision.

Establishment of Numerical Objectives for Specific Water Bodies

Where available data were sufficient to define existing ambient levels of constituents, these levels were used in developing the numerical objectives for specific water bodies. By utilizing annual mean, 90th percentile values and flow-weighted values, the objectives are intended to be realistic within the variable conditions imposed by nature. This approach provides an opportunity to detect changes in water quality as a function of time through comparison of annual means, while still accommodating variations in the measured constituents.

Objectives for specific water bodies generally reflect either historical (often pre-1975) water quality, or the levels of constituents needed to protect the most sensitive beneficial use. The waters of the Lake Tahoe Basin are generally of very high quality; however, in a few water bodies, State water quality objectives may be exceeded due to natural causes. For example, some wells in South Lake Tahoe have concentrations of uranium exceeding the drinking water maximum contaminant level. The Regional Board recognizes that such violations may occur, and will assess compliance with the objectives on a case-by-case basis.

Most of the numerical water quality objectives for Lake Tahoe and its tributaries, and the narrative objectives for clarity and productivity, are based on historical high quality. In 1980, the State Board revised the numerical objectives set for Lake Tahoe and its tributaries in the 1975 North Lahontan Basin Plan, with some modifications clarifying the standards for Lake Tahoe and revising the standards for tributary streams. The clarity and productivity objectives were based on monitoring data from the late 1960s and early 1970s and were set to stabilize the quality of Lake Tahoe at levels recorded in those years. The revised water quality objectives for

tributary streams were based on data collected during TRPA's Section 208 planning effort in the 1970s for streams classified as draining disturbed or undisturbed watersheds. Weighted mean concentrations were determined for total nitrogen, total phosphorus, and iron for each tributary stream. For a stream draining an undisturbed watershed, the water quality objectives for these three parameters in Table 5.1-3 represent the weighted mean concentrations determined for that specific stream. For streams draining disturbed watersheds, the objectives in Table 5.1-3 are based on the overall mean nutrient concentration for all streams draining undisturbed watersheds.

Numerical objectives have not yet been established for all streams tributary to Lake Tahoe in California. TRPA has requested that the Regional Board review and consider revising existing objectives for iron, since recent monitoring data show violations of objectives in some presumably undisturbed water bodies. Although more intensive stream monitoring has been performed since 1980, most of the information collected reflects drought conditions, and it does not provide a good basis for setting or revising objectives. Regional Board staff propose to review and consider further revision of objectives for tributaries of Lake Tahoe as part of the next Triennial Review process, assuming that better information will be available.

Achieving water quality objectives for tributary streams will also help to protect Lake Tahoe. Tributary objectives are in addition to, not a substitute for the standards for Lake Tahoe. Despite attainment of the standards for a stream, further reductions in the nutrient concentrations in the stream may be required so that the total nutrient load from all streams is reduced enough to prevent deterioration of Lake Tahoe.

Prohibited Discharges

Discharges which cause violation of the Nondegradation Objective (see below), or any narrative or numerical water quality objective are prohibited. (See also Section 5.2, "Waste Discharge Prohibitions.")

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 the 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.

Compliance with Water Quality Objectives

The purpose of text, in italics, following certain water quality objectives is to provide specific direction on compliance with the objective. General direction on compliance with objectives is described in the last section of this Chapter. It is not feasible to cover all circumstances and conditions which could be created by all discharges. Therefore, it is within the discretion of the Regional Board to establish other, or additional, direction on compliance with objectives of this Basin Plan. The purpose of the italic text is to provide direction only, and **not** to specify method of compliance.

Nondegradation Objective

This objective applies to **all** waters of the Lahontan Region (including surface waters, wetlands, and ground waters.)

On October 28, 1968, the State Water Resources Control Board adopted Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," establishing a nondegradation policy for the protection of water quality. This policy, referred to in this Basin Plan as the Nondegradation Objective, requires continued maintenance of existing high quality waters. Whenever the existing quality of water is better than the quality of water established in this Basin Plan as objectives (both narrative and numerical), such existing quality shall be maintained unless appropriate findings are made under the policy. The U.S. Environmental Protection Agency, Region IX, has also issued detailed guidelines for implementation of federal antidegradation regulations for surface waters (40 CFR § 131.12). For more information, see the discussion on "General Direction Regarding Compliance With Objectives" at the end of this Chapter.

The State Board designated Lake Tahoe an Outstanding National Resource Water (ONRW) in 1980, both for its recreational and its ecological value, and stated:

"Viewed from the standpoint of protecting beneficial uses, preventing deterioration of Lake Tahoe requires that there be no significant increase in algal growth rates. Lake Tahoe's exceptional recreational value depends on enjoyment of the scenic beauty imparted by its clear, blue waters. ...Likewise, preserving Lake

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Tahoe's ecological value depends on maintaining the extraordinarily low rates of algal growth which make Lake Tahoe an outstanding ecological resource."

Section 114 of the federal Clean Water Act also indicates the need to "preserve the fragile ecology of Lake Tahoe."

Water Quality Objectives for Surface Waters

(See Tables 5.1-3 through 5.1-6)

Unless otherwise specified, the following objectives (listed alphabetically) apply to all surface waters of the Lahontan Region, including the Lake Tahoe HU (see Figures 5-3 and 5-4):

Ammonia

The neutral, unionized ammonia species (NH_3°) is highly toxic to freshwater fish. The fraction of toxic NH_3° to total ammonia species ($\text{NH}_4^+ + \text{NH}_3^\circ$) is a function of temperature and pH. Tables 5.1-5 and 5.1-6 were derived from USEPA ammonia criteria for freshwater. Ammonia concentrations shall not exceed the values listed for the corresponding conditions in these tables. For temperature and pH values not explicitly in the these tables, the most conservative value neighboring the actual value may be used or criteria can be calculated from numerical formulas developed by the USEPA. For one-hour (1h- NH_3) and four-day (4d- NH_3) unionized ammonia criteria, the following equations apply:

$$1\text{h-}\text{NH}_3 = 0.052 \div (\text{FT} \times \text{FPH} \times 2)$$

$$4\text{d-}\text{NH}_3 = 0.80 \div (\text{FT} \times \text{FPH} \times \text{RATIO})$$

where:

$$\text{FT} = 10^{[0.03(20-\text{TCAP})]}$$

for: $\text{TCAP} \leq \text{T} \leq 30$

$$\text{FT} = 10^{[0.03(20-\text{T})]}$$

for: $0 \leq \text{T} \leq \text{TCAP}$

$$\text{FPH} = (1 + 10^{(7.4-\text{pH})}) \div 1.25$$

for: $6.5 \leq \text{pH} \leq 8.0$

$$\text{FPH} = 1$$

for: $8.0 \leq \text{pH} \leq 9.0$

$$\text{RATIO} = 20.25 \times (10^{(7.7-\text{pH})}) \div (1 + 10^{(7.4-\text{pH})})$$

for: $6.5 \leq \text{pH} \leq 7.7$

$$\text{RATIO} = 13.5$$

for: $7.7 \leq \text{pH} \leq 9.0$

and:

T = temperature in °C

TCAP = temperature cap in °C

For 1h- NH_3 , TCAP is 20°C with salmonids present and 25°C with salmonids absent. For 4d- NH_3 , TCAP is 15°C with salmonids present and 20°C with salmonids absent.

For interpolation of total ammonia ($\text{NH}_4^+ + \text{NH}_3^\circ$) criteria, the following equations can be used:

$$n_{1\text{h}} = 1\text{h-}\text{NH}_3 \div f, \text{ or } n_{4\text{d}} = 4\text{d-}\text{NH}_3 \div f$$

where:

$n_{1\text{h}}$ is the one-hour criteria for total ammonia species ($\text{NH}_4^+ + \text{NH}_3^\circ$)

$n_{4\text{d}}$ is the four-day criteria for total ammonia species ($\text{NH}_4^+ + \text{NH}_3^\circ$)

$$f = 1 \div (10^{(\text{pKa}-\text{pH})} + 1)$$

$$\text{pKa} = 0.0901821 + [2729.92 \div (\text{T} + 273.15)]$$

and:

pKa is the negative log of the equilibrium constant for the $\text{NH}_4^+ \rightleftharpoons \text{NH}_3^\circ + \text{H}^+$ reaction

f is the fraction of unionized ammonia to total ammonia species: $[\text{NH}_3^\circ \div (\text{NH}_4^+ + \text{NH}_3^\circ)]$

Values outside of the ranges 0-30°C or pH 6.5-9.0 cannot be extrapolated from these relationships. Site-specific objectives must be developed for these conditions. A microcomputer spreadsheet to calculate ammonia criteria was developed by Regional Board staff. An example of output from this program is given in Table 5.1- 7. Contact the Regional Board if a copy is desired.

Bacteria, Coliform

Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes.

The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml. The log

mean shall ideally be based on a minimum of not less than five samples collected as evenly spaced as practicable during any 30-day period. However, a log mean concentration exceeding 20/100 ml for any 30-day period shall indicate violation of this objective even if fewer than five samples were collected.

Biostimulatory Substances

Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect the water for beneficial uses.

Chemical Constituents

Waters designated as MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) based upon drinking water standards specified in the following provisions of Title 22 of the California Code of Regulations which are incorporated by reference into this plan: Table 64431-A of Section 64431 (Inorganic Chemicals), Table 64431-B of Section 64431 (Fluoride), Table 64444-A of Section 64444 (Organic Chemicals), Table 64449-A of Section 64449 (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits), and Table 64449-B of Section 64449 (Secondary Maximum Contaminant Levels-Ranges). This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

Waters designated as AGR shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses (i.e., agricultural purposes).

Waters shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses.

Chlorine, Total Residual

For the protection of aquatic life, total chlorine residual shall not exceed either a median value of 0.002 mg/L or a maximum value of 0.003 mg/L. Median values shall be based on daily measurements taken within any six-month period.

Color

Waters shall be free of coloration that causes nuisance or adversely affects the water for beneficial uses.

Dissolved Oxygen

The dissolved oxygen concentration, as percent saturation, shall not be depressed by more than 10

percent, nor shall the minimum dissolved oxygen concentration be less than 80 percent of saturation.

For waters with the beneficial uses of COLD, COLD with SPWN, WARM, and WARM with SPWN, the minimum dissolved oxygen concentration shall not be less than that specified in Table 5.1-8.

Floating Materials

Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect the water for beneficial uses.

For natural high quality waters, the concentrations of floating material shall not be altered to the extent that such alterations are discernable at the 10 percent significance level.

Oil and Grease

Waters shall not contain oils, greases, waxes or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect the water for beneficial uses.

For natural high quality waters, the concentration of oils, greases, or other film or coat generating substances shall not be altered.

Nondegradation of Aquatic Communities and Populations

All wetlands shall be free from substances attributable to wastewater or other discharges that produce adverse physiological responses in humans, animals, or plants; or which lead to the presence of undesirable or nuisance aquatic life.

All wetlands shall be free from activities that would substantially impair the biological community as it naturally occurs due to physical, chemical and hydrologic processes.

Pesticides

For the purposes of this Basin Plan, pesticides are defined to include insecticides, herbicides, rodenticides, fungicides, piscicides and all other economic poisons. An economic poison is any substance intended to prevent, repel, destroy, or mitigate the damage from insects, rodents, predatory animals, bacteria, fungi or weeds capable of infesting or harming vegetation, humans, or animals (CA Agriculture Code § 12753).

Pesticide concentrations, individually or collectively, shall not exceed the lowest detectable levels, using the most recent detection procedures available.

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There shall not be an increase in pesticide concentrations found in bottom sediments. There shall be no detectable increase in bioaccumulation of pesticides in aquatic life.

Waters designated as MUN shall not contain concentrations of pesticides or herbicides in excess of the limiting concentrations specified in Table 64444-A of Section 64444 (Organic Chemicals) of Title 22 of the California Code of Regulations which is incorporated by reference into this plan. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

pH

In fresh waters with designated beneficial uses of COLD, changes in normal ambient pH levels shall not exceed 0.5 pH units. For all other waters, the pH shall not be depressed below 6.5 nor raised above 8.5.

The Regional Board recognizes that some waters of the Region may have natural pH levels outside of the 6.5 to 8.5 range. Compliance with the pH objective for these waters will be determined on a case-by-case basis.

Radioactivity

Radionuclides shall not be present in concentrations which are deleterious to human, plant, animal, or aquatic life nor which result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or aquatic life.

Waters designated as MUN shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Section 64443 (Radioactivity) of Title 22 of the California Code of Regulations which is incorporated by reference into this plan. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

Sediment

The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses.

Settleable Materials

Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water for beneficial uses. For natural high quality

waters, the concentration of settleable materials shall not be raised by more than 0.1 milliliter per liter.

Suspended Materials

Waters shall not contain suspended materials in concentrations that cause nuisance or that adversely affects the water for beneficial uses.

For natural high quality waters, the concentration of total suspended materials shall not be altered to the extent that such alterations are discernible at the 10 percent significance level.

Suspended Sediment

Suspended sediment concentrations in streams tributary to Lake Tahoe shall not exceed a 90th percentile value of 60 mg/L. (This objective is equivalent to the Tahoe Regional Planning Agency's regional "environmental threshold carrying capacity" standard for suspended sediment in tributaries.) *The Regional Board will consider revision of this objective in the future if it proves not to be protective of beneficial uses or if review of monitoring data indicates that other numbers would be more appropriate for some or all streams tributary to Lake Tahoe.*

Taste and Odor

Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish or other edible products of aquatic origin, that cause nuisance, or that adversely affect the water for beneficial uses. For naturally high quality waters, the taste and odor shall not be altered.

Temperature

The natural receiving water temperature of all waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such an alteration in temperature does not adversely affect the water for beneficial uses.

For waters designated COLD, the temperature shall not be altered.

Temperature objectives for COLD interstate waters and WARM interstate waters are as specified in the "Water Quality Control Plan for Control of Temperature in The Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" including any revisions. This plan is summarized in Chapter 6 (Plans and Policies) and included in Appendix B.

Toxicity

All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. *Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration and/or other appropriate methods as specified by the Regional Board.*

The survival of aquatic life in surface waters subjected to a waste discharge, or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or when necessary, for other control water that is consistent with the requirements for "experimental water" as defined in *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association, et al. 1998).

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. Increases in turbidity shall not exceed natural levels by more than 10 percent.

Water Quality Objectives for Certain Water Bodies (Figure 5.1-1)

The following objectives (listed alphabetically) are in addition to the regionwide objectives specified above. These objectives apply to certain surface waters of the Lake Tahoe Hydrologic Unit (HU). Tables 5.1-3 and 5.1-4 also contain additional water quality objectives for certain water bodies within the Lake Tahoe HU.

Algal Growth Potential

For Lake Tahoe, the mean algal growth potential at any point in the Lake shall not be greater than twice the mean annual algal growth potential at the limnetic reference station. *The limnetic reference station is located in the north central portion of Lake Tahoe. It is shown on maps in annual reports of the Lake Tahoe Interagency Monitoring Program. Exact coordinates can be obtained from the U.C. Davis Tahoe Research Group.*

Biological Indicators

For Lake Tahoe, algal productivity and the biomass of phytoplankton, zooplankton, and periphyton shall not be increased beyond the levels recorded in 1967-71, based on statistical comparison of seasonal and annual means. *The "1967-71 levels" are reported in the annual summary reports of the "California-Nevada-Federal Joint Water Quality Investigation of*

Lake Tahoe" published by the California Department of Water Resources.

Clarity

For Lake Tahoe, the vertical extinction coefficient shall be less than 0.08 per meter when measured below the first meter. When water is too shallow to determine a reliable extinction coefficient, the turbidity shall not exceed 3 Nephelometric Turbidity Units (NTU). In addition, turbidity shall not exceed 1 NTU in shallow waters not directly influenced by stream discharges. *The Regional Board will determine when water is too shallow to determine a reliable vertical extinction coefficient based upon its review of standard limnological methods and on advice from the U.C. Davis Tahoe Research Group.*

Conductivity, Electrical

In Lake Tahoe, the mean annual electrical conductivity shall not exceed 95 umhos/cm at 50°C at any location in the Lake.

pH

In Lake Tahoe, the pH shall not be depressed below 7.0 nor raised above 8.4.

Plankton Counts

For Lake Tahoe, the mean seasonal concentration of plankton organisms shall not be greater than 100 per ml and the maximum concentration shall not be greater than 500 per ml at any point in the Lake.

Suspended Sediment

Suspended sediment concentrations in streams tributary to Lake Tahoe shall not exceed a 90th percentile value of 60 mg/L. (This objective is equivalent to the Tahoe Regional Planning Agency's regional "environmental threshold carrying capacity" standard for suspended sediment in tributaries.) *The Regional Board will consider revision of this objective in the future if it proves not to be protective of beneficial uses or if review of monitoring data indicates that other numbers would be more appropriate for some or all streams tributary to Lake Tahoe.*

Transparency

For Lake Tahoe, the secchi disk transparency shall not be decreased below the levels recorded in 1967-71, based on a statistical comparison of seasonal and annual mean values. *The "1967-71 levels" are reported in the annual summary reports of the "California-Nevada-Federal Joint Water Quality Investigation of Lake Tahoe" published by the California Department of Water Resources.*

Water Quality Objectives for Fisheries Management Activities Using the Fish Toxicant Rotenone

Rotenone is a fish toxicant used by the California Department of Fish and Game (DFG) for fishery management purposes. (See Chapter 4 for a more complete discussion of this topic.)

The application of rotenone solutions and the detoxification agent potassium permanganate can cause several water quality objectives to be temporarily exceeded, both inside and outside of project boundaries. (Project boundaries are defined as encompassing the treatment area, the detoxification area, and the area downstream of the detoxification station up to a thirty-minute travel time.)

Additional narrative water quality objectives applicable to rotenone treatments are: color, pesticides, toxicity, and species composition. Conditional variances to these objectives may be granted by the Regional Board's Executive Officer for rotenone applications by the DFG, provided that such projects comply with the conditions described below and with the conditions described in Chapter 4 (Implementation) under the section entitled "Rotenone Use in Fisheries Management."

Color

The characteristic purple discoloration resulting from the discharge of potassium permanganate shall not be discernible more than two miles downstream of project boundaries at any time. Twenty-four (24) hours after shutdown of the detoxification operation, no color alteration(s) resulting from the discharge of potassium permanganate shall be discernible within or downstream of project boundaries.

Pesticides

Chemical residues resulting from rotenone treatment must not exceed the following limitations:

1. The concentration of naphthalene outside of project boundaries shall not exceed 25 ug/liter (ppb) at any time.
2. The concentration of rotenone, rotenolone, trichloroethylene (TCE), xylene, or acetone (or potential trace contaminants such as benzene or ethylbenzene) outside of project boundaries shall not exceed the detection levels for these respective compounds at any time. "Detection level" is defined as the minimum level that can be reasonably detected using state-of-the-art equipment and methodology.

3. After a two-week period has elapsed from the date that rotenone application was completed, no chemical residues resulting from the treatment shall be present at detectable levels within or downstream of project boundaries.
4. No chemical residues resulting from rotenone treatments shall exceed detection levels in ground water at any time.

Species Composition

The reduction in fish diversity associated with the elimination of non-native game fish or exotic species may be part of the project goal, and may therefore be unavoidable. However, non-target aquatic populations (e.g., invertebrates, amphibians) that are reduced by rotenone treatments are expected to repopulate project areas within one year. Where species composition objectives are established for specific water bodies or hydrologic units, the established objective(s) shall be met for all non-target aquatic organisms within one year following rotenone treatment. For multi-year treatments (i.e., when rotenone is applied to the same water body during two or more consecutive years), the established objective(s) shall be met for all non-target aquatic organisms within one year following the final rotenone application to a given water body.

Threatened or endangered aquatic populations (e.g., invertebrates, amphibians) shall not be adversely affected. The DFG shall conduct pre-project monitoring to prevent rotenone application where threatened or endangered species may be adversely impacted.

Toxicity

Chemical residues resulting from rotenone treatment must not exceed the limitations listed above for pesticides.

Water Quality Objectives Which Apply to All Ground Waters

Bacteria, Coliform

In ground waters designated as MUN, the median concentration of coliform organisms over any seven-day period shall be less than 1.1/100 milliliters.

Chemical Constituents

Ground waters designated as MUN shall not contain concentrations of chemical constituents in excess of the maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) based upon drinking water standards specified in the following

provisions of Title 22 of the California Code of Regulations which are incorporated by reference into this plan: Table 64431-A of Section 64431 (Inorganic Chemicals), Table 64431-B of Section 64431 (Fluoride), Table 64444-A of Section 64444 (Organic Chemicals), Table 64449-A of Section 64449 (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits), and Table 64449-B of Section 64449 (Secondary Maximum Contaminant Levels-Ranges). This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

Waters designated as AGR shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses (i.e., agricultural purposes).

Ground waters shall not contain concentrations of chemical constituents that adversely affect the water for beneficial uses.

Radioactivity

Ground waters designated as MUN shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Section 64443 (Radioactivity) of Title 22 of the California Code of Regulations which is incorporated by reference into this plan. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

Taste and Odor

Ground waters shall not contain taste or odor-producing substances in concentrations that cause nuisance or that adversely affect beneficial uses. For ground waters designated as MUN, at a minimum, concentrations shall not exceed adopted secondary maximum contaminant levels specified in Table 64449-A of Section 64449 (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits), and Table 64449-B of Section 64449 (Secondary Maximum Contaminant Levels-Ranges) of Title 22 of the California Code of Regulations which is incorporated by reference into this plan. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

General Direction Regarding Compliance With Objectives

This section includes general direction on determining compliance with the nondegradation, narrative and numerical objectives described in this Chapter. (Specific direction on compliance with certain

objectives is included, in italics, following the text of the objective.) It is not feasible to cover all circumstances and conditions which could be created by all discharges. Therefore, it is within the discretion of the Regional Board to establish other, or additional, direction on compliance with objectives of this Plan. Where more than one objective is applicable, the **stricter objective shall apply**. (The only exception is where a regionwide objective has been superseded by the adoption of a site-specific objective by the Regional Board.) Where objectives are not specifically designated, downstream objectives apply to upstream tributaries.

Nondegradation Objective

To implement State Board Resolution No. 68-16, the "Statement of Policy with Respect to Maintaining High Quality Waters in California," the Regional Board follows guidance such as that in the USEPA's 1993 *Water Quality Standards Handbook* and the State Board's October 7, 1987 legal memorandum titled "Federal Antidegradation Policy" (Attwater 1987). The State Board has interpreted the Resolution No. 68-16 to incorporate the federal antidegradation policy in order to ensure consistency with federal Clean Water Act requirements (see State Board Order No. WQ 86-17, pages 16-24). For detailed information on the federal antidegradation policy, see USEPA Region IX's *Guidance on Implementing the Antidegradation Provisions of 40 CFR 131.12* and USEPA's *Questions and Answers on Antidegradation*. The Regional Board's procedures for implementation of State and federal antidegradation policies are summarized below. It is important to note that the federal policy applies only to surface waters, while the State policy applies to both surface and ground waters.

Under the State Nondegradation Objective, whenever the existing quality of water is better than that needed to protect all existing and probable future beneficial uses, the existing high quality shall be maintained until or unless it has been demonstrated to the State that any change in water quality will be consistent with the maximum benefit of the people of the State, and will not unreasonably affect present and probable future beneficial uses of such water. Therefore, unless these conditions are met, background water quality concentrations (the concentrations of substances in natural waters which are unaffected by waste management practices or contamination incidents) are appropriate water quality goals to be maintained. If it is determined that some degradation is in the best interest of the people of California, some increase in pollutant level may be appropriate.

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However, in no case may such increases cause adverse impacts to existing or probable future beneficial uses of waters of the State.

Where the federal antidegradation policy applies, it does not absolutely prohibit any changes in water quality. The policy requires that any reductions in water quality be consistent with the three-part test established by the policy, as described below.

Part One—Instream Uses

[40 CFR § 131.12(a)(1)]

The first part of the test establishes that “existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.” Reductions in water quality should not be permitted if the change in water quality would seriously harm any species found in the water (other than an aberrational species). Waters of this type are generally referred to as “Tier I” waters.

Part Two—Public Interest Balancing

[40 CFR § 131.12(a)(2)]

The second part of the test applies where water quality is higher than necessary to protect existing instream beneficial uses. This part of the test allows reductions in water quality if the state finds “that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located” **and** existing beneficial uses are protected. Waters of this type are generally referred to as “Tier II” waters.

Part Three—Outstanding National Resource Waters (ONRWs) [40 CFR § 131.12(a)(3)]

The third part of the test established by the federal policy requires that the water quality of the waters which constitute an outstanding national resource be maintained and protected. No permanent or long-term reduction in water quality is allowable in areas given special protection as Outstanding National Resource Waters (48 Fed. Reg. 51402). Waters which potentially could qualify for ONRW designation are generally classified as “Tier III” waters.

Examples of such waters include, but are not limited to, waters of National and State Parks and wildlife refuges, waters of exceptional recreational or ecological significance, and state and federally designated wild and scenic rivers. To date, the only California water designated as an ONRW is Lake Tahoe. However, other California waters would certainly qualify.

ONRWs may be designated as part of adoption or amendment of water quality control plans. It is important to note that even if no formal designation has been made, lowering of water quality should not be allowed for waters which, because of their exceptional recreational and/or ecological significance, should be given the special protection assigned to ONRWs.

Narrative and Numerical Objectives

The sections below provide additional direction on determining compliance with the narrative and numerical objectives of this Basin Plan.

Pollution and/or Nuisance

In determining compliance with narrative objectives which include the terms “pollution” and or “nuisance,” the Regional Board considers the following definitions from the Porter-Cologne Water Quality Control Act.

Pollution -- an alteration of the waters of the State by waste to the degree which unreasonably affects either of the following:

- such waters for beneficial uses.
- facilities which serve these beneficial uses.

“Pollution” may include “contamination.” Contamination means an impairment of the quality of the waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease. Contamination includes any equivalent effect resulting from the disposal of waste, whether or not waters of the State are affected.

Nuisance -- Anything which meets all of the following requirements:

- Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.
- Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.
- Occurs during or as a result of the treatment or disposal of wastes.

References to Taste and Odor, Human Health and Toxicity (also see “acute toxicity” and “chronic toxicity,” below):

In determining compliance with objectives including references to Taste and Odor, Human Health or Toxicity, the Regional Board will consider as evidence relevant and scientifically valid water quality goals from sources such as drinking water standards from the California Department of Health Services (State “Action Levels”), the National Interim Drinking Water Standards, Proposition 65 Lawful Levels, National Ambient Water Quality Criteria (USEPA’s “Quality Criteria for Water” for the years 1986, 1976 and 1972; “Ambient Water Quality Criteria,” volumes 1980, 1984, 1986, 1987 and 1989), the National Academy of Sciences’ Suggested No-Adverse-Response Levels (SNARL), USEPA’s Health and Water Quality Advisories, as well as other relevant and scientifically valid evidence.

References to Agriculture or AGR designations:

In determining compliance with objectives including references to the AGR designated use, the Regional Board will refer to water quality goals and recommendations from sources such as the Food and Agriculture Organization of the United Nations, University of California Cooperative Extension, Committee of Experts, and McKee and Wolf’s “Water Quality Criteria” (1963).

References to “Natural High Quality Waters”:

The Regional Board generally considers “natural high quality water(s)” to be those waters with ambient water quality equal to, or better than, current drinking water standards. However, the Regional Board also recognizes that some waters with poor chemical quality may support important ecosystems (e.g., Mono Lake).

References to “10 percent significance level”:

A statistical hypothesis is a statement about a random variable’s probability distribution, and a decision-making procedure about such a statement is a hypothesis test. In testing a hypothesis concerning the value of a population mean, the null hypothesis is often used. The null hypothesis is that there is no difference between the population means (e.g., the mean value of a water quality parameter after the discharge is no different than before the discharge.) First a level of significance to be used in the test is specified, and then the regions of acceptance and rejection for evaluating the obtained sample mean are determined.

At the **10 percent significance level**, assuming normal distribution, the acceptance region (where one

would correctly accept the null hypothesis) is the interval which lies under 90 percent of the area of the standard normal curve. Thus, a level of **significance of 10 percent** signifies that when the population mean is correct as specified, the sample mean will fall in the areas of rejection only 10 percent of the time.

If the hypothesis is rejected when it should be accepted, a Type I error has been made. In choosing a **10 percent level of significance**, there are 10 chances in 100 that a Type I error was made, or the hypothesis was rejected when it should have been accepted (i.e., one is 90 percent *confident* that the right decision was made.)

The **10 percent significance level** is often incorrectly referred to as the 90 percent significance level. As explained above, the significance level of a test should be low, and the confidence level of a confidence interval should be high.

References to “Means” (e.g., annual mean, log mean, mean of monthly means), “Medians” and “90th percentile values”:

“**Mean**” is the arithmetic mean of all data. “**Annual mean**” is the arithmetic mean of all data collected in a one-year period. “**Mean of monthly mean**” is the arithmetic mean of 30-day averages (arithmetic means). A logarithmic or “**log mean**” (used in determining compliance with bacteria objectives) is calculated by converting each data point into its log, then calculating the mean of these values, then taking the anti-log of this log-transformed average. The **median** is the value which half of the values of the population exceed and half do not. The **average value** is the arithmetic mean of all data. For a **90th percentile value**, only 10% of data exceed this value.

Compliance determinations shall be based on available analyses for the time interval associated with the discharge. If only one sample is collected during the time period associated with the water quality objective, (e.g., monthly mean), that sample shall serve to characterize the discharge for the entire interval. Compliance based upon multiple samples shall be determined through the application of appropriate statistical methods.

Standard Analytical Methods to Determine Compliance with Objectives

Analytical methods to be used are usually specified in the monitoring requirements of the waste discharge permits. Suitable analytical methods are:

- those specified in 40 CFR Part 136, and/or

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- those methods determined by the Regional Board and approved by the USEPA to be equally or more sensitive than 40 CFR Part 136 methods and appropriate for the sample matrix, and/or
- where methods are not specified in 40 CFR Part 136, those methods determined by the Regional Board to be appropriate for the sample matrix

All analytical data shall be reported uncensored with method detection limits and either practical quantitation levels or limits of quantitation identified. Acceptance of data should be based on demonstrated laboratory performance.

For **bacterial analyses**, sample dilutions should be performed so the range of values extends from 2 to 16,000. The detection method used for each analysis shall be reported with the results of the analysis. Detection methods used for coliforms (total and fecal) shall be those presented in *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association et al. 1998), or any alternative method determined by the Regional Board to be appropriate.

For **acute toxicity**, compliance shall be determined by short-term toxicity tests on undiluted effluent using an established protocol (e.g., American Society for Testing and Materials [ASTM], American Public Health Association, USEPA, State Board).

For **chronic toxicity**, compliance shall be determined using the critical life stage (CLS) toxicity tests. At least three approved species shall be used to measure compliance with the toxicity objective. If possible, test species shall include a vertebrate, an invertebrate, and an aquatic plant. After an initial screening period, monitoring may be reduced to the most sensitive species. Dilution and control waters should be obtained from an unaffected area of the receiving waters. For rivers and streams, dilution water should be obtained immediately upstream of the discharge. Standard dilution water can be used if the above sources exhibit toxicity greater than 1.0 Chronic Toxicity Units. All test results shall be reported to the Regional Board in accordance with the "Standardized Reporting Requirements for Monitoring Chronic Toxicity" (State Board Publication No. 93-2 WQ).

Application of Narrative and Numerical Water Quality Objectives to Wetlands

Although not developed specifically for wetlands, many surface water **narrative objectives** are generally applicable to most wetland types. However, the Regional Board recognizes, as with other types of

surface waters such as saline or alkaline lakes, that natural water quality characteristics of some wetlands may not be within the range for which the narrative objectives were developed. The Regional Board will consider site-specific adjustments to the objectives for wetlands (bacteria, pH, hardness, salinity, temperature, or other parameters) as necessary on a case-by-case basis.

The **numerical criteria** to protect one or more beneficial uses of surface waters, where appropriate, may directly apply to wetlands. For example, wetlands which actually are, or which recharge, municipal water supplies should meet human health criteria. The USEPA numeric criteria for protection of freshwater aquatic life, as listed in *Quality Criteria for Water—1986*, although not developed specifically for wetlands, are generally applicable to most wetland types. As with other types of surface waters, such as saline or alkaline lakes, natural water quality characteristics of some wetlands may not be within the range for which the criteria were developed. Adjustments for pH, hardness, salinity, temperature, or other parameters may be necessary. The Regional Board will consider developing site-specific objectives for wetlands on a case-by-case basis.

Variances from Water Quality Objectives

The USEPA allows states to grant variances from water quality standards under the narrow circumstances summarized below (USEPA Water Quality Standards Handbook, Second Edition, 1993, Chapter 5). Such variances must be "built into" the standards themselves, and thus variances cannot be granted in California without Basin Plan amendments.

According to the USEPA, variances from standards "are both discharger and pollutant specific, are time-limited, and do not forego the currently designated use". The USEPA recommends use of variances instead of removal of beneficial uses when the State believes that standards can ultimately be attained. Variances can be used with NPDES permits to ensure reasonable progress toward attainment of standards without violation of Clean Water Act Section 402(a)(1), which requires NPDES permits to meet applicable water quality standards.

The USEPA "has approved State-adopted variances in the past and will continue to do so if:

- each individual variance is included as part of the water quality standard;
- the State demonstrates that meeting the standard is unattainable based on one or more of the

grounds outlined in 40 CFR 131.10(g) for removing a designated use;

- the justification submitted by the State includes documentation that treatment more advanced than that required by sections 303(c)(2)(A) and (B) has been carefully considered, and that alternative effluent control strategies have been evaluated;
- the more stringent State criterion is maintained and is binding upon all other dischargers on the stream or stream segment;
- the discharger who is given a variance for one particular constituent is required to meet the applicable criteria for other constituents;
- the variance is granted for a specific period of time and must be rejustified upon expiration but at least every 3 years (Note: the 3-year limit is derived from the triennial review requirements of section 303(c) of the Act.);
- the discharger either must meet the standard upon the expiration of this time period or must make a new demonstration of “unattainability”;
- reasonable progress is being made toward meeting the standards; and
- the variance was subjected to public notice, opportunity for comment, and public hearing. (See section 303(c)(1) and 40 CFR 131.20.) The public notice should contain a clear description of the impact of the variance upon achieving water quality standards in the affected stream segment.”

(The “section” references in the quoted language above are to the Clean Water Act. As used in this language, “criteria” and “criterion” are equivalent to “water quality objective[s].”)

Key to Table 5.1-1

“HU No.” This column contains numbers used by the California Department of Water Resources in mapping surface water Hydrologic Units, Hydrologic Areas, and Hydrologic Subareas (watersheds and subwatersheds). See Plate 1A. The Lake Tahoe Basin is divided into three separate Hydrologic Areas, including the lake itself and “North Tahoe” and “South Tahoe” Hydrologic Areas including tributary waters.

“Hydrologic Unit/Subunit/Drainage Feature” This column contains (in bold type) the names of watersheds and subwatersheds corresponding to the Hydrologic Unit numbers in the preceding column, and the names of surface waterbodies, including lakes, streams, and wetlands. Wetlands of the Lake Tahoe Basin were not delineated by the Regional Board's wetlands identification contractor to the same level of detail as those in other parts of the Lahontan Region such as the Owens River HU. Wetland names in this column are generally indicators of location rather than “official” geographic names. More precise information on wetland locations is available in the Regional Board's wetlands database.

“Waterbody Class Modifier” This column includes descriptive information on each waterbody in the preceding column (i.e., distinction between lakes, streams, and wetlands). The modifiers in the entries for “minor wetlands” indicate that such wetlands may include springs, seeps, emergent wetlands, and marshes. The term “emergent” refers to wetlands dominated by erect, rooted, herbaceous aquatic plants such as cattails, which extend above the water surface (Mitsch and Gosselink 1986). Marshes are one type of emergent wetland.

“Beneficial Uses” The subheadings under this heading are abbreviations of beneficial use names which are defined in the text of Section 5.1. An “x” in a column beneath one of these subheadings designates an existing or potential beneficial use for a given waterbody.

“Receiving Water” This column names the waterbody to which a “drainage feature” named at the far left side of the table is tributary.

TABLE 5.1-1.1. BENEFICIAL USES OF SURFACE WATERS OF THE LAKE TAHOE HU

Unless otherwise specified, beneficial uses also apply to all tributaries of surface waters identified in Table 5.1-1.

HU No.	HYDROLOGIC UNIT/SUBUNIT DRAINAGE FEATURE	WATERBODY CLASS MODIFIER	BENEFICIAL USES																RECEIVING WATER							
			MUN	AGR	PRO	IND	GWR	FRSH	NAV	POW	REC-1	REC-2	COMM	AQUA	WARM	COLD	SAL	WILD		BIOL	RARE	MIGR	SPWN	WQE	FLD	
634.00	LAKE TAHOE HYDROLOGIC UNIT																									
634.10	SOUTH TAHOE HYDROLOGIC AREA																									
	TAHOE MEADOWS WETLANDS	WETLANDS	X					X					X	X			X						X	X		
	HEAVENLY VALLEY CREEK	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			TROUT CREEK	
	COLD CREEK	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			TROUT CREEK	
	TROUT CREEK	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			UPPER TRUCKEE RIVER	
	SAXON CREEK	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			TROUT CREEK	
	GRASS LAKE WETLANDS	WETLANDS	X	X			X						X	X	X		X			X		X	X	X		
	GRASS LAKE	LAKE	X	X			X						X	X	X		X			X		X			GRASS LAKE CREEK	
	GRASS LAKE CREEK	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			UPPER TRUCKEE RIVER	
	MEISS MEADOWS/WETLANDS	WETLANDS	X	X			X						X	X			X			X		X	X	X		
	MEISS LAKE	LAKE	X	X			X						X	X	X		X			X		X			UPPER TRUCKEE RIVER	
	UPPER TRUCKEE RIVER	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			LAKE TAHOE	
	ECHO LAKES	LAKES	X				X						X	X	X		X			X		X			ECHO CREEK/U. TRUCKEE RIVER	
	UPPER ANGORA LAKE	LAKE	X				X						X	X	X		X			X		X			LOWER ANGORA LAKE	
	LOWER ANGORA LAKE	LAKE	X	X			X						X	X	X		X			X		X			ANGORA CREEK	
	GLEN ALPINE CREEK	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			FALLEN LEAF LAKE	
	FALLEN LEAF LAKE	LAKE	X						X				X	X	X		X			X		X			TAYLOR CREEK	
	TAYLOR CREEK	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			LAKE TAHOE	
	TAYLOR CREEK MEADOW MARSH	WETLANDS	X	X			X						X	X			X			X		X	X	X		
	TALLAC CREEK	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			LAKE TAHOE	
	CASCADE LAKE	LAKE	X						X				X	X	X		X			X		X			CASCADE CREEK	
	CASCADE CREEK	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			LAKE TAHOE	
	MECKS CREEK MEADOW/WETLANDS	WETLANDS	X	X			X						X	X			X			X		X	X	X		
	POPE MARSH/WETLANDS	WETLANDS	X				X						X	X	X		X			X		X				
	OSGOOD SWAMP	WETLANDS	X				X						X	X			X			X		X	X	X		
	EAGLE CREEK	PERENNIAL STREAM	X	X			X						X	X			X			X		X			LAKE TAHOE	
	MINOR SURFACE WATERS		X	X			X						X	X	X		X			X		X				
	MINOR WETLANDS	SPRINGS/SEEPS/EMERGENT/MARSHES	X	X			X						X	X	X		X			X		X	X	X		
634.20	NORTH TAHOE HYDROLOGIC AREA																									
	LONELY GULCH CREEK	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			LAKE TAHOE	
	MECKS CREEK	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			LAKE TAHOE	
	GENERAL CREEK	PERENNIAL STREAM	X	X			X						X	X	X		X			X		X			LAKE TAHOE	

TABLE 5.1-1. BENEFICIAL USES OF SURFACE WATERS OF THE LAKE TAHOE HU

Unless otherwise specified, beneficial uses also apply to all tributaries of surface waters identified in Table 5.1-1.

HU No.	HYDROLOGIC UNIT/SUBUNIT DRAINAGE FEATURE	WATERBODY CLASS MODIFIER	BENEFICIAL USES																		RECEIVING WATER			
			MUN	AGR	PRO	IND	GWR	FRSH	NAV	POW	REC-1	REC-2	COMM	AQUA	WARM	COLD	SAL	WILD	BIOL	RARE		MIGR	SPWN	WQE
634.20	NORTH TAHOE HYDROLOGIC AREA (continued)																							
	McKINNEY CREEK	PERENNIAL STREAM	X	X			X					X	X	X				X					X	
	MADDEN CREEK	PERENNIAL STREAM	X				X					X	X	X				X					X	
	BLACKWOOD CREEK	PERENNIAL STREAM	X									X	X	X				X				X	X	
	WARD CREEK	PERENNIAL STREAM	X				X					X	X	X				X				X	X	
	BURTON CREEK	PERENNIAL STREAM	X				X					X	X	X				X				X	X	
	DOLLAR CREEK	PERENNIAL STREAM	X	X			X					X	X	X				X					X	
	WATSON CREEK	PERENNIAL STREAM	X				X					X	X	X				X				X	X	
	SNOW CREEK	PERENNIAL STREAM	X	X			X					X	X	X				X				X	X	
	CARNELIAN CREEK	PERENNIAL STREAM	X	X			X					X	X	X				X				X	X	
	GRIFF CREEK	PERENNIAL STREAM	X				X					X	X	X				X				X	X	
	MINOR SURFACE WATERS		X	X			X	X				X	X	X				X				X	X	
	MINOR WETLANDS	SPRINGS/SEEPS/EMERGENT/MARSHES	X	X			X	X				X	X	X				X				X	X	X
634.30	TAHOE LAKE BODY HYDROLOGIC AREA																							
	LAKE TAHOE	LAKE	X	X			X		X		X	X	X				X		X		X	X		TRUCKEE RIVER
	MINOR SURFACE WATERS		X	X			X	X			X	X	X				X		X		X	X		
	MINOR WETLANDS	EMERGENT/MARSHES	X	X			X	X			X	X	X				X		X		X	X	X	

TABLE 5.1-2. BENEFICIAL USES FOR GROUND WATERS OF THE TAHOE BASIN

BASIN DWR NO.	BASIN NAME	BENEFICIAL USES					
		MUN	AGR	IND	FRSH	AQUA	WILD
6-5.01	TAHOE VALLEY -SOUTH	X	X	X			
6-5.02	TAHOE VALLEY -NORTH	X	X				

Table 5.1-3
WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES
LAKE TAHOE HYDROLOGIC UNIT

See Fig. 5.1-1	Surface Waters	Objective (mg/L except as noted) ^{1,2}						
		TDS	Cl	SO ₄	B	N	P	Fe
1	Lake Tahoe	<u>60</u> 65	<u>3.0</u> 4.0	<u>1.0</u> 2.0	<u>0.01</u> -	<u>0.15</u> -	<u>0.008</u> -	--
2	Fallen Leaf Lake	<u>50</u> -	<u>0.30</u> 0.50	<u>1.3</u> 1.4	<u>0.01</u> 0.02	See Table 5.1-4 for additional objectives		
3	Griff Creek	<u>80</u> -	<u>0.40</u> -	--	--	<u>0.19</u> -	<u>0.010</u> -	<u>0.03</u> -
4	Carnelian Bay Creek	<u>80</u> -	<u>0.40</u> -	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
5	Watson Creek	<u>80</u> -	<u>0.35</u> -	--	--	<u>0.22</u> -	<u>0.015</u> -	<u>0.04</u> -
6	Dollar Creek	<u>80</u> -	<u>0.30</u> -	--	--	<u>0.16</u> -	<u>0.030</u> -	<u>0.03</u> -
7	Burton Creek	<u>90</u> -	<u>0.30</u> -	--	--	<u>0.16</u> -	<u>0.015</u> -	<u>0.03</u> -
8	Ward Creek	<u>70</u> 85	<u>0.30</u> 0.50	<u>1.4</u> 2.8	--	<u>0.15</u> -	<u>0.015</u> -	<u>0.03</u> -
9	Blackwood Creek	<u>70</u> 90	<u>0.30</u> -	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
10	Madden Creek	<u>60</u> -	<u>0.10</u> 0.20	--	--	<u>0.18</u> -	<u>0.015</u> -	<u>0.015</u> -
11	McKinney Creek	<u>55</u> -	<u>0.40</u> 0.50	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
12	General Creek	<u>50</u> 90	<u>1.0</u> 1.5	<u>0.4</u> 0.5	--	<u>0.15</u> -	<u>0.015</u> -	<u>0.03</u> -
13	Meeks Creek	<u>45</u> -	<u>0.40</u> -	--	--	<u>0.23</u> -	<u>0.010</u> -	<u>0.07</u> -
14	Lonely Gulch Creek	<u>45</u> -	<u>0.30</u> -	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
	continued...							

Table 5.1-3 (continued)
WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES
LAKE TAHOE HYDROLOGIC UNIT

See Fig. 5.1-1	Surface Waters	Objective (mg/L except as noted) ^{1,2}						
		TDS	Cl	SO ₄	B	N	P	Fe
15	Eagle Creek	<u>35</u> -	<u>0.30</u> -	--	--	<u>0.20</u> -	<u>0.010</u> -	<u>0.03</u> -
16	Cascade Creek	<u>30</u> -	<u>0.40</u> -	--	--	<u>0.21</u> -	<u>0.005</u> -	<u>0.01</u> -
17	Tallac Creek	<u>60</u> -	<u>0.40</u> -	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
18	Taylor Creek	<u>35</u> -	<u>0.40</u> 0.50	--	--	<u>0.17</u> -	<u>0.010</u> -	<u>0.02</u> -
19	Upper Truckee River	<u>55</u> 75	<u>4.0</u> 5.5	<u>1.0</u> 2.0		<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -
20	Trout Creek	<u>50</u> 60	<u>0.15</u> 0.20	--	--	<u>0.19</u> -	<u>0.015</u> -	<u>0.03</u> -

¹ Annual average value/90th percentile value.

² Objectives are as mg/L and are defined as follows:

B Boron

Cl Chloride

SO₄ Sulfate

Fe Iron, Total

N Nitrogen, Total

P Phosphorus, Total

TDS Total Dissolved Solids (Total Filterable Residues)

Table 5.1-4
WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES
FALLEN LEAF LAKE, LAKE TAHOE HYDROLOGIC UNIT

Constituent	Objective (See Fig. 5.1-1, location 2)
pH ^a	6.5 - 7.9
Temperature ^b	Hypolimnion - ≤15°C Bottom (105m) - ≤7.5°C at no time shall water be increased by more than 2.8°C (5°F).
Dissolved oxygen ^c	% saturation above 80% and DO >7 mg/L except if saturation exceeds 80% DO at bottom (105m) > 6mg/L
Total nitrogen ^d	0.087 ^e /0.114 ^f /0.210 ^g
Dissolved inorganic - N ^h	0.007 / 0.010 / 0.023
Total phosphorus	0.008 / 0.010 / 0.018
Soluble reactive - P	0.001 / 0.002 / 0.009
Soluble reactive iron	0.004 / 0.005 / 0.012
Total reactive iron	0.005 / 0.007 / 0.030
Chlorophyll-a ^{ij}	0.6 / 0.9 / 1.5
Clarity - Secchi depth ^k - Vertical extinction coefficient	18.5 / 16.0 ^l / 13.6 ^m 0.146 / 0.154 / 0.177 ⁿ
Phytoplankton cell counts ^o	219 / 280 / 450

^a 0.5 units above and 0.5 units below 1991 maximum and minimum values. Also reflects stability of this constituent throughout the year.

^b Based on 1991 data. Indicates that if temperature in the hypolimnion during the summer exceeds 15°C or if the water at 105m exceeds 7.5°C this would constitute a significant change from existing conditions. Unless there is an anthropogenic source of thermal effluent, which does not currently exist, changes in water temperature in Fallen Leaf Lake are natural. Objectives apply at any time during the defining period.

^c Based on coldwater habitat protection and 1991 data base. The need for an objective for the bottom (105m) results from the desire to control primary productivity and deposition of organic matter on the bottom. A decline in bottom DO to below 6 mg/L would indicate a fundamental shift in the trophic state of Fallen Leaf Lake.

^d Because of the similarity between the mid-lake and nearshore sites, Fallen Leaf Lake objectives for N, P and Fe are based on the combined mid-lake 8 m and 45 m, and nearshore 8 m concentrations. Units are mg N/L, mg P/L and mg Fe/L.

^e Mean annual concentration (May - October) unless otherwise noted.

^f 90th percentile value unless otherwise noted.

^g Maximum allowable value; 1.5 times the maximum 1991 value. No single measurement should exceed this value unless otherwise noted.

^h DIN = NO₃+NO₂+NH₄

ⁱ Corrected for phaeophytin degradation pigments.

^j Units are µg chl-a/L.

^k Units are meters.

^l 10th percentile since clarity increases with increasing Secchi depth.

^m Represents 15% loss of clarity from 10th or 90th percentile value.

ⁿ Calculated in the photic zone between 1 m below surface to 35 m. Units are per meter.

^o Units are cells per milliliter.

Figure 5.1-1
WATER QUALITY OBJECTIVES FOR CERTAIN WATER BODIES
LAKE TAHOE HYDROLOGIC UNIT

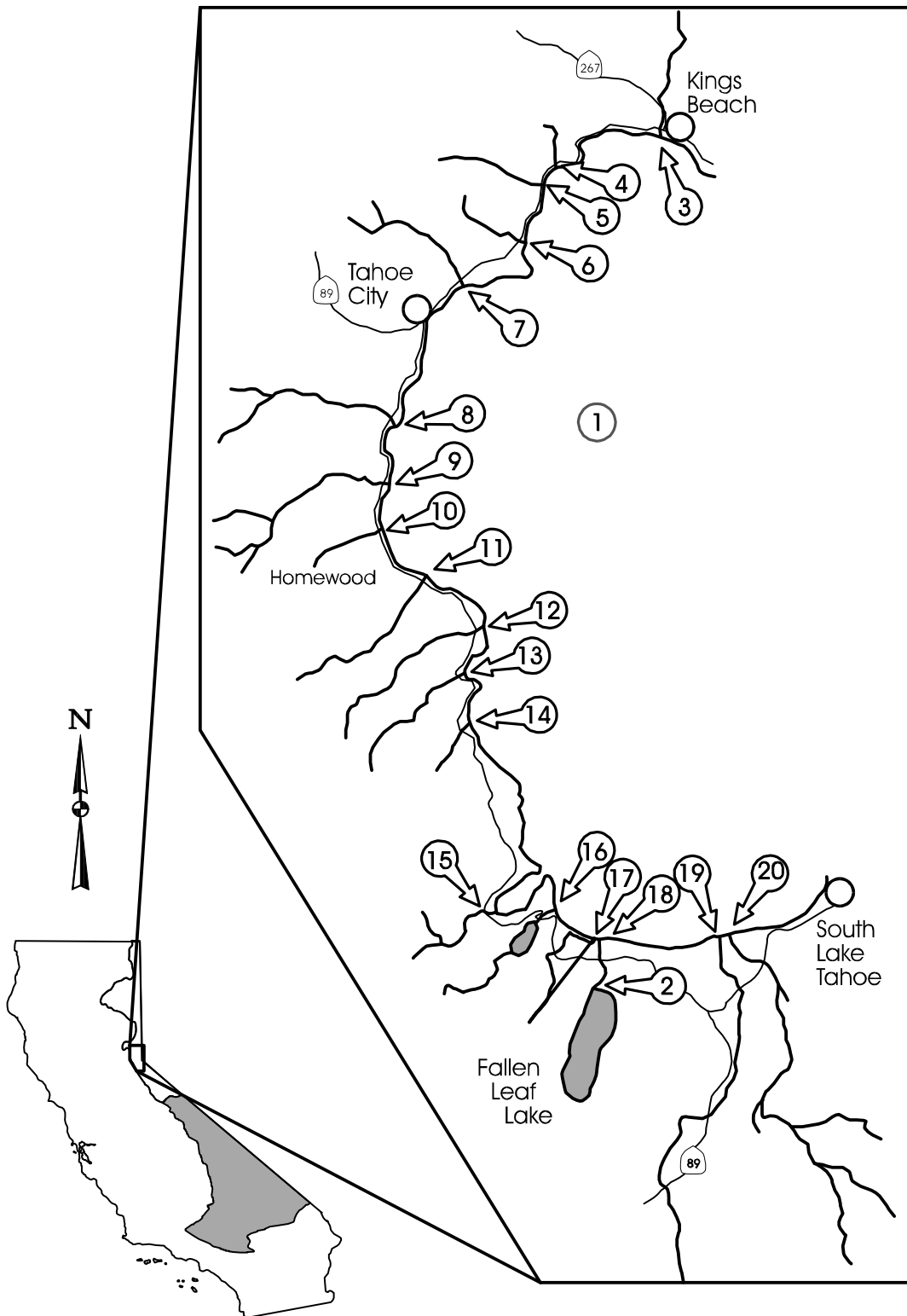


Table 5.1-5
ONE-HOUR AVERAGE CONCENTRATION FOR AMMONIA^{1,2}

Waters Designated as COLD, COLD with SPWN, COLD with MIGR (Salmonids or other sensitive coldwater species present)

	Temperature, °C						
pH	0	5	10	15	20	25	30
Un-ionized Ammonia (mg/liter NH ₃)							
6.50	0.0091	0.0129	0.0182	0.026	0.036	0.036	0.036
6.75	0.0149	0.021	0.030	0.042	0.059	0.059	0.059
7.00	0.023	0.033	0.046	0.066	0.093	0.093	0.093
7.25	0.034	0.048	0.068	0.095	0.135	0.135	0.135
7.50	0.045	0.064	0.091	0.128	0.181	0.181	0.181
7.75	0.056	0.080	0.113	0.159	0.22	0.22	0.22
8.00	0.065	0.092	0.130	0.184	0.26	0.26	0.26
8.25	0.065	0.092	0.130	0.184	0.26	0.26	0.26
8.50	0.065	0.092	0.130	0.184	0.26	0.26	0.26
8.75	0.065	0.092	0.130	0.184	0.26	0.26	0.26
9.00	0.065	0.092	0.130	0.184	0.26	0.26	0.26
Total Ammonia (mg/liter NH ₃)							
6.50	35	33	31	30	29	20	14.3
6.75	32	30	28	27	27	18.6	13.2
7.00	28	26	25	24	23	16.4	11.6
7.25	23	22	20	19.7	19.2	13.4	9.5
7.50	17.4	16.3	15.5	14.9	14.6	10.2	7.3
7.75	12.2	11.4	10.9	10.5	10.3	7.2	5.2
8.00	8.0	7.5	7.1	6.9	6.8	4.8	3.5
8.25	4.5	4.2	4.1	4.0	3.9	2.8	2.1
8.50	2.6	2.4	2.3	2.3	2.3	1.71	1.28
8.75	1.47	1.40	1.37	1.38	1.42	1.07	0.83
9.00	0.86	0.83	0.83	0.86	0.91	0.72	0.58

1 To convert these values to mg/liter N, multiply by 0.822

2 Source: U. S. Environmental Protection Agency. 1986. Quality criteria for water, 1986. EPA 440/5-86-001.

Table 5.1-6
FOUR DAY AVERAGE CONCENTRATION FOR AMMONIA^{1,2}

Waters Designated as COLD, COLD with SPWN, COLD with MIGR (Salmonids or other sensitive coldwater species present)

	Temperature, °C						
pH	0	5	10	15	20	25	30
Un-ionized Ammonia (mg/liter NH ₃)							
6.50	0.0008	0.0011	0.0016	0.0022	0.0022	0.0022	0.0022
6.75	0.0014	0.0020	0.0028	0.0039	0.0039	0.0039	0.0039
7.00	0.0025	0.0035	0.0049	0.0070	0.0070	0.0070	0.0070
7.25	0.0044	0.0062	0.0088	0.0124	0.0124	0.0124	0.0124
7.50	0.0078	0.0111	0.0156	0.022	0.022	0.022	0.022
7.75	0.0129	0.0182	0.026	0.036	0.036	0.036	0.036
8.00	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
8.25	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
8.50	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
8.75	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
9.00	0.0149	0.021	0.030	0.042	0.042	0.042	0.042
Total Ammonia (mg/liter NH ₃)							
6.50	3.0	2.8	2.7	2.5	1.76	1.23	0.87
6.75	3.0	2.8	2.7	2.6	1.76	1.23	0.87
7.00	3.0	2.8	2.7	2.6	1.76	1.23	0.87
7.25	3.0	2.8	2.7	2.6	1.77	1.24	0.88
7.50	3.0	2.8	2.7	2.6	1.78	1.25	0.89
7.75	2.8	2.6	2.5	2.4	1.66	1.17	0.84
8.00	1.82	1.70	1.62	1.57	1.10	0.78	0.56
8.25	1.03	0.97	0.93	0.90	0.64	0.46	0.33
8.50	0.58	0.55	0.53	0.53	0.38	0.28	0.21
8.75	0.34	0.32	0.31	0.31	0.23	0.173	0.135
9.00	0.195	0.189	0.189	0.195	0.148	0.116	0.094

1 To convert these values to mg/liter N, multiply by 0.822.

2 Source: U. S. Environmental Protection Agency. 1992. Revised tables for determining average freshwater ammonia concentrations.

Table 5.1-7
EXAMPLE AMMONIA SPREADSHEET OUTPUT
 (USEPA AMMONIA CRITERIA CALCULATOR*)

Required user inputs: 1-h Temp. Cap = 20°; 4-d Temp. Cap = 15°; Temp., °C = 10; pH = 7.0

One-hour criteria not to exceed, mg/L as NH₃

Parameter	0<T<TCAP			TCAP<T<30		
	6.5<pH<7.7	7.7<pH<8.0	8.0<pH<9.0	6.5<pH<7.7	7.7<pH<8.0	8.0<pH<9.0
FT	1.995	1.995	1.995	1.000	1.000	1.000
FPH	2.810	2.810	1.000	2.810	2.810	1.000
Unionized NH ₃	0.0464	0.0464	0.1303	0.0925	0.0925	0.2600
Total NH ₃ +NH ₄	25.0369	25.0369	70.3414	49.9552	49.9552	140.3495

Four-day criteria not to exceed, mg/L as NH₃

Parameter	0<T<TCAP			TCAP<T<30		
	6.5<pH<7.7	7.7<pH<8.0	8.0<pH<9.0	6.5<pH<7.7	7.7<pH<8.0	8.0<pH<9.0
FT	1.995	1.995	1.995	1.413	1.413	1.413
FPH	2.810	2.810	1.000	2.810	2.810	1.000
RATIO	28.899	13.500	13.500	28.899	13.500	13.500
Unionized NH ₃	0.0049	0.0106	0.0297	0.0070	0.0149	0.0420
Total NH ₃ +NH ₄	2.6657	5.7064	16.0322	3.7654	8.0605	22.6461

Chemical thermodynamic constants**

pKa = 9.731432321

f = 0.001852518

*

A Microsoft Excel spreadsheet

Use only that temperature and pH column which applies to the input data

T = Temperature, °C; TCAP = Temperature Cap, °C

**

pKa: -log K; K is equilibrium constant for ammonium

f is the fraction of unionized NH₃/(Total NH₃+NH₄)

Table 5.1-8
WATER QUALITY CRITERIA FOR
AMBIENT DISSOLVED OXYGEN CONCENTRATION^{1,2}

	Beneficial Use Class	
	COLD & SPWN ³	COLD
30 Day Mean	NA ⁴	6.5
7 Day Mean	9.5 (6.5)	NA
7 Day Mean Minimum	NA	5.0
1 Day Minimum ^{5,6}	8.0 (5.0)	4.0

¹ From: USEPA. 1986. Ambient water quality criteria for dissolved oxygen. Values are in mg/L.

² These are water column concentrations recommended to achieve the required intergravel dissolved oxygen concentrations shown in parentheses. For species that have early life stages exposed directly to the water column (SPWN), the figures in parentheses apply.

³ Includes all embryonic and larval stages and all juvenile forms to 30-days following hatching (SPWN).

⁴ NA (Not Applicable).

⁵ For highly manipulatable discharges, further restrictions apply.

⁶ All minima should be considered as instantaneous concentrations to be achieved at all times.

5.2 WASTE DISCHARGE PROHIBITIONS

The following is a listing of waste discharge prohibitions applicable within the Lake Tahoe Hydrologic Unit (Figure 5-3). These include both regionwide prohibitions and prohibitions specifically applicable to the Lake Tahoe Hydrologic Unit (HU). The texts of prohibitions and exemption criteria applicable to portions of the Truckee River HU within the Tahoe Regional Planning Agency's jurisdiction are also included. "Waste" is defined to include any waste or deleterious material, including, but not limited to, waste earthen materials (such as soil, silt, sand, clay, rock, or other organic or mineral material) and any other waste as defined in the California Water Code Section 13050(d). A short summary of these prohibitions (Table 5.8-1) is included with the discussion of development restrictions, below, for reference.

Regionwide Prohibitions

1. The discharge of waste which causes violation of any narrative water quality objective contained in this Plan, including the Nondegradation Objective, is prohibited.
2. The discharge of waste which causes violation of any numeric water quality objective contained in this Plan is prohibited.
3. Where any numeric or narrative water quality objective contained in this Plan is already being violated, the discharge of waste which causes further degradation or pollution is prohibited.
4. Direct discharges of wastes, including sewage, garbage, and litter, into surface waters of the Region are prohibited.

Regionwide Exemption Criteria for Restoration Projects

The Regional Board encourages restoration projects that are intended to reduce or mitigate existing sources of soil erosion, water pollution, or impairment of beneficial uses. For waste earthen materials discharged as a result of restoration projects, exemptions to the prohibitions above, and all other prohibitions contained in this Basin Plan, may be granted by the Regional Board whenever it finds that a specific project meets all of the following criteria:

1. The project will eliminate, reduce, or mitigate existing sources of soil erosion, water pollution, and/or impairment of beneficial uses of water, *and*
2. There is no feasible alternative to the project that would comply with the provisions of this Basin Plan, precluding the need for an exemption, *and*
3. Land disturbance will be limited to the absolute minimum necessary to correct or mitigate existing sources of soil erosion, water pollution, and/or impairment of beneficial uses of water, *and*
4. All applicable Best Management Practices and mitigation measures have been incorporated into the project to minimize soil erosion, surface runoff, and other potential adverse environmental impacts, *and*
5. The project complies with all applicable laws, regulations, plans, and policies, *and*
6. Additional exemption criteria apply to restoration projects proposed within the Lake Tahoe Basin. To the extent that they are more stringent, the Lake Tahoe Basin criteria supersede the regionwide criteria, above.

Considerations for Water Reclamation Projects

The Regional Board encourages the reuse of treated domestic wastewater, and desires to facilitate its reuse (see Section 4.4). The need to develop and use reclaimed water is one factor the Regional Board will evaluate when considering exemption requests to waste discharge prohibitions. (For special water reclamation provisions applicable in the Lake Tahoe Basin, see 5.c. below.)

Discharge Prohibitions for the Lake Tahoe Hydrologic Unit (HU)

1. The discharge of wastes from boats, marinas, or other shoreline appurtenances to surface waters of the Lake Tahoe HU is prohibited.
2. The discharge of any waste or deleterious material to surface waters of the Lake Tahoe HU is prohibited.
3. The discharge of waste earthen material or of any other waste as defined in Section 13050(d) of the California Water Code which would violate the water quality objectives of this plan, or otherwise adversely affect the beneficial uses of water designated by this plan, is prohibited.

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4. The discharge of treated or untreated domestic sewage, industrial waste, garbage or other solid wastes, or any other deleterious material to the surface waters of the Lake Tahoe Basin is prohibited. (Also see Sections 4.1 and 4.4 of this plan.)
5. Prohibition 4 above applies to surface waters. The following language from the Porter-Cologne Act also prohibits the disposal of municipal wastewater to ground waters and requires export of sewage from the Lake Tahoe Basin, with limited exceptions:
 - a. *"Notwithstanding any other provision of law, upon any district in the Lake Tahoe Basin providing in any area of the district a sewer system and treatment facilities sufficient to handle and treat any resultant waste and transportation facilities sufficient to transport any resultant effluent outside the Lake Tahoe Basin, the further maintenance or use of cesspools or other means of waste disposal in such area is a public nuisance and the district shall require all buildings from which waste is discharged to be connected with the sewer system within a period of not less than 90 days from the completion of such system and facilities."* (Porter-Cologne Act § 13950, effective January 1, 1970)
 - b. *"Notwithstanding any other provision of law, on or after January 1, 1972, waste from within the Lake Tahoe watershed shall be placed only into a sewer system and treatment facilities sufficient to handle and treat any such waste and transportation facilities sufficient to transport any resultant effluent outside the Lake Tahoe watershed, except that such waste may be placed in a holding tank which is pumped and transported to such treatment and transportation facilities."*

As used in this section 'waste' shall not include solid waste refuse.

The further maintenance or use of cesspools, septic tanks, or other means of waste disposal in the Lake Tahoe watershed on or after January 1, 1972, by any person, except as permitted pursuant to this section, is a public nuisance. The occupancy of any building from which waste is discharged in violation of this section is a public nuisance,

and an action may be brought to enjoin any person from occupying any such building.

This section shall not be applicable to a particular area of the Lake Tahoe watershed whenever the Regional Board for the Lahontan Region finds that the continued operation of septic tanks, cesspools, or other means of waste disposal in such area will not, individually or collectively, directly or indirectly, affect the quality of the waters of Lake Tahoe and that the sewerage of such area would have a damaging effect upon the environment.

This section shall not be applicable to any area or areas within the Fallen Leaf Lake watershed in the event the Regional Board for the Lahontan Region finds that with the export of toilet wastes by single family residences, or with the export of toilet and kitchen wastes with respect to any commercial properties, the continued use of septic tanks, cesspools, or other means of waste disposal in such area or areas for the treatment and disposal of the remaining wastes, will not, individually or collectively, directly or indirectly, affect the quality of the waters of Lake Tahoe, and that the sewerage of such area or areas would have a damaging effect upon the environment.

This section shall not affect the applicability of Section 13950." (CA Water Code § 13951, effective September 2, 1969; amended 1975)

(Most development within the Fallen Leaf Lake watershed is now sewered. See the section of this Chapter on wastewater treatment, export, and disposal for additional discussion of Regional Board exceptions for wastewater disposal by unsewered structures in remote areas of the Fallen Leaf Lake watershed, and in some other parts of the Lake Tahoe Basin. See Appendix B for copies of Orders 6-70-48, 6-71-17, and 6-74-139 regarding sewage export variances for the Lake Tahoe Basin.)

- c. *"Notwithstanding the provisions of Sections 13950 and 13951, water containing waste which has been placed in a sanitary sewer system for treatment and transportation outside of the Lake Tahoe Basin may be reclaimed in a pilot reclamation project to demonstrate the technical and environmental*

5.2, Waste Discharge Prohibitions

feasibility of using such water for beneficial purposes within the Lake Tahoe Basin in accordance with the provisions of the Water Reclamation Law...and the provisions of this section.

Prior to the initiation of any pilot reclamation project within the Lake Tahoe Basin, the reclaimer or reuser shall submit the project with technical data to the Regional Board for the Lahontan Region for approval. Only those projects submitted before January 1, 1984, shall be considered. The technical data submitted shall demonstrate that such pilot reclamation project will not, individually or collectively, directly or indirectly, adversely affect the quality of the waters of Lake Tahoe. The intended operational life of the project shall be at least 10 years.

No pilot reclamation project shall be initiated unless and until such Regional Board approves the project, and finds that such pilot reclamation project or projects will not, individually or collectively, directly or indirectly, adversely affect the quality of the waters of Lake Tahoe. The Regional Board for the Lahontan Region shall place conditions on any approved project to include specification of maximum project size. The Regional Board for the Lahontan Region may suspend or terminate an approved project for cause at any time.” (Porter-Cologne Act § 13952, added in 1978.)

(Only one reclamation proposal, from the South Tahoe Public Utility District, was received by the January 1, 1984 deadline.)

6. The prohibition in Porter-Cologne Act § 13951, cited above, excluded discharges of solid waste. The State Board adopted the following additional prohibition in 1980:

The discharge of garbage or other solid waste to lands within the Lake Tahoe Basin is prohibited.

The State Board also stated that “No discharge of industrial waste within the Lake Tahoe Basin should be allowed.”

7. The discharge, attributable to human activities, of solid or liquid waste materials, including soil, silt, clay, sand and other organic and earthen materials, to the surface waters of the Lake Tahoe Basin, is prohibited.

8. The discharge, attributable to human activities, of solid or liquid waste materials, including soil, silt, clay, sand and other organic and earthen materials to lands below the highwater rim of Lake Tahoe or within the 100-year floodplain of any tributary to Lake Tahoe is prohibited.

(See the sections of this Chapter on 100-year floodplain protection, shorezone protection, and development restrictions for discussion of the applicability of and exemption criteria for this prohibition.)

9. The threatened discharge, attributable to human activities, of solid or liquid waste materials including soil, silt, clay, sand, and other organic and earthen materials, due to the placement of said materials below the highwater rim of Lake Tahoe or within the 100-year floodplain of any tributary to Lake Tahoe, is prohibited.

(See the sections of this Chapter on 100-year floodplain protection, shorezone protection, and development restrictions for discussion of the applicability of and exemption criteria for this prohibition.)

10. The discharge or threatened discharge, attributable to new pier construction, of solid or liquid wastes, including soil, silt, sand, clay, rock, metal, plastic, or other organic, mineral, or earthen materials, to significant spawning habitats or to areas immediately offshore of important stream inlets in Lake Tahoe is prohibited.

(The applicability of this prohibition is discussed in the subsection on “Piers” within the section of this Chapter on water quality problems related to outdoor recreation.)

The applicability of, and exemption criteria for, Prohibitions 11-14 below are discussed in the sections of this Chapter on Stream Environment Zone protection, development restrictions, and remedial projects and offset. Definitions of terms used in these prohibitions are given following Prohibition 14.

11. The discharge or threatened discharge, attributable to development of any new subdivision, of solid or liquid waste, including soil, silt, sand, clay, or other organic or earthen material, to ground or surface waters in the Lake Tahoe Basin is prohibited.

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12. The discharge or threatened discharge, attributable to new development in Stream Environment Zones or which is not in accordance with land capability, of solid or liquid waste, including soil, silt, sand, clay, or other organic or earthen material, to ground or surface waters in the Lake Tahoe Basin is prohibited.
13. The discharge or threatened discharge, attributable to new development in Stream Environment Zones, of solid or liquid waste, including soil, silt, sand, clay, rock, metal, plastic, or other organic, mineral or earthen materials, to Stream Environment Zones in the Lake Tahoe Basin is prohibited.
14. The discharge or threatened discharge attributable to new development not in accordance with the offset policy set by the *Lake Tahoe Basin Water Quality Plan* and/or the offset requirements summarized in the section of this Chapter entitled "Remedial Programs and Offset," of solid or liquid waste, including soil, silt, sand, clay or other organic or earthen material, to ground or surface waters in the Lake Tahoe Basin is prohibited.

Prohibitions 11 through 14 above shall not apply to any structure the Regional Board approves as reasonably necessary:

- for erosion control projects, habitat restoration projects, wetland rehabilitation projects, Stream Environment Zone restoration projects, and similar projects, programs, and facilities,
- to carry out the 1988 TRPA regional transportation plan,
- for health, safety, or public recreation, or
- for access across SEZs to otherwise buildable parcels.

Approvals of exemptions shall include the specific findings set forth in the section of this Chapter on development restrictions.

As used in Prohibitions 11 through 14, a discharge is "ATTRIBUTABLE" to development of the type addressed by a discharge prohibition listed above if and only if that development results in a discharge in excess of that which would result from development which is not of the type addressed by the discharge prohibition, and is otherwise in conformance with the other control measures set forth in Chapters 4 and 5 of the *Water Quality Control Plan for the Lahontan*

Region, and applicable requirements of any public agency.

"NEW DEVELOPMENT" as used in Prohibitions 11 through 14, above, means the construction of any structure, including any commercial or residential building, road, driveway or other impervious surface, or any other construction activity resulting in permanent soil disturbance, which had not received all necessary permit approvals before adoption of these prohibitions (before October, 1980). "New Development" does not include maintenance or repair of an existing structure or the replacement of any existing structure with another structure on the same parcel of no greater land coverage. (Relocation of land coverage on the same parcel is subject to specific relocation criteria.)

"NEW DEVELOPMENT NOT IN ACCORDANCE WITH LAND CAPABILITY," as used in Prohibition 12 above, means new development which results in an impervious surface or other land disturbance in excess of the allowable percentage of impervious cover set forth in R. Bailey, *Land Capability Classification of the Lake Tahoe Basin, California-Nevada* (1974). In the case of development within an existing subdivision where all necessary subdivision roads and utilities have been constructed, development within a particular parcel shall not be considered in excess of allowable coverage where:

- Land coverage or land disturbance within that particular lot or parcel does not exceed allowable coverage; or
- Coverage has been allocated among all lots or parcels within the subdivision so that total land coverage or land disturbance within the subdivision—taking into account all roads, utilities, existing structures, and disturbed areas, allocations to vacant lots or parcels, and areas dedicated to open space—does not exceed allowable coverage,
- Coverage is allocated on an areawide basis within a redevelopment area, as defined by an approved redevelopment plan meeting the requirements of California law.
- Maximum coverage is in conformance with the requirements of the TRPA Regional Plan (TRPA 1987) and the revised 208 Plan (TRPA 1988), including the coverage rules set forth later in this Chapter.

“NEW DEVELOPMENT NOT IN ACCORDANCE WITH THE OFFSET POLICY/OFFSET REQUIREMENTS” as used in Prohibition 14, above, means any new development for which mitigation work has not been performed or for which water quality mitigation fees have not been paid as required by the TRPA Code of Ordinances, Chapter 82.

“NEW SUBDIVISION,” as used in Prohibition 11 above, means any new development involving the division of any lot or parcel into two or more lots or condominiums which: “(1) results in impervious surface or other soils disturbance in excess of that which would be allowable under these prohibitions or any applicable land use ordinance if the lot or parcel were not divided; or (2) which would create new development potential inconsistent with the goals and policies of the TRPA Regional Plan.” Examples of land divisions which do not constitute new subdivisions under the revised 208 Plan are listed in the section of this Chapter on development restrictions, below. “NEW SUBDIVISION,” as used in Prohibition 11 above, also means any housing development involving construction of new roads and utilities which has the same type of water quality impacts as a new lot and block subdivision, even if the property remains under single ownership.

“STATE BOARD” means the California State Water Resources Control Board.

“REGIONAL BOARD” means the California Regional Water Quality Control Board, Lahontan Region.

“STREAM ENVIRONMENT ZONE,” as used in Prohibitions 12 and 13, above, means any areas which can be identified as a “stream environment and related hydrologic zone” using the procedures set forth in the revised 208 Plan (TRPA 1988, Vol. III, pages 10-15). (The criteria for identification of Stream Environment Zones and related setbacks are summarized in the section of this Chapter on resource protection and restoration.)

Discharge Prohibitions for the Portions of the Truckee River Hydrologic Unit Affected by the TRPA 208 Plan

In addition to the regionwide discharge prohibitions above, the Lahontan Regional Board implements the following discharge prohibitions and exemption criteria within the Truckee River HU between the Lake Tahoe Dam and the confluence of the River with Bear Creek. TRPA implements a different set of land use restrictions and exemption criteria for SEZs and 100-year floodplains in this area.

The following prohibition language has been edited to isolate language applicable to the portion of the Truckee River HU within TRPA's jurisdiction, and to provide clarification. Section 4.1 of this Basin Plan contains the complete prohibition language applicable to the entire Truckee River HU (Figure 5-4).

1. The discharge of wastes from boats, marinas or other shoreline appurtenances to surface waters of the Truckee River HU is prohibited.
2. The discharge of any waste or deleterious material to surface waters of the Truckee River HU is prohibited.
3. The discharge of any waste or deleterious material in the Truckee River HU, which would cause or threaten to cause violation of any water quality objective contained in this plan, or otherwise adversely affect or threaten to adversely affect, the beneficial uses of water set forth in this Plan, is prohibited.
4. The discharge of treated or untreated domestic sewage, industrial waste, garbage or other solid wastes, or any other deleterious material to surface waters of the Truckee River HU is prohibited.
5. Discharge of wastewater or wastewater effluent resulting in an average total nitrogen concentration in the (undiluted) wastewater exceeding 9-mg/l entering the Truckee River or any of its tributaries above the Boca Reservoir outlet confluence is prohibited.
6. Further discharge from the secondary wastewater treatment facilities of the Tahoe City Public Utility District and North Tahoe Public Utility District is prohibited (Figure 5.2-1).
7. No discharge of domestic wastewater to individual facilities such as septic tank-leachfield systems shall be permitted for any subdivisions (as defined by the Subdivision Map Act, Government Code § 66424) which did not discharge prior to October 16, 1980. This prohibition shall apply to all areas where underlying ground waters are tributary to the Truckee River or any of its tributaries above the confluence of the Boca Reservoir Outlet and the Truckee River (Figure 5.2-2). **Note:** TRPA's land use restrictions against new subdivisions, adopted in 1987, apply to the portion of the Truckee River HU within its jurisdiction. TRPA

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also requires new development to be served by sewers.

An exemption to this prohibition may be granted whenever the Regional Board finds (based on geologic and hydrologic evidence presented by the proposed discharger) that operation of individual domestic wastewater facilities in a particular area will not, individually or collectively, directly or indirectly, adversely affect water quality or beneficial uses of water. (See Appendix B for a copy of Order 6-81-7 which describes a point system used by the Regional Board for evaluating requests for exemptions to this prohibition.)

There are some vacant lots within the portion of the Truckee River HU where the 208 Plan applies which were subdivided prior to the effective date of Prohibition 3, above. The exclusion of these lots from Prohibition 3 is not a mandate for buildout of these lots using septic systems. TRPA requires that new development within its jurisdiction be served by a sewer system.

8. Once sewer lines are installed in a subdivision or area, discharge of wastes or wastewater to individual systems (such as septic tank-leachfield systems) from all new dwellings constructed or installed within 200 feet of the sewer line shall be prohibited.
9. Continued onsite discharge of septic tank effluent from structures within 200 feet of any existing sewer line connecting to the Tahoe-Truckee Sanitation Agency (TTSA), including the Truckee River Interceptor, where a septic tank-leachfield system is found to function improperly at any time, and/or where septic tank-leachfield construction is found to be in violation of the minimum criteria listed in Chapter 4 of this Plan, is prohibited.
10. The discharge, or threatened discharge, attributable to human activities, of solid or liquid waste materials, including soil, silt, clay, sand and other organic and earthen materials to lands within the 100-year floodplain of the Truckee River or any tributary to the Truckee River is prohibited.

The following are Regional Board exemption criteria for this discharge prohibition. Applicants should be aware that TRPA has separate exemption criteria for its land use restrictions on

Stream Environment Zone and 100-year floodplain disturbance.

The Regional Board may grant exemptions to Prohibition 10 above for the repair or replacement of existing structures, provided that the repair or replacement does not involve the loss of additional floodplain area or volume. For example, if a building or residence is damaged or destroyed by fire, flooding, etc., the pre-existing structure could be repaired or a structure of identical or smaller size could be rebuilt on the same site. Prior to granting any such exemption, the Regional Board shall require demonstration by the proposed discharger that all applicable Best Management Practices and mitigation measures have been incorporated into the project to minimize any potential soil erosion and/or surface runoff problems.

The Regional Board may also grant exemptions to Prohibition 10 above for the following categories of new projects:

- (1) Projects solely intended to reduce or mitigate existing sources of erosion or water pollution, or to restore the functional value to previously disturbed floodplain areas
- (2) Bridge abutments, approaches, or other essential transportation facilities identified in an approved county general plan
- (3) Projects necessary to protect public health or safety or to provide essential public services
- (4) Projects necessary for public recreation
- (5) Projects that will provide outdoor public recreation within portions of the 100-year floodplain that have been substantially altered by grading and/or filling activities which occurred prior to June 26, 1975 (the effective date of Prohibition 10 above).

An exemption to Prohibition 10 above may be allowed for a specific new project only when the Regional Board makes all of the following findings:

- The project is included in one or more of the five categories listed above.
- There is no reasonable alternative to locating the project or portions of the project within the 100-year floodplain.

5.2, Waste Discharge Prohibitions

- The project, by its very nature, must be located within the 100-year floodplain. (This finding is not required for those portions of outdoor public recreation projects to be located in areas that were substantially altered by grading and/or filling activities before June 26, 1975.) The determination of whether a project, by its very nature, must be located in a 100-year floodplain shall be based on the kind of project proposed, not the particular site proposed. Exemptions for projects such as recreational facility parking lots and visitor centers, which by their very nature do not have to be located in a 100-year floodplain, will not be allowed in areas that were not substantially altered by grading and or filling prior to June 26, 1975.
- The project incorporates measures which will insure that any erosion and surface runoff problems caused by the project are mitigated to levels of insignificance.
- The project will not, individually or cumulatively with other projects, directly or indirectly, degrade water quality or impair beneficial uses of water.
- The project will not reduce the flood flow attenuation capacity, the surface flow treatment capacity, or the ground water flow treatment capacity from existing conditions. This shall be ensured by restoration of previously disturbed areas within the 100-year floodplain within the project site, or by enlargement of the floodplain within or as close as practical to the project site. The restored, new or enlarged floodplains shall be of sufficient area, volume, and wetland value to more than offset the flood flow attenuation capacity, surface flow treatment capacity, and ground water flow treatment capacity lost by construction of the project. This finding will not be required for: (1) essential public health or safety projects, (2) projects to provide essential public services for which the Regional Board finds such mitigation measures to be infeasible because the financial resources of the entity proposing the project are severely limited, or (3) projects for which the Regional Board finds (based on evidence presented by the proposed

discharger) that the project will not reduce the flood flow attenuation capacity, the surface flow treatment capacity, or the ground water flow treatment capacity from existing conditions.

Definitions:

“Necessary” shall mean when the appropriate government agency findings that a project is needed to protect public health and safety, to provide essential service, or for public recreation.

“Public recreation” shall mean a project which can be enjoyed by an entire community or neighborhood, or a considerable number of persons. In previously altered floodplain areas (defined as floodplain areas where soils, vegetation and hydrology are found by the Regional Board to have been substantially altered by human activities which occurred prior to June 26, 1975) “public recreation” is limited to public outdoor recreation facilities and/or activities such as hiking trails, bike paths, and similar recreation facilities/activities which do not involve construction of buildings or similar structures.

The Regional Board has delegated authority to the Executive Officer to grant exceptions to Prohibition 10 above, for the Truckee River watershed, for specific discharges where the proposed project meets the conditions required for a waiver of waste discharge requirements or for approval under general waste discharge requirements or a general NPDES permit, under the following circumstances:

- (1.) the project is within the following specific size limitations:
 - less than 1000 square feet of new impervious coverage, or
 - less than 2000 square feet of new ground disturbance, or
 - less than 100 cubic yards of fill or excavation; **or**
- (2.) the project’s primary purpose is to reduce, control, or mitigate existing sources of erosion or water pollution; **and**
- (3.) the project meets the exemption criteria set forth in this section of the Basin Plan.

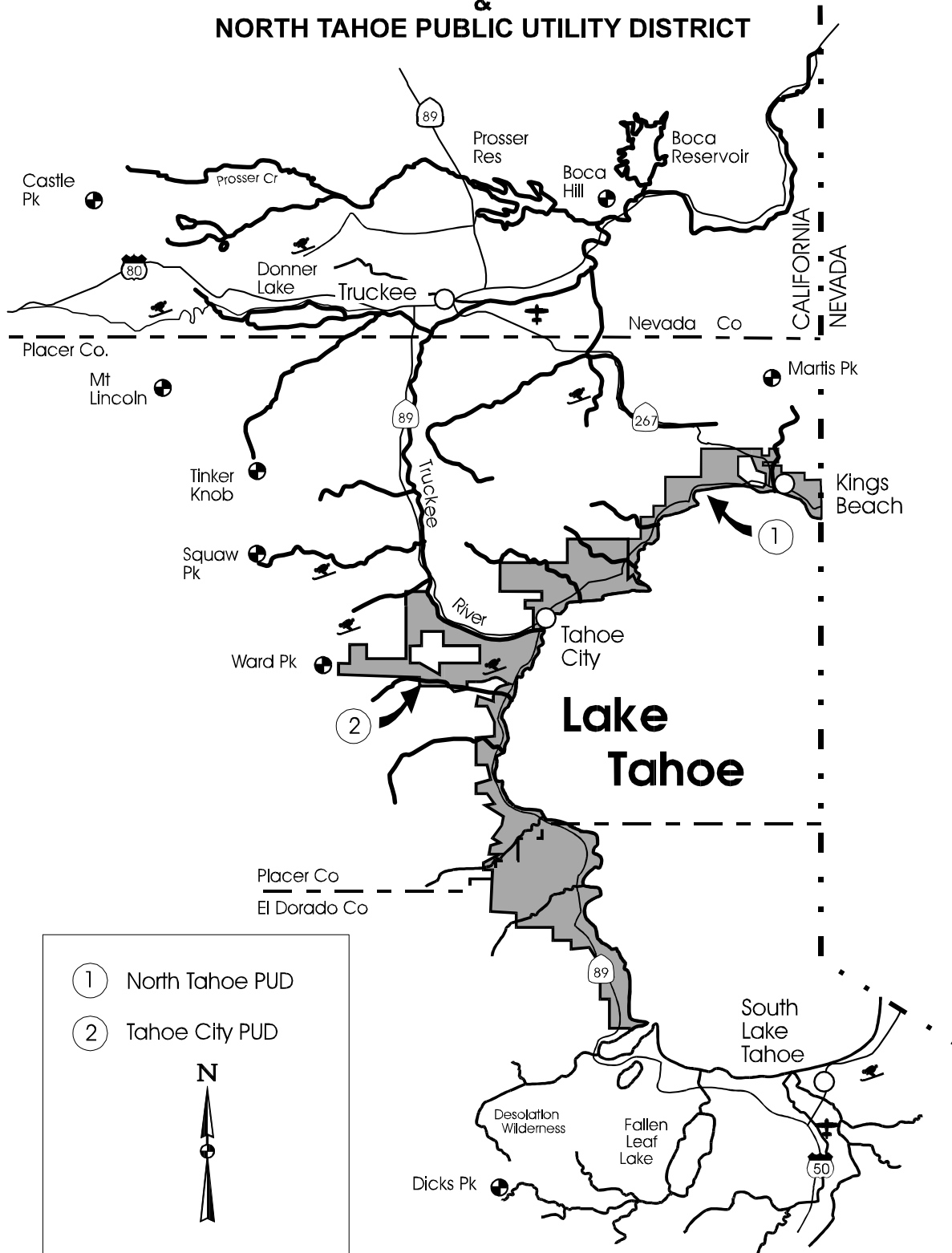
Except in emergency situations, the Executive Officer shall notify the Board and interested members of the public of his intent to issue an exemption subject to

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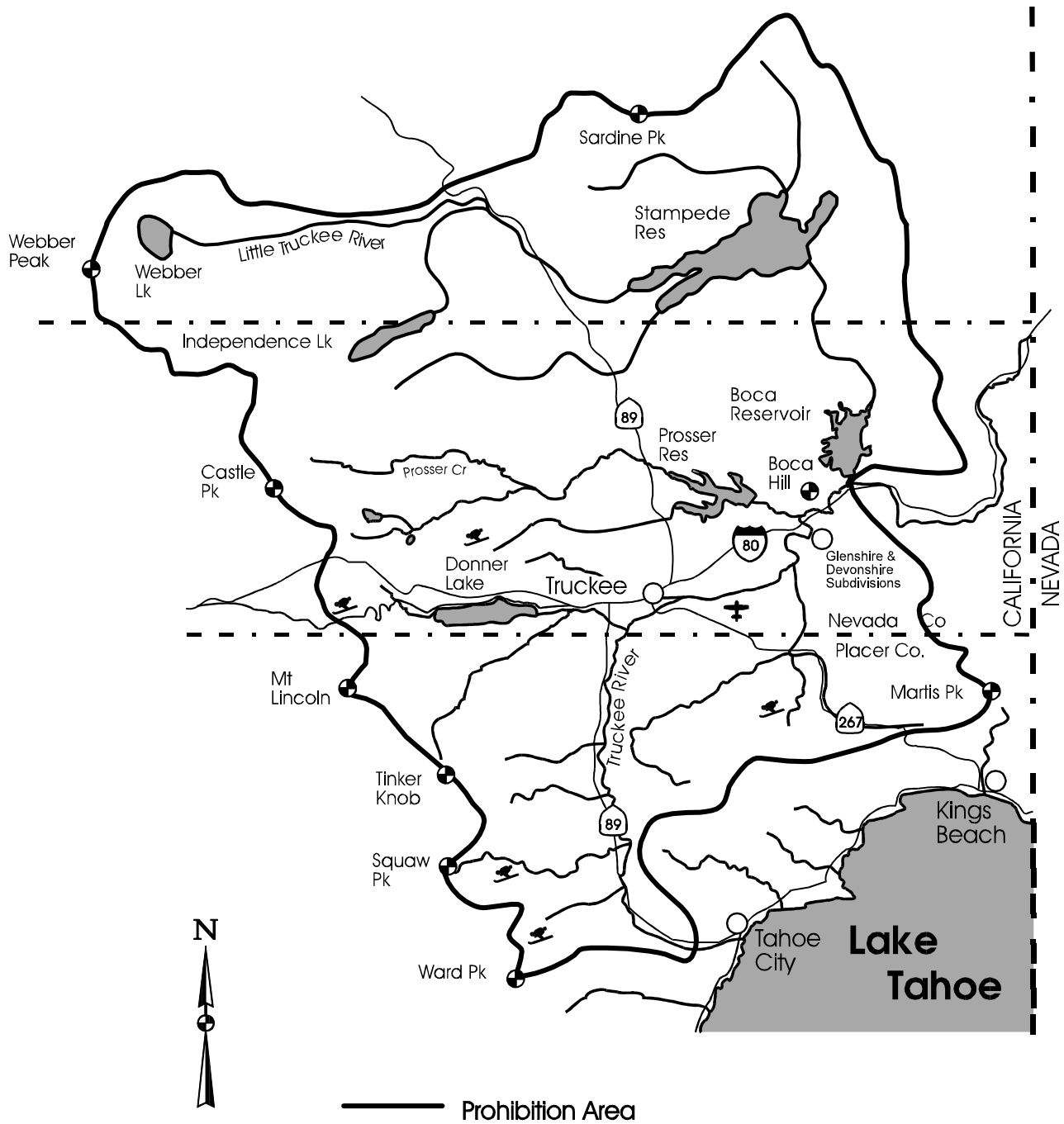
this Resolution at least ten (10) days before the exemption is issued. A notice of the exemption will also be published seven (7) days prior to issuance to allow for public comments. All comments received and staff's response to the comments will be forwarded to the Board with the proposed exemption. Any Regional Board member may direct that an exception not be granted by the Executive Officer and that it be scheduled for consideration by the Regional Board.

A Report of Waste Discharge shall be filed for any discharge for which approval is sought from the Executive Officer. Discharge from a project cannot commence until such time as the Regional Board Executive Officer has prepared and sent a letter to the applicant indicating that an exemption to the Basin Plan prohibitions is granted and that waste discharge requirements for the project are waived, or that General Waste Discharge Requirements are applicable. The Regional Board's action delegating authority to the Executive Officer to grant exemptions is conditional and the Executive Officer may recommend that certain exemption requests be considered by the Regional Board. Also see Appendix B for a copy of Resolution 6-90-22 describing conditions under which the Executive Officer can grant exceptions.

**Figure 5.2-1
TAHOE CITY PUBLIC UTILITY DISTRICT
&
NORTH TAHOE PUBLIC UTILITY DISTRICT**



**Figure 5.2-2
TRUCKEE RIVER AND TRIBUTARIES ABOVE
THE BOCA OUTLET CONFLUENCE**



5.3 BEST MANAGEMENT PRACTICES

As noted in the introduction to Chapter 4 of this Basin Plan, Best Management Practices (BMPs) are:

“methods, measures, or practices selected by an agency to meet its nonpoint source control needs. BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during and after pollution producing activities to reduce or eliminate the introduction of pollutants into receiving waters”

(40 CFR § 103.2[m])

The State Water Resources Control Board has historically certified BMPs for use in California as part of its approval of water quality management plans prepared by other agencies, although they can be approved separately. The State Board's 1988 *Nonpoint Source Management Plan* stresses voluntary implementation of BMPs as an initial approach, with regulatory Regional Board action to require use of BMPs if necessary to protect water quality. The use of BMPs is required under stormwater NPDES permits, although the State and Regional Boards cannot specify the particular BMPs to be selected. Because of the sensitivity of Lake Tahoe and tributary waters, the State Board adopted the following mandatory requirement for BMPs in 1980:

“For construction in the Tahoe Basin allowed under this plan, the structures or facilities built must incorporate best management practices to control erosion and surface runoff.”

Specific examples of BMPs given were slope stabilization, protective surface cover or vegetation, and adequate drainage facilities.

This Basin Plan continues the 1980 requirement for BMPs, and the endorsement of the Tahoe Regional Planning Agency's *Handbook of Best Management Practices*, which was revised in 1988 and certified as part of the current 208 Plan (Volume II). Most practices in the Handbook are concerned directly with erosion and stormwater control, but it also addresses other topics such as dredging and antifouling coatings on boats.

The TRPA BMP Handbook incorporates most of the BMPs related to forest practices in the USFS's

statewide 208 Plan (USFS 1979) which has also been certified by the State Board. Although there is no specific BMP Handbook, Caltrans has agreed under its statewide 208 Plan and MAA to develop and use BMPs in highway work. The State Board has **not** certified the Board of Forestry's Forest Practice Rules as BMPs for timber harvest activities on private lands in the Lake Tahoe Basin. However, the Forest Practice Rules apply in the Lake Tahoe Basin, for all commercial timber harvest operations on private or State land, just as they apply to other areas of California.

The use of BMPs does **not** provide assurance of compliance with state effluent limitations. Compliance with water quality discharge standards can only be determined on a site-by-site basis (208 Plan, Vol. VI, page 123).

The Regional Board may consider approval of alternative management practices for use in specific projects on a case-by-case basis. TRPA may also approve alternative “BMPs” to meet water quality standards when special circumstances occur. Such circumstances may include but are not limited to: streets, highways, and bike trails, existence of high water tables, unusual upstream or downstream flow conditions, and the presence of unusual concentrations of pollutants. More recent handbooks prepared for other agencies (APWA Task Force 1993, USEPA 1993) summarize management practices which could be considered as alternatives to TRPA BMPs in some situations.

The BMP Handbook also specifies (page 5) that:

“the use of a practice not contained in the Handbook should be demonstrated to the satisfaction of the permit-issuing authority to be equal or better in achieving the runoff quality guidelines than the use of methods or practices presented herein. Since no one BMP is 100 percent effective, usually more than one practice must be applied to the problem. Selection of combinations of practices must be based upon analysis of specific site conditions.”

One very important BMP which both the Regional Board and TRPA require to be implemented is the regional grading deadline. Grading, filling, and clearing of vegetation which disturbs soil, and other disturbances of soil are prohibited during inclement weather and for the resulting period of time when the site is covered with snow or in a saturated, muddy or unstable condition. Special regulations and construction techniques will apply to construction activities occurring between October 15 and May 1. All project sites must be adequately winterized by

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October 15 as a condition for continued work on the site. Exceptions will be permitted in emergency situations where grading is necessary for reasons of public safety or erosion control (208 Plan, Vol. I, page 125).

The BMP Handbook also contains the regional stormwater runoff effluent limitations (Table 5.6-1) and specifies the 20-year, 1-hour design storm for stormwater control facilities (see the section of this Chapter on stormwater problems).

The Preface to TRPA's BMP Handbook indicates that it is meant to be used in conjunction with other portions of the 208 Plan and with TRPA's Code of Ordinances (TRPA 1987). Applicable ordinances include Chapter 25 on general installation of BMPs, Chapter 54 on standards and provisions for installation of shorezone BMPs, Chapter 64 on grading, Chapter 65 on vegetation protection during construction, Chapter 71 on timber harvest activities, Chapter 73 on livestock grazing, Chapter 78 on wildlife habitat protection, and Chapter 79 on fish habitat protection.

Monitoring data for remedial erosion and drainage control projects, and several ongoing grant-funded special studies of BMP effectiveness in the Lake Tahoe Basin, will allow better evaluation of BMPs in the future, and may indicate the need for more revisions in the current Handbook. TRPA has made a commitment to submit changes or additions to the BMP Handbook to the States and (the USEPA) for certification and approval as 208 Plan amendments, except for minor editorial revisions, updates, and additional diagrams and illustrations.

The Lahontan Regional Board requires the use of BMPs in its waste discharge permits for new Tahoe Basin projects, and may issue waste discharge permits to require the "retrofit" of BMPs to existing developed or disturbed sites which are causing water quality problems. Retrofit is also addressed in the areawide municipal stormwater NPDES permits (see the discussions of stormwater permits and "offset" programs later in this Chapter). The Regional Board prefers that detailed, design-level mitigation proposals, including proposed BMPs, be submitted as early as possible in the review process for waste discharge permits.

Under TRPA's Regional and 208 Plans, all persons who own land, and all public agencies which manage public land, are required to install and maintain BMPs. The 208 Plan requires that TRPA permits for new projects which modify structures or establish land

coverage shall require application of BMPs to the area affected by the project. As part of its permitting process, TRPA also requires the preparation of a plan and schedule for retrofit of BMPs to the remainder of the parcel. The amount of retrofit required at the time of project approval is based on the cost and nature of the project (208 Plan Vol. I, pages 110-111 and 228).

BMPs for specific types of water quality problems (e.g., problems associated with livestock grazing) are discussed in greater detail in separate sections of this Chapter, below.

5.4 LAND CAPABILITY AND COVERAGE LIMITATIONS

In 1980, the State Board determined that limits on land disturbance and impervious surface coverage are necessary to prevent further increases in nutrient loading to Lake Tahoe from erosion and stormwater runoff. These limits are implemented largely through the land capability system and associated land use restrictions and discharge prohibitions. The Tahoe Regional Planning Agency implements a complex set of land coverage rules through the 208 Plan and its regional plan ordinances (TRPA 1987).

A system developed by the USFS in 1971, in cooperation with TRPA, provides a relative quantification of tolerance of land in the Lake Tahoe Basin to human disturbance (Bailey 1974). The Lake Tahoe Basin land capability system should not be confused with the U.S. Department of Agriculture system used to classify the suitability of agricultural lands for growing crops. It should also not be confused with the more recent USFS "Cumulative Watershed Effects" methodology (USFS 1988), which provides a different way to assess the sensitivity of watersheds to disturbance (see the discussion of ski areas later in this Chapter).

The land coverage rules summarized in this section are implemented through land use permits issued by TRPA and local governments, and may be implemented through waste discharge permits issued by the Regional Board.

Land Capability

Factors evaluated in determining land capability classification include geomorphology, hazards from floods, high water tables, poorly drained soils, landslides, fragile flora and fauna, soil erodibility, and slope steepness. All of these factors affect sediment generation from an area following disturbance. The criteria used to assign lands to different land capability classes are shown in Table 5.4-1. The 208 Plan (Vol. I) contains a more detailed discussion of Tahoe Basin soils and geomorphology.

Verification of Land Capability Classifications

TRPA has adopted land capability maps as part of its regional land use plan (TRPA 1987). The U.S. Soil Conservation Service soils maps which form the basis of the land capability maps do not have

sufficient resolution to identify soils on parcels which are typically 1/3 acre or less (208 Plan, Vol. I, page 5). Field verification is necessary to determine the true land capability classification of individual parcels or project areas. In its field surveys of more than 12,000 vacant single family residential parcels to assign scores under the Individual Parcel Evaluation System (IPES, discussed below), TRPA has also determined their Bailey land capability classifications. The Bailey land capability system is used for other types of development, and verification of onsite land capability classification under the is done on a project-by-project basis.

TRPA's regional land use plan establishes procedures for "land capability challenges," under which a landowner who believes that the capability of his parcel has been wrongly mapped or field-verified can appeal the classification to TRPA. The TRPA Governing Body may, after reviewing information provided by the landowner's and TRPA's technical consultants, decide to change the land capability classification of the parcel. In some cases, land capability challenges for larger areas may result in amendments to the land capability maps.

While California's water quality control programs include discharge prohibitions related to the land capability system, the State and Regional Boards have not formally adopted TRPA's land capability maps as part of their State water quality plans. Regional Board staff generally accept TRPA's use of these maps and its field verifications of land capability classification, rather than taking the time to do independent field verifications. However, if a technical disagreement occurs, the Regional Board may evaluate the site-specific data independently against the criteria of the Bailey system.

"Man-Modified" Determinations

The 1980 *Lake Tahoe Basin Water Quality Plan* included the concepts that some Stream Environment Zones (SEZs) might have been so altered by human activities that they would no longer function as SEZs, and that under certain circumstances such SEZs could be assigned another land capability classification and allowable impervious surface coverage for development. The Regional Board reclassified the Tahoe Keys subdivision and some nearby properties under these criteria. TRPA also developed "man-modified SEZ" reclassification procedures. In its 1987 land use plan and 1988 208 Plan, TRPA extended the "man-modified" concept to allow reclassification of the land capability of any parcel which has been so changed by human activities that it now exhibits the

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characteristics of another class, if certain findings can be made. Thus an originally steep Class 2 parcel which had been disturbed by quarrying might be reclassified to Class 6 or 7. The major impact of such a reclassification would be to increase the allowable “base coverage” (see the discussion of land coverage rules, below).

The Lahontan Regional Board implements discharge prohibitions related to the land capability system and the protection of SEZs, which are similar to but separate from the land use prohibitions implemented by TRPA. (See the discussion of development restrictions later in this Chapter.) The Regional Board must therefore approve “man-modified” reclassifications separately from TRPA. Although TRPA may consider “man-modified” reclassifications as part of its land capability map amendment process, the Regional Board has historically considered them only in connection with discharge permits issued for specific project proposals.

TRPA's process for “man-modified” reclassifications involves TRPA retention of a “team of experts” who “shall be recognized as possessing special qualifications to evaluate soils, landforms, hydrology, and other characteristics of land in the Tahoe Region.” The team may include a geomorphologist, soil scientist, geologist, and hydrologist. TRPA also considers data provided by the applicant's consultants. TRPA's “team of experts” prepares a technical report which addresses factors such as geomorphic characteristics, hydrology, soil characteristics, erosion hazard, and vegetation. The report must also identify the land capability characteristics resulting from the modification and the team's opinion as to the land capability district generally exhibiting those characteristics (TRPA 1987, Ordinance Section 20.2). TRPA's Governing Body evaluates this report and considers whether findings can be made to amend the land capability maps to reclassify the lands in question.

Regional Board staff will generally review “man-modified” reclassifications concurrently with, or following review by TRPA. The Regional Board will independently evaluate the technical information generated by TRPA's “team of experts” and the applicant's consultants, and TRPA's interpretation of project compliance with its required findings. The proposed reclassification of a project site should be evaluated as part of the California Environmental Quality Act (CEQA) document for the project.

“Man-modified” reclassifications of land capability may be approved by the Regional Board only if all of the following findings can be made:

- If the land proposed for reclassification is mapped as a Stream Environment Zone, it was modified before June 11, 1971 (the date of adoption of the Regional Board's prohibitions against discharge to 100-year flood plains and lands below the high water rim of Lake Tahoe and its tributaries). If the land proposed for reclassification is mapped as land capability 1a, 1c, 2, 3, 4, 5, 6, or 7, it was modified before February 10, 1972 (the effective date of TRPA's first land use plan). Evidence of modification, such as historic aerial photographs, must be supplied by the applicant; and
- Further development or modification will not exacerbate the water quality-related problems resulting from the modification of the land and will not adversely impact sensitive lands (e.g., high erosion hazard lands or SEZs) adjacent to or nearby the man-modified area; and
- The land no longer exhibits the characteristics of land bearing the same, original land capability classification; and
- Restoration of the land to its original land capability is infeasible. (Factors to be used by the Regional Board in determining feasibility may include, but need not be limited to: the cost of restoration, the potential achievement of a more positive cost-benefit ratio by offsite restoration, environmental harm which could be caused by onsite restoration, interference by onsite restoration with an existing legal use, and whether or not the land is identified for restoration, e.g., in the 208 Plan SEZ Restoration Program.) and
- Further development or modification of the reclassified site can be mitigated offsite; and
- Mitigation will be implemented to offset the losses in water quality protection caused by modification of the land and pertinent land capability district. This mitigation should be implemented both onsite and offsite, and should include a schedule of maintenance.

Separate procedures for “man-modified” reclassification of 100-year floodplains and shorezone areas by the Regional Board and TRPA are discussed in the sections of this Chapter on floodplain and shorezone protection.

Individual Parcel Evaluation System (IPES)

The IPES is an alternative to the Bailey land capability system adopted as part of TRPA's 1987 regional land use plan, which ranks vacant single family parcels in relation to their potential to create water quality problems if developed. The IPES applies **only** to vacant single family residential parcels; the Bailey land capability system is used to evaluate modifications of already developed single family parcels and new or modified development of all other types.

TRPA has established an initial numerical score, the "IPES line" (725 out of a possible 1150 points), separating more sensitive from less sensitive parcels. Parcels with scores above the line may be built upon if the owner receives a development "allocation." TRPA currently limits allocations for new single family homes to about 300 per year in the Lake Tahoe Basin as a whole, in order to phase development in relation to accomplishment of its mitigation programs for all of the environmental impacts of development, including water quality impacts. (See the discussions of offset programs and development restrictions later in this Chapter.) Local governments may distribute allocations on a first come-first serve basis or by some other process such as a random drawing. If the criteria discussed below are met, TRPA may consider allowing the "line" between buildable and unbuildable parcels to move downwards to allow development of more sensitive parcels. IPES rankings are not exactly equivalent to land capability classifications; some lots mapped in land capability Classes 4-7 have received IPES scores below the line, and some land capability Class 3 lots have received IPES scores above the line.

Although the review of single family home projects in the Lake Tahoe Basin was delegated to TRPA in the 1989 amendments to the *Lake Tahoe Basin Water Quality Plan*, the State and Regional Boards have a continuing interest in the protection of Class 1-3 lands. See the section of this Chapter on development restrictions for discussion of the applicability of discharge prohibitions to development under the IPES.

The State Board's certification of the 208 Plan (Resolution 89-32) includes the condition that:

"TRPA will notify the State Board 90 days in advance of a proposed change in the Individual Parcel Evaluation System (IPES) line. Upon notification of a

proposed move in the IPES line, the State Board will assess the reasonableness of progress being made toward meeting the revised 208 Plan's Thresholds and interim targets and in accordance with its responsibilities as a certifying agency under Section 208 of the Clean Water Act, make a determination regarding continued State Board certification of the revised 208 Plan."

Technical details on procedures for establishing IPES scores and moving the IPES line are provided in TRPA's Ordinance Chapter 37. The following is a summary of information on the IPES from the 208 Plan (Vol. I, page 116).

The IPES score of a given parcel is established based on the following criteria: (1) relative erosion hazard, (2) runoff potential, (3) degree of difficulty to access the building site, (4) water influence areas, (5) condition of the watershed, (6) ability to revegetate, and (7) the need for water quality improvements in the vicinity of the parcel. A property owner may increase the rating of a parcel, to a limited and finite degree, by constructing offsite water quality improvements. TRPA must approve any such water quality improvement projects; a project must be located off-site, and must be completed prior to the construction of the single family dwelling.

IPES scores are determined by a TRPA "team of experts" who conduct field evaluations using a standardized approach. If part of the parcel is SEZ, the process includes consideration of the area of land outside the SEZ which is available for construction. Depending upon the size of the parcel, the IPES team or the property owner may select the best building site. Property owners may appeal a parcel's rating to an independent body of qualified experts not involved in the initial field evaluation of that parcel. These independent experts shall apply the IPES criteria, and their decision shall be final unless the property owner appeals to the TRPA Governing Board. The Board may change a rating only upon finding that the IPES criteria were not applied correctly. The 208 Plan includes procedures to adjust the IPES line if appeals result in significant increases in the number of parcels above the line in a given jurisdiction.

The numerical level defining the top rank for any jurisdiction (County or City) shall be lowered annually by the number of allocations utilized in that jurisdiction during the previous year provided that the following conditions are met:

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- all parcels in the top rank are otherwise eligible for development under state water quality plans and other legal limitations, and
- a monitoring program for that jurisdiction is in place as set forth in the Monitoring and Evaluation Subelement of the TRPA Goals and Policies (TRPA 1987), and
- demonstrable progress is being made on the Capital Improvements Program for water quality within that jurisdiction, and
- there is a satisfactory rate of reduction in the inventory of vacant parcels, (the IPES line shall not move down in any jurisdiction unless the number of parcels below the line in that jurisdiction, compared to the number deemed sensitive on January 1, 1986, does not exceed 20 percent in El Dorado and Placer Counties, or 33 percent in Washoe and Douglas Counties), and
- the level of compliance with conditions of project approvals within that jurisdiction is satisfactory.

With respect to the requirement that a monitoring program shall be in place in a given jurisdiction, TRPA will monitor stream flows and concentrations of sediment and nutrients in representative tributaries to determine annual pollutant loads. This information will provide a basis for evaluating the relative health of the watershed within which development is contemplated and progress toward meeting environmental threshold carrying capacity standards.

The 208 Plan, as amended, requires that this monitoring program shall be in place in a local jurisdiction, and shall characterize water quality conditions, before the IPES line is lowered. The term "in place" means that a TRPA-approved monitoring system, with established procedures and responsibilities, is physically located on the selected tributaries, and samples have been collected and analyzed for the previous water year. The monitoring program, to be effective, should remain in place on a continuing and long-term basis. TRPA intends to collect, on a long-term basis pursuant to stringent QA/QC [quality assurance/quality control] procedures, improved tributary water quality data which will be used to better assess average and existing conditions and to understand water quality trends and compliance with state and federal water quality standards.

The location of IPES monitoring program sampling sites, the frequency of sampling, and financial

responsibilities will be set forth in TRPA's Monitoring Program, based on the recommendations of the TRPA Monitoring Committee (see the general discussion of monitoring at the end of this Chapter). The objectives of the IPES monitoring program are to:

- (1) Characterize the water quality of streams draining affected residential areas in relationship to the overall water quality observed in the watershed,
- (2) Identify short-term changes in water quality from affected residential areas, and
- (3) Ensure that TRPA and state water quality standards are being attained and maintained.

The IPES monitoring program will include QA/QC procedures to ensure that the data accurately represent the actual water quality conditions. Monitoring will normally occur not only at the mouths of streams, but also at locations in closer proximity to residential subdivisions. While the stream mouth monitoring will generally cover the entire year, monitoring at other locations higher in the watershed will be geared toward the spring snowmelt period and the fall storm season to contain costs. In addition to the monitoring stations established at the time of 208 Plan adoption in 1988, TRPA estimates that 30 to 40 additional IPES monitoring stations will be required throughout its jurisdiction (208 Plan, Vol. I, page 119).

To determine that demonstrable progress is being made on the Capital Improvements Program (CIP) within a given jurisdiction, TRPA will consider progress under both the CIP and the SEZ Restoration Programs (208 Plan Volumes III and IV). TRPA has established benchmarks against which the progress can be evaluated (see the discussion of compliance schedules earlier in this Chapter). TRPA will review the progress of a given jurisdiction over a three-year period covering the previous year, the current year, and the upcoming year. For the demonstrable progress criteria to be met, TRPA must make one of the following findings: (1) funding is committed and there is a strong likelihood that construction will commence on one or more high priority watershed improvement projects in the current or upcoming year, and construction of one or more high priority projects has taken place in the previous or current year, or (2) the performance of the local jurisdiction on implementation of SEZ restoration and capital improvement projects is

consistent with progress necessary to meet the established benchmarks. In this context, the term “high priority project” means a project with a substantial water quality benefit.

To determine whether the level of compliance in a jurisdiction is satisfactory, TRPA will evaluate:

1. The percentage of projects which commenced construction three or more years earlier but which have not had their securities returned for water quality related practices (TRPA collects securities for projects which it permits in order to ensure implementation of conditions of approval);
2. The number of projects which are behind schedules in project approvals for BMP retrofit;
3. The number of projects which required TRPA issuance of cease and desist orders for failure to observe conditions of approval within the previous fiscal year, as compared to the number of projects inspected, and
4. The number of projects on which violations remain unresolved, compared to the number resolved.

For TRPA to approve a project under IPES, the parcel must be served by a paved road, water service, sewer service, and electric utility. However, Chapter 27 of the TRPA Code of Ordinances sets forth provisions for waiver of the paved road requirement.

TRPA has assigned IPES scores to most vacant single family parcels within its jurisdiction; some of these scores are still being appealed. Following adoption of the 208 Plan, TRPA began discussion on whether conditions for movement of the IPES line had been satisfied in Douglas County, Nevada. The discussion group, which included the Regional Board's Executive Officer, developed more detailed performance criteria for evaluation of the conditions. TRPA subsequently moved the IPES line in both Douglas and Washoe Counties, Nevada. No movement of the IPES line has yet been approved by TRPA in California.

Regional Board staff should continue to participate in TRPA-sponsored discussions, and to review written TRPA proposals, regarding any changes in the IPES criteria or movement of the IPES line. If and when movement of the line is proposed in California, Regional Board staff should independently review the proposal and advise the Regional Board and State

Board staff regarding possible recommendations to the State Board on reconsideration of certification of the 208 Plan, pursuant to State Board Resolution 89-32.

Coverage Limitations

Projects permitted by the Regional Board and TRPA must comply with the limitations on land coverage outlined below. In amending the *Lake Tahoe Basin Water Quality Plan* in 1989, the State Board endorsed the following land coverage rules from Volume I of the 208 Plan. TRPA's Code of Ordinances, Chapter 20 (TRPA 1987) provides more detailed information on coverage rules and calculations affecting specific circumstances.

Base Coverage Limits

Each land capability class is assigned a single numerical value representing the percentage of the land surface which may be covered with impervious surface without substantial damage to the land. These coverages are listed in Table 5.4-2. (Note that although the original Bailey land capability system assigned 1% coverage to class 1b, or Stream Environment Zone (SEZ) lands, **no** new coverage or permanent disturbance is currently permitted in SEZs unless specific exemption findings can be made; see the “Development Restrictions” section of this Chapter). The land coverage rules allow transfer of the assigned 1% coverage for use out of the SEZ under some circumstances. The land capability system also specifies that high erosion hazard lands in capability classes 1 and 2 are not suited to urbanization and should be left in their natural state.

Before 1980, most of the development in the Lake Tahoe Basin did not comply with the land capability system. Most of the subdivisions in the Basin were built before regional planning agencies adopted ordinances implementing the land capability system. This lack of conformance to land capability has contributed significantly to water quality problems. Modeling of 19 watersheds by State Board staff in 1980 showed a high correlation among sediment yield, land capability, and degree of disturbance. In 1980, the State Water Resources Control Board adopted a prohibition against discharges or threatened discharges attributable to new development which is not in compliance with the land capability system.

In 1982, TRPA adopted an “environmental threshold carrying capacity” management standard for soil conservation which provides that:

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“Impervious surface coverage shall comply with the Land Capability Classification of the Lake Tahoe Basin, California-Nevada, A Guide for Planning (Bailey 1974).”

The 1987 TRPA regional land use plan and the 1988 208 Plan set forth a complex set of rules for application of the land capability system to determine allowable impervious surface coverage for new and existing development. The 1987 TRPA Regional Plan assigns coverage to vacant single family residential lots according to their numerical scores under an Individual Parcel Evaluation System (IPES). The TRPA Regional Plan also assigns an allowable “base coverage,” reflecting the Bailey limits or the IPES criteria, to each commercial, tourist, recreational, or residential parcel, and allows coverage exceeding land capability system limits on some parcels in exchange for the retirement or restoration of coverage elsewhere in the same “Hydrologically Related Area” (Figure 5.4-1). TRPA considers the implementation of these Regional Plan provisions to be in conformance, on a regionwide basis, with the Bailey land capability standard.

The 208 Plan (Vol. I, page 121) provides that allowed “base coverage” for all new projects and activities shall be calculated by applying the Bailey coefficients to the applicable area within the parcel boundary, or:

- for subdivisions previously approved by TRPA in conformance with the Bailey coefficients, coverage assigned to individual lots shall be the allowed base coverage,
- for (previously approved) planned unit developments not in conformance with the Bailey coefficients, the coefficients shall apply to the entire project area minus public rights-of-way, and the allowed base coverage shall be apportioned to individual lots and common area facilities,
- for parcels evaluated under the IPES, the allowable base land coverage shall be a function of the parcel's combined score for relative erosion hazard and runoff potential, as correlated with the Bailey coefficients and applied to the evaluated area. Figure 5.4-2 is a graph showing allowable coverage in relation to IPES scores.

The allowed base coverage may be increased by transfer of land coverage within hydrologically related areas (Figure 5.4-1) up to the limits set forth in Table 5.4-3. Special provisions for additional coverage, such as for exceptionally long driveways and

handicapped access, may also be allowed by TRPA ordinance.

In addition to the limitations on land coverage above, the 208 Plan (Vol. I, page 121) provides that no new land coverage or other permanent disturbance shall be allowed in land capability districts 1, 2, or 3, except as follows:

- For single-family dwellings reviewed and approved pursuant to the IPES
- For public outdoor recreation facilities if certain findings can be made
- For public service facilities if certain findings can be made.

TRPA's exemption findings for public outdoor recreation and public service projects on Class 1-3 lands are similar to those required for SEZs. TRPA requires the proponents of such projects to fully restore Class 1-3 lands in an amount 1.5 times the area disturbed or developed beyond that permitted in the Bailey coefficients. The 1.5:1 restoration requirement can be accomplished onsite or offsite, and is in lieu of coverage transfer or excess coverage mitigation provisions elsewhere in TRPA's Regional Plan. Onsite mitigation in the form of implementation of Best Management Practices is still required. (See the section on “Development Restrictions” below for a more detailed discussion of required Regional Board findings in connection with discharge prohibitions related to disturbance of high erosion hazard lands.)

Excess Coverage Mitigation

As noted above, existing impervious surface coverage in the Lake Tahoe Basin far exceeds allowable coverage in most developed areas, particularly in SEZs. TRPA has adopted an excess coverage mitigation program, which is described in the 208 Plan (Vol. I, pages 111-112) and summarized below. The Regional Board generally relies on TRPA to implement this program. If the Regional Board finds that TRPA is not providing for excess coverage mitigation according to the criteria below, the Board reserves the right to require such mitigation in waste discharge permits. Existing coverage in excess of the land capability system limits which has been fully mitigated, or which is exempt according to the criteria below, is not considered to be in violation of the Regional Board discharge prohibitions related to land capability (see

5.4, Land Capability and Coverage Limitations

the section of this Chapter on development restrictions).

Where rehabilitation or modification projects are approved on parcels with existing coverage in excess of the Bailey coefficients ("excess coverage"), a land coverage mitigation program shall provide for the reduction of coverage in an amount proportional to the cost of the project and the extent of excess coverage. To accomplish these reductions, property owners may (1) reduce coverage onsite; (2) reduce coverage offsite within the hydrologically related area (Figure 5.4-1); (3) in lieu of coverage reduction, pay an excess coverage mitigation fee to a land bank established to accomplish coverage reductions; (4) consolidate lots or adjust lot lines; or (5) any combination of the above. These programs are expected to achieve significant reductions in existing coverage. (Other programs such as the coverage transfer system discussed below, land acquisition and restoration programs by public agencies, and the bonus incentive program in TRPA's Ordinance Chapter 34 will also help to reduce excess coverage.)

Certain types of projects are exempt from excess coverage mitigation requirements, including: projects on parcels where the coverage has already been mitigated; repair and reconstruction of buildings damaged by fire or other calamity; installation of erosion control facilities; restoration of disturbed areas; SEZ restoration; underground storage tank removal, replacement, or maintenance; hazardous waste spill control or prevention facilities; sewage pumpout facilities; and repairs to linear public facilities. (The TRPA Regional Plan defines "linear public facilities" to include pipelines and power transmission facilities, transmission and receiving facilities, transportation routes, and transit stations and terminals.)

TRPA sets excess coverage mitigation fees according to guidelines in its regional land use plan (TRPA 1987). The fee schedule must provide a reasonable level of funding for the land bank, must not unduly restrict or deter property owners from undertaking rehabilitation projects, and must carry out an effective coverage reduction program.

Coverage Transfer

Within limits, impervious surface coverage for a specific project may be increased beyond the base coverage allowance through transfer of existing or potential coverage from another parcel. Maximum allowable coverage with transfer is summarized for

various types of development in Table 5.4-3. The Regional Board generally relies on TRPA to implement the coverage transfer program. If the Regional Board finds that TRPA is not following the procedures described below, the Board reserves the right to require compliance with these criteria in waste discharge permits.

Land coverage may be transferred within hydrologically related areas (Figure 5.4-1). The intent of the coverage transfer provisions is to allow greater flexibility in the placement of land coverage within hydrologically related areas, using land banks, lot consolidations, land coverage restoration, and transfers. The coverage transfer provisions allow for coverage in excess of base coverage to be permitted and still be consistent with Regional Board discharge prohibitions related to land capability and with TRPA's environmental threshold standards (see the section of this Chapter on development restrictions).

Coverage transfers for commercial and tourist accommodations projects shall be existing hard coverage (i.e., man-made structures) except where TRPA finds that there is an inadequate supply at a reasonable cost within the hydrologically-related area. In such a case, TRPA may increase the coverage supply in this order of priority: (1) by allowing transfer of existing soft coverage, i.e., compacted areas without structures, (2) by allowing transfer of potential coverage, i.e. base allowed coverage, and (3) by redefining the hydrologic boundaries within which transfers can occur. (Regional Board staff should review and evaluate the potential water quality impacts of any TRPA proposals to increase the coverage supply; the Regional Board may wish to make formal recommendations to TRPA regarding such proposals.)

Coverage transfers for residential, outdoor recreation, public service, regional public facility and public health and safety projects may utilize either existing coverage or disturbance or potential coverage. Transfer for linear public facility projects shall have the option of transferring existing hard or soft coverage.

The 208 Plan (Vol. I, page 127) directs that a land coverage banking system be established to facilitate the elimination of excess land coverage and to provide transfer mechanisms. As of 1993, the California Tahoe Conservancy served as a land bank on the California side of the Tahoe Basin; and TRPA was seeking establishment of a Nevada-side land

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bank. Private coverage transactions are also allowed in both states.

Under the 208 Plan, coverage transfers are subject to the following qualifications and constraints:

- coverage transfers shall be at a ratio of 1:1 or greater, and
- coverage transferred for a single family house shall be from a parcel equal to, or more environmentally sensitive than, the receiving parcel, and
- in the case of parcels containing an SEZ, the amount of coverage attributable to the SEZ portion may be transferred to the non-SEZ portion or may be utilized in the SEZ pursuant to the access provisions of the SEZ policies.

In connection with a transfer of land coverage, the transferor lot shall be appropriately restricted and restored to a natural or near natural state. All transfers must be approved by the affected local government jurisdictions.

TRPA cannot approve coverage transfers into community plan areas until it adopts community plans which must include schedules for implementation of remedial water quality projects that achieve applicable goals and water quality standards (208 Plan, Vol. VI, page 51).

Transfers of soft coverage (denuded and compacted areas without structures) are allowed only where the soft coverage was established legally. Thus transfer of soft coverage does not constitute a disincentive to rehabilitate disturbed areas, since legally established soft coverage can, and should be legally paved. To have been legally established, soft coverage must be established prior to the adoption of TRPA's first regional land use plan in 1972, and compacted such that 75% of normal precipitation runs off the surface. (208 Plan, Vol. VI, page 53).

The following additional criteria should be used to verify the existence of legal soft coverage:

- The site should have been in continuous use since 1972.
- In addition to the use of historical aerial photographs, a site inspection should be done to verify existing conditions, including the rate of infiltration.

- The disturbed area should be associated with a legally established land use (e.g., an unpaved driveway for an existing house, or the shoulder of an existing road).

Coverage transfers may occur in association with other types of transfer of development rights (see the discussion below).

Occasionally TRPA encounters a parcel which is otherwise eligible for a permit for a single family house, but on which the building site with the least impact on the land is far from the street. In return for sacrificing up to 400 square feet of otherwise available land coverage, and upon a finding that the direct result of the increased coverage is to locate the house on the site with the least impact on the land, TRPA will allow extra land coverage by transfer (208 Plan, Vol. VI, page 105).

New linear public facilities, public health and safety facilities, and access for the handicapped may utilize coverage transfer programs to achieve coverage which is the minimum needed to achieve their public purpose. Repairs to linear public facilities are exempt from excess coverage mitigation requirements. Linear public facilities which create additional land coverage must offset the water quality impacts of that additional coverage, although impervious coverage permitted as a result of transfer of coverage is exempt from water quality mitigation fee requirements (see also the sections of this Chapter on roads and rights-of-way, and on development restrictions).

Coverage Relocation

In addition to transfer of coverage between parcels, existing coverage may be relocated on the same parcel or project area if the following findings can be made:

- The relocation is to an equal or superior portion of the parcel or project area, as determined by reference to the following factors:
 - (a) Whether the area of relocation already has been disturbed
 - (b) The slope of and natural vegetation on the area of relocation
 - (c) The fragility of the soil on the area of relocation
 - (d) Whether the area of relocation appropriately fits the scheme of use of the property

5.4, Land Capability and Coverage Limitations

- (e) The relocation does not further encroach into a Stream Environment Zone, backshore, or the setbacks established in TRPA's Code of Ordinances for protection of SEZs or backshore
- (f) The project otherwise complies with the land coverage mitigation program set forth in TRPA's Ordinance Section 20.5, and
- The area from which the land coverage was removed is restored in accordance with TRPA's Ordinance Section 20.4.C., and
- The relocation is not to Land Capability Districts 1a, 1b, 1c, 2 or 3, from any higher numbered land capability district, and
- If the relocation is from one portion of a SEZ to another portion, there is a net environmental benefit to the SEZ. Net environmental benefit to the SEZ is defined as an improvement to the functioning of the SEZ and includes, but is not limited to:
 - (a) Relocation of coverage from a more disturbed area or to an area further away from the stream channel
 - (b) Retirement of land coverage in the affected SEZ in the amount of 1.5:1 of the amount of land coverage being relocated within a SEZ, or
 - (c) For projects involving the relocation of more than 1000 square feet of land coverage within a SEZ, a finding, based on a report prepared by a qualified professional, that the relocation will improve the functioning of the SEZ and will not negatively affect the quality of existing habitats.

The Regional Board generally relies on TRPA to ensure that coverage relocation complies with the criteria above. If the Regional Board finds that TRPA is not fully implementing these criteria, the Board reserves the right to review projects involving relocation of coverage in accordance with the language included in this Basin Plan. The Regional Board may also determine that site specific or project-specific water quality impacts or issues warrant its review of coverage relocation separately from TRPA. Details of the types of projects to be reviewed by the Regional Board will be worked out through an implementation agreement with TRPA.

Figure 5.4-1
HYDROLOGICALLY RELATED AREAS
Lake Tahoe Basin

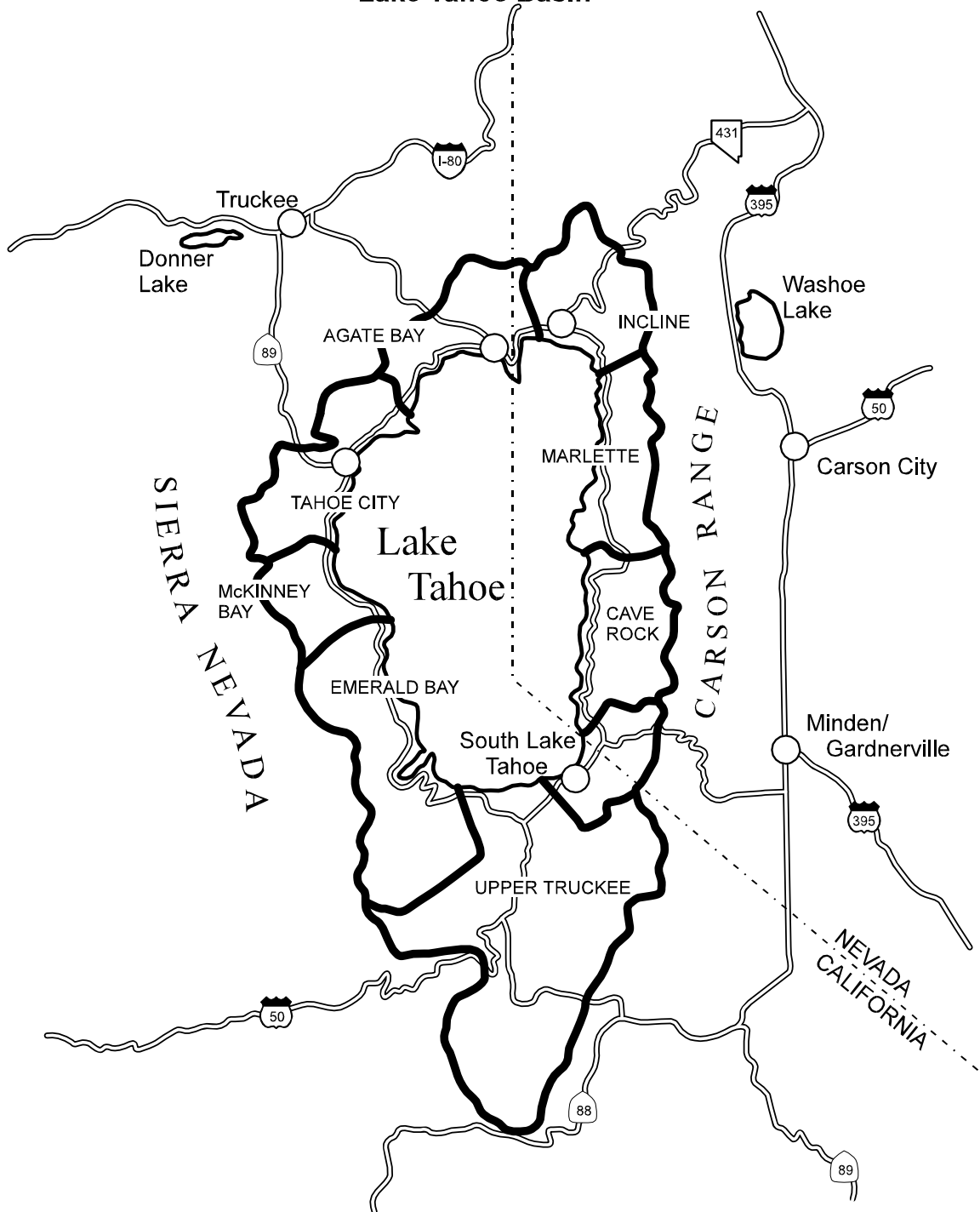


Figure 5.4-2
GRAPH FOR ALLOWABLE BASE LAND COVERAGE UNDER
THE INDIVIDUAL PARCEL EVALUATION SYSTEM

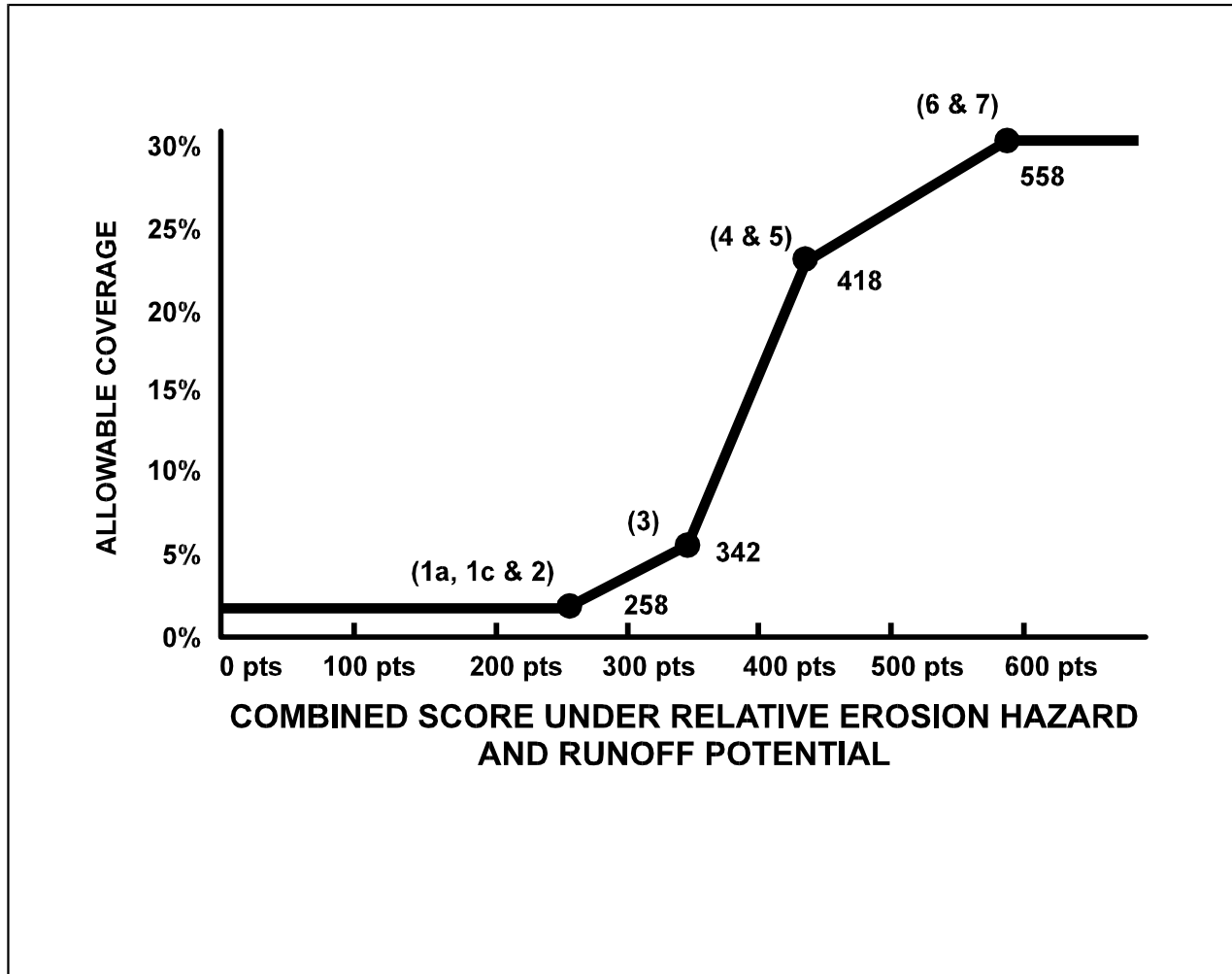


Table 5.4-1
CRITERIA FOR ASSIGNMENT OF CAPABILITY CLASSIFICATION
TO LAKE TAHOE BASIN LANDS

Capability Levels	Tolerance for Use	Slope Percent ¹	Relative Erosion Potential	Runoff Potential	Disturbance Hazards	
7	Most	0-5	Slight	Low to Moderately Low	Low Hazard Lands	
6		0-16	Slight	Low to Moderately Low		
5		0-16	Slight	Moderately High to High		
4		9-30	Moderate	Low to Moderately Low	Moderate Hazard Lands	
3		9-30	Moderate	Moderately High to High		
2		30-50	High	Low to Moderately Low	High Hazard Lands	
1a		30+	High	Moderately High to High		
1b		Poor Natural Drainage Fragile Flora and Fauna ²				
1c						

¹ Most slopes occur within this range. There are however, many areas that fall outside the range given.

² Areas dominated by rocky and stony land.

Table 5.4-2
ALLOWABLE COVERAGE ON DIFFERENT
CAPABILITY CLASSES

Capability Class	Erosion Hazard	Allowable Impervious Surface Coverage (%)
7	Low	30
6		30
5		25
4	Moderate	20
3		5
2	High	1
1		1

Table 5.4-3
LAND COVERAGE TRANSFER LIMITS

Category	Maximum Allowed Land Coverage	
Single Family Residential	The maximum land coverage allowed (base plus transfer) on a parcel through a transfer program shall be:	
	Parcel Size	Land Coverage
	0 - 4,000 4,001 - 9,000 9,001 - 14,000 14,001 - 16,000 16,001 - 20,000 20,001 - 25,000 25,001 - 30,000 30,001 - 40,000 40,001 - 50,000 50,001 - 70,000 70,001 - 90,000 90,001 - 120,000 120,001 - 150,000 150,001 - 200,000 200,001 - 400,000	base land coverage only 1,800 square feet. 20% 2,900 sq. ft. 3,000 sq. ft. 3,100 sq. ft. 3,200 sq. ft. 3,300 sq. ft. 3,400 sq. ft. 3,500 sq. ft. 3,600 sq. ft. 3,700 sq. ft. 3,800 sq. ft. 3,900 sq. ft. 4,000 sq. ft.
Single Family Residential in Planned Unit Developments	The maximum coverage allowed (base plus transfer) shall be up to 100 percent of the proposed building envelope but not more than 2,500 sq. ft. Lots in subdivisions with TRPA-approved transfer programs may be permitted with the coverage specified by that approval.	
Commercial Facilities in an Approved Community Plan	The maximum coverage allowed (base plus transfer) on an existing undeveloped parcel shall be 70% of the land in capability districts 4, 5, 6 and 7. For existing developed parcels, the maximum is 50 percent. Coverage transfers to increase base coverage up to 50% shall be at 1:1. Coverage transfers to increase coverage above 50% shall be at gradually increasing ratios, up to a maximum of 2:1.	
Tourist, Multi-Residential, Public Service, Recreation in an Approved Community Plan.	The maximum coverage (base plus transfer) shall be 50% of the land in capability district 4, 5, 6 and 7. Coverage transfer ratios to increase coverage to 50% shall be at 1:1.	
Other Multi-Residential	The maximum coverage (base plus transfer) shall be as set forth under Single Family Residential, above.	
Linear Public Facilities and Public Health and Safety Facilities	The maximum coverage (base plus transfer) shall be the minimum coverage needed to achieve their public purpose.	
Public Service Facilities Not in a Community Plan Area	The maximum coverage (base plus transfer) shall be 50 percent, provided TRPA finds there is a demonstrated need and requirement to locate the facility outside a community plan area, and there is no feasible alternative which would reduce land coverage.	

Source: TRPA (1987) Regional Plan, Goals and Policies, p. II-14, 15.

5.5 REMEDIAL PROGRAMS AND OFFSET

While restrictions on new development in the Lake Tahoe Basin (see the “Development Restrictions” section of this Chapter) will prevent or mitigate new adverse water quality impacts from such development, the water quality impacts of current watershed disturbance will continue to be felt for years to come unless remedial projects are implemented to offset their impacts. In 1980, the State Board adopted prohibitions against discharges or threatened discharges from new development which is not offset by remedial work, and directed the Lahontan Regional Board to adopt an offset policy or approve such a policy if adopted by another agency.

The 1980 *Lake Tahoe Basin Water Quality Plan* included a priority list of remedial erosion control projects, which was subsequently replaced by the TRPA “Capital Improvements Program” priority list (208 Plan, Vol. IV). The 1988 revisions to the 208 Plan also added a remedial Stream Environment Zone Restoration Program (208 Plan, Vol. III, discussed in the section of this Chapter on SEZ protection). A variety of other TRPA programs function to offset the impacts of past development, including excess coverage mitigation, transfer of development rights, and requirements for remedial work as a condition of approval of permits for new or remodeled development. More information on the rationale for current remedial project priorities is available in the *Lake Tahoe Basin Water Quality Plan* (as amended through 1989) and the 208 Plan.

Offset Policy

The 1980 *Lake Tahoe Basin Water Quality Plan* called for phasing of new development in accordance with the accomplishment of remedial erosion control work in order to offset the adverse impacts of previous development. The plan directed the Lahontan Regional Board to review progress toward the adoption of an offset policy by regional land use agencies, and to adopt its own policy if necessary. The plan set forth specific criteria for an offset policy, related to its priority list for public remedial projects and to payment of fees or performance of remedial work by private land owners.

In 1982, the Regional Board approved the Tahoe Regional Planning Agency's water quality mitigation fee system as an offset policy. (See Resolution 82-4

in Appendix B). This fee system has since been revised. This Basin Plan considers the entire TRPA offset program described below to fulfill the 1980 direction for an offset policy. Substantial modifications to this offset program are subject to Regional Board review.

The current 208 Plan and TRPA regional land use plan provide for offset and for phasing of development in relation to offset, in several ways:

- Chapter 82 of the TRPA Code of Ordinances requires that “all projects and activities which result in the creation of additional impervious surface coverage shall offset 150 percent of the potential water quality impacts of the project” through performance of offsite water quality control projects and/or payment of water quality mitigation fees. Exemptions from this requirement are provided under limited circumstances.
- Chapter 20 of the TRPA Code of Ordinances includes an excess coverage mitigation program to reduce the impacts of existing excess land coverage by requiring onsite or offsite retirement or restoration of coverage in connection with project approvals on such sites.
- Development beyond the limits established in the 1987 Regional Plan litigation settlement will require findings regarding progress toward the attainment of environmental standards, which will include evaluation of the adequacy of remedial work.
- Lowering the Individual Parcel Evaluation System line to permit single family home development on more sensitive parcels will also require findings regarding progress on remedial projects.
- The TRPA plans provide incentives, such as additional building height, or a limited increase in the IPES score, for the performance of additional remedial work by landowners.
- TRPA requires retrofit of BMPs to all existing development over the 20-year lifetime of the 208 Plan, and enforces this requirement primarily through its permitting process for remodeling projects. See the discussion of the Regional Board's BMP retrofit program, below.

Remedial Projects

The remedial erosion and urban runoff control projects implemented in the Lake Tahoe Basin are large scale measures to control runoff and erosion from past development, especially street and

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highway construction. These projects involve source controls for erosion and surface runoff problems on public lands, and include implementation of BMPs.

The 208 Plan relies heavily upon the implementation of watershed improvements to reduce sediment and nutrient loads from the watershed of Lake Tahoe and to improve water quality in the region. Because it involves projects affecting public rights-of-way, the Capital Improvements Program (CIP) is discussed in greater detail in the section of this Chapter on roads and rights-of-way. The SEZ Restoration Program is discussed in the section on Stream Environment Zones. The cost of these improvements, which are described in Volumes III and IV of the plan, is high (over \$300 million in 1988 dollars). To achieve the most cost effective and timely improvements in water quality, it is necessary to set priorities among the many watershed improvement projects.

The CIP attaches a high priority for erosion and runoff control to projects which affect SEZs, particularly wetland and riparian areas; which reduce or repair disturbance of seasonally-saturated variable source areas; and which attempt to restore a more natural hydrologic response in the watershed by infiltrating runoff and reducing drainage density, especially in areas near tributary streams. Full program implementation can only be accomplished through effective interagency communications, cooperation, and flexibility. TRPA will work with the various implementation agencies to incorporate the 208 priority guidance into their long-range programs and to evaluate their programs at regular five-year intervals.

The U.S. Forest Service implements remedial erosion control and SEZ restoration projects on National Forest lands in the Lake Tahoe Basin as part of its ongoing watershed restoration program.

The California Tahoe Conservancy provides grant funding for remedial projects carried out by other agencies, and implements remedial projects on some of the lands which it has acquired (see the discussion of land acquisition in the section of this Chapter on development restrictions).

Local governments will have incentives to carry out remedial projects in that future development in their jurisdictions will be phased depending upon progress under the CIP.

BMP Retrofit

The retrofit of BMPs is mandatory for all existing development in the Lake Tahoe Basin. Retrofit of BMPs to existing facilities is addressed under municipal and industrial stormwater NPDES permits (see the discussions of these permits in the sections of this Chapter and Chapter 4 on stormwater). The Regional Board may also require BMP retrofit through waste discharge requirements, NPDES permits, and enforcement actions. The Board evaluates the need for retrofit based on factors contributing to a facility's threat to water quality, including proximity to surface water, depth to ground water, Bailey land capability classification, potential pollutants or nutrients used or stored on the site, and "housekeeping practices" for control of litter, liquid and solid wastes, and past spills. The number and severity of factors involved determine a facility's threat to water quality.

The Regional Board's strategy for obtaining retrofit of BMPs includes the following priority groups of facilities (industrial facilities regulated under the statewide industrial stormwater NPDES permit program are not included):

Priority Group 1 includes facilities with the most significant potential for sediment, nutrient, or pollutant loadings to Lake Tahoe, such as large parking lots, commercial stables and grazing operations, automobile service stations and repair shops, and facilities where machinery or materials are stored or used outdoors (e.g., cement and asphalt plants).

Priority Group 2 includes facilities such as mobile home parks, disposal areas for snow from roadways, and parking lots greater than 50 spaces, which have relatively lower potential for sediment, nutrient, or pollutant loading.

Priority Group 3 includes facilities such as campgrounds, carpet and steam cleaner operations, and large turf areas, and pollutants such as greywater, pesticides, and fertilizer use in addition to the categories above.

Specific facilities within each category will be regulated based on threat to water quality from pollutant/nutrient loadings and water quality factors. The priority for a specific facility within Group 2 or 3 may change if a water quality problem is discovered.

Ongoing waste discharge requirements may be maintained for facilities which present an ongoing

threat even after BMPs are installed (e.g., golf courses and marinas; see the separate discussions of these facilities later in this Chapter). Waste discharge requirements for facilities which no longer threaten water quality after the installation of BMPs may be rescinded.

Excess Coverage Mitigation

The 208 Plan (Vol. I, page 111) requires that, when projects are approved for modification or rehabilitation of facilities on parcels with existing coverage in excess of the Bailey coefficients ("excess coverage"), a land coverage mitigation program shall provide for the reduction of coverage in an amount proportional to the cost of the project and the extent of excess coverage. To accomplish these reductions, property owners may:

- reduce coverage onsite,
- reduce coverage offsite within the same hydrologically related area (Figure 5.4-1),
- in lieu of coverage reduction, pay an excess coverage mitigation fee to a land bank established to accomplish coverage reductions,
- consolidate lots or adjust lot lines, or
- implement any combination of the measures above.

These programs are expected to achieve significant reductions in existing coverage. TRPA's plans set forth procedures for establishing the excess coverage mitigation fee schedule, and require that it shall (1) provide a reasonable level of funding for the land bank, (2) not unduly restrict or deter property owners from undertaking rehabilitation projects, and (3) carry out an effective coverage reduction program.

Transfer of Development

To provide both TRPA and property owners with more flexibility to plan new development and at the same time, mitigate existing land use and water quality problems, TRPA encourages consolidation of development through transfer of existing development, including a transfer of land coverage program (208 Plan, Vol. I, page 126).

Transfers of residential development rights are permitted from vacant parcels to parcels eligible for residential or multiresidential development. Each parcel is assigned one development right, which in conjunction with a residential allocation, is required by TRPA for construction of a residential unit. Multi-

residential development thus requires the transfer of development rights unless bonus units are granted in relation to public benefits provided by the project, including the benefits from water quality improvements. Upon transfer of a development right, sensitive parcels are not eligible for future residential development. Nonsensitive parcels are restricted from residential development unless a development right transfer back to the parcel is permitted.

Transfers of "units of use" (tourist accommodation units, residential units, and commercial floor area) are also permitted when the structures on the donor sites are removed or modified to eliminate the transferred units. Bonus units may be granted for transferred tourist units, based on public benefits, including water quality benefits. Upon transfer of units of use, sensitive parcels are permanently restricted from receiving new development, and are restored and maintained in a natural state, insofar as is possible.

Transfers of residential allocations are permitted from parcels located on sensitive lands to more suitable parcels. (An allocation, in addition to a residential development right, is required before any person can commence construction of an additional residential unit, except for affordable housing units as defined in the TRPA Code. TRPA shall permit the transfer of allocations from parcels in SEZs, land capability districts 1, 2, and 3, lands determined to be sensitive under the IPES, or shorezone capability districts 1 through 4, to parcels outside these areas. When an allocation is transferred, the entire donor parcel shall be permanently retired, and the transfer shall be approved by the affected local government jurisdictions.

Transfers of Land Coverage are discussed earlier in this Chapter in the section on land capability and coverage limits.

5.6 STORMWATER PROBLEMS AND CONTROL MEASURES

Surface runoff is the principal controllable source of pollutants affecting Lake Tahoe. Development of the watershed has greatly accelerated natural erosion rates and increased nutrient loading in stormwater. Disturbance of soils and vegetation, particularly in Stream Environment Zones, has reduced the natural treatment capacity for nutrients in stormwater. Impervious surfaces collect pollutants from vehicles and atmospheric sources and discharge them in stormwater. Infiltration of precipitation is greatly reduced; surface runoff dramatically increases, and downstream rill and gully erosion are increased. Stormwater from some land use types, such as golf courses and other areas of heavy fertilizer use, may be particularly rich in nutrients. The 208 Plan (Vol. 1, page 92) identifies stormwater problems associated with urban and roadside drainage systems, snow disposal and increased impervious surface coverage.

Chapter 4 of this Basin Plan includes a more general discussion of stormwater problems and regionwide control measures. Most of the control measures discussed in this Chapter (including limits on development of fragile lands and on total impervious surface coverage, remedial erosion control, excess coverage mitigation and SEZ restoration programs, fertilizer management, and requirements for use of BMPs for erosion and drainage control) are meant to prevent or mitigate stormwater impacts.

The 208 Plan (Vol. I, page 91) states that management practices to control elevated levels of runoff from existing development should be geared toward treatment of runoff waters through the use of natural and artificial wetlands as close to the source of the problem as possible. Management practices should also infiltrate runoff to negate the effects of increased impervious coverage and drainage density. Management practices should ensure that snow disposal does not harm water quality, and that snow removal from unpaved areas does not expose soils to runoff and further disturbance, contributing to sediment and nutrient loading to receiving waters. This section focuses on effluent limitations, stormwater permits and areawide stormwater treatment systems.

Effluent Limitations

In 1980, the State Board adopted an earlier version of the stormwater effluent limitations set forth in

Table 5.6-1. The Regional Board uses these effluent limitations in discharge permits for stormwater. Effluent limitations for additional pollutants, especially for toxic substances, may be necessary to ensure compliance with receiving water standards. The “design storm” for stormwater control facilities in the Lake Tahoe Basin is the 20-year, 1-hour storm; however, containment of a storm of this size does not necessarily ensure compliance with effluent limitations or receiving water quality standards.

The 208 Plan incorporates the State Board's 1980 effluent limitations, and TRPA has adopted them as regional “environmental threshold carrying capacity standards” for ground water, with the addition of the following provision:

“Where there is a direct and immediate hydraulic connection between ground and surface waters, discharges to groundwater shall meet the guidelines for surface discharges.”

TRPA has also adopted the following environmental threshold standard related to surface runoff:

Numerical standard

Achieve a 90 percentile concentration value for dissolved inorganic nitrogen of 0.5 mg/l, for dissolved phosphorus of 0.1 mg/l, and for dissolved iron of 0.5 mg/l in surface runoff directly discharged to a surface water body in the Basin.

Achieve a 90 percentile concentration value for suspended sediment of 250 mg/l.

Management standard

Reduce total annual nutrient and suspended sediment loads as necessary to achieve loading thresholds for tributaries and littoral and pelagic Lake Tahoe.

(The latter standard refers to other TRPA environmental threshold standards which involve reductions in nutrient loading from all sources.)

Table 5.6-1 includes revisions of the 1980 limitations. The Lahontan Regional Board applies the numbers in Table 5.6-1 on a site- or project-specific basis in response to identified erosion or runoff problems. Monitoring through 1988 showed that urban runoff exceeds the limitations for discharge to surface waters in more than 90 percent of the samples taken (208 Vol. 1 page 262).

The effluent limitations at the top of Table 5.6-1 apply to stormwater discharges to surface waters, and generally to surface runoff leaving a specific project site. If surface runoff enters a project site from

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upgradient, its quality and volume may together with the quality and volume of runoff generated onsite, affect the quality of runoff leaving the site. Regional Board stormwater permits for sites where offsite stormwater enters the property will take these effects into consideration. In general, where the quality of runoff entering the site is worse than that of runoff generated on site, there should be no statistically significant increase (at a 90 percent confidence level) in pollutants in the water discharged from the site. If the quality of runoff entering the site is equal to or better than the quality of runoff generated on the site, stormwater exiting the site should be of the quality which would be expected if there were no onsite runoff (i.e., onsite stormwater should not degrade clean runoff flowing through the site).

The effluent limitations at the bottom of Table 5.6-1 apply to stormwater discharges to infiltration systems. Infiltration systems include, but are not limited to, trenches, dry wells, ponds, vaults, porous pavement and paving stones. Infiltration effectively filters out sediments and results in reductions in heavy metals, oil and grease, and nutrients bound to particulate matter. Dissolved nutrient concentrations can be reduced by incorporating vegetation and an organic soil layer into the infiltration system (e.g., grass-lined swales, vegetated ponds, etc.) Since runoff is treated by infiltration through vegetation and soil layers, the effluent limits are greater for discharges to infiltration systems. Locating infiltration systems in areas of high ground water may result in ground water contamination and reduced percolation rates. Therefore, discharges to infiltration systems located in areas where the separation between the highest anticipated ground water level and the bottom of the infiltration system is less than five (5) feet may be required to meet the effluent limits for stormwater discharges to surface waters.

Stormwater Permits

The Lahontan Regional Board regulates stormwater discharges in the Lake Tahoe Basin through waste discharge requirements for individual dischargers, and through stormwater NPDES permits. As noted in elsewhere in this Chapter, the Regional Board has an active program to ensure the retrofit of BMPs to existing development in the Lake Tahoe Basin. This includes the retrofit of stormwater control measures. The regionwide stormwater NPDES permit program is summarized in Chapter 4; additional information is provided in the statewide BMP Handbooks for municipal, construction, and industrial stormwater NPDES permits (APWA Task Force, 1993).

In 1980, the State Board adopted a requirement that municipal and stormwater NPDES permits be issued for local governments on the California side of the Lake Tahoe Basin (and also recommended that such permits be issued on the Nevada side). This direction preceded the USEPA's development of nationwide regulations for stormwater NPDES permits, and the USEPA was reluctant for such permits to be issued at Lake Tahoe in the early 1980s. The Lahontan Regional Board adopted areawide stormwater waste discharge requirements for local governments (Placer and El Dorado Counties and the City of South Lake Tahoe) in 1984. Following the development of nationwide USEPA stormwater regulations, the Regional Board adopted municipal stormwater NPDES permits for these entities in 1992. (Although the permanent resident populations of these municipalities within the Lake Tahoe Basin are less than 100,000, too small to trigger the automatic requirement for municipal stormwater NPDES permits, the State has determined that stormwater from these areas is a significant contributor of pollutants to Lake Tahoe, and that such permits are necessary.)

Municipal NPDES permits require preparation of stormwater management programs, which must cover the topics summarized in Table 5.6-2. Municipal stormwater management programs must (1) address appropriate planning and construction procedures, (2) ensure BMP implementation, inspection and monitoring at construction sites, and (3) provide for education or training for construction site operators.

Coordination among municipal, industrial and construction stormwater permittees in the same geographic area is expected as part of the NPDES process. As noted in Chapter 4, NPDES permit conditions to control stormwater from state highways may be included in the municipal permit or in a separate permit issued to the highway authority. In 1993, the Regional Board has adopted a separate municipal stormwater NPDES permit for Caltrans to address discharges from California State highways within the Lake Tahoe Basin.

The municipal stormwater NPDES permits for the Lake Tahoe Basin will be important vehicles for ensuring implementation of the remedial Capital Improvements and Stream Environment Zone Restoration Programs and obtaining compliance with BMP retrofit schedules.

The statewide construction stormwater NPDES permit for projects involving one-time or cumulative disturbance of five or more acres does **not** apply within the Lake Tahoe Basin. The Regional Board has the authority to issue individual stormwater NPDES permits for larger Tahoe construction projects, and has adopted a general NPDES permit for such projects, which will be implemented together with current general waste discharge requirements for small commercial, recreation public works, and multifamily residential projects. New projects are reviewed individually, and are required to submit reports of waste discharge before being placed under the general requirements.

There is no heavy manufacturing industry in the Lake Tahoe Basin. However, certain Tahoe dischargers (e.g., recycling facilities, transportation facilities such as the airport and some marinas, and the South Tahoe Public Utility District wastewater treatment plant) are classified as “industrial” for purposes of the statewide industrial stormwater NPDES permit (see the summary of “industrial” categories and the explanation of the statewide NPDES permitting process in Chapter 4). Because of the sensitivity of affected waters, the Regional Board generally adopts and maintains individual stormwater waste discharge requirements for such facilities; individual stormwater NPDES permits may also be issued.

Some of the areas which need surface runoff management systems are on federal land. The sites are operated under special use permits from the USFS, Lake Tahoe Basin Management Unit. The USFS requires, and should continue to require, compliance with BMPs as a condition of these special use permits. The Regional Board may issue individual stormwater NPDES permits to projects on National forest lands if necessary to protect water quality.

The 208 Plan (Vol.1, page 112) directs the State of California to continue to set effluent limitations and issue discharge permits for stormwater in accordance with the federal Clean Water Act and the Porter-Cologne Act. TRPA considers large parking areas, the South Tahoe airport, golf courses and ski areas high priorities for retrofitting with BMPs because of their potential for significant water quality impacts from runoff. The 208 Plan encourages the states to issue WDRs or NPDES permits to these facilities. After 1991, TRPA will work the states to require establishment of BMP retrofit schedules for such facilities for which retrofit schedules have not been established.

TABLE 5.6-1
Stormwater Effluent Limitations

These limits shall apply in addition to any more stringent effluent limitations for the constituents below, or to limitations for additional constituents, which are necessary to achieve all applicable water quality objectives for specific receiving waters.

Surface Discharges

Surface water runoff which directly enters Lake Tahoe or a tributary thereto, shall meet the following constituent levels:

Constituent	Maximum Concentration
Total Nitrogen as N	0.5 mg/l
Total Phosphate as P*	0.1 mg/l
Total Iron	0.5 mg/l
Turbidity	20 NTU
Grease and Oil	2.0 mg/l

See the text for discussion of the application of these limits to runoff generated on a discharge site in relation to the quality of runoff entering the site.

Runoff Discharged to Infiltration Systems

Waters infiltrated into soils should not contain excessive concentrations of nutrients which may not be effectively filtered out by soils and vegetation. See the text for further discussion of the application of these limits:

Constituent	Maximum Concentration
Total Nitrogen as N	5 mg/l
Total Phosphate as P*	1 mg/l
Total Iron	4 mg/l
Turbidity	200 NTU
Grease and Oil	40 mg/l

Note: *Total phosphate is measured as "total phosphorus."

TABLE 5.6-2
Activities to be Addressed in Municipal Stormwater Management Programs

(Adapted from: APWA Task Force, 1993)

For Residential/Commercial Activities:

- Roadway and drainage facility operations and maintenance programs
- BMP planning for new development and redevelopment projects
- Retrofitting existing or proposed flood control projects with BMPs
- Municipal waste handling and disposal operations
- Pesticide, herbicide, and fertilizer use controls

For Improper Discharge Activities:

- Prevention, detection and removal program for illegal connections to storm drains
- Spill prevention, containment and response program
- Program to promote proper use and disposal of toxic materials
- Reduction of stormwater contamination by leaking/overflowing separate sanitary sewers

For Industrial Activities:

- Inspection and control prioritization and procedures
- Monitoring of significant industrial discharges

For Construction and Land Development Activities:

- Water quality and BMP assessments during site planning
- Site inspection and enforcement procedures
- Training for developers and contractors

5.7 STREAM ZONES, FLOODPLAINS, SHOREZONES, AND GROUND WATER

Stream Environment Zones

An important component of water quality protection programs in the Lake Tahoe Basin is the preservation and restoration of “Stream Environment Zones” (SEZs). Although SEZs are generally synonymous with “wetlands” and “riparian areas” as discussed elsewhere in this Basin Plan, the criteria for field delineation of SEZs, and SEZ control measures, are unique to the Lake Tahoe Basin (and the Tahoe Regional Planning Agency’s “Lake Tahoe Region,” which includes part of the Truckee River watershed). One of the differences between the TRPA and federal criteria is the use of both primary and secondary SEZ indicators in the TRPA system.

The Lahontan Regional Board’s regionwide control measures for protection and restoration of wetlands are discussed in Chapter 4. In the Lake Tahoe Basin, the Regional Board implements discharge prohibitions to protect SEZs; these prohibitions and applicable exemption criteria are discussed in the section of this Chapter on development restrictions.

The dense vegetation of SEZs is capable of rapid nutrient uptake and incorporation, while the moist to saturated soils are conducive to denitrification. Studies of nutrient removal by SEZs (reviewed in the 208 Plan, TRPA 1988, Vol. I) have shown that:

- Sheet flow across SEZs provides the most effective treatment of water
- The natural treatment capability of SEZs is destroyed where development causes channelization, and
- Channelized SEZs may actually increase sediment and nutrient loading in areas where erosion is caused by concentrated flow.

While SEZs have been found to be very effective in removing nutrients and sediment, during certain rainfall and snowmelt episodes, and following the fall die-off of vegetation, SEZs can also act as a source of nutrients and sediments, especially if they are disturbed. Nevertheless, the effect of an undisturbed SEZ as a sink for nutrients and sediment remains.

In addition to removing nutrients from stormwater, naturally functioning SEZs can reduce flood peaks, diffuse flow, increase evapotranspiration, and increase the retention time of surface water. SEZs also have many other values related to water quality, such as scenic, wildlife, fishery, and vegetation values.

In 1982, following a “threshold study” to evaluate existing environmental conditions, TRPA estimated that 4,376 of the 9,196 acres of SEZs in its jurisdiction had been developed, disturbed or subdivided. In addition to the 9,196 acres of SEZs in the urbanized areas, TRPA reported 15,971 acres existing on public lands. TRPA estimates that development in SEZs has resulted in approximately 10 times the impervious surface coverage that the Bailey coefficients would allow. Because most of the significant SEZ disturbance has occurred in urbanized areas close to Lake Tahoe, the loss of natural treatment capacity for sediment and nutrients in stormwater from these areas, and the consequent increased pollutant loading to Lake Tahoe, is of special concern.

Identification of SEZs and SEZ Setbacks

SEZs are biological communities that owe their characteristics to the presence of surface water or a seasonal high ground water table. Specific criteria for defining SEZs have changed over time; the history of these criteria is summarized in Volume III of the 208 Plan. Current criteria for identification of SEZs and SEZ setbacks are outlined below.

The following criteria are used by both the Regional Board and TRPA. A Stream Environment Zone is determined to be present if any one of the following key indicators is present, or in the absence of a key indicator, if any three of the following secondary indicators are present. Soil types are discussed in Volume I of the 208 Plan. Plant communities are identified in accordance with the definitions and procedures contained in the report entitled *Vegetation of the Lake Tahoe Region, A Guide for Planning* (TRPA 1971).

1. Key Indicators: Key indicators are:

- (a) Evidence of surface water flow, including perennial, ephemeral, and intermittent streams, but not including rills or man-made channels; or
- (b) Primary riparian vegetation; or
- (c) Near surface groundwater; or

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- (d) Lakes or ponds; or
- (e) Beach (Be) soils; or
- (f) One of the following alluvial soils:
 - (i) Elmira loamy coarse sand, wet variant (Ev)
 - (ii) Marsh (Mh).

2. **Secondary Indicators:** Secondary indicators are:

- (a) Designated floodplain
- (b) Groundwater between 20-40 inches
- (c) Secondary riparian vegetation
- (d) One of the following alluvial soils:
 - (i) Loamy alluvial land (Lo), or
 - (ii) Celio gravelly loamy coarse sand (Co), or
 - (iii) Gravelly alluvial land (Gr).

The boundary of a SEZ is the outermost limit of the key indicators; the outermost limit where three secondary indicators coincide; or if Lo, Co or Gr soils are present, the outermost limit where two secondary indicators coincide, whichever establishes the widest SEZ at any point. The outermost boundaries of a stream are the bank-full width of such stream which is defined as the level of frequent high flow, i.e., the level of flood with a recurrence interval of approximately 1.5 years. Other definitions of terms used in the criteria above are given in Table 5.7-1.

Note that SEZs can include bodies of open water as well as wet meadows without defined stream channels. SEZs are generally identical with Bailey land capability Class 1b lands (see the section of this Chapter on land capability, above). One hundred year floodplains are sometimes, but not always, included within SEZs; see the separate section of this Chapter on 100-year floodplain protection for control measures associated with 100-year floodplains which are not also SEZs.

The SEZ criteria can be compared to the federal definition of wetlands (40 CFR § 110.1[f]). Federal "jurisdictional" wetlands are areas which are:

"inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions [including] playa lakes, swamps, marshes, bogs, and similar areas such as sloughs, prairie potholes, wet meadows, prairie river overflows, mudflats, and natural ponds."

TRPA's official land capability maps shall be used to identify SEZs initially, but are subject to field verification in every instance. The section of this Chapter on land capability describes procedures for land capability challenges, map amendments, and "man-modified" reclassifications which apply to SEZs.

TRPA requires detailed SEZ mapping as part of the "community plan" process for designated commercial core areas. Community plans must include information on the location, amount, and condition of SEZs. TRPA's plans provide that it shall not approve any community plan or master plan, or commit significant resources to development or restoration in affected watersheds, until maps are prepared and approved which precisely identify the SEZ areas and applicable setbacks for the affected areas and contributing SEZ areas for a reasonable distance upstream.

All new development should be set back from the edge of SEZs to buffer the SEZs from erosion, runoff, alteration, and human activities associated with that development. In addition to preserving the integrity of the SEZ, setbacks preserve the important wildlife and scenic values of the edge zone created by the SEZ and the adjoining vegetation types. The 208 Plan (Vol. I, page 136) provides that buildings, other structures, and land coverage shall be set back from SEZs in accordance with the criteria below. TRPA's Ordinance Section 37.3.D provides further direction on use of the allowable base coverage assigned to the setback area.

The width of SEZ setbacks should be related to the sensitivity of the SEZ, particularly in terms of channel types and stability. Broad SEZs surrounding meandering streams, for example, require wider setbacks than narrow SEZs adjacent to deeply incised, V-shaped channels. SEZ setbacks are established in accordance with the following criteria, which are illustrated in Figure 5.7-1:

1. Confined Perennial Stream: When a confined perennial stream is present, the following

setbacks are established based on the corresponding slope condition:

- (a) Good Slope Condition: When the slope condition is identified as good, the setback is 25 feet from the edge of the SEZ or 15 feet from the edge of a terrace, if present, whichever is less.
 - (b) Average Slope Condition: When the slope condition is identified as average, the setback is 35 feet from the edge of the SEZ or 20 feet from the edge of a terrace, if present, whichever is less.
 - (c) Poor Slope Condition: When the slope condition is identified as poor, the setback is 60 feet from the edge of the SEZ or 35 feet from the edge of a terrace, if present, whichever is less.
2. Unconfined Perennial Stream: When an unconfined perennial stream is present, the setback is 50 feet from the edge of the SEZ.
 3. Confined Ephemeral or Intermittent Stream: When a confined ephemeral or intermittent stream is present, the following setbacks are established based on the corresponding slope conditions:
 - (a) Good Slope Condition: When the slope condition is identified as good, the setback is 15 feet from the edge of the SEZ or 10 feet from the edge of a terrace if present, whichever is less.
 - (b) Average Slope Condition: When the slope condition is identified as average, the setback is 25 feet from the edge of the SEZ or 15 feet from the edge of a terrace, if present, whichever is less.
 - (c) Poor Slope Condition: When the slope condition is identified as poor, the setback is 40 feet from the edge of the SEZ or 25 feet from the edge of a terrace, if present, whichever is less.
 4. Unconfined Ephemeral or Intermittent Stream: When an unconfined ephemeral or intermittent stream is present, the setback is 25 feet from the edge of the SEZ.

5. Channel Absent: When there is an SEZ present but there is no associated channel identified, the setback is 10 feet from the edge of the SEZ.

SEZ Protection

During development of the land capability system, TRPA and the U.S. Forest Service recognized the importance of protecting SEZs. Bailey (1974) recommended that no more than 1% impervious surface coverage or permanent disturbance be allowed within SEZs. Although early land use plans for the Lake Tahoe Basin endorsed protection for SEZs, protective measures were not strictly enforced until the State Water Resources Control Board adopted SEZ discharge prohibitions discussed earlier in this Chapter in 1980, and TRPA adopted similar land use restrictions in the 1981 208 Plan.

TRPA's Goals and Policies provide that SEZs shall be protected and managed for their natural values, and that ground water development in SEZs shall be discouraged when such development might impact associated plant communities or instream flow. The 208 Plan (Vol. I, page 94) recognizes that, because of their importance to water quality, encroachment on SEZs should be severely restricted, and areas of existing encroachment should be restored wherever possible. These preventative BMPs are cost effective ways to protect water quality.

The 208 Plan provides that **no** new land coverage or other permanent disturbance shall be permitted in SEZs except for public outdoor recreation projects, for public service facilities, for projects which require access across SEZs to otherwise buildable sites, for new development in man-modified SEZs, and for SEZ restoration and erosion control projects, if certain findings can be made. (See also Section 5.4 "Land Capability" and Section 5.8 "Development Restrictions" for discussions of required exemption findings by the Regional Board and TRPA).

The required findings parallel the USEPA policy for review of proposed wetland disturbance in that avoidance of disturbance through reasonable alternatives is preferable to disturbance with offsite mitigation.

The Regional Board and TRPA exemption findings include requirements for a 1.5:1 restoration offset for new disturbance and development which is permitted in SEZs. Implementation of this offset restoration is expected to help fulfill TRPA's SEZ restoration goals (below) and to provide a margin of safety in the event

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that restored SEZs are not functionally equivalent to natural SEZs.

Note that the “no new coverage” restriction is more stringent than the original Bailey land capability system, which assigned 1 percent allowable coverage to SEZs. TRPA allows the 1 percent coverage attributable to a SEZ to be transferred for use on non-SEZ land on the same parcel.

Replacement of existing coverage in SEZs may be permitted where the project will reduce impacts on SEZs and will not impede restoration efforts. Existing structures in SEZs may be repaired or rebuilt.

Relocation of coverage in SEZs may be permitted when there is a net benefit to the SEZs. The findings which must be made to permit relocation are summarized in the section of this Chapter on land capability and coverage limits.

Additional restrictions on SEZ disturbance apply to resource management activities such as timber harvest and livestock grazing; see the discussions of these activities elsewhere in this Chapter.

Protection of SEZs is also being achieved through land acquisition under the California Tahoe Conservancy and U.S. Forest Service Santini-Burton programs (see the discussion of land acquisition programs in Section 5.8 “Development Restrictions”).

In addition to the SEZ protection and restoration programs, TRPA's regional “environmental threshold carrying capacity” standards for the protection of vegetation resources call for the maintenance of existing species richness by providing for the maintenance of nine plant associations, including the deciduous riparian association, the meadow association, and the wetland associations, and require that at least four percent of the total undisturbed vegetation in the Region remain deciduous riparian vegetation. TRPA's wildlife threshold standards state that a non-degradation standard shall apply to significant wildlife habitat consisting of deciduous trees, wetlands, and meadows while providing for opportunities to increase the acreage of such riparian associations.

SEZ Restoration

The 1980 *Lake Tahoe Basin Water Quality Plan* identified SEZ restoration as a “promising additional control measure.” The restoration of disturbed SEZs has been carried out by the U.S. Forest Service as part of its watershed restoration program, by the California Tahoe Conservancy, as part of erosion

control projects implemented by local governments, and by private parties as mitigation for specific projects. However, the first comprehensive SEZ Restoration Program was adopted in 1988 as part of the revised 208 Plan.

In 1982, TRPA adopted an “environmental threshold carrying capacity” management standard which directs that agency to:

“...preserve existing naturally functioning SEZ lands in their natural condition and restore 25 percent of the SEZ lands that have been identified as disturbed, developed, or subdivided, to attain a 5 percent total increase in the areas of naturally functioning SEZ lands.”

The 208 Plan (Vol. I, page 135) reflects this restoration goal and also provides that, to restore a portion of the natural treatment capacity lost from disturbance, disturbed SEZs in undeveloped, unsubdivided lands shall be restored.

Based on then current SEZ maps and estimates of the area of disturbance, TRPA interpreted this standard in 1988 to require restoration of 1,100 acres of SEZ. Volume III of the revised 208 Plan identifies 48 specific restoration projects affecting about 450 acres, which could be carried out by federal, state, or local governments or by private parties seeking credit for mitigation. Twenty-nine of these projects are in California (Table 5.7-2). When they are considered together with already completed restoration work, and with large and small projects still to be carried out on public lands, TRPA estimates that the threshold standard will be attained within the 20-year lifetime of the revised 208 Plan. The Lahontan Regional Board will review, and will consider issuing waste discharge requirements for these projects to ensure that they are properly designed and will not exacerbate adverse water quality impacts (e.g., through excessive fertilizer use). SEZ restoration projects require Regional Board exemptions from the discharge prohibitions.

In addition to the formal SEZ restoration program, SEZ restoration is required as a condition of approval for exemptions from land use and discharge prohibitions for other projects. TRPA's Code of Ordinances also provides incentives for SEZ restoration in the form of “bonus” multifamily residential or tourist accommodation development allocations for developers. (See Section 5.8 “Development Restrictions.”)

Where full SEZ restoration is not being proposed, BMPs should be used to reduce the impacts of existing development on SEZs and their water quality-related functions. For example, the 208 Plan (Vol. I, page 136) states that golf courses in SEZs shall be encouraged to redesign layouts and modify fertilization to prevent the release of nutrients to adjoining ground and surface waters. Specific measures which can be used to protect and enhance disturbed SEZs are discussed later in this Chapter in connection with specific problem sources such as livestock grazing.

The 208 Plan directs TRPA to develop an implementation program and establish an annual tracking system for SEZ restoration. TRPA recognizes that restored SEZs may or may not perform the same water quality functions as an undisturbed SEZ. The contribution to water quality management of a restored SEZ will depend upon its location, the nature of the restoration and long-term maintenance of the site.

TRPA expects to carry out a detailed re-mapping of SEZs and 100-year floodplains in the Lake Tahoe Basin using the SEZ criteria in the 208 Plan. TRPA has made a commitment to update and refine the SEZ restoration program as a result of this re-mapping. Current priorities for projects identified in 208 Plan Volume III are based on watershed conditions and consequent ability to deliver sediment and nutrients to Lake Tahoe.

Issues to be addressed in the projected update and refinement of the SEZ Restoration Program include:

1. classification and mapping of stream reaches according to their stability classification
2. matching restoration methods and disturbed reaches based on their stability classification
3. identification of major problem areas and project sites for use in the community planning process, public works planning and other programs
4. development of guidelines for planning and designing SEZ restoration projects
5. integration of SEZ mapping for purposes of identification, restoration and flood hazard determination, and
6. establishment of a scientific and technical advisory committee to guide the SEZ restoration program.

The Regional Board recommends that further updates to the SEZ restoration program include development of scientific criteria for measurement of the adequacy of restoration in terms of restoration of natural SEZ functions, including water quality protection. There is a growing body of literature on the adequacy of wetland restoration (e.g., National Research Council 1992; see the discussion in Chapter 4 of this Basin Plan). This literature supports restoration ratios up to 10:1 in certain circumstances.

SEZ Creation

The potential also exists for creation of new SEZs, or expansion of the boundaries of existing SEZs in the Lake Tahoe Basin to increase the potential for stormwater treatment. A few small wetlands have already been created in associations with specific Tahoe Basin projects. As for wetlands restoration, scientific criteria are being developed for wetlands creation (Costlier and Candela 1990), and many of the same concerns about development of natural wetland functions apply. The Regional Board generally encourages additional SEZ creation in the Lake Tahoe Basin, but the impacts of each proposal on water quality and beneficial uses must be carefully evaluated. For example, a water diversion to support a created SEZ could adversely affect beneficial uses at the diversion site.

Created wastewater treatment wetlands designed, built, and operated solely as wastewater treatment systems are generally not considered to be waters of the United States (USEPA 1988). Water quality standards that apply to natural wetlands generally do not apply to such created wastewater treatment wetlands. However, many created wetlands are designed, built, and operated to provide, in addition to wastewater treatment, functions and values similar to those provided by natural wetlands. Under certain circumstances, such created multiple use wetlands may be considered waters of the U.S. and applicable water quality standards would apply. The applicability of water quality standards to created SEZs/wetlands will be determined by the Regional Board on a case-by-case basis. In its determination, the Regional Board will consider factors such as size, location, type of waste to be treated, degree of isolation of the created wetlands, and other appropriate factors. Any discharge from a created wetland which does not qualify as "waters of the U.S." must meet applicable water quality standards of its receiving water(s).

It is probable that most larger created SEZs (e.g., areawide stormwater treatment systems) in the Lake

Tahoe Basin will be multiple use systems which will be considered waters of the State and of the U.S.

Floodplain Protection

Flooding in the Lake Tahoe Basin results from rapid surface water runoff from rainfall, snowmelt, or both, that exceeds the capacity of the natural and manmade drainage systems. Localized flooding occurs throughout the urbanized areas of the Lake Tahoe Region, but is most prevalent in low-lying areas of the south shore, with its broad alluvial plain. Flooding from seiches (abnormally large waves generated by earthquakes or landslides) is also possible in the shoreline of Lake Tahoe and other lakes in the Region.

As noted in Chapter 4 of this Basin Plan, development in floodplains contributes to water quality problems as well as exposing people and property to flood hazards. In addition to providing natural treatment capacity for water pollutants, undisturbed floodplains reduce the intensity of downstream flows, and thus the potential for streambank erosion. In developed floodplains, flood waters can also adversely affect water quality by rupturing sewer lines, and mobilizing stored toxic substances.

Control Measures for Floodplain Protection

This Basin Plan includes Regional Board discharge prohibitions to protect 100-year floodplains in the Lake Tahoe Basin and the Truckee River watershed which are separate from the prohibitions for protection of Stream Environment Zones (SEZs).

The criteria for definition of SEZs, outlined in the previous section of this Chapter, include 100-year floodplains as secondary indicators, but unless other indicators are also present, a 100-year floodplain is **not** automatically considered to be a SEZ. When a 100-year floodplain **is** considered a SEZ, the SEZ exemption criteria in the section of this Chapter on development restrictions apply. TRPA (208 Plan, Vol. I, page 132) has land use restrictions against construction within 100-year floodplains, and has adopted a set of floodplain exemption criteria, which are very similar to the SEZ exemption criteria, for projects in floodplains which are not also SEZs. These TRPA criteria were modified by Regional Board staff to derive the exemption criteria below. TRPA applies its floodplain exemption criteria in the portion of the Truckee River corridor within its jurisdiction, but the Regional Board applies separate

100-year floodplain exemption criteria for the Truckee River HU (see the section of this Chapter on discharge prohibitions).

The Lahontan Regional Board may grant exceptions to the 100-year floodplain discharge prohibitions for Lake Tahoe and its tributaries, in cases where the floodplain is not also a Stream Environment Zone, only under the following circumstances:

1. For public outdoor recreation facilities if: (a) the project is a necessary part of a public agency's long range plans for public outdoor recreation; (b) the project, by its very nature, must be sited in a floodplain; (c) there is no feasible alternative which would reduce the extent of encroachment in a floodplain, and (d) the impacts on the floodplain are minimized. In determining whether the project "by its very nature" must be sited in a floodplain, the Regional Board should use the guidelines for SEZ projects in Table 5.7-3;
2. For public service facilities if: (a) the project is necessary for public health, safety, or environmental protection, (b) there is no reasonable alternative, including spans, which avoids or reduces the extent of encroachment in a floodplain, and (c) the impacts on the floodplain are minimized;
3. For projects which require access across floodplains to otherwise buildable sites if: (a) there is no reasonable alternative which avoids or reduces the extent of encroachment in the floodplain and (b) the impacts on the floodplain are minimized; and
4. For erosion control projects, habitat restoration projects, SEZ restoration projects and similar projects provided that the project is necessary for environmental protection and there is no reasonable alternative which avoids or reduces the extent of encroachment in the floodplain.

Under limited circumstances, the Regional Board may delegate authority to the Executive Officer to grant exemptions from the floodplain prohibitions. The Regional Board has delegated authority to the Executive Officer to grant exceptions to Prohibitions 8 and 9 for the Lake Tahoe HU, in Section 5.2 of the Basin Plan, for specific discharges where the proposed project meets the conditions required for a waiver of waste discharge requirements or for approval under general waste discharge requirements or a general NPDES permit, under the following circumstances:

5.7, Stream Zones, Floodplains, Shorezones, and Ground Water

- (1.) the project is within the following specific size limitations:

less than 1000 square feet of new impervious coverage, or

less than 2000 square feet of new ground disturbance, or

less than 100 cubic yards of fill or excavation; or

- (2.) the project's primary purpose is to reduce, control, or mitigate existing sources of erosion or water pollution; **and**
- (3.) the project meets the exemption criteria set forth in this section of the Basin Plan.

Except in emergency situations, the Executive Officer shall notify the Board and interested members of the public of his intent to issue an exemption subject to this Resolution at least ten (10) days before the exemption is issued. A notice of the exemption will also be published seven (7) days prior to issuance to allow for public comments. All comments received and staff's response to the comments will be forwarded to the Board with the proposed exemption. Any Regional Board member may direct that an exemption not be granted by the Executive Officer and that it be scheduled for consideration by the Regional Board.

A Report of Waste Discharge shall be filed for any discharge for which approval is sought from the Executive Officer. Discharge from a project cannot commence until such time as the Regional Board Executive Officer has prepared and sent a letter to the applicant indicating that an exemption to the Basin Plan prohibitions is granted and that waste discharge requirements for the project are waived, or that General Waste Discharge Requirements are applicable. The Regional Board's action delegating authority to the Executive Officer to grant exemptions is conditional and the Executive Officer may recommend that certain exemption requests be considered by the Regional Board. Also see Appendix B for a copy of Resolution 6-90-22 describing conditions under which the Executive Officer can grant exceptions.

In evaluating proposed measures to "minimize" impacts for floodplain projects, the Regional Board should use the regionwide criteria in Chapter 4 in addition to conducting an independent review of TRPA's proposed mitigation conditions.

In evaluating proposed exemptions to discharge prohibitions for environmental protection projects which are related to protection or enhancement of parameters other than water quality and beneficial uses (e.g., transportation, noise, energy conservation) the Regional Board should give the highest priority to water quality protection.

All public utilities, transportation facilities, and other necessary public uses located in the 100-year floodplain must be constructed and maintained so as to prevent damage from flooding and not to cause flooding.

In remote locations and other locations where 100-year floodplain maps have not yet been prepared by TRPA, the U.S. Army Corps of Engineers, the U.S. Geological Survey, or the Federal Emergency Management Agency (FEMA), and where there is reason to believe that a flood hazard may exist, the Regional Board will require project applicants to accurately delineate the 100-year floodplain in their applications for waste discharge permits.

Floodplains may occur on land capability classes other than Class 1b. Therefore, the base allowable coverage on parcels in the 100-year floodplain but not in SEZs is generally greater than if the parcel were SEZ. This coverage cannot be applied within the floodplain except where TRPA finds it to be consistent with its regional land use plan's Goals and Policies, but it can be transferred to another parcel or another part of the same parcel outside of the floodplain (see the discussion of coverage transfer in the section of this Chapter on land capability and coverage rules).

TRPA projects that some encroachment into 100-year floodplains may occur under the 208 plan. This encroachment may reduce the ability of a given SEZ to convey flood flows and expose physical improvements to flood damage, because the required offset may take place in a different watershed. TRPA expects SEZ restoration programs to provide a general offset for such impacts (208 Plan, Vol. I, page 333).

The Regional Board's 100-year floodplain prohibitions for the Lake Tahoe HU also apply to the area below the high water rim of Lake Tahoe, which corresponds to part of the area which TRPA considers "shorezone." TRPA's development restrictions and exemption findings for 100-year floodplains do not apply to the shorezone of Lake Tahoe, except where the project site is determined to

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be within the 100-year floodplain of a tributary stream. Instead, TRPA uses the shorezone provisions of its Code of Ordinances. See the following section on “Shorezone Protection” for findings which must be made by the Regional Board to approve exemptions to the floodplain discharge prohibitions for projects affecting the “shorezone” of Lake Tahoe.

Shorezone Protection

The littoral (nearshore) areas of lakes are often the most biologically productive. Warmer temperatures and penetration of light to the bottom encourage plant growth which in turn supports invertebrates and fish. Littoral areas are often very important for fish spawning and the early life-cycle stages of young fish. Human activities in and near the littoral zone can physically alter fish habitat and contribute nutrients leading to eutrophication and the alteration of food webs. Rocky shorezones are generally considered better fish habitat than sandy or silty areas; erosion and sedimentation can degrade habitat quality. Lakeshore areas near tributary stream deltas are important “staging areas” for lake fish which migrate up the streams to spawn. Increased growth of attached algae and rooted plants in the shorezone is the most visible sign of eutrophication to human recreational users of lakes.

Piers, marinas, buoys, breakwaters, floating docks, and jetties are found in the nearshore of Lake Tahoe, along with most “prime fish habitat.” Prime fish habitat consists of areas of rock, rubble, or cobble substrates which provide suitable conditions to support prey organisms and spawning. The shorezone is also particularly attractive to many species of wildlife, including bald eagles, ospreys, and waterfowl. TRPA has adopted regional “environmental threshold carrying capacity” standards for the protection of nearshore fish habitat and wildlife, including waterfowl habitat.

Fish habitat maps have been adopted as part of TRPA's regional land use plan (TRPA 1987). These maps, and the habitat classifications used, differ somewhat from the maps and habitat classifications derived from a joint study by the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the Nevada Department of Wildlife (see the separate discussion on piers in this Chapter).

In 1982, much of the fish habitat in Lake Tahoe rated “good” under the TRPA system experienced moderate to heavy boat traffic, contributing to the

decrease in its rating from “excellent” to “good.” Siltation and alteration of the lake bottom also contribute to degraded lake habitat.

Shoreline erosion and sediment transport are natural processes, which contribute to beach replenishment; their interruption can result in beach erosion and deep water beaches. Human activities can accelerate shoreline erosion. Tributary streams can create barrier beaches which protect backshore areas from wave action. Encroachment on delta areas can interrupt barrier beach formation and create severe backshore erosion, liberating stored sediment and nutrients. Unnatural fluctuations in lake level may also contribute to water quality problems, eroding large quantities of sediments and nutrients from the shoreline. A dam at the outlet of Lake Tahoe has regulated its maximum level at 6229.1 feet above mean sea level (6.1 feet above the natural level) since 1934.

Shorezone disturbance has the potential to jeopardize the survival of the endangered plant species Tahoe yellow cress, *Rorippa subumbellata*, which is currently found only in the shorezone of Lake Tahoe.

The shorezone of Lake Tahoe is especially vulnerable to the impacts of development, recreation, and underwater construction activities to support recreation (see the separate section of this Chapter on impacts of and control measures for water quality problems related to boating). The following is a general discussion of shorezone protection programs.

Control Measures for Shorezone Protection

Regional Board staff participate in the interagency review process for proposed projects in the shorezone of Lake Tahoe, and may draft waste discharge requirements if necessary to protect water quality. (See the section of this Chapter on recreation for more information on Regional Board regulation of dredging and construction in Lake Tahoe.) The prohibitions against discharges and threatened discharges within 100-year floodplains or below the high water rim of Lake Tahoe apply to portions of the shorezone. In order to improve coordination of Regional Board regulation of shorezone projects with that of TRPA and other agencies, this Basin Plan provides the following direction for the Board, its staff, and the regulated community:

5.7, Stream Zones, Floodplains, Shorezones, and Ground Water

- California Environmental Quality Act environmental documents and reports of waste discharge for shorezone projects should address compliance with all of TRPA's water quality related shorezone development standards. Conditions in waste discharge permits should reflect these standards.
- In processing waste discharge permits for shorezone projects, Regional Board staff should independently evaluate technical data collected for field verifications of shorezone tolerance district classifications, challenges of such classifications, shorezone district map amendments, and "man-modified" reclassifications.
- Before approving exemptions from discharge prohibitions for projects proposing the creation of new land coverage or permanent disturbance in the backshore of Shorezone Tolerance District 1 lands, or for projects proposing replacement of existing coverage in the backshore of Shorezone Tolerance District 1 lands, the Regional Board must make the SEZ exemption findings set forth elsewhere in the section of this Chapter on development restrictions.
- Before approving projects below the high water rim of Lake Tahoe or its tributaries, in areas which are not also considered SEZs, the Regional Board must make the 100-year floodplain exemption findings set forth in the section of this Chapter on 100-year floodplain protection.
- The Regional Board must make separate "man-modified" findings before issuing waste discharge permits and/or exemptions to discharge prohibitions for any shorezone project involving a TRPA "man-modified" reclassification of a shorezone tolerance district.

Under limited circumstances, the Regional Board may delegate authority to the Executive Officer to grant exemptions from the 100-year flood plain and Stream Environment Zone discharge prohibitions applicable to shorezone development. The Regional Board has delegated authority to the Executive Officer to grant exceptions to the Stream Environment Zone and 100-year floodplain prohibitions (Prohibitions 8, 9, 12, and 13 for the Lake Tahoe HU in Section 5.2 of the Basin Plan), for specific discharges where the proposed project meets the conditions required for a waiver of waste discharge requirements or for approval under general

waste discharge requirements or a general NPDES permit, under the following circumstances:

- (1) the project is within the following specific size limitations:
 - less than 1000 square feet of new impervious coverage, or
 - less than 2000 square feet of new ground disturbance, or
 - less than 100 cubic yards of fill or excavation; or
- (2) the project's primary purpose is to reduce, control, or mitigate existing sources of erosion or water pollution; **and**
- (3) the project meets the exemption criteria for 100-year flood plain or Stream Environment Zone projects set forth in Chapter 5 of the Basin Plan.

Except in emergency situations, the Executive Officer shall notify the Board and interested members of the public of his intent to issue an exemption subject to this Resolution at least ten (10) days before the exemption is issued. A notice of the exemption will also be published seven (7) days prior to issuance to allow for public comments. All comments received and staff's response to the comments will be forwarded to the Board with the proposed exemption. Any Regional Board member may direct that an exception not be granted by the Executive Officer and that it be scheduled for consideration by the Regional Board.

A Report of Waste Discharge shall be filed for any discharge for which approval is sought from the Executive Officer. Discharge from a project cannot commence until such time as the Regional Board Executive Officer has prepared and sent a letter to the applicant indicating that an exemption to the Basin Plan prohibitions is granted and that waste discharge requirements for the project are waived, or that General Waste Discharge Requirements are applicable. The Regional Board's action delegating authority to the Executive Officer to grant exemptions is conditional and the Executive Officer may recommend that certain exemption requests be considered by the Regional Board. Also see Appendix B for a copy of Resolution 6-90-22 describing conditions under which the Executive Officer can grant exceptions.

The Tahoe Regional Planning Agency's regional land use plan (TRPA 1987) has a special set of goals,

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policies, and ordinances regulating shorezone activities at Lake Tahoe and other lakes within its jurisdiction (TRPA 1987). The 208 Plan incorporates key provisions of these Regional Plan components. The TRPA shorezone ordinances (Chapters 50 through 56) establish detailed shorezone standards regarding project review, permissible uses and accessory structures, existing structures, Shorezone Tolerance Districts and development standards, development standards lakeward of high water, development standards in the backshore, and mitigation requirements.

TRPA divides the “shorezone” into the backshore, foreshore, and nearshore. The backshore extends from the high water level to the area of wave runup or “area of instability,” plus ten feet. (The area of instability may be determined based on a geotechnical report, or through calculations based on the height of a bluff, as described in TRPA's Ordinance Chapter 55.) The foreshore is the area of lake level fluctuation between the high and low water level. The nearshore of Lake Tahoe extends lakeward from the low water elevation to a depth of 30 feet, or to a minimum width of 350 feet. In other lakes within TRPA's jurisdiction, the nearshore extends to a depth of 25 feet below the low water elevation.

TRPA has established a “Shorezone Tolerance District” system, independent of the land capability system, which defines tolerance districts on the basis of soils and slope characteristics, the potential for shoreline or cliff erosion and their sensitivity to disturbance (Table 5.7-4). Shorezone Tolerance District maps have been adopted as part of TRPA's land use plan (TRPA 1987), and TRPA's Code of Ordinances establishes procedures for field verification of shorezone classifications, challenges of classification, map amendments, and “man-modified” reclassifications which are similar to those applicable to the Bailey land capability system (see the section of this Chapter on land capability).

Because TRPA now regulates most of the shorezone under the Shorezone Tolerance District system and shorezone ordinances rather than the land capability system, the TRPA's land use exemption criteria for SEZ projects do not automatically apply. As noted in Table 5.7-4, TRPA applies its SEZ regulations, including exemption criteria, to new development and replacement of existing land coverage in the backshore of Shorezone Tolerance District 1.

Development Standards

Construction of man-made lagoons connected to any lake in the Tahoe Region, not including existing marinas and modifications thereto, and construction of artificial islands, are prohibited by the 208 Plan (Vol. I, page 155).

The 208 Plan provides that all vegetation at the interface of the backshore and foreshore shall remain undisturbed unless disturbance is permitted for uses otherwise consistent with the shorezone policies. The interface includes backshore cliffs and other unstable lands influenced by littoral or wave processes. The use of lawns and ornamental vegetation in the shorezone shall be discouraged. Plant species approved by TRPA shall be selected when revegetating disturbed sites.

TRPA has targeted for restoration the shorezone fish habitat adjoining 24 of 29 of its “plan areas” where degraded habitat has been identified. Under TRPA's ordinance Chapter 79, projects and activities in the shorezones of lakes may be prohibited or otherwise regulated in prime fish habitat areas, or in other areas TRPA finds to be vulnerable or critical to the needs of fish. Certain activities (e.g., construction) may be restricted in areas where spawning is occurring.

The 208 Plan (Vol. I, page 155) provides that TRPA shall regulate the placement of new buoys, piers and other structures in the foreshore and nearshore to avoid degradation of fish habitat and interference with littoral drift, and further provides that TRPA will require mitigation for all impacts. TRPA shall regulate the maintenance, repair, and modification of piers and other structures in the nearshore and foreshore. Retention of a natural buffer to minimize impacts of backshore development is preferred over engineering solutions to backshore instability. Construction activity should be set back to ensure no disturbance of the interface between high capability backshore and cliff areas.

Requirements for application of BMPs to new projects, and retrofit of BMPs to existing projects, and TRPA's enforcement program, apply to shorezone lands as they do to all other lands in the Region.

The BMP Handbook (TRPA 1988, Vol. II) includes special construction techniques and development criteria applicable to the shorezone. Implementation of shorezone BMPs and vegetation policies will have a positive effect on the stability and integrity of the shorezone. Proper construction techniques and other

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measures will be required to mitigate activities in the shorezone and to protect the natural values of the shorezone.

The protection of stream deltas is important to the stability of the shorezones of lakes in the Tahoe Region. Stream deltas shall be protected from encroachment and disturbance as described under the Stream Environment Zone protection provisions. Protection of stream deltas preserves the natural balance between the erosive forces of winds and waves and the protection provided by barrier beaches. (Related needs for protection of stream inlets are discussed in the section of this Chapter on piers.) The 208 Plan protects stream deltas through restrictions on SEZ and shorezone encroachment and vegetation alteration, and restrictions and conditions on filling and dredging (Vol. VI, page 108).

The following general TRPA development standards (TRPA 1987, Code of Ordinances) related to water quality protection also apply to all shorezones, including those of the “other lakes” than Lake Tahoe where development is permitted (see the separate “Protection of Lakes” section, below):

Chapter 50 provides that a project in the shorezone or lakezone shall not be approved unless TRPA finds that:

- The project will not adversely impact littoral processes, fish spawning, backshore stability, or onshore wildlife habitat, including wildfowl nesting habitat
- There are sufficient accessory facilities to accommodate the project
- The project is compatible with existing shorezone and lakezone uses or structures on, or in the immediate vicinity of, the littoral parcel, or that modifications of such existing uses or structures will be undertaken to assure compatibility
- The use proposed in the foreshore or nearshore is water-dependent
- Measures will be taken to prevent spills or discharges of hazardous materials
- Construction and access techniques will be used to minimize disturbance to the ground and vegetation
- The project will not adversely impact navigation or create a threat to public safety as determined by

those agencies with jurisdiction over a lake's navigable waters, and

- TRPA has solicited comments from those public agencies having jurisdiction over the nearshore and foreshore, and all such comments received were considered by TRPA prior to action being taken on the project.

Table 5.7-4 lists special TRPA development standards for each of the shorezone tolerance districts.

TRPA's ordinances provide for the removal or modification of existing shorezone structures which are non-conforming with development standards and which interfere with navigation or have impacts on the shoreline.

In addition to review by the Lahontan Regional Board and TRPA, shorezone development or disturbance in the California portion of the Lake Tahoe Basin may also require permits from the U.S. Army Corps of Engineers, the California State Lands Commission, and the Department of Fish and Game. These agencies coordinate their regulatory activities through periodic shorezone development review committee meetings. As discussed elsewhere in this Basin Plan, State water quality certification under Section 401 of the Clean Water Act is necessary for Corps of Engineers permits. The State Lands Commission, which manages state-owned lands under Lake Tahoe and its tributaries, and in the shorezone, implements the Public Trust Doctrine (see Chapter 1) in its permitting process; it also implements a special program for the protection of the endangered Tahoe yellow cress.

Additional control measures affecting piers and marinas are discussed in the section of this Chapter on recreation.

Section 401 and 404 Permits

As discussed in Chapter 4 of this Basin Plan, Section 401 of the federal Clean Water Act requires state “water quality certification” for certain types of permits granted by federal agencies such as the Federal Energy Regulatory Commission (FERC) and the U.S. Army Corps of Engineers. In some cases the State Board handles Section 401 certifications directly, and in some cases it delegates authority to the Regional Boards. Applicants for Section 401 certification for Lake Tahoe Basin projects should contact Regional Board staff for information on current certification procedures.

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Section 404 of the Clean Water Act requires permits from the U.S. Army Corps of Engineers for dredge and fill activities in “waters of the United States,” which include essentially all surface waters and “jurisdictional wetlands” in the Lake Tahoe Basin. In order to simplify its permitting process, the Corps has issued a variety of “nationwide permits” for certain types of activities. To be effective in California, the Corps nationwide permits require Section 401 certification by the State Board. Following the direction of the 1980 *Lake Tahoe Basin Water Quality Plan*, the State Board has **not** certified nationwide permits for dredge and fill activities in the waters of the Lake Tahoe Basin under Section 26 applicable to “headwaters.” Thus, individual Corps permits are required for construction and dredging in Lake Tahoe and its tributaries, including wetlands and many SEZs.

Protection of Lakes and Streams Tributary to Lake Tahoe

Relatively little quantitative information is available on the quality of most tributaries to Lake Tahoe. However, the control measures designed to protect and enhance Lake Tahoe should also protect tributary lakes and streams.

The Lake Tahoe Basin includes about 170 lakes and ponds other than Lake Tahoe, most of which are in California. Many of these are within the Desolation Wilderness or in National Forest lands managed for dispersed recreation use, and the major threats to water quality are from human wastes and watershed disturbance due to recreational overuse (see the section of this Chapter on control of recreational impacts). Several of the larger lakes have residential or recreational development within their watersheds (Fallen Leaf, Cascade, and Upper and Lower Echo Lakes). Threats to water quality of tributaries of Lake Tahoe include nutrients from past use of septic systems, watershed disturbance, stormwater runoff from roads and parking areas, livestock grazing, and vessel wastes. Taste and odor problems have been reported in water supplies from Fallen Leaf Lake; they appear to be associated with blooms of an algal species usually associated with eutrophic conditions. TRPA now coordinates monitoring of and reporting to the State Board on a number of lakes other than Lake Tahoe, and has recommended that a nitrogen study of the Echo Lakes be conducted before future development is permitted there. The U.S. Forest Service is also monitoring water quality in a Desolation Wilderness lake to determine the impacts of atmospheric deposition.

Development around Fallen Leaf Lake has been sewered. Development near other larger lakes discharges toilet wastes to holding tanks; greywater discharges to leachfields are permitted in some circumstances (see the section of this Chapter on wastewater treatment, export, and disposal). The Regional Board should continue to review monitoring data for these lakes to determine the need for further controls on wastewater.

Problems affecting streams tributary to Lake Tahoe, and their beneficial uses (including fish habitat) include siltation, channelization, dredging, removal of rock or gravel, culverts, bridges, diversions, urban runoff, snow disposal and littering. Stream flows for fish habitat may be endangered by diversions for domestic use, irrigation, and snowmaking.

Streams themselves are included in the definition of the term “Stream Environment Zone,” and all of the SEZ protection measures discussed in this Chapter apply. TRPA has adopted a regionwide “environmental threshold carrying capacity” standard of 60 mg/l suspended sediment for tributary streams, which applies in addition to the state water quality objectives set forth earlier in this Chapter. TRPA has also set regional “threshold” standards for fish habitat, requiring the upgrading of specific amounts of stream mileage from “marginal” to “good” and from “good” to “excellent”; the thresholds also require nondegradation of instream flows pending adoption of instream flow standards. The thresholds also state that it is TRPA’s policy to support, in response to justifiable evidence, state and federal efforts to reintroduce the Lahontan cutthroat trout (see the fisheries management section of Chapter 4). The 208 Plan (Vol. I, page 323) does not permit modifications to stream channels and other activities that may physically alter the natural characteristics of a stream, unless TRPA finds that they avoid adverse effects to fish or are otherwise allowed under TRPA’s Code of Ordinances. TRPA requires development adjacent to tributaries to fully mitigate adverse impacts to the fishery.

The control measures discussed throughout this Chapter, which are implemented by the Regional Board, TRPA, and other agencies, will protect the tributaries of Lake Tahoe as well as the lake itself. See especially the sections on SEZs, shorezone protection, and 100-year floodplain protection.

Ground Water Protection

Although data are limited, research to date indicates that ground water nutrient loading represents a

substantial contribution to Lake Tahoe. Loeb (1987) found ground water concentrations of nitrate in three watersheds to be lowest (by a factor of two to ten) in areas farthest upgradient from Lake Tahoe and to increase downgradient toward the lake. This corresponds to the degree of land disturbance. Urbanization can significantly increase nitrate concentration in ground water through fertilizer addition, irrigation, sewer line exfiltration, sewage spills, infiltration of urban runoff, and leachate from abandoned septic systems. Future development will increase nutrient transport in ground water by removing vegetation which normally recycles nutrients in the watershed. Although ground water disposal of stormwater is generally preferable to surface discharge because it provides for prolonged contact with soils and vegetation which remove nutrients, infiltration of urban stormwater in areas with high groundwater tables may be undesirable because of possible contamination of drinking water supplies from toxic runoff constituents.

In addition to contributing nutrients, human activities in the Lake Tahoe Basin have led to localized ground water contamination through leaks, spills, and illegal disposal of fuels and solvents. The impacts of infiltration of stormwater containing petroleum products, heavy metals, and deicing chemicals on ground water quality at Lake Tahoe have not been well studied, but are of concern. Local naturally high concentrations of uranium and arsenic in groundwater have also limited the use of some potential municipal supplies. Because of these problems, and because total consumptive use of surface and ground water in the Tahoe Basin is limited by interstate agreement, it is important to protect the remaining good quality ground water for municipal use.

Control Measures for Ground Water Protection

Further increases in nutrient concentrations in Tahoe Basin ground waters can be prevented through control measures discussed elsewhere in this Chapter, including use of alternatives to infiltration in areas with high ground water, fertilizer management, maintenance and upgrading of sewer systems, and vegetation protection and revegetation of denuded areas. Because ground water tables are often very near the surface in Stream Environment Zones, protection of SEZs will also protect ground water quality.

Many of the control measures needed to control erosion and surface runoff are also needed to protect

ground water. In addition, some of the Best Management Practices set forth in the 208 Plan (Vol. II) are specifically directed to preventing discharges to ground water. For example, the BMP for livestock confinement facilities (BMP 79) provides that they shall not be located in areas with less than 4 feet between the soil surface and the ground water table at any time of the year. The surface and ground water systems of the Lake Tahoe Basin are interconnected, and the control measures are directed towards protecting both.

Programs used to control surface runoff will incorporate measures to protect ground water. The prohibitions adopted to prevent development which threatens water quality include prohibitions against discharges to ground water. The limitations on vegetation removal set to prevent erosion from timber harvesting, ski areas, and other sources will also help protect ground water. Programs to enforce BMPs at sites with onsite surface water problems will also incorporate those Best Management Practices adopted to protect ground water.

Controls on solid waste disposal and on toxic leaks and spills (discussed elsewhere in this Chapter, and in greater detail in Chapter 4) will also protect ground water quality in the Lake Tahoe Basin. Because redevelopment of existing urban areas is expected to be an important component of future development in the Basin, Regional Board staff should continue to cooperate with local governments in identification of soil and ground water contamination from past development, and in requiring cleanup of identified problems before new development takes place.

**Figure 5.7-1
SEZ SETBACKS**

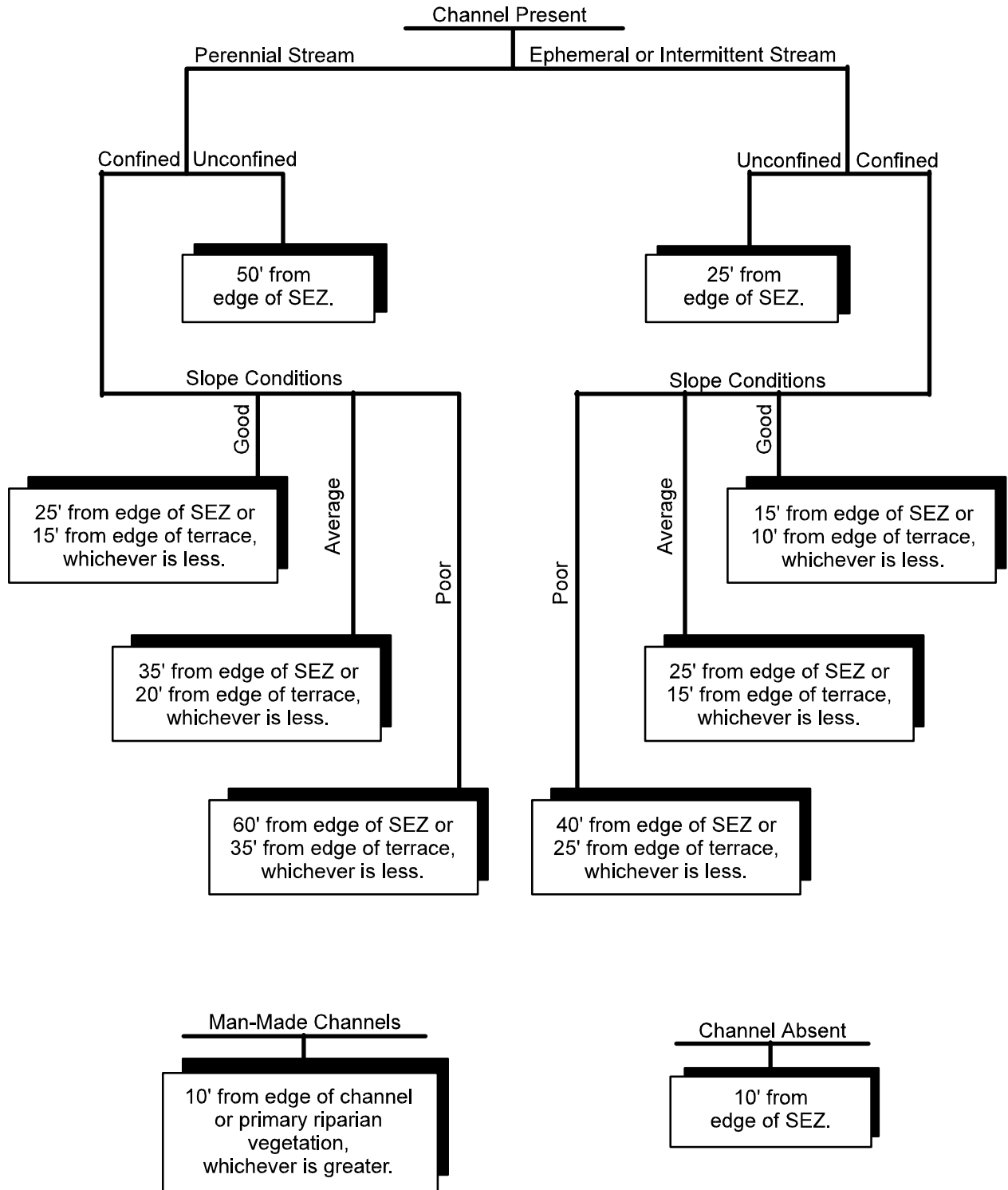


Table 5.7-1
DEFINITIONS OF SEZ TERMINOLOGY

Alluvial Soils - All the following soil types owe their major characteristics to the presence of surface or subsurface water:

- (a) Loamy alluvial land (Lo).
- (b) Elmira loamy coarse sand, wet variant (Ev).
- (c) Celio gravelly loamy coarse sand (Co).
- (d) Marsh (Mh).
- (e) Gravelly alluvial land (Gr).
- (f) Fill land (Fd)

Confined - Stream types classified under major categories A and B, and stream type C2, as defined in the report entitled "A Stream Classification System", David L. Rosgen, April, 1985.

Designated Flood Plain - The limits of the intermediate Regional Flood where established for creeks by the U.S. Army Corps of Engineers, or the limits of the 100-year flood where established for creeks by the U. S. Army Corps of Engineers.

Ephemeral Stream - Flows sporadically only in response to precipitation, with flows lasting a short time.

Groundwater between 20-40 inches - Evidence of ground water between 20 and 40 inches below the ground surface (somewhat poorly drained soil).

Intermittent Stream - Flows in response to precipitation or snow melt.

Lake - A water body greater 20 acres in size, exceeding two meters deep at low water and lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 20 percent areal coverage.

Man-Made Channel - A channel constructed by man for the purpose of conveying water or a channel created by water being discharged from a man-made source, such as a culvert or pipe.

Near Surface Groundwater - Evidence of ground water within 20 inches of the ground surface (poorly drained soil).

Perennial Stream - Permanently inundated surface stream courses. Surface water flows throughout the year except in years of infrequent drought. Perennial streams shall be those shown as solid blue lines on USGS Quad Maps, or streams determined to be perennial by TRPA.

Pond - A standing water body of less than 20 acres in size and/or less than two meters deep at low water.

Table 5.7-1 (continued)
DEFINITIONS OF SEZ TERMINOLOGY

Primary Riparian Vegetation - the following vegetative community types as identified in the 1971 TRPA report entitled "Vegetation of the Lake Tahoe Region, A Guide for Planning" (see TRPA, 1988, Vol. I, Attachment 4 for species composition):

- (a) Type 0: Open water - Open water, swamps and pools and vernal pools.
- (b) Type 2: Herbaceous - Wet marsh or meadow and Sphagnum bog.
- (c) Type 7: Riparian shrub - Willow thicket and Alder thicket.
- (d) Type 9: Broadleaf - Low elevations.

SEZ Setbacks - A strip of land adjacent to the edge of a SEZ, the designated width of which is considered the minimum width necessary to protect the integrity of the various characteristics of the SEZ. The width of the setback shall be established in accordance with the procedure set forth in Subsection 37.3.D of the TRPA Code of Ordinances.

Secondary Riparian Vegetation - The following vegetative types as identified in the 1971 TRPA report entitled "Vegetation of the Lake Tahoe Region, A Guide for Planning" (see TRPA, 1988, Vol. I, Attachment 4 for species composition):

- (a) Type 2: Herbaceous - Wet mesic meadow.
- (b) Type 9: Broadleaf - High elevations.
- (c) Type 19: Lodgepole - Wet type.

Slope Condition - The condition of the slope located adjacent to the stream channel or edge of the SEZ shall be defined as follows. The extent of existing slope protection, which is defined as the percent cover of original duff layer, down logs, low growing vegetation or rock fragments greater than 1-2 inches in diameter, shall be given primary consideration when determining slope condition.

- (a) Good - Slopes show little or no evidence of surface (sheet, rill, gully) erosion or mass wasting. Slopes are typically covered 90 percent or more with original duff layer, down logs, slash, low growing vegetation or rock fragments greater than 1-2 inches in diameter. Slope gradient is commonly less than 30 percent. Soil horizons are usually cohesive and consolidated.
- (b) Average - Slopes show evidence of surface (sheet, rill, gully) erosion or mass wasting over 5 to 25% of the slope surface. Slopes are typically covered between 50 to 90 percent with original duff layer, down logs, slash, low growing vegetation or rock fragments greater than 1-2 inches in diameter. Slope gradient is commonly between 30 and 70 percent. Soil horizons are typically moderately cohesive and consolidated.
- (c) Poor - Slopes show evidence of active and pronounced surface (sheet, rill, gully) erosion or mass wasting over more than 50 percent of the slope surface. Slopes are typically covered less than 50 percent with original duff layer, down logs, slash, low growing vegetation or rock fragments greater than 1-2 inches in diameter. Slope gradient is often greater than 70 percent. Soil horizons are typically non-cohesive and unconsolidated. Evidence of seeping is often present.

Terrace - A moderately flat land area, above the flood plain, generally less than 20 percent slope.

Unconfined - Stream types classified under major categories C (excluding stream type 2), D and E as defined in the report entitled "A Stream Classification System", David L. Rosgen, April 1985.

Table 5.7-2
LIST OF POTENTIAL SEZ RESTORATION PROJECTS

Placer County, California

1. PA 001A, 002¹: Grove Street Tract
2. PA 002: Tahoe Lake School
3. PA 005: Burton Creek Meadow
4. PA 006: Sierra Pacific Yard
5. PA 024B: Snow Creek
6. PA 158S: Quail Creek
7. PA 158N: Homewood, Canyon Creek
8. PA 159: Grand View Avenue
9. PA 166, 167: Ward Creek

City of South Lake Tahoe

1. PA 085, 093: Charlesworth and Elva Streets
2. PA 092: Wildwood - Ski Run Boulevard
3. PA 093: Tamarack Avenue
4. PA 100: Truckee Marsh
5. PA 100S: Barton Meadow
6. PA 100N: Truckee Marsh
7. PA 100E: Trout Creek Meadow
8. PA 100SE: Trout Creek Meadow
9. PA 100, 103: Optimist Club
10. PA 110: Dunlap Drive
11. PA 110, 112: Fifth Street

El Dorado County, California

1. PA 106W: Cold Creek
2. PA 106E: Ravine Street
3. PA 118: Sawmill Pond
4. PA 119S: Upper Truckee River
5. PA 119N: Upper Truckee River
6. PA 119S: Boca Raton Drive
7. PA 119T: Elks Club Drive
8. PA 123, 125: Santa Fe Road
9. PA 132: Angora Creek Drive

¹ Indicates location of project in one of TRPA's 175 "plan areas" which have replaced earlier regional zoning maps.

Source: TRPA, 1988, Volume III.

Table 5.7-3
DISCHARGE PROHIBITION EXEMPTION CRITERIA
FOR RECREATION PROJECTS

The following types of facilities need not, "by their very nature", be located on sensitive lands. See text for other criteria and exemption findings.		
Category	Sensitive Lands	
	SEZs and 1b	(Capabilities 1a, 1c, 2, 3)
Ski Areas	Any activity or facility which causes additional land coverage or permanent disturbance, except for stream crossings for ski runs provided no more than five percent of SEZ area in the ski area is affected by the stream crossings and except for facilities otherwise exempted such as utilities and erosion control facilities	Activities or facilities such as parking areas, base lodge facilities and offices, and retail shops (unless there is no feasible non-sensitive site available, the use is a necessary part of a skiing facility, and the use is pursuant to a TRPA approved master plan), except for facilities otherwise exempted such as utilities and erosion control facilities.
Campgrounds	Facilities and activities such as campsites, toilets, parking areas, maintenance facilities, offices, lodges, and entrance booths, except for facilities otherwise exempted such as pedestrian and vehicular stream crossings, utilities and erosion control facilities.	Facilities and activities such as campsites, toilets, parking areas, maintenance facilities, offices, lodges, and entrance booths, except for facilities otherwise exempted such as utilities and erosion control facilities.
ORV Courses	Facilities and activities such as ORV trails, staging areas, parking areas, maintenance facilities, and first aid stations, except for bridged stream crossings, and facilities otherwise exempted such as erosion control facilities.	Facilities and activities such as ORV trails, staging areas, parking areas, maintenance facilities, and first aid stations (unless the ORV course is pursuant to a comprehensive TRPA approved ORV management plan for resolving resource management problems associated with ORV activity), except for facilities otherwise exempted such as erosion control facilities.
Golf Courses	Facilities and activities such as tees; greens; fairways and driving ranges which require mowing, vegetative disturbance or fertilizer; clubhouses; retail services; proshop; parking areas; offices; maintenance facilities; and accessory uses, except for facilities otherwise exempted such as pedestrian and vehicular stream crossings, utilities, and erosion control facilities.	Facilities and activities such as tees; greens; fairways and driving ranges which require mowing, vegetative disturbance or fertilizer; clubhouses; retail services; proshop; parking areas; offices; maintenance facilities; and accessory uses, except such as utilities and erosion control facilities.

Table 5.7-4
SHOREZONE TOLERANCE DISTRICTS AND
SPECIAL DEVELOPMENT STANDARDS

District 1	<p>Shoreline formed by low, sandy barrier beach separating lake proper from marshes and wetlands. Generally ecologically fragile shorezone; any substantial use or alteration can lead to excessive sedimentation, beach erosion and water turbidity. Special development standards include:</p> <ul style="list-style-type: none"> (a) Access to the shoreline shall be restricted to planned footpaths which minimize the impact to the backshore. (b) Vegetation shall not be manipulated or otherwise disturbed except when permitted under TRPA's ordinance Chapter 55. (c) No drainage or modification of backshore wetlands shall be permitted. (d) New development in the backshore of a Shorezone Tolerance District 1 shall be regulated in accordance with TRPA's regulations for Stream Environment Zones. (e) Replacement of existing land coverage in the backshore of a Shorezone Tolerance District 1 shall be in accordance with TRPA's regulations for replacing existing land coverage in Stream Environment Zones.
District 2	<p>Typically volcanic and morainic debris shorezones with slopes thirty percent (30%) and over, and alluvial soils at nine to thirty percent (9-30%) slopes. Potential for disturbance in the nearshore is high as is potential for erosion and cliff collapse in the backshore. Special development standards include:</p> <ul style="list-style-type: none"> (a) Permitted development or continued use may be conditioned upon installation and maintenance of vegetation to stabilize backshore areas and protect eroding areas from future destruction. (b) Projects shall not be permitted in the backshore unless TRPA finds that such a project is unlikely to accelerate or initiate backshore erosion. (c) Access to the shoreline shall be restricted to stabilized access ways, which minimize the impact to the backshore.
District 3	<p>Armored granite shorezones with slopes exceeding thirty percent (30%). The erosion potential is high immediately above the shore, with moderate potential for disturbance in the steep nearshore zone. Removal of vegetation in the backshore may lead to mass movement and erosion. Special development standards are the same as those for Shorezone Tolerance District 2, above.</p>

Source: TRPA, 1987, Ordinance Chapter 53.

Table 5.7-4 (continued)
SHOREZONE TOLERANCE DISTRICTS AND
SPECIAL DEVELOPMENT STANDARDS

District 4	<p>Volcanic rock shorelines with moderate potential for erosion. The potential increases where colluvium of volcanic debris is present and stony, sandy loams lie on fifteen to thirty percent (15-30%) slopes; on morainic debris shorelines with high erosion potential above the shoreline, and alluvial shorezones where the shoreline is characterized by steep, crumbling cliffs with continuing erosion problems. Special development standards include:</p> <ul style="list-style-type: none"> (a) Permitted development or continued use may be conditioned upon installation and maintenance of vegetation to stabilize backshore areas and protect existing cliffs from accelerated erosion. (b) Projects shall not be permitted in the backshore unless TRPA finds that such project is unlikely to require the cliff area to be mechanically stabilized or that the project will not accelerate cliff crumbling, beach loss, or erosion. (c) Access to the shoreline shall be restricted to stabilized access ways which minimize the impact of the backshore. (d) Access to buoys shall be designed to cause the least possible environmental harm to the foreshore and backshore. (e) Access to piers, floating platforms, and boat ramps shall be designed to cause the least possible alteration to the natural backshore.
District 5	<p>Armored granite shorezones with fifteen to thirty percent (15-30%) slopes with less erosion potential than similar lands in Shorezone Tolerance District 4. Development standards are the same as those for District 4, above.</p>
District 6	<p>Shorezone underlain by weathered volcanic or morainic debris with slopes of five to fifteen percent (5-15%). Development standards include the standards set forth for Tolerance Districts 4 and 5 above, and the following additional standards:</p> <ul style="list-style-type: none"> (a) Vehicular access to the shoreline shall not be permitted except where TRPA finds that such access will not cause environmental harm. (b) Boat launching facilities and marinas shall be located where the nearshore shelf is of sufficient width to enable construction and use without potential for significant shelf erosion.
District 7	<p>Comparatively level shorezone underlain by morainic and alluvial materials with slopes of zero to nine percent (0-9%). Development standards are the same as those for District 6, above.</p>
District 8	<p>Gently sloping, armored granitic shorezone with high capability for development. Shorelines are in equilibrium and potential for erosion in foreshore and nearshore is low. Backshore possesses a moderate erosion potential in some cases. Development standards are the same as those for District 6, above.</p>

Source: TRPA, 1987, Ordinance Chapter 53.

5.8 DEVELOPMENT RESTRICTIONS

In addition to remedial work to mitigate the impacts of past development in the Lake Tahoe Basin, restrictions (TRPA land use restrictions and State discharge prohibitions) on new development are also necessary for the protection of Lake Tahoe. To ensure that further development will not lead to further deterioration of water quality, the following development restrictions must be imposed:

- No new subdivision development except as permitted under the revised 208 Plan (TRPA 1988);
- No coverage on individual parcels in excess of the allowable percentage of impervious coverage set by the land capability system except as permitted under the Individual Parcel Evaluation System (IPES) and coverage transfer provisions of the 208 Plan;
- No further construction in Stream Environment Zones, with limited exceptions;
- No further construction in 100-year floodplains which are not also SEZs or below the high water rim of Lake Tahoe and its tributaries, with limited exceptions;
- No further development until offsetting erosion and urban runoff control projects are implemented; and
- No new pier construction in significant fish spawning habitat or immediately offshore of important stream inlets in Lake Tahoe, with limited exceptions (Figure 5.8-1).

The development restrictions called for in this Basin Plan may be implemented through zoning, land purchase, or water quality programs such as prohibitions. By whatever means the controls are implemented, however, and regardless of the implementing agency, implementation will require a procedure to apply the controls on a lot-by-lot basis. The Lahontan Regional Board will perform the review necessary to determine whether proposed applications are consistent with the development restrictions set by this plan, except for single family homes, and accessory structures, for which review responsibility has been delegated to TRPA. The Regional Board may delegate review of other types of projects for consistency with the control measures

below to TRPA without further Basin Plan changes. (TRPA has delegated review of single family residential projects to local governments through Memoranda of Understanding.) The Lahontan Regional Board shall require that the necessary information be submitted in reports for waste discharge requirements, which will apply the development restrictions.

The Tahoe Regional Planning Agency controls new development through its regional land use plan (TRPA 1987) and through the land use provisions of its 208 Plan. Controls are set to ensure attainment of a variety of TRPA “environmental threshold carrying capacity standards.” These “thresholds” include standards for soils, air quality, vegetation, fisheries, wildlife, recreational opportunities, noise, and scenic quality as well as for water quality. Under TRPA’s plans, and under the 1987 Regional Plan litigation settlement, the total amount of new residential, commercial, tourist commercial, public service and recreational development in the Lake Tahoe Basin is limited. TRPA periodically evaluates progress toward attainment of its environmental thresholds, and progress in accomplishment of the Capital Improvements and Stream Environment Zone Restoration Programs of the 208 Plan, and adjusts allocations for new development accordingly. Movement of the Individual Parcel Evaluation System (IPES) line to allow new development on more sensitive residential parcels within each local government jurisdiction also depends upon accomplishment of remedial work.

As noted in the “Offset” section of this Chapter, TRPA has a system of mitigation fees, offset requirements, and other provisions applicable to new development, or expansion/remodeling of existing development, which both mitigate the impacts of the new project and provide for offset of the impacts of earlier development in the Tahoe Basin.

The California discharge prohibitions related to discharges of earthen materials, which were adopted in the 1975 *Water Quality Control Plan for the North Lahontan Basin* and the 1980 *Lake Tahoe Basin Water Quality Plan*, also effectively limit new development in the Lake Tahoe Basin. These prohibitions remain in effect as part of this Basin Plan. Exemptions from the prohibitions, discussed below, are provided under limited circumstances for projects which benefit the public.

Both the California prohibitions and the TRPA land use restrictions serve to prevent the construction of additional excess impervious surface coverage, and to prevent or minimize disturbance of high erosion

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hazard lands, 100-year floodplains, Stream Environment Zones, and sensitive fish habitat. The development restrictions will prevent any major increase in erosion and urban runoff problems. Coupled with implementation of remedial erosion and urban runoff control projects, SEZ restoration projects, and onsite control measures including BMPs, the restrictions will ensure that nutrient and sediment loading to Lake Tahoe are reduced significantly below levels prevalent in 1980, when the development restrictions took effect. These restrictions will also greatly reduce the number of lots which may be used for residential or commercial construction. Because most subdivisions were created without regard to the land capability system and without regard to the need to protect SEZs, development of many of these lots will be precluded or delayed under these restrictions. There are a variety of options available to landowners who are unable to build on their property due to TRPA land use restrictions and/or Regional Board discharge prohibitions, including land purchase by a public agency, and transfer of development rights. These options are discussed below.

In general, areas outside of existing development will be those affected by restrictions on new subdivisions. Enforcement of coverage limitations set by the land capability system will effectively preclude or delay almost all development on lands classified as capability levels 1, 2, or 3. The Individual Parcel Evaluation System (IPES), approved as part of the revised 208 Plan, could eventually allow construction on up to 20 percent of the remaining vacant single family parcels in California which are classified as land capability 1a, 1c, 2, and 3. Construction continues to be precluded on SEZ (Class 1b) lots. (See the summary of the IPES in the section of this Chapter on land capability and coverage.)

Some "substandard areas" have lots too small to be developed within coverage limitations, or where existing development has not made adequate provisions for roads or utilities. The 1988 revisions to the 208 Plan allow resubdivision of such areas. Development on high capability lands will be subject to coverage limitations set by the land capability system, but in most situations these limitations will not preclude development. Some high capability lands received IPES scores at least initially below the line between developable and undevelopable parcels. The 208 Plan estimates that, over 20 years, 4,080 new Tahoe Basin single family dwellings could be built in El Dorado County and 1,034 in Placer County.

Prohibitions

State law authorizes the State and Regional Boards to set prohibitions against the discharge of waste in certain areas or under certain conditions. These prohibitions may apply to discharges to ground water or surface water or both (CA Water Code § 13280-13284). The Nevada State Environmental Commission also has the authority to establish discharge prohibitions.

The prohibitions related to new development in the Lake Tahoe HU which are summarized in Table 5.8-1 were adopted by the State Board in 1980. They apply in addition to other prohibitions against discharges of sewage, solid waste, and industrial waste, and against discharges within 100-year floodplains, which were adopted in the 1975 *Water Quality Control Plan for the North Lahontan Basin* or in earlier Regional Board policies. (See the full texts of these prohibitions in an earlier section of this Chapter.)

It is important to note that the Regional Board implements a **separate** set of waste discharge prohibitions in the Truckee River HU. The full texts of prohibitions which apply to the portion of the Truckee River HU within TRPA's jurisdiction are also given earlier in this Chapter. These include prohibitions related to septic system discharges and to 100-year floodplain discharges. The Regional Board has adopted exemption criteria for the 100-year floodplain prohibition which differ from those for 100-year floodplain discharges in the Lake Tahoe Basin. The Regional Board recognizes that TRPA applies the 208 Plan land use restrictions and exemption criteria for SEZ and 100-year floodplain projects within the portion of the Truckee River HU between the Lake Tahoe dam and the confluence of the Truckee River and Bear Creek, and that the 208 Plan provisions will be more stringent in some cases than the Regional Board's Basin Plan provisions for this area.

The 1980 exemption criteria for the prohibitions related to development in the Lake Tahoe HU have been revised to make them more consistent with TRPA's exemption criteria for its land use restrictions. These prohibitions shall be enforced by the Lahontan Regional Board through administrative orders, injunctions, and monetary penalties. Because ground water as well as surface water carries nutrients into Lake Tahoe, the prohibitions related to new development address discharges to both ground water and surface water. Definitions for important

5.8, Development Restrictions

terms used in the prohibitions are given along with their full texts earlier in this Chapter.

The prohibitions do not directly prohibit the construction of new subdivisions, development of environmentally sensitive lands, or development which is not offset by remedial erosion control measures. The discharge of sediment and nutrients which results from such development is prohibited. If a person proposing a project can prove that it will cause no greater discharge than would result from development which is outside the areas addressed by the prohibitions and that it complies with other applicable control measures, the prohibitions do not apply. In practical effect, however, the prohibitions will preclude any new development which is not in accord with the development restrictions called for in this Basin Plan.

For example, the discharge or threatened discharge attributable to new development which does not comply with land capability is prohibited. If proposed development would create excess coverage, but would not create any discharge above that which would result from development which adheres to coverage limitations and other applicable control measures, the prohibition does not apply. (As noted in the section of this Chapter on land capability, above, coverage on a parcel which exceeds the Bailey system limits but which is in compliance with the coverage rules described in that section is **not** considered “excess” coverage in violation of discharge prohibitions.) The State and Regional Boards do not know of any currently available technology which would make it possible to construct excess coverage without causing an increase in discharge of sediment and nutrients. The Lahontan Regional Board must allow a project proponent an opportunity to present evidence that the project will not result in a discharge in violation of the prohibition. The project proponent would have to prove there would be no discharge above that which would result from development which adheres to land capability coverage limitations and which incorporates the other BMPs called for by this Basin Plan. As noted in the section of this Chapter on Best Management Practices, BMPs such as drainage facilities are required for **all** land capability levels. Both increases in the levels of sediment and nutrients carried from a construction site in surface or ground water and increases in downslope erosion must be prevented to assure compliance with the prohibitions.

Remedial measures to control existing sources of erosion, which should be carried out whether or not

new development is permitted, will not be taken into account in determining whether a project would result in violation of the discharge prohibitions. Base coverage allowances and maximum coverage limits for different types of development, as set forth in the TRPA Regional Plan (TRPA 1987) and Vol. I of the 208 Plan, are construed to be in accordance with land capability. (See the section of this Chapter on land capability and coverage rules.)

These prohibitions are not intended to prevent the implementation of the Individual Parcel Evaluation System for assigning development permits, sewer permits, and allowable coverage to single family residential lots. However, in its conditional certification of the revised 208 Plan (State Board Resolution 89-32), the State Board required advance notification of a change in the IPES line between developable and undevelopable parcels:

“Upon notification of a proposed move in the IPES line, the State Board will assess the reasonableness of progress being made toward the revised 208 Plan’s thresholds and interim targets, and in accordance with its responsibilities as a certifying agency under Section 208 of the Clean Water Act, make a determination regarding continued State Board certification of the revised 208 Plan.”

Changes in certification of the 208 Plan could lead to changes in the applicability of these prohibitions.

The prohibitions related to new development do not apply to repair or replacement of an existing structure. For example, if a building or residence is destroyed by fire, a new building or residence could be built on the same lot. In addition, these prohibitions shall not apply to any new development holding a valid sewer permit issued before the October, 1980 date of approval of the *Lake Tahoe Basin Water Quality Plan* so long as all necessary approvals are obtained. BMPs will be required in these cases.

These prohibitions shall apply in addition to the other prohibitions against discharges to waters of the Lake Tahoe Basin which were adapted as part of the 1975 Basin Plan (e.g., the prohibition against direct discharges to surface waters; see the summary of prohibitions earlier in this Chapter).

These prohibitions shall be strictly enforced. No discharge shall be permitted in violation of the prohibitions related to new development. The Lahontan Regional Board will issue waste discharge requirements for construction projects in the Lake

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Tahoe Basin. The prohibitions related to new development can be enforced without issuing waste discharge requirements to individual projects, but waste discharge requirements can be used to apply the prohibitions. The Regional Board shall also prescribe requirements when development does not violate the prohibitions, but control measures are still needed to prevent erosion and surface runoff problems. Waste discharge requirements shall require new development to comply with the discharge prohibitions and to incorporate measures which limit erosion and surface runoff discharges to ground and surface waters to the levels which can be achieved by complying with the discharge prohibitions and by following BMPs. The Regional Board may waive discharge requirements when a permit issued by another agency sets adequate controls.

The prohibitions related to new development can be enforced through conditions in waste discharge requirements, NPDES stormwater permits, denial of water quality certification for Section 404 permits by the U.S. Army Corps of Engineers, and through conditions in grants and waste discharge permits issued to sewerage agencies.

Exemption Criteria—General Considerations

Exemptions may be granted under certain circumstances to the discharge prohibitions related to new subdivisions, new development in SEZs or not in accord with land capability, new development which is not offset by remedial projects, 100-year floodplains, and development of new piers. (Also see Appendix B, Resolution 6-90-22 for a description of exemption considerations.) These prohibitions shall not apply to any structure the Regional Board, or a management agency designated by the State Board to implement the Lake Tahoe Basin provisions of the *Water Quality Control Plan for the Lahontan Region*, approves as reasonably necessary:

- to control existing sources of erosion or waterpollution
- to carry out the 1988 TRPA regional transportation plan
- for health, safety, or public recreation
- for access across SEZs to otherwise buildable parcels.

Under limited circumstances, the Regional Board may delegate authority to the Executive Officer to grant exemptions from these prohibitions.

Projects “to control existing sources of erosion or water pollution” are interpreted to include projects which enhance beneficial uses of water bodies, including wetlands. These may include erosion control projects, habitat restoration projects, wetland rehabilitation projects, and similar projects, programs and facilities.

Exemptions are permitted for projects which implement TRPA's 1988 transportation plan. However, the 1980 *Lake Tahoe Basin Water Quality Plan* is strongly opposed to exemptions for new highway construction to ease traffic congestion (see the section of this Chapter on roads and rights-of-way).

In Regional Board review of proposed exemptions for public recreation projects, the determination whether a project, by its very nature, must be built where construction would otherwise be impossible without violation of a prohibition shall be based on the kind of project proposed, not the particular site proposed. Exceptions will not be allowed for projects such as parking lots and visitor centers which do not by their very nature have to be located in Stream Environment Zones or other sensitive areas. The criteria in Table 5.7-3 were established in 1988 to aid making these determinations.

In Regional Board review of proposed exemptions for public health and safety projects, projects necessary to protect public health or safety shall include projects needed to protect the health and safety of occupants of existing structures, including private dwellings. Exceptions for public health and safety purposes shall not be granted to permit residential or commercial development of any vacant lot or parcel, however, nor shall the allowance of any exception for public health and safety purposes permit such development.

Projects involving creation of land coverage which is in excess of the Bailey land capability system limits, but which is in accordance with the coverage rules described earlier in this Chapter are not considered to be in violation of the discharge prohibitions against development involving excess coverage, and do not require specific exemptions.

The restoration requirements in the exemption findings below may be accomplished onsite or offsite by the applicant or another agency approved by the Regional Board and TRPA. Such restoration requirements shall be in lieu of any land coverage transfer requirement or TRPA water quality mitigation

fee (TRPA Code of Ordinances Section 20.4.C). Only land which has been disturbed or which consists of hard coverage or soft coverage shall be eligible for credit for restoration. Restoration plans shall require restoration to cause the area to function in a natural state with provisions for permanent protection from further disturbance. Lands disturbed by the project and then restored are not eligible for credit. Permanent protection from further disturbance shall include, but not be limited to, recordation by the owner of deed restrictions, or other covenants running with the land, on a form approved by TRPA, against parcels in private ownership, permanently assuring the restoration requirements. The Regional Board and TRPA shall obtain appropriate assurance from public agency applicants that restoration requirements are met. (See the discussions of coverage rules and offset programs above, for additional information.)

Construction in SEZs or on land capability Classes 1, 2, and 3 normally will require special conditions of project approval because of the sensitivity of these areas (208 Plan, Vol. VI, page 122).

Restrictions on New Subdivisions

Construction of new subdivisions causes major increases in sediment and nutrient loads. On low erosion hazard lands, subdivision construction will increase sediment yields 20-fold, and the increases on moderate and high erosion hazard lands are even greater. Close attention to land capability and installation of surface runoff management systems can reduce sediment yields. Even development on low erosion hazard land following Best Management Practices to control erosion and surface runoff will at least double sediment yields over natural levels.

New subdivisions disturb large areas for road construction and utility installation. Even before the first house is built, the average subdivision disturbs about 20 percent of the area. New subdivisions, therefore, yield a great deal more sediment per unit constructed than does construction of additional units in existing subdivisions. New subdivisions in the Tahoe Basin would cause a significant increase in sediment loads. Because of this, and because new subdivisions add far more sediment per unit than construction in existing subdivisions, no new subdivision in the Basin should be allowed. The State Board adopted the prohibitions against discharges or threatened discharges attributable to new subdivision, which is set forth in full earlier in this Chapter, in 1980. For purposes of implementing these discharge prohibitions any new development

which involves construction of roads and utilities which have water quality impacts comparable those of a lot and block, multiple ownership subdivision is considered a new subdivision, even if the property remains under a single ownership.

The 208 Plan (Volume I, page 114) provides that no new division of land shall be permitted within the region which would create new development potentially inconsistent with TRPA's Goals and Policies. This policy does not consider the following divisions of land to be inconsistent when the result does not increase the development potential permitted by TRPA's Regional Plan:

- division of land for purposes of conveyance to a government agency, public entity, or public utility,
- division of land for cemetery lots,
- divisions ordered by a federal or state court as a result of an adversary legal proceedings (sic) involving TRPA,
- certain modifications or lot-line adjustments to existing subdivisions,
- certain conversions of existing structures to stock cooperatives, community apartments, condominiums, or other form of divided interest,
- redivision, adjustment, or consolidation within an existing urban area as part of a TRPA-approved redevelopment plan, or
- division of land through condominiums, community apartments, or stock cooperatives within an existing urban area in conjunction with a project involving transfer of development rights or otherwise in accordance with the Regional Plan, provided the project is approved prior to the approval of the division.

Only very limited subdivisions will be allowed under the 208 Plan. TRPA's intent is to avoid the impacts of new lot and block subdivisions while using mechanisms such as resubdivision to lessen the potential impact of existing approved but unbuilt subdivisions.

In approving a waste discharge permit for development involving any of the types of land division above which TRPA does not consider to be a "new subdivision," the Regional Board should make a finding that it is not a new subdivision which will lead to a discharge in violation of the prohibition.

Restrictions on Development of High Erosion Hazard Lands

Development of high erosion hazard lands poses a significant risk of major increases in erosion. Erosion rates more than 100 times natural background levels have been experienced in the Tahoe Basin. The revised 208 Plan could allow some construction of single family homes on high erosion hazard lands under the Individual Parcel Evaluation System, if TRPA demonstrates that progress has been made toward attainment of water quality standards through other components of the total 208 Plan program. In certifying the 208 Plan revisions, the State Board requested advance notice of any plans to move the IPES line between developable and undevelopable parcels. After receiving such notification, the State Board will review TRPA's progress reports and determine whether to continue certification of the revised 208 Plan.

The section of this Chapter on land capability references TRPA's land use restrictions on development of land capability Class 1-3 lands. In general, TRPA allows such development only for residential construction approved under the IPES, and for public outdoor recreation and public service projects if specific exemption findings can be made. These findings are summarized in the 208 Plan (Vol. I, page 125).

The State's discharge prohibitions affecting Class 1a, 1c, 2 and 3 lands are related to land coverage which exceeds the land capability system limits, rather than to development of these lands *per se*. The TRPA exemption findings in the 208 Plan and in Ordinance Chapter 20 have been adapted as exemption findings from the discharge prohibitions. These findings are set forth below.

Restrictions on Development Related to Coverage Limits

All development results in some increase in erosion and surface runoff even when construction is limited to high capability lands. Impervious surface, disturbed terrain, and unvegetated areas all contribute to erosion and surface runoff. Increased coverage also interferes with the normal recycling of nutrients in the watershed by reducing uptake of nutrients by vegetation, resulting in increased nutrient loadings over and above those associated with increased erosion. These problems are most serious when the disturbed area exceeds the limits set by the land capability system. The land capability system and coverage rules are discussed earlier in this

Chapter; the rules define the only circumstances under which impervious surface coverage can be allowed to exceed the limits of the Bailey land capability system.

The section of this Chapter on land capability and coverage rules discusses allowable "base coverage"; coverage above the Bailey system limits which may be obtained by transfer; and mitigation of existing "excess coverage." New land coverage on Class 4-7 lands which is in accordance with the coverage rules outlined in this section shall not be considered to be in violation of the prohibitions.

The Regional Board may grant exemptions from the discharge prohibitions for new development in excess of the land capability system limits on Class 1a, 1c, 2 or 3 lands only under the following circumstances:

- For public outdoor recreation facilities, when all of the following findings can be made:
 - (a) The project, by its very nature, must be sited in Land Capability Districts 1a, 1c, 2 or 3, such as a ski run or hiking trail (see Table 5.7-3 for additional criteria for this finding),
 - (b) There is no feasible alternative which avoids or reduces the extent of excess coverage in Land Capability Districts 1a, 1c, 2, or 3, and
 - (c) The impacts of the new development are fully mitigated through means including, but not limited to, application of BMPs and restoration of land in Land Capability Districts 1a, 1c, 2, and 3 in the amount of 1.5 times the area of land in such districts disturbed beyond the limits of the land capability system. (Exceptions to the restoration requirement shall be made as permitted in the 208 Plan; see the land capability section of this Chapter.)
- For public service facilities, when all of the following findings can be made:
 - (a) The project is necessary for public health, safety, or environmental protection,
 - (b) There is no reasonable alternative, including relocation, which avoids or reduces the extent of excess coverage in land capability Districts 1a, 1c, 2 and 3, and

- (c) The impacts of new development are fully mitigated through means including, but not limited to, application of BMPs and restoration of land in land capability Districts 1a, 1c, 2, and 3. (Exceptions to the restoration requirement shall be made as permitted in the 208 Plan; see the land capability section of this Chapter.)
- For erosion control projects, habitat restoration projects, wetland rehabilitation projects, Stream Environment Zone restoration projects, and similar projects, programs and facilities, when all of the following findings can be made:
 - (a) The project, program or facility is necessary for environmental protection, and
 - (b) There is no reasonable alternative, including relocation, which avoids or reduces the extent of encroachment in land capability Districts 1a, 1c, 2 and 3.

Restrictions on Development and Disturbance in Stream Environment Zones

To protect the natural treatment capacity of Stream Environment Zones, and to prevent channelized flows from causing erosion, encroachment of SEZs must not be allowed. (See the separate section of this Chapter on SEZ protection.) The Regional Board shall grant exemptions to the prohibitions against discharges or threatened discharges attributable to new development or permanent disturbance in SEZs only under the following circumstances:

- For public outdoor recreation facilities if all of the following findings can be made:
 - (a) The project by its nature must be sited in a Stream Environment Zone (in making this determination the Regional Board should use the criteria in Table 5.7-3);
 - (b) There is no feasible alternative which would reduce the extent of SEZ encroachment;
 - (c) Impacts are fully mitigated; and
 - (d) SEZs are restored in an amount 1.5 times the area of SEZ disturbed or developed for the project.
- For public service facilities if all of the following findings can be made:

- (a) The project is necessary for public health, safety or environmental protection;
- (b) There is no reasonable alternative, including spans, which avoids or reduces the extent of encroachment;
- (c) The impacts are fully mitigated; and
- (d) SEZ lands are restored in an amount 1.5 times the area of SEZ developed or disturbed by the project.
- For projects which require access across SEZs to otherwise buildable sites if all of the following findings can be made:
 - (a) There is no reasonable alternative which avoids or reduces the extent of encroachment;
 - (b) Impacts are fully mitigated; and
 - (c) SEZ lands are restored in an amount 1.5 times the area of SEZ disturbed or developed by the project.
- For new development in man-modified SEZs after the Regional Board has reclassified them according to the procedure described in the section of this Chapter on land capability.
- For erosion control projects, habitat restoration projects, wetland rehabilitation projects, Stream Environment Zone restoration projects, and similar projects, programs, and facilities, if all of the following findings can be made:
 - (a) The project, program, or facility is necessary for environmental protection;
 - (b) There is no reasonable alternative, including relocation, which avoids or reduces the extent of encroachment in the Stream Environment Zone; and
 - (c) Impacts are fully mitigated.

Full mitigation of impacts, as used in the findings above, includes, but is not limited to, proper design and implementation of all applicable BMPs and the 1.5:1 restoration requirements. However, the 1.5:1 restoration requirement shall not apply to erosion control projects, habitat restoration projects, wetland rehabilitation projects or SEZ restoration projects.

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The Regional Board has delegated authority to the Executive Officer to grant exceptions to the Stream Environment Zone prohibitions (Prohibitions 12 and 13 for the Lake Tahoe HU in Section 5.2 of the Basin Plan) for specific discharges where:

- (1.) the project is within the following specific size limitations:
 - less than 1000 square feet of new impervious coverage, or
 - less than 2000 square feet of new ground disturbance, or
 - less than 100 cubic yards of fill or excavation; **or**
- (2.) the project's primary purpose is to reduce, control, or mitigate existing sources of erosion or water pollution; **and**
- (3.) the project meets the exemption criteria set forth above in this section of the Basin Plan.

Except in emergency situations, the Executive Officer shall notify the Board and interested members of the public of his intent to issue an exemption subject to this Resolution at least ten (10) days before the exemption is issued. A notice of the exemption will also be published seven (7) days prior to issuance to allow for public comments. All comments received and staff's response to the comments will be forwarded to the Board with the proposed exemption. Any Regional Board member may direct that an exception not be granted by the Executive Officer and that it be scheduled for consideration by the Regional Board.

A Report of Waste Discharge shall be filed for any discharge for which approval is sought from the Executive Officer. Discharge from a project cannot commence until such time as the Regional Board Executive Officer has prepared and sent a letter to the applicant indicating that an exemption to the Basin Plan prohibitions is granted and that waste discharge requirements for the project are waived, or that General Waste Discharge Requirements are applicable. The Regional Board's action delegating authority to the Executive Officer to grant exemptions is conditional and the Executive Officer may recommend that certain exemption requests be considered by the Regional Board. Also see Appendix B for a copy of Resolution 6-90-22 describing conditions under which the Executive Officer can grant exceptions.

Restrictions on Development Not Offset by Implementation of Remedial Erosion Control Measures

While the restrictions set above will hold down the level of erosion caused by development, further development will still cause some increase in sediment and nutrient loads. Even development on high capability lands, built according to Best Management Practices, will lead to some increase in surface erosion, as well as an increase in subsurface nutrient migration. With the quality of Lake Tahoe presently deteriorating, no new development can be tolerated unless it can be proven that water quality will not be affected. Water quality can still be protected if the development allowed by this plan is offset by construction of remedial erosion control projects and SEZ restoration projects.

Development not offset by remedial programs is defined as "any new development for which mitigation work has not been performed or for which water quality mitigation fees have not been paid as required by the TRPA Code of Ordinances, Chapter 82." The remedial programs discussed elsewhere in this Chapter provide a means of offsetting increased sediment and nutrient loads from permitted development. TRPA's land use and water quality plans will phase development based on the accomplishment of remedial programs and the attainment of environmental standards.

As long as the remedial offset programs of the 208 Plan are being implemented, the prohibitions against discharges or threatened discharges from development which is not offset will not be an issue in Regional Board review of individual projects. To ensure that the prohibition continues to be implemented on a regionwide basis, Regional Board staff should participate in TRPA's periodic reviews of progress on the implementation of remedial projects in relation to allocations for new development.

Restrictions on Development in 100-Year Floodplains

See the separate section of this Chapter on 100-year floodplain protection.

Restrictions on New Pier Construction

See the discussion of control measures for pier impacts in the section of this Chapter on recreation.

Land Purchase Programs

Land purchase programs can also be used to prevent development which threatens the quality of

5.8, Development Restrictions

Lake Tahoe. Two land purchase programs operate in California to purchase lots in stream environment zones or on high erosion hazard lands, or lots which cannot be used for residential or commercial construction without excessive coverage.

The State and Regional Boards strongly support the land purchase programs of the U.S. Forest Service and the California Tahoe Conservancy. The acquisition of environmentally sensitive single family residential lots by these agencies provides relief for owners of SEZ lots, or lots with low scores under the IPES, where development is prevented or delayed under the provisions of this Basin Plan. (Land purchase programs can also provide for payment of any outstanding utility assessments associated with the undeveloped property, providing relief for the utility as well as the landowner.)

The activation of the California Tahoe Conservancy was funded by a state bond act in 1982. The Conservancy has purchased thousands of sensitive single family residential lots with these funds, and has received additional funds for the acquisition of larger parcels. In addition, the California Tahoe Conservancy serves as a land bank to facilitate the coverage transfer programs which are part of TRPA's land use and water quality plans. The Conservancy also functions as a land bank for the transfer of development rights programs. Lands in the Tahoe Basin have also been purchased with State funds by other agencies, including the Department of Parks and Recreation.

The Santini-Burton program, implemented by the U.S. Forest Service, Lake Tahoe Basin Management Unit uses funds from the sale of federal lands near Las Vegas to purchase sensitive single family parcels in both California and Nevada.

A City of South Lake Tahoe ordinance provides for the expenditure of up to five percent of the City's general revenues for purchase of open space and community parks. In implementing the ordinance the city is emphasizing purchase and preservation of fragile lands, especially stream environment zones.

An additional land purchase program for single family lots in Nevada was established by passage of a bond act in 1986. All those bond funds have now been spent. Nevada is considering additional funding for land acquisition in the Tahoe Basin.

Land conservancy programs implemented by private nonprofit organizations may also help to protect water quality in the Lake Tahoe Basin. The League

to Save Lake Tahoe has established a separate land trust to acquire property in the Lake Tahoe Basin.

Property acquisition programs are the best long-term solution to the water quality problems posed by future development in the Tahoe Basin. Property acquisition provides a means of reducing or eliminating the financial impact on the individual lot owners who will be unable to build homes. Land purchase also brings the property into public ownership so that it may be managed to prevent water quality problems. This Basin Plan, therefore, strongly supports land purchase as a matter of policy. Land purchase is not constitutionally compelled. Although the issue is not free from doubt, courts have upheld restrictions on development where reasonably necessary to protect environmental quality, even where the restrictions left the property with little or no pecuniary value. To ensure protection of Lake Tahoe water quality, restrictions on development must be enforced. So long as restrictions on development are enforced, purchases should only be made on a willing seller basis.

TRPA's Individual Parcel Evaluation System (IPES) is closely related to the land purchase program. The IPES concept that all lots, except for those in SEZs, are potentially developable helps to prevent decreases in property value. At the same time, the IPES provides that the initially established line between developable and undevelopable lots will not move down until all but 20% of the sensitive lots in Placer, and El Dorado Counties, California, and all but 33 percent of sensitive lots in Douglas, Washoe, and Carson City Counties, Nevada, have been retired from development. The land purchase agencies are using IPES scores in setting future priorities for land acquisition.

A problem which must be addressed as part of any land purchase program is how the acquired properties will be managed. Proper maintenance is required to preserve the appearance of the site and prevent unauthorized use. One of the issues to be considered is what arrangements should be made to provide for management of acquired property. Properties could be managed by the USFS, the California Department of General Services, local governments, or public or private conservancy agencies. Lots purchased by one agency could be transferred to another to provide for consolidated management. Another alternative would be to encourage resale of purchased lots to neighboring property owners or homeowners' associations. The

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property could be purchased from the original landowner, then sold to adjacent property owners with deed restrictions to prevent development of the property, or use of the property to increase allowable coverage on other lands owned by the buyer. The assessed value of the property would be appropriately reduced.

Public agencies who have acquired sensitive lands with public funds in order to prevent the water quality impacts which would result from their development should be strongly discouraged from transferring these lands to other parties (including public agencies) for other public uses involving development (e.g., developed recreation or transportation), even if such uses might meet exemption criteria for discharge prohibitions.

As noted in the discussion of restrictions on discharges from new subdivisions, above, all development, even on less sensitive lands, with the application of BMPs, has the potential for increased sediment yield. If funds are available, additional land purchases, beyond those where development is prohibited under the plan, should be made in order to provide a margin of safety.

Transfer of Development Rights

Transfer of development rights provides another means by which the financial impact on lot owners of restrictions on development can be reduced. The Regional Board strongly supports these programs as a means of mitigating the impacts of this plan on owners of undevelopable lots. In addition to the land coverage transfer program discussed in the section of this Chapter on land capability, TRPA allows transfer of development rights, residential allocations, existing "units of use" (e.g., hotel/motel rooms) and commercial floor space. The rules for such transfers are summarized in TRPA's Ordinance Chapter 34. They provide for permanent retirement or restriction from further development of sensitive lands from which development rights have been transferred. TRPA's Ordinance Chapter 35 provides "bonus unit incentives," in the form of additional allowable multifamily housing or tourist accommodation units, to developers who retire or transfer development from sensitive lands. (See the section of this Chapter on offset programs, above, for further discussion of some of these transfer programs.)

Other Means of Relief for Landowners

Lands in the Lake Tahoe Basin which are restricted from residential or commercial development may have other potential uses such as dispersed

recreation or forestry, or wildlife habitat. The California Department of Forestry and Fire Protection operates the California Forest Improvement Program which provides technical and financial assistance to the owners of private forest parcels. The Department of Fish and Game has a wetlands protection easement program.

A few landowners who cannot build on their property because of restrictions against Stream Environment Zone encroachment may be able to receive payments through the federal Water Bank program. The Agricultural Stabilization and Conservation Service provides annual payments to landowners who agree to protect wetlands on their property. The program applies only to freshwater marshes and open water. The wetland area to be protected must be at least two acres, although several landowners may participate jointly.

Affordable Housing

Since 1980, some local governments have requested that the development restrictions discussed above be relaxed to facilitate the construction of affordable housing. The State and Regional Boards must consider housing needs before adoption of water quality standards, but are not required to weaken water quality standards where there is a need to develop more housing within a region. In addition, under federal law, housing needs do not constitute a valid basis for weakening water quality standards for waters like Lake Tahoe which constitute an outstanding national resource. In the Lake Tahoe Basin, lowering water quality standards would not be an effective means of meeting housing needs. Much of the additional housing would be second homes, and almost none would be low income housing. Housing needs in the Lake Tahoe Basin should be addressed through more direct means than through modification of water quality controls. Strong incentives for low income housing, in the form of subsidies or priority for building and sewer permits are needed to overcome market conditions favoring higher income and second home housing.

The development restrictions related to discharge prohibitions in this Basin Plan still leave local and regional government some flexibility in deciding how much housing there should be. The restrictions are based on land capability and the extent of land disturbance. They do not specify how many units can be built. More units could be built if local and regional ordinances limiting the number of units allowed per lot are amended. Housing needs for persons working

in the Basin will also be met in part by additional residential construction outside the Basin.

Local governments on the north and south shores of Lake Tahoe in California are implementing or considering redevelopment programs. California state redevelopment law requires redevelopment projects to include a proportion of affordable housing.

TRPA's regional land use plan (TRPA 1987) includes the goal of providing, to the extent possible, affordable housing in suitable locations for the residents of the Tahoe Region, and calls for special incentives to promote affordable or government assisted housing for low-income households. TRPA exempts eligible affordable housing projects from the requirement to have residential growth allocations, requires the community planning process to consider housing needs, and has bonus incentive programs to encourage the construction of multifamily housing.

Table 5.8-1
SUMMARY OF DISCHARGE PROHIBITIONS
LAKE TAHOE HYDROLOGIC UNIT (HU)

See the full texts of these prohibitions in the “Waste Discharge Prohibitions” section earlier in this Chapter. Some prohibitions apply to more than one of the categories below.

General Prohibitions

- Against discharges which violate water quality objectives or impair beneficial uses.
- Against discharges which cause further degradation of waters where objectives are already being violated.
- Against discharges to surface waters of the Lake Tahoe HU.

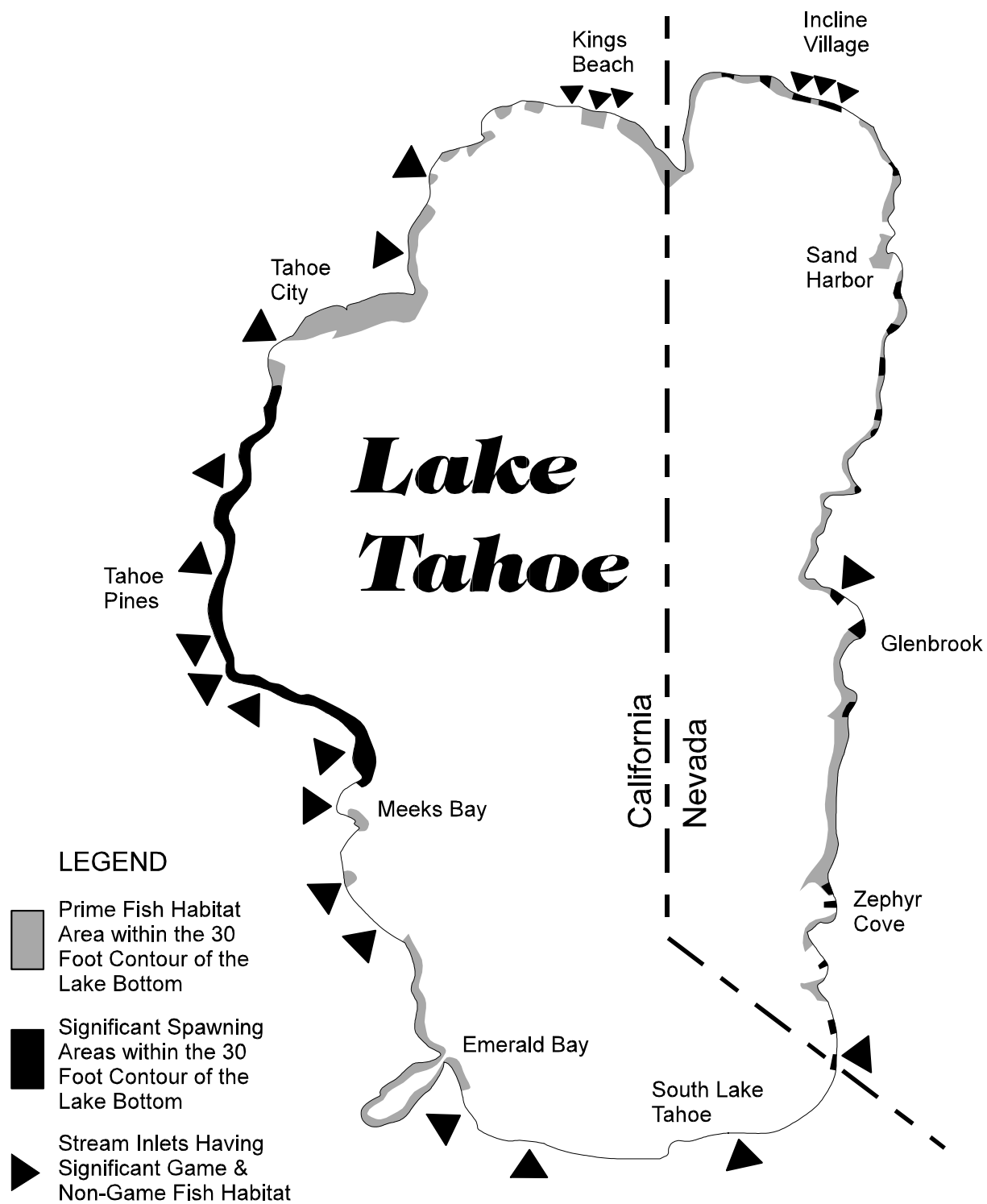
Prohibitions Related to Sewage and Solid Wastes

- Against discharges to cesspools, septic tanks or other means of waste disposal in the Lake Tahoe watershed after January 1, 1972 (with limited exceptions).
- Against discharges from boats, marinas, or other shoreline appurtenances (also applies to fuel spills, etc.)
- Against discharges of treated or untreated domestic sewage, industrial wastes, garbage or other solid wastes to surface waters.
- Against discharges of garbage or solid waste to lands.

Prohibitions Related to Development

- Against discharges or threatened discharges below the highwater rim of Lake Tahoe or within the 100-year floodplains of tributaries.
- Against discharges or threatened discharges attributable to new pier construction in significant spawning habitats or offshore of important stream inlets in Lake Tahoe.
- Against discharges or threatened discharge attributable to the development of new subdivisions.
- Against discharges or threatened discharges attributable to new development which is not in accordance with land capability.
- Against discharges attributable to new development in Stream Environment Zones.
- Against discharges attributable to new development not in accordance with offset requirements.

**Figure 5.8-1
PRIME FISH HABITAT AREAS**



5.9 WASTEWATER TREATMENT, EXPORT, AND DISPOSAL

The Porter-Cologne Act (§ 13950-13952) includes specific language regarding domestic wastewater disposal in the Lake Tahoe Basin. It requires the export of all domestic wastewater from the California portion of the Lake Tahoe Basin; an Executive Order of the Governor of Nevada requires export on the Nevada side. The Tahoe Regional Planning Agency (1987, Ordinance Chapter 81) also prohibits the discharge of domestic, municipal, or industrial wastewater within its jurisdiction, with the types of exceptions noted below.

Under the Porter-Cologne Act, the Regional Board allows exceptions to the mandate for export for a small number of summer homes in remote areas of the Lake Tahoe Basin where sewerage would be environmentally damaging. Toilet wastes must be disposed to holding tanks, or incinerator toilets; holding tank wastes or ashes must be exported from the Lake Tahoe Basin (see the discussion of septage disposal in Chapter 4). Disposal of greywater (sink and shower wastes only) to leachfields may be allowed. Food wastes must be exported or incinerated. Garbage grinders, washing machines, dishwashers, and phosphate-based detergents are not allowed. Proper long-term maintenance of exempted facilities (both holding tanks and greywater systems) is very important. Regional Board staff should continue surveillance of these exempted facilities, and their exemptions should be revoked if the Regional Board cannot continue to find that they will not individually or collectively, directly or indirectly, adversely affect the quality of the waters of Lake Tahoe. The Forest Service periodically reviews its permits for summer home tracts. Regional Board staff should continue to review and comment on proposals for permit extensions, to ensure that wastewater issues are adequately addressed. The Regional Board shall make sure that the conditions of exemptions are complied with before extending the exemptions for septic system discharges. The Regional Board will also reconsider the exemptions in the light of technical advances permitting installation of low pressure sewers in environmentally sensitive areas.

Further studies should be done to determine the extent of compliance with conditions for septic system variances in the Lake Tahoe Basin. TRPA (1987) recommends that no further development at

Echo Lakes be allowed until a nitrogen study is performed to document any problems associated with septic system use.

The 208 Plan allows the use of wastewater holding tanks for temporary land uses. TRPA's (1987) Ordinance Chapter 81 indicates that such temporary uses include, but are not limited to, sporting events, community events, and construction. The ordinance also allows holding tanks as a permanent measure associated with remote public or private recreation sites, including, but not limited to, trailheads, undeveloped walk-in campgrounds, and summer home tracts where connection to a sewer system is not feasible or would create excessive adverse environmental impacts.

Proper disposal of domestic wastewater from holding tanks and chemical toilets in boats and recreational vehicles is an issue of concern in the Lake Tahoe Basin. See the discussions of control measures for campgrounds and day use areas, and for impacts of boating recreation in the section of this Chapter on recreational impacts, below.

Occasionally, existing structures in more urbanized areas of the Lake Tahoe Basin are found not to be connected to a sewer system. Wastewater collection and treatment agencies should continue to review records and use appropriate field methods to survey for unconnected wastewater discharges within their jurisdictions, and should inform Regional Board staff when such discharges are found. Where necessary, the Regional Board may use enforcement action to prevent discharges from unconnected structures. The Tahoe Regional Planning Agency requires all projects involving a new structure, or reconstruction or expansion of an existing structure, which is designed or intended for human occupancy, and which generates wastewater, to be served by facilities for the treatment and export of wastewater from the Lake Tahoe Basin. To be considered served, a service connection shall be required to transport wastewater from the parcel to a treatment plant (TRPA 1987, Ordinance Chapter 27).

The Porter-Cologne Act (§ 13952) allows the Regional Board to consider approval of pilot reclamation projects for the use of reclaimed domestic wastewater for beneficial purposes within the Lake Tahoe Basin, provided that such projects will not individually or collectively, directly or indirectly, adversely affect the quality of the waters of Lake Tahoe. The Regional Board shall place conditions on any approved project to include specification of maximum project size. The Regional Board may suspend or terminate an approved project

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for cause at any time. The deadline for submittal of technical data to support proposed in-Basin reclamation projects was January 1, 1984; the Regional Board has not yet approved any proposals for such projects.

In order to prevent raw sewage overflows, all sewerage agencies within the Lake Tahoe Basin are required to have preventative maintenance and spill response programs; enforcement actions may be taken if spills occur. Enforcement orders and grant conditions will require measures such as installation of monitoring equipment and any necessary reconstruction or relocation of sewerlines.

The Regional Board should continue to incorporate requirements for preventative maintenance and spill response programs into waste discharge requirements and National Pollutant Discharge Elimination System (NPDES) permits for all wastewater treatment agencies in the California portion of the Lake Tahoe Basin. These could include requirements for the installation of monitoring equipment, or for the reconstruction or relocation of defective sewerlines. If a sewerline has a series of overflows due to design deficiencies, it should be reconstructed. Bolted down, sealed manhole covers should be added to sewerlines that parallel the Lake Tahoe shoreline or are located in SEZs to prevent spills from exiting via loose manhole covers. In other areas, sewerlines in or adjacent to stream channels should be relocated to high ground and fitted with sealed manhole covers. The 208 Plan also recommends that sewerlines be relocated out of SEZs where feasible, and identifies capital improvement needs for prevention of spills and exfiltration.

Grants, NPDES permits, and waste discharge requirements for wastewater collection and treatment facilities serving the Lake Tahoe Basin should be conditioned to prohibit the sewerage agencies from providing any connection serving new development which is not in accordance with this Basin Plan. This includes development which is not in compliance with the waste discharge prohibitions discussed in the "Development Restrictions" section of this Chapter, related to land capability, SEZs, new subdivisions, and offset of past erosion/stormwater problems. State and federal buyout programs for sensitive lots include payment of wastewater treatment plant assessments for lots which cannot be built upon without violation of these prohibitions. The Regional Board shall require that the necessary information be submitted in reports of waste discharge to determine

whether applications are consistent with the development restrictions.

The existence of infiltration/inflow problems in Tahoe Basin sewer systems raised the possibility that exfiltration of nutrients from sewer lines to ground water might be a problem. A joint sewer district study of sewerline exfiltration was carried out in the early 1980s in response to the recommendations of the *Lake Tahoe Basin Water Quality Plan*. Although the results of this study did not indicate the presence of significant exfiltration problems, a later study within the jurisdiction of the South Tahoe Public Utility District (Loeb 1987) showed high levels of nitrogen in ground water beneath urbanized areas. Loeb did not conclusively identify the sources of this nitrogen, but his report included recommendations regarding control of exfiltration and fertilizer use, restrictions on watershed disturbance, and monitoring of lake, stream and ground water quality.

Due to aging infrastructure, the likelihood of exfiltration problems in the Tahoe Basin sewer systems may have increased since the early 1980s. Further study of **all** potential sources of nitrogen in Tahoe Basin ground water should be encouraged as part of the ongoing interagency monitoring program. Waste discharge requirements could be used to require correction of sewer exfiltration problems if such problems are shown to be significant in the future. Proposals for study and correction of exfiltration problems could be eligible for grant funding.

Waste discharge requirements for Tahoe Basin sewerage agencies should include a requirement that these agencies submit annual reports providing information needed to update estimates of available capacity, including information on flows, connections during the past year, and remaining unused treatment plant capacity. The 208 Plan allows expansion of wastewater treatment plants to meet the needs of new growth allowed by TRPA, but requires wastewater utilities to notify TRPA once the plant has reached 85% of its design capacity, so that orderly planning may be done for expansion. Future growth in the Lake Tahoe Basin is limited by TRPA's Regional Plan (TRPA 1987) to levels projected at about 27% over the 1987 level of development.

The three sewerage agencies on the California side of the Lake Tahoe Basin also function as water purveyors. The State Board has directed that waste discharge requirements for these agencies should include conditions designed to prevent water use in

the basin beyond the limits of the California-Nevada Interstate Water Compact (portions of this Compact which deal with the Lake Tahoe Basin were ratified by Congress in 1990 as PL 101-618). See the discussion of water rights and water use later in this Chapter for additional information on the Compact limits.

The South Tahoe Public Utility District (STPUD) provides wastewater collection and treatment for the southern part of the Tahoe Basin in California, and exports treated effluent to Alpine County, where it is stored and used for pasture irrigation. The North Tahoe Public Utility District (NTPUD) and Tahoe City Public Utility District (TCPUD) operate collection systems and export sewage for treatment and disposal by the regional Tahoe-Truckee Sanitation Agency (TTSA), located in Truckee in Nevada County. Chapter 4 of this Basin Plan contains additional information on the STPUD and TTSA facilities, including their operations outside of the Lake Tahoe Basin. The following is a summary of important issues related to these facilities and to the Tahoe Basin implementation program.

South Tahoe Public Utility District

The South Tahoe Public Utility District (STPUD) provides collection and treatment for municipal wastewater from most of the El Dorado County portion of the Lake Tahoe Basin. Wastewater is given advanced secondary treatment and pumped over Luther Pass to the East Fork Carson River in Alpine County, where it is stored in Harvey Place Reservoir and used for pasture irrigation. (An amendment to the Porter-Cologne Act [§ 13952] allowed STPUD to submit a conceptual plan for the reuse of very highly treated wastewater within the Tahoe Basin, but the costs of the necessary treatment will probably prohibit the implementation of such a plan.) STPUD's approved capacity is 7.7 mgd. Issues associated with the STPUD include treatment capacity and continuing problems with spills within the Lake Tahoe Basin.

STPUD's capacity in 1993 was inadequate to serve projected buildout under the 208 Plan (TRPA 1988). The district's current maximum capacity in sewer units was defined by a 1989 agreement with the League to Save Lake Tahoe and the California Attorney General. In 1993, STPUD began evaluation of alternative means to increase the number of allowable connections without expanding the treatment plant, including abandonment of the sewer unit concept. Flows to STPUD can be affected by wet weather infiltration/inflow to sewer lines, changes in

occupancy, increases in day use, and the degree of water conservation. Unless and until the treatment plant can be reliably expanded, or until agreement is reached that the plant can serve significant additional development within its approved capacity, treatment capacity for large scale new projects such as hotels will probably need to be obtained through retirement of sewer units associated with existing development.

Problems associated with STPUD's facilities within the Lake Tahoe Basin have included:

- Raw sewage overflows from blockages in gravity sewerlines, pump station malfunctions, etc.
- Spills of several million gallons of diluted, partially treated wastewater to Lake Tahoe as a result of storm events.
- Adverse impacts of sewage spills and maintenance activities on streams and wetlands tributary to Lake Tahoe. (Portions of STPUD's collection and export systems are located within SEZs.)

Environmental review of the STPUD facilities plan which led to conversion from tertiary to advanced secondary treatment, and the storage of effluent in Harvey Place rather than Indian Creek Reservoir, led to the conclusion that improvements at STPUD could facilitate growth in the Lake Tahoe Basin (USEPA 1981). This growth was expected to have a variety of impacts including non-point source impacts on water quality. Further expansions of STPUD's treatment capacity would be expected to have similar impacts.

As mitigation for the growth-related impacts associated with its 1980s facilities upgrading, STPUD agreed to implement a detailed mitigation program which incorporated many of the measures later included in TRPA's Regional Plan and 208 Plan. The mitigation program was also made a condition of state and federal grants.

Infiltration and inflow (I/I) problems in STPUD facilities and in any entities which connect to those facilities in the future should be corrected.

STPUD's export system should continue to be upgraded to prevent further spills to Lake Tahoe and its tributaries. However, because of the environmental sensitivity of affected waters both inside and outside of the Lake Tahoe Basin, the Regional Board will review plans for improvement of the system very carefully.

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Control measures for existing or potential water quality problems associated with STPUD's current and former storage and disposal operations in Alpine County (including the use of reclaimed water for irrigation by private ranchers) are discussed in Chapter 4 of this Basin Plan.

Tahoe-Truckee Sanitation Agency

The regional wastewater treatment facilities of the Tahoe-Truckee Sanitation Agency (TTSA), located in Truckee in Nevada County, provide tertiary treatment for wastewater collected by the North Tahoe and Tahoe City Public Utility Districts in the Lake Tahoe Basin. (TTSA also serves other member districts outside of the Lake Tahoe Basin.) Wastewater is carried from member districts by an interceptor pipeline which generally parallels the Truckee River. TTSA's member districts formerly operated separate wastewater treatment plants but now operate and maintain collection facilities. Discharge prohibitions for the Truckee River Hydrologic Unit (HU), cited in the prohibition section of this Chapter, include prohibitions affecting further operation of these treatment plants, and discharges from septic tank/leachfield systems from current and future development in the portion of the HU within TRPA's jurisdiction. Additional information on TTSA's treatment and disposal operations in relation to water quality in the Truckee River HU is provided in Chapter 4 of this Basin Plan. A stipulated judgment which settled litigation between TTSA and the League to Save Lake Tahoe limits TTSA connections in the Lake Tahoe Basin to 3500. In 1991, TTSA staff estimated that the plant had available capacity for the next 5-10 years.

Infiltration and inflow (I/I) of stormwater into collection systems is an important consideration in evaluating the available capacity of TTSA. Although TTSA's member districts have made considerable efforts to reduce I/I, it continues to be a substantial problem during normal to wet water years. TTSA's consultants showed that approximately 21% of the total flow to the treatment plant in 1978, and approximately 44% of the flow during the maximum flow month (March), was from I/I.

Effective control of I/I is an ongoing process, and benefits gained through extensive correction measures can be reversed within a few years if control efforts are not maintained. Substantial I/I reduction measures must be implemented as TTSA facilities approach rated capacity to allow additional connections. If I/I control efforts are then substantially reduced, TTSA facilities will eventually be overloaded

as I/I increases. This could result in violations of waste discharge requirements and/or long-term upsets of treatment facilities processes. The Regional Board must fully utilize its regulatory authority to assure that TTSA member entities are committed to an ongoing program of maintaining acceptable levels of I/I once they are achieved. Acceptable I/I control programs would include annual surveys to locate significant I/I sources, and complete implementation of proper corrective measures on an annual basis.

5.10 WATER RIGHTS AND WATER USE

In 1988, there were approximately 57 water purveyors providing domestic supplies to development within the California portion of the Lake Tahoe Basin.

There were about 17 suppliers in California using over 100 acre-feet per annum (afa). Water supplies are obtained from public and private wells, intakes from Lake Tahoe, and surface water diversions from tributaries. In the past, some water purveyors did not always treat well water prior to distribution, although chlorination might be provided at certain times of the year. Drinking water from surface intakes, both from streams and Lake Tahoe, has historically been filtered and chlorinated prior to distribution. New federal drinking water regulations require higher treatment levels for surface sources; because of these regulations, water purveyors are increasingly changing from surface to ground water sources.

Total water diversion for consumptive use in the Lake Tahoe Basin is limited by the California-Nevada Interstate Water Compact, an agreement which, after 13 years of negotiation, was ratified by the legislatures of both states in 1970 and 1971, and partly ratified by Congress in 1990 as P.L. 101-618. On the California side of the Lake Tahoe Basin, total diversions for consumptive use from all sources (both surface and ground waters) are limited to 23,000 afa.

The State Water Resources Control Board, which is responsible for administering California's water rights program, issued a *Report on Water Use and Water Rights in the Lake Tahoe Basin* in January 1980. The report determined that after water rights held by the USFS, State Parks requirements, and certain exports and depletions are taken into account, 19,000 afa is available for use on private lands on the California side of the Basin. The report also estimated the amount of water used at different levels of projected development.

The State Board has adopted a policy of limiting new water rights permits in accordance with the Compact allocation. The State Board does not have permit authority over all diversions, however. The largest group of diversions not subject to permit is ground water diversions, which made up 54% of the total diversions for use on the California side of the Lake Tahoe Basin in 1980. Local government has authority to regulate ground water pumping, and special ground water districts can be created, but

current State law does not require local government to act, even when ground water pumping exceeds available supply.

The water rights study recommended that the State Board issue new water rights permits subject to conditions which ensure that issuance of the permits will not result in use in excess of the amount available under the Interstate Water Compact. It further recommended that water available for use on private lands be allocated among three zones corresponding to the boundaries of the North Tahoe, Tahoe City, and South Tahoe Public Utility Districts. Water rights permits would be issued to the utilities, allowing them to divert amounts equal to the amount allocated to the zone minus the total of all other diversions, including ground water diversions, for use on private lands within the zone.

In 1984, the State Board circulated a draft Environmental Impact Report (EIR) for update of its 1969 water rights policy for the Lake Tahoe Basin. The draft EIR considered several alternatives for allocation of unallocated water supplies, including one based on the recommendations of the earlier water use study. The draft EIR also estimated then-current (1982) water use levels, and predicted water use at various levels of buildout for the Lake Tahoe Basin. It predicted that the Interstate Compact limit could be exceeded at some levels of development without drastic increases in water conservation. It recommended that the State Board limit water rights allocations for private consumptive water use in relation to allowable buildout under the 1980 *Lake Tahoe Basin Water Quality Plan*. The State Board did not complete a final EIR or take action on the proposed policy changes.

Current levels of consumptive water use in the Lake Tahoe Basin are unknown. (Most water use is not metered.) New residential construction has occurred since 1982, but conservation efforts (e.g., landscape watering restrictions and requirements for ultra-low flow toilets) have increased due to drought conditions. TRPA predicts that there will be a 27% increase in population of the Lake Tahoe Basin between 1987 and 2007, but has not estimated ultimate buildout. Assuming that the Individual Parcel Evaluation System will permit development of some land capability Class 1, 2, and 3 lots which were not considered buildable under the 1980 *Lake Tahoe Basin Water Quality Plan*, it is possible that water use at buildout could exceed the Interstate Water Compact limits. The 208 Plan (Vol. I, page 307) states that the "range of ultimate demand for water supply on the California side would be approximately 21,600 to 24,200 afa."

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The State Board's water rights report recommends that local and regional agencies involved in land use planning consider the limitations set by the Interstate Water Compact, and that the State's water quality program take the availability of water into account. The California Water Code directs the State and Regional Boards to take water supply into account during water quality planning, and in issuing waste discharge requirements. The public utility districts provide sewerage service, for which they are subject to waste discharge requirements issued by the Lahontan Regional Board. Any additional development in the Lake Tahoe Basin which will increase water use will not be possible without a connection to the sewerage system. The number of units which may connect to the sewerage systems is limited by sewage collection, treatment, and disposal capacity. Accordingly, this Basin Plan requires that waste discharge requirements issued for these sewerage systems include conditions designed to prevent water use in the Lake Tahoe Basin beyond the Compact limitations. The conditions could take several different forms, ranging from connection limitations to water conservation programs. The precise form the conditions shall take will be determined when waste discharge requirements are renewed or modified.

The 208 Plan (Vol. I, page 299) states TRPA's intent to allow water supply systems to upgrade and expand to support existing and new development consistent with the its Regional Plan. This expansion should be phased in to meet the needs of new development without creating inefficiencies from over-expansion or under-expansion. However, expansion of water supplies may not violate TRPA's environmental threshold standard for instream flows for fisheries. This threshold establishes a non-degradation standard for instream flows until TRPA establishes instream flow standards in its regional land use plan. It is TRPA's policy to seek transfers of existing points of water diversion from streams to Lake Tahoe.

TRPA requires all projects proposing a new structure, or reconstruction or expansion of an existing structure designed or intended for human occupancy to have adequate water rights or water supply systems. TRPA cannot approve additional development requiring water unless it has, or provides, an adequate water supply within a water right recognized under state law.

TRPA recognizes that many water supply systems are in need of upgrading to insure delivery of

adequate quantities of water for domestic and fire suppression purposes. Needed improvements include water lines, storage facilities, and additional hydrants. TRPA requires all additional development requiring water to have systems to deliver an adequate quantity and quality of water for domestic consumption and fire protection. Applicable local, state, federal, or utility district standards determine adequate fire flows, but where no such standards exist, the TRPA Code of Ordinances provides minimum fire flow requirements. TRPA may waive the fire flow requirements for its plan areas which are "zoned" for conservation and recreation uses, and for single family development if fire departments serving the development meet the requirements of the TRPA Code. Individual water suppliers will have to maintain their existing water supply systems, and upgrade them as appropriate to meet fire flow requirements, peak demand, and the need for backup supplies. Water suppliers will also have to provide treatment for drinking water from surface diversions in accordance with state and federal standards and regulations.

This Basin Plan provides exemptions from discharge prohibitions for public health and safety projects, including projects associated with domestic water supply systems. The 208 Plan recommendation that diversion points be changed from streams to Lake Tahoe was designed to protect stream and SEZ uses. As noted above, new treatment requirements are leading to an increase in ground water diversions. New wells in SEZs may affect SEZ functions both through direct disturbance for construction of wells and distribution lines, and through the impacts of ground water drawdown on SEZ soils and vegetation. When considering exemptions from discharge prohibitions for new or expanded ground water diversions in SEZs, the Regional Board should evaluate the water quality impacts and "reasonableness" of these projects in relation to those of the alternative of continued use of a surface source, even if treatment costs are higher.

The remedial erosion control projects proposed in this Chapter require use of irrigation water for revegetation. However, native plants will be used except for some temporary stabilization, and once established will not require irrigation. To ensure that the irrigation needed for revegetation can be carried out within the limits of water supply, the State Board's water rights decisions should reserve water for revegetation. Once it is determined that reserving water for revegetation is no longer necessary, the

water can be made available for municipal and domestic use.

At the time that it adopted the 1980 *Lake Tahoe Basin Water Quality Plan*, in response to a comment by the Department of Water Resources, the State Water Resources Control Board agreed that the use of water meters should be required in the Lake Tahoe Basin. This recommendation has not been implemented. The State Board should revisit the need for water meters, and if appropriate, facilitate their use. The State Board should update its estimates of current and projected water use in the Lake Tahoe Basin in relation to allowable development and visitor use under current land use and water quality plans. The State Board should consider updating its 1969 water rights policy for the Lake Tahoe Basin, particularly in relation to the need to control ground water diversions under the Interstate Water Compact.

5.11 SOLID AND HAZARDOUS WASTE

Solid Waste Disposal

No solid waste disposal has been permitted in the Lake Tahoe Basin since 1972. To require continued export of all solid waste from the Lake Tahoe Basin, the State Board adopted the following prohibition in 1980:

“The discharge of garbage or other solid waste to lands within the Lake Tahoe Basin is prohibited.”

The 208 Plan (TRPA 1988, Vol. I, page 145) provides that:

“To control potential water quality problems resulting from solid waste disposal, no person shall discharge solid wastes in the Tahoe Region by depositing them in or on the land, except as provided by TRPA ordinance. Existing state policies and laws will continue to govern solid waste disposal in the Tahoe Region.”

The State Board recommended in 1980 that BMPs be developed for the disposal of excavated soil from construction sites, and that consideration be given to their use to reclaim abandoned mines, quarries, and borrow pits. It also recommended that dredged material should be considered for similar uses. Other construction wastes should be exported from the Basin.

Problems associated with former solid waste disposal in the Lake Tahoe Basin were recognized as early as 1966; they include leachate from the disposal sites, erosion due to lack of vegetation, and uncontrolled runoff from landfill surfaces. There were formerly four disposal sites within the Basin; none were operated as sanitary landfills. The USFS has done extensive erosion and drainage control work at the old Meyers Landfill, and continues to monitor its effects on water quality. All of the closed sites in California are under the ongoing surveillance of the California Integrated Waste Management Board (CIWMB). The Lahontan Regional Water Quality Control Board, in cooperation with the CIWMB and the USFS, shall continue surveillance and monitoring of old disposal sites within the Tahoe Basin to ensure that leachate and eroded sediment do not impair water quality. Where water quality problems at these sites are identified, corrective measures shall be implemented in the same manner as for sites requiring erosion control projects.

Proposals have been made to use old landfill sites in the Tahoe Basin for other purposes such as a county park or industrial development. Further cleanup of these sites may be required before additional development can be permitted.

It has been estimated that, because of the seasonal nature of the Tahoe Basin's population and the inaccessibility of some homes due to weather and terrain, only 85 percent of the refuse generated in the Basin is collected for export. Illegal dumping and littering impair the visual appeal of surface waters and stream environment zones, and contribute leachate to surface runoff. Efforts should be made to increase the amount of Basin refuse which is actually collected for export or recycling. Local governments are responsible for efforts to increase the effectiveness of refuse collection. Existing anti-litter laws should be strictly enforced. Public education and cleanup programs should be expanded. The California Conservation Corps can assist in cleanup programs. The 208 Plan (TRPA 1988, Vol.I, page 145) states that:

“Existing state policies and laws will continue to govern solid waste disposal in the Tahoe Region. Local units of government, as well as land managers such as the U.S. Forest Service, shall police their areas of jurisdiction to control unauthorized dumping of solid wastes to the maximum extent feasible. Garbage pickup service shall be mandatory throughout the Tahoe Region, and will be so structured so as to encourage clean-up programs, composting, and recycling.”

In 1980, the State Board recommended the preparation of a comprehensive solid waste management plan for the entire Tahoe Basin. Such a plan was never prepared. Current California law requires local governments to prepare solid waste management plans, and to address specific targets for waste reduction, recycling, and resource recovery. These plans should also address long-term contingency plans for disposal of Tahoe Basin wastes, since the availability of landfill space is limited by physical capacity and political constraints.

Industrial Wastes

Except for stormwater, which is addressed elsewhere in this Chapter, no industrial discharges are allowed in the Lake Tahoe Basin. Discharges of industrial wastes into Lake Tahoe or any stream in the Basin are prohibited in both California and Nevada (see the section of this Chapter on prohibitions). Current prohibitions against a discharge of industrial waste in the Lake Tahoe Basin should be continued and enforced.

Toxic and Hazardous Substance Spills

Considering the amount of urbanization and the fact that a major interstate truck route (U.S. Highway 50) passes through the Lake Tahoe Basin, possible spills of hazardous materials such as gasoline, diesel fuels, fuel oil, aviation fuel, pesticides, solvents, chlorine, and other substances create the potential for serious water quality problems. Infrequent spills of petroleum products have resulted from transportation accidents in the Lake Tahoe Basin. Numerous small spills occur at construction sites, usually due to vandalism or improper storage. Spill prevention and abatement programs are necessary to control the risk of spills affecting Lake Tahoe and its tributaries, and the ground waters and lands of the Lake Tahoe Region. In addition, hazardous waste management programs are needed to ensure that potentially hazardous substances such as paints, pesticides, household solvents, and waste motor oil are properly managed and disposed of and not discharged to lands or waters (TRPA 1988, Vol. I, page 99).

The Lahontan Regional Board's regionwide control measures for hazardous waste leaks, spills, and illegal discharges (Chapter 4 of this Basin Plan) are applicable to the Lake Tahoe Basin, as are statewide requirements for the preparation and implementation of local government hazardous waste management plans. When reviewing environmental documents and drafting waste discharge permits for marinas, tour boat and waterborne transit operations, and other activities on or near surface waters which may involve use or storage of fuels, Regional Board staff should give special attention to contingency measures for prevention and cleanup of spills.

Following the recommendations of the State Board in the 1980 Lake Tahoe Basin Water Quality Plan, the Lahontan Regional Board took the lead in development of an interagency spill contingency plan to address issues including incident reporting and lines of communication, areas of responsibility and chain of command, and response, cleanup and disposal procedures.

The USEPA, Region IX, has prepared a new interagency spill response plan for the Lake Tahoe Basin, as a supplement to its *Mainland Oil and Hazardous Substance Pollution Contingency Plan* (USEPA 1994). This plan addresses topics such as the roles, responsibilities, and jurisdictional boundaries of the agencies involved; priority resources for use by responders; training and response capabilities in the Tahoe Basin and needs for further training; and evacuation/shelter-in-place

procedures. It also includes a standardized notification checklist which addresses spill response scenarios.

The 208 Plan (Vol. I, page 146) provides that TRPA shall cooperate with other agencies with jurisdiction in the Tahoe Region in the preparation, evaluation, and implementation of toxic and hazardous substance spill control plans covering Lake Tahoe, its tributaries, and the ground waters and lands of the Tahoe Region. TRPA will cooperate with the USFS, USEPA, U.S. Coast Guard, state water quality and health agencies, and local units of government to develop programs to prevent toxic and hazardous spills and to formulate plans for responding to spills that may occur. With regard to local government hazardous waste management plans, TRPA will participate on technical advisory committees, review and comment on management plans, and implement hazardous material control measures through the project review process, as appropriate, upon receiving requests to do so from state or local units of government.

The 208 Plan underscores the need for compliance by all persons handling, transporting, using, or storing toxic or hazardous substances with applicable state and federal laws regarding waste management, spill prevention, reporting, recovery, and cleanup. It also provides that underground storage tanks for sewage, fuel, or other potentially harmful substances shall meet standards set forth in TRPA ordinances, and shall be installed, maintained, and monitored in accordance with the BMP Handbook (208 Plan, Vol. II). (BMP 78 in that handbook is essentially a reference to the applicable regulations of other agencies.)

5.12 ROADS AND RIGHTS-OF-WAY

There are approximately 1000 miles of streets, roads, and highways in the Lake Tahoe Region. Past road construction, both for public streets and highways and for timber harvest and other purposes on USFS and private forest lands, has contributed significantly to sediment and nutrient loading to Lake Tahoe. Sediment loading from new subdivisions and associated roads has been a particular problem (see the section of this Chapter on development restrictions). Existing unpaved roads, and unstabilized cut and fill slopes, drainage ditches, and road shoulders continue to act as sediment sources. Winter road maintenance, including sanding and the use of deicing chemicals including salt, affects stormwater quality. The 208 Plan (TRPA 1988, Vol. I, page 88) concluded that limited information indicates that all components of the highway transportation system have serious impacts on water quality. Roads also increase impervious surface, magnifying surface runoff and often directing it toward surface waters.

Because of the significance of roads in erosion problems on forest lands, the USFS's Cumulative Watershed Effects methodology for assessing watershed problems (USFS 1988) uses "equivalent roaded acres" as a measure of disturbance. Erosion problems on forest roads are similar to those associated with offroad vehicle use (see the section of this Chapter on outdoor recreation).

While TRPA's Transportation and Air Quality Plan (TRPA 1992) has the goal of reducing dependence on private automobiles, it calls for the construction of, or the study of, a variety of new road segments. In 1980, the State Board determined that construction of new roads to handle the increased traffic projected for the Lake Tahoe Basin would cause serious water quality problems. The most serious water quality problems threatened by new highway construction in the Lake Tahoe Basin stem from encroachment of SEZs and construction in high erosion hazard lands. The State Board concluded that construction of new roads in high erosion hazard lands or SEZs would cause water quality problems which far outweigh any benefits in traffic improvement.

Maintenance of roads and parking lots is an important means of controlling stormwater pollutants at the source. However, maintenance activities may in themselves create water quality problems. Routine road shoulder maintenance can repeatedly disturb soils and prevent stabilization. An ongoing problem in

the Tahoe Basin is associated with the clearance of roadside drainage areas along streets and highways without curbs. Annual use of a grader to clear drainageways often removes material from the toes of slopes and ensures continual erosion. This problem has been acknowledged by several public works agencies and is one of the primary justifications for installing curbs and gutters.

Road maintenance requirements are not always proportional to traffic use. In the Lake Tahoe Basin, weather is more likely to increase maintenance needs than the amount of traffic. The use of road deicing chemicals (also discussed in Chapter 4) is of special concern in the Lake Tahoe Basin because the death of vegetation from road salt can contribute to increased erosion.

Control Measures

Erosion Problems

Except where roads are essential for fire control or for other emergency access, erosion from dirt forest roads in the Lake Tahoe Basin should be controlled through closure, stabilization and drainage control, and revegetation.

Wherever possible, roads must be eliminated from high erosion hazard lands and Stream Environment Zones. For some of the roads which are not closed, protective surfacing, relocation, or installation of drainage facilities will be necessary. Best Management Practices should be required for all dirt roads which are not closed, stabilized, and revegetated.

The U.S. Forest Service, Lake Tahoe Basin Management Unit (LTBMU) has an ongoing watershed restoration program which includes closing and revegetating some roads, construction of bridges to prevent erosion at stream crossings, and installation of roadside drainage controls.

Revegetation, resurfacing, or other measures to control erosion from dirt roads on private forest lands should be enforced through regulatory programs adopted by local and regional agencies. Where these agencies have not made a commitment to implement controls, waste discharge requirements and cleanup orders issued by the Lahontan Regional Board shall require landowners to correct erosion problems from dirt roads. Regulatory programs should include an inventory of old forest roads to identify the problems needing correction. TRPA and the Lahontan Regional Board have the authority to require the

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performance of remedial erosion control work on private forest lands.

The 208 Plan states that management practices for roads should be geared toward infiltration of runoff and stabilization of unstable drainages, slopes, and shoulders. The necessary practices include both capital improvements and proper operation and maintenance. The main implementing agencies are local units of government, improvement districts, state highway departments and state and federal land management districts.

The BMP Handbook (208 Plan, Vol. II) describes the appropriate BMPs for streets, roads and highways. As described in the introduction above, TRPA can require BMP implementation as a condition of approval for both new road construction, and road alterations. TRPA (1987, Ordinance Chapter 27) requires that all development requiring vehicular access be served by paved roads, with limited exceptions. TRPA's BMP retrofit program includes requirements for paving of unpaved roads and driveways.

Roads and Discharge Prohibitions

The impacts of road construction associated with lot and block subdivisions were one of the major reasons for the adoption of the prohibitions against discharge or threatened discharge due to the development of new subdivisions in the Lake Tahoe Basin (see the section of this Chapter on prohibitions). The 208 Plan (Vol. I) states that construction of new road networks, such as would be necessary to serve new subdivisions, should be avoided. Regional Board staff should carefully review **any** Tahoe project which would include new access road systems with potential impacts similar to those of a subdivision.

Exemptions from the TRPA and Regional Board prohibitions related to SEZ disturbance and excess land coverage may be allowed for road and highway construction projects if specific findings are made (see the section of this Chapter on development restrictions). Because of the problems with new road construction identified above, special consideration should be given to reasonable alternatives such as transit, ridesharing, and large employer transportation management programs which will preclude the need for exemptions. Wherever possible, existing structures or fills should be used when SEZs must be crossed. The State Board concluded in 1980 that in contrast to new highway construction which would affect large areas, the

amount of land required for public transportation facilities (such as road widening for bus lanes or bikeways) would be insignificant, and would occur along existing transportation corridors instead of in previously undeveloped areas.

Maintenance Problems

To reduce problems associated with annual clearance of roadside drainage areas, TRPA has made a commitment to meet with road maintenance organizations to develop improved practices, which may be added to its BMP Handbook in the future. Remedial erosion control projects can reduce the amount of general road maintenance required throughout the year. Once these projects have been successfully implemented, there will be less mud flowing onto roads, less regrading of roadsides to maintain proper slopes, and fewer cases of roads being undermined by runoff.

Street and parking lot sweeping are among the most important control measures for onsite problems. The revised BMP for street sweeping discusses the efficiency of different types of sweepers and requires sweeping at least once a year. The reduction in dissolved nutrients will be minor, but the reduction in particulate bound nutrients from street sweeping will be comparable to the reduction in suspended sediments. Street and parking lot sweeping also helps prevent clogging of infiltration facilities.

Proper management of runoff from areas of intensive vehicular use requires installation of onsite drainage facilities and adherence to operating practices to control water quality deterioration. A program of intensive maintenance, including periodic vacuum sweeping and cleanup of debris, is required in all cases. Drainage systems should be designed to convey runoff to the treatment or infiltration facility and then to a stable discharge point.

Large parking lots have high priority in the Regional Board's strategy for retrofit of BMPs to existing development. (See the discussion of this program in the section of this Chapter on offset.) The Regional Board has adopted maintenance waste discharge requirements for public works departments and utility districts in the Lake Tahoe Basin, and considers placing new public works projects involving road maintenance under its general waste discharge requirements applicable to small scale Tahoe Basin projects. The Board also regulates road maintenance activities through its municipal stormwater NPDES permits (see the "Stormwater" sections of this Chapter and of Chapter 4).

Snow and Ice Control

The Regional Board may allow the use of road salt to continue in the Lake Tahoe Basin as one component of a comprehensive winter maintenance program. However, the Regional Board should continue to require that it be applied in a careful, well-planned manner, by competent, trained crews. Should even the “proper” application of salt be shown to cause adverse water quality impact, the Regional Board should consider requiring that it no longer be used in the Tahoe Basin. Similarly, should an alternative deicer be shown to be effective, environmentally safe, and economically feasible, its use should be encouraged in lieu of salt. Stormwater permits, which may include controls on deicing chemicals, are discussed earlier in this Chapter.

Remedial erosion and drainage control projects can reduce the need for ice control on roads by collecting snowmelt runoff and conveying it in stable drainage systems rather than allowing it to flow across roadways where it can freeze in thin layers which require ice control for public safety.

The 208 Plan (Vol. I, page 146) provides that all persons engaged in public snow disposal operations in the Tahoe Region shall dispose of snow in accordance with the management standards in the BMP Handbook. This plan also requires all institutional users of road salt to keep records showing the time, rate, and location of salt application. State highway departments and other major users of salt and abrasives are required to initiate a tracking program to monitor the use of deicing salt in their jurisdictions. Annual reports to TRPA must include information on the rate, amount, and distribution of use. In addition, the 208 Plan requires that removal of snow from individual parcels be limited to structures, and paved and unpaved areas necessary for parking or providing safe pedestrian access. Snow removal from dirt roads is subject to TRPA regulation. When TRPA approves snow removal from an unpaved road it shall specify required winterization practices, BMPs, the specific means of snow removal, and a schedule for either paving the dirt road or ceasing snow removal.

Heavily used roads and driveways requiring winter snow removal should be paved. Less heavily used roads and driveways should be surfaced with gravel. Unneeded dirt roads and driveways should be revegetated.

Snow disposal areas should be located entirely upon high capability land with rapid permeability, should be

separated from Stream Environment Zones, and should be contained within berms to avoid surface runoff. The BMP Handbook (208 Plan, Vol. II) includes practices for snow disposal and for road salt storage and application.

The use of deicing salt and abrasives may be restricted where damage to vegetation in specific areas may be linked to their use, or where their use would result in a violation of water quality standards. Required mitigation for the use of road salt or abrasives may include use of alternative substances, and/or changes in the pattern, frequency, and amount of application. Revegetation of parcels may be required where there is evidence that deicing salts or abrasives have caused vegetation mortality. TRPA may enter into MOUs with highway and street maintenance entities to address the use of salts or abrasives in relation to safety requirements.

Retrofit Requirements and the Capital Improvements Program

All governmental agencies responsible for road maintenance are required to bring all roads in the Lake Tahoe Basin into compliance with 208 Plan standards within the 20-year implementation schedule of that plan (by 2007). That is, all existing facilities must be retrofitted to handle the stormwater runoff from the 20-year, 1-hour storm, and to restabilize all eroding slopes.

As noted in the section of this Chapter on remedial programs and offset, remedial controls for the water quality impacts of past development in the Lake Tahoe Basin are essential for the prevention of further degradation of Lake Tahoe. The Capital Improvements Program (CIP) of the 208 Plan (Vol. IV) is directed toward remediation of erosion and stormwater problems along public rights-of-way. Under the 208 Plan (Vol. I, page 109) federal, state and local units of government and other land management agencies shall be responsible for carrying out the water quality Capital Improvements Program, with oversight from TRPA. Memoranda of Understanding (MOUs) or other agreements between TRPA and the implementing agencies will provide the necessary coordination to ensure implementation. Appropriate roles and responsibilities of the involved agencies will be identified and verified through these agreements. TRPA expects to work with implementing agencies toward periodic revision of the CIP and development and implementation of long-term revenue programs. Minor changes in project descriptions or revenue programs shall not require state certification and

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federal approval before they take effect, but shall be included in periodic updates of the CIP submitted to the states and USEPA.

Specific CIP projects are proposed in Volume IV of the revised 208 Plan. California CIP projects are summarized in Tables 5.12-1 through 5.12-4. The systems proposed are source controls, which incorporate the methods presented in the Handbook of Best Management Practices (208 Plan, Vol. II). Detailed facilities planning will be required to determine exactly what systems will be put on the ground. Completion of these projects is essential if the load of sediment and nutrients causing deterioration of Lake Tahoe is to be reduced. The cost of completing all erosion and urban runoff control projects will be approximately \$300 million in 1988 dollars, requiring development of a phased program for completion. The total cost of projects to be implemented in California is estimated at \$204.7 million (1988 dollars), including \$18 million for Caltrans projects, \$58.9 million for City of South Lake Tahoe projects, \$49.8 million for El Dorado County projects, and \$78 million for Placer County projects. The CIP incorporates the watershed restoration priorities of the USFS, Lake Tahoe Basin Management Unit, by reference.

The CIP includes a project priority system related to the capability of each watershed to deliver sediment and nutrients to Lake Tahoe. TRPA gives high priority for erosion and runoff control to projects which affect SEZs (particularly wetland and riparian areas), which reduce or repair disturbance of seasonally saturated variable source areas, and which attempt to restore a more natural hydrologic response in the watershed. TRPA will work with the various implementing agencies to incorporate the 208 Plan's priority guidance into their long-range programs and evaluate their programs at regular five-year intervals.

TRPA's financial strategy for implementing the CIP is summarized in Volume VI of the 208 Plan (pages 46-47). It includes commitments to review funding sources, work with state and federal agencies to obtain funding, and to prepare and conduct annual updates of a detailed five-year CIP. Some of the components of this strategy were incorporated into TRPA's 1992 financial plan for 208 Plan implementation. An important element of the strategy is the direction that the Lahontan Regional Board, Nevada Division of Environmental Protection, and TRPA will use their regulatory powers to ensure that local units of government and other local agencies

bear a fair share of the costs of erosion and runoff control projects, while recognizing that voluntary cooperation is preferred to mandatory action.

This Basin Plan designates Caltrans as the agency with primary responsibility for implementing erosion control projects on California state highways. The Lahontan Regional Board will monitor Caltrans' progress to ensure that the projects are properly designed and built on schedule. Some state highways are on National Forest lands and are subject to special use permits issued by the Forest Service. The USFS can require correction of erosion problems as part of these special use permits.

The cities and counties have authority to carry out projects on public streets and roads. When these agencies carry out erosion control projects, their responsibilities will include detailed facilities planning, design, construction, and maintenance. The technical and advisory services of the Resource Conservation Districts can be used to help meet these responsibilities. Local governments will have incentives to carry out remedial projects in that future development in their jurisdictions will be phased under TRPA's land use plan (TRPA 1987) depending upon progress under the CIP.

To the extent feasible, this Basin Plan will rely on local governments to construct the erosion control projects required on city and county streets and roads, with financial assistance provided by state and federal grants. Local governments may also establish special assessment districts for the purpose of carrying out erosion and runoff control projects.

Where state transportation departments or local agencies fail to carry out erosion and urban runoff control projects, regulatory programs must be adopted to require them to carry out the projects. These agencies own the roads causing erosion; they can be held responsible for correcting the problem.

In some cases, an oversteepened roadway slope or other erosion problem is not entirely within public ownership. The parties dedicating a public road to a city or county may have failed to designate the entire right-of-way. Waste discharge requirements can be issued to the individual property owner at the same time they are issued to the city or county, making the property owner responsible for those measures required on his property. The city or county could also accept a dedication of the area from the landowner, or establish a special assessment district for the project.

Table 5.12-1
SUMMARY LIST OF CIP PRIORITIES AND COSTS FOR THE
CITY OF SOUTH LAKE TAHOE

Plan Area	Name	Priority/Cost		
		1	2	3
085	Lakeview Heights		\$6,000,000	
089B	California South Stateline Resort Area			\$4,057,000
090	Tahoe Meadows	x(089B)		
091	Ski Run		\$5,828,000	
092	Pioneer/Ski Run			x(091)
093	Bijou		\$7,278,000	
094	Glenwood		\$1,795,000	
096	Pioneer Village		\$715,000	
097	Bijou Pines		\$2,982,000	
098	Bijou/Al Tahoe		x(096,097)	
099	Al Tahoe			\$6,462,000
101	Bijou Meadow	x(094,096)		
103	Sierra Tract-Commercial			\$5,748,000
104	Highland Woods			x(103)
105	Sierra Tract		\$2,842,000	
108	Winnemucca			\$4,788,000
110	South "Y"		x(111,108)	
111	Tahoe Island		\$5,439,000	
112	Gardner Mountain			\$4,357,000
114	Bonanza		\$642,000	
Total estimated cost for the City of South Lake Tahoe is \$58,933,000.				
x - Indicates CIP needs within this PA. () - Indicates the PA that contains the CIP description and estimated cost.				

Source: TRPA, 1988, Volume IV.

Table 5.12-2
SUMMARY LIST OF CIP PRIORITIES AND COSTS FOR
EL DORADO COUNTY

Plan Area	Name	Priority/Cost		
		1	2	3
106	Montgomery Estates		\$2,599,000	
107	Black Bart		\$1,540,000	
115	Golden Bear			\$1,430,000
117	Tahoe Paradise (T.P.) - Washoan		\$12,025,000	
120	T.P. - Meadowvale			\$3,752,000
122	T.P. - Mandan		\$7,231,000	
124	Meyers /Residential		\$3,724,000	
125	Meyers /Commercial		x(122)	
129	Fallen Leaf North		\$141,000	
131	Angora Highlands			\$3,280,000
132	Mountain View		\$2,624,000	
133	T.P. - Upper Truckee		\$5,762,000	
134	Echo View			\$3,272,000
135	T.P. - Chiapa			\$429,000
137	Christmas Valley	\$978,000		
138	T.P. - Nahane			\$135,000
151	Glenridge		\$840,000	
Total estimated cost for El Dorado County is \$49,772,000.				
x - Indicates CIP needs within this PA. () - Indicates the PA that contains the CIP description and estimated cost. T.P. = Tahoe Paradise				

Source: TRPA, 1988, Volume IV.

**Table 5.12-3
SUMMARY LIST OF CIP PRIORITIES AND COSTS FOR
PLACER COUNTY**

Plan Area	Name	Priority/Cost		
		1	2	3
001A	Tahoe City		\$4,778,000	
002	Fairway Tract			\$2,404,000
003	Lower Truckee			\$560,000
005	Rocky Ridge			\$560,000
006	Fish Hatchery			\$2,806,000
007	Lake Forest Glen			x(006)
008	Lake Forest			x(006)
009A	Lake Forest Commercial			x(006)
009B	Dollar Hill			\$2,414,000
010	Dollar Point			\$1,350,000
011	Highlands			x(009B)
014	Cedar Flat			\$8,406,000
016A	Carnelian Woods			x(018)
016B	Carnelian Bay Subdivision			x(018)
017	Carnelian Bay			x(018)
018	Flick Point/Agate Bay			\$7,197,000
020	Kingswood West			\$1,639,000
021	Tahoe Estates			\$4,615,000
022	Tahoe Vista Commercial			x(021)
023	Tahoe Vista Subdivision			x(021)
025	Kingswood East		\$6,532,000	
026	Kings Beach Industrial			\$5,609,000
027	Woodvista		x(025)	
028	Kings Beach /Residential			\$1,907,000
029	Kings Beach /Commercial		x(028,026)	
031	Brockway			\$982,000
156	Chambers Landing		\$3,182,000	
158	McKinney Tract	\$284,000		
159	Homewood /Commercial		x(158)	
160	Homewood /Residential		\$865,000	
161	Tahoe Pines	\$3,653,000		
163	Lower Ward Valley		\$4,951,000	
164	Sunnyside /Skyland	\$5,983,000		
165	Timberland			\$1,632,000
167	Alpine Peaks		x(163)	
x - Indicates CIP needs within this PA. () - Indicates the PA that contains the CIP description and estimated cost.				

Source: TRPA, 1988, Volume IV.

Table 5.12-3 (continued)
SUMMARY LIST OF CIP PRIORITIES AND COSTS FOR
PLACER COUNTY

Plan Area	Name	Priority/Cost		
		1	2	3
168	Talmont			x(164)
169	Sunnyside	x(164)		
170	Tahoe Park /Pineland	x(164)		
171	Tavern Heights			\$5,740,000
172	Mark Twain Tract			x(001A)
173	Granlibakken			x(171)
Total estimated cost for Placer County is \$78,049,000.				
x - Indicates CIP needs within this PA. () - Indicates the PA that contains the CIP description and estimated cost.				

Source: TRPA, 1988, Volume IV.

**Table 5.12-4
SUMMARY LIST OF CIP PRIORITIES AND COSTS FOR
CALTRANS**

Highway Segment	Priority/Cost		
	1	2	3
1. Highway 50 - El Dorado County Echo Summit to the Jct. w/89.			\$3,193,000
2. Highway 89 - El Dorado County Luther Pass to the Jct. w/50.		\$1,556,000	
3. Highway 50/89 - El Dorado County Jct. of 50/89 to the South Lake Tahoe "Y".		\$1,955,000	
4. Highway 50 - El Dorado County, City of South Lake Tahoe. South Tahoe "Y" to South Stateline.			\$250,000*
5. Highway 89 - El Dorado County South Tahoe "Y" to the El Dorado/ Placer County Line.		\$4,099,000	
6. Highway 89 - Placer County El Dorado/Placer County Line to the Lake Tahoe Regional Boundary Northwest of Tahoe City.	\$2,810,000		
7. Highway 28 - Placer County Tahoe City to North Stateline.		\$3,322,000	
8. Highway 267 - Placer County Brockway Summit to the Jct. w/ 28.			\$1,200,000
Total estimated cost for Caltrans is \$18,385,000.			
* TRPA has identified CIP needs in these highway segments even though Caltrans has expended more money than originally estimated (see Table 9 of TRPA, 1988 Volume IV).			

Source: TRPA, 1988, Volume IV.

5.13 FOREST MANAGEMENT ACTIVITIES

Accessible pine and fir forest lands in the Lake Tahoe Basin were heavily logged by clearcut methods in the middle to late 1800s. Most private timberlands in the basin which had not been harvested earlier were logged between 1950 and 1971. Although the current Forest Management Plan for the USFS Lake Tahoe Basin Management Unit (LTBMU) emphasizes watershed protection over commercial timber sales, large-scale tree dieoffs from drought-related stresses in the 1980s and early 1990s have prompted proposals for extensive sanitation/salvage cuts to reduce fire hazard and increase forest health. TRPA encourages public and private vegetation management to increase plant community diversity, and the California Tahoe Conservancy carries out forest management (silvicultural) projects on the lands it has purchased. Because much of the Lake Tahoe Basin is forested, land clearing for development projects often involves timber harvest.

Because the potential contributions of an individual forest management operation to stream sedimentation may not be fully realized until years after that operation is concluded, attempts to compute loadings on an individual project basis are likely to result in underestimates. Forest management activities can create water quality problems if sites are left bare of vegetation, if riparian vegetation is disturbed, or if soil is disturbed by road construction, skid trails, or use of vehicles off of roadways. Even if Best Management Practices are followed, some impact on water quality can be expected from forest management activities.

Both remedial actions to correct problems from past timber harvest, and controls to prevent problems associated with future forest management activities are necessary for the protection of the waters of the Lake Tahoe Basin. The most important control measures needed on forest lands are remedial erosion control projects and control of erosion on forest dirt roads (see the sections of this Chapter on offset and on roads and rights-of-way). BMPs are also needed to minimize water quality problems from activities on forest lands. Controls should ensure that access roads, which increase drainage density, are well-placed and designed, and that skidding and related practices do not significantly disturb soils and vegetation. Since timber harvesting may take place

on steep slopes with poor land capability, required management practices should take slope differences into account. As noted in Section 5.3 (BMPs), no one BMP is 100 percent effective, and the use of BMPs does not provide assurance of compliance with state effluent limitations. BMPs must be monitored to ensure that measures are effective and that water quality is protected. If monitoring shows that a measure is ineffective, then additional measures must be applied until water quality standards are attained.

Control Measures

The Regional Board's general procedures for review of forest management activities on public and private lands are discussed in Chapter 4. The following is a summary of special measures which must be used in the Lake Tahoe Basin to protect sensitive watersheds and surface waters.

Forest management activities (in the Lake Tahoe Basin) should follow practices to protect vegetation not being removed, prevent damage to riparian vegetation, and provide for prompt soil stabilization and revegetation where necessary to prevent erosion.

Even stricter controls than the statewide Forest Practice Rules for silvicultural activities adopted by the California Board of Forestry may need to be applied in the Lake Tahoe Basin to take into account the unique conditions of the Basin and the mandate of the federal nondegradation standard. The Forest Practice Rules will not be certified as the BMPs applicable to silvicultural activities in the Tahoe Basin until they are revised to include the controls necessary to protect Lake Tahoe water quality.

Timber harvesting on National Forest land in the Lake Tahoe Basin is regulated by the LTBMU. The LTBMU uses the "Cumulative Watershed Effects" (CWE) method (USFS 1988) to evaluate the impacts of logging together with those of other disturbances in a watershed.

Private and State timber harvesting and other forms of tree removal in the Lake Tahoe Basin are regulated by the state forestry departments, and by the Tahoe Regional Planning Agency under the 208 Plan and TRPA Ordinance Chapter 71. TRPA has delegated most of the permitting authority for private tree cutting to the California Department of Forestry and Fire Protection (CDF). Unless conditions can be set by TRPA and/or CDF which will adequately protect water quality, the timber harvest should not be permitted. If other agencies fail to enforce the

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controls on timber harvesting and other forest management activities called for in this plan, the Lahontan Regional Water Quality Control Board shall issue waste discharge requirements enforcing controls. The Regional Board will use both the State and TRPA criteria below in its review of proposals for forest management activities in the Lake Tahoe Basin.

The 208 Plan Handbook of Best Management Practices (Vol. II) incorporates the silvicultural BMPs from the USFS's statewide BMP handbook. In addition, the 208 Plan (Vol. I, page 148) includes the following control measures for tree removal on federal, State, and private land:

- TRPA approval of timber harvesting shall require application of BMPs to the project area as a condition of approval. Application of BMPs is site specific. The Handbook of Best Management Practices identifies the various practices which may apply.
- All logging roads and skid trails shall be constructed and maintained in accordance with the TRPA Code and BMP Handbook, and BMPs shall be installed on all skid trails, landings, and roads prior to seasonal shutdown. Design, grade, tree felling in the right-of-way, slash cleanup, width, maintenance, and type of roads and trails shall meet TRPA standards, as shall cross-drain spacing.

In addition, the TRPA Code sets requirements for timber harvesting. In cases of substantial tree removal, the applicant is required to submit a harvest plan or tree removal plan prepared by a qualified forester. The plan shall set forth prescriptions for tree removal, water quality protection, vegetation protection, reforestation, and other considerations, and shall become part of the project's conditions of approval.

Management techniques for tree removal shall be consistent with the objectives of SEZ restoration, protection of sensitive lands, minimization of new road construction, revegetation of existing temporary roads, minimization of SEZ disturbance, and provisions for revegetation.

TRPA requires that sufficient trees shall be reserved and left uncut to meet minimum acceptable stocking standards, except where patch cutting is necessary for regeneration harvest or early successional stage

management. Patch cuts shall be limited in size to less than five acres.

Tree cutting within SEZs may be permitted to allow for early successional stage vegetation management, sanitation cuts, and fish and wildlife habitat improvement, provided that:

- all vehicles shall be restricted to areas outside the SEZ or to existing roads within SEZs, except for over-snow tree removal [The Regional Board will review proposals for use of "innovative technology" vehicles within high erosion hazard lands (i.e., SEZs, steep slopes, etc.) under other circumstances. If it can be demonstrated, preferably through the use of such vehicles in similar environments of the Sierra Nevada **outside** of the Lake Tahoe Basin, that such vehicles cause no greater soil or vegetation disturbance than over-snow tree removal, the Regional Board will consider allowing their use and recommending that TRPA amend the 208 Plan to permit their use], and
- work within SEZs shall be limited to times of year when soils are dry and stable or when snow depth is adequate for over-snow removal, and
- felled trees and harvest debris shall be kept out of all perennial and intermittent streams, and
- crossing of perennial streams or other wet areas shall be limited to improved crossings in accordance with the BMP Handbook or to temporary bridge spans that can be removed upon project completion or the end of the work season, whichever is sooner, and damage to the SEZ associated with a temporary crossing shall be restored within one year of removal, and
- special conditions shall be placed on tree harvest within SEZs or edge zones adjoining SEZs as necessary to protect instream values and habitat.

Tree removal methods within the various land capability districts shall be limited to the methods shown in Table 5.13-1. (See the discussion elsewhere in this Chapter on the Tahoe Basin land capability system and impervious surface coverage limitations.) Skidding over snow is preferred to ground skidding, and shall be limited to appropriate snow conditions and equipment.

In addition to the forest management control measures above, the following restrictions adopted

by the State Board in 1980 are needed to protect water quality:

- No permanent soil disturbance shall be permitted in Stream Environment Zones, on high erosion hazard lands, on soils with low productivity, or on soils with low revegetation potential.
- Forest management activities on high erosion hazard lands shall be solely by means of helicopter, balloon, over snow, or other techniques which will not result in any permanent soil disturbance.
- No vegetation shall be disturbed or removed from Stream Environment Zones except to maintain the health and diversity of the vegetation or to maintain the character of the Stream Environment Zone.
- All tree cutting shall be limited to tree selection operations with the exception of removal of insect-infested or diseased trees or similar measures to maintain the health and diversity of the vegetation. No clearcut logging shall be permitted. TRPA's Regional Plan allows small "patch cuts" for increase in vegetative diversity.

Drought related stresses in the 1980s and early 1990s led to the death of large numbers of forest trees in the Lake Tahoe Basin. Local governments, the CDF, and the USFS are concerned with the prevention of catastrophic fires, especially near urbanized areas. Sanitation-salvage cuts are being proposed on a much larger scale than that envisioned by the State Board in the 1980 *Lake Tahoe Basin Water Quality Plan*. Firebreaks are also being proposed near developed areas, in at least one case on high erosion hazard lands. The water quality impacts of such cutting could be individually and cumulatively significant. Regional Board staff should continue to participate in ongoing interagency "forest health" discussions to address the dead tree problem, to ensure that the health of the watershed is adequately addressed in other agencies' timber harvest proposals. Sanitation salvage clearcuts and fuel breaks should be limited to areas near existing development, and selective fuel reduction techniques should be used in the backcountry and on high erosion hazard lands. Existing understory vegetation should be maintained on fuel breaks to prevent erosion; it could be enhanced with nonflammable native species and irrigated, if feasible, to reduce the risk of wildfire.

Table 5.13-1
ALLOWABLE TREE REMOVAL METHODS IN RELATION TO LAND CAPABILITY

Only the following tree removal methods shall be used on lands located within the land capability districts shown:	
Land Capability District	Removal Method
1a, 1c, or 2	Aerial removal, hand carry, and use of existing roads, in conformance with the TRPA Code of Ordinances. Over-snow removal may be approved.
1b (stream environment zones)	As permitted in Land Capability District 1a. End lining may be approved when site conditions are dry enough and suitable so as to avoid adverse impacts to the soil and vegetation.
3	As permitted in Land Capability District 1b. Ground skidding pursuant to the Code of Ordinances may be approved.
4, 5, 6 and 7	As permitted in Land Capability District 1b. Ground skidding, as well as pickup and removal by conventional construction equipment, may be approved.

Source: TRPA, 1988 Vol. I, Table 19

5.14 LIVESTOCK GRAZING AND CONFINEMENT

Water quality problems related to livestock grazing and livestock confinement facilities in the Lake Tahoe Basin are similar to those described in the sections of Chapter 4 on resource management and agriculture, but the number of animals involved is generally lower than in other parts of the Lahontan Region. Range grazing occurs on National Forest lands and on some other large publicly and privately owned parcels; there are several riding stables, and some “backyard horses.” Because of the sensitivity of Lake Tahoe to sediment and nutrient loading, and the importance of SEZs, which have received the greatest historical grazing use, the following control measures have been adopted for the Tahoe Basin in addition to the regionwide control measures in Chapter 4. Control measures for livestock confinement facilities are discussed together with those for grazing operations because they are combined in the 208 Plan (TRPA 1988).

The 208 Plan (Vol. I, page 102) identifies needs for controls on grazing and livestock confinement to protect SEZs and seasonally wet soils from trampling, compaction, or storage of animal wastes. In addition, it states that previously disturbed areas should be restored.

Control Measures

The State Board adopted the following control measures in 1980: Existing stables and corrals in SEZs should be relocated outside of SEZs on low erosion hazard lands with surface slopes of five percent or less (see Section 5.4 of this Chapter on the Tahoe Basin land capability system). Livestock confinement areas should have runoff management systems designed to prevent drainage from flowing through these areas or through manure storage sites. All surface runoff from the facility should be contained and disposed of through an infiltration system [or if high ground water is present, by other appropriate means approved by the Regional Board]. The intensity of grazing on private lands should be monitored and controlled to prevent water quality problems, and the Forest Service should continue to observe Best Management Practices to prevent overgrazing on National Forest lands.

A special use permit from the Forest Service is required to use National Forest lands for stables or

livestock grazing. These permits can require compliance with the Best Management Practices needed to control erosion and runoff from livestock confinement areas or to prevent overgrazing.

The Regional Board shall consider adopting waste discharge requirements or taking other appropriate action if livestock grazing on public or private lands in the Lake Tahoe Basin is shown to result in degradation of water quality. In addition to the State Board guidelines discussed above, Regional Board permits for grazing and livestock confinement operations in the Lake Tahoe Basin should ensure attainment of the 208 Plan conditions below.

TRPA approval is required for any new livestock grazing or confinement project involving ten or more head of stock, expansion of existing activity outside of the current range, or an increase in livestock numbers of ten or more head at one time. An applicant for a grazing permit shall submit a grazing management plan prepared by a qualified range consultant. The grazing plan shall include pertinent information and a certification by the range consultant that the grazing plan complies with the TRPA Code of Ordinances.

TRPA has made the following additional commitments with respect to control of livestock confinement and grazing in the 208 Plan (Vol. I, page 153):

“TRPA shall review the grazing BMPs of TRPA and the U.S. Forest Service, and if appropriate, revise or refine the grazing BMPs in cooperation with affected segments of the public within one year of the date of USEPA adoption of these 208 Plan amendments.

In addition, grazing pursuant to TRPA approval shall comply with the following standards (Code, Section 73.2):

- grazing is limited to June 15 through September 15, or as indicated in the approval.*
- livestock shall be allowed onsite only when soil is firm enough to prevent damage to soil and vegetation*
- the grazing level shall not exceed the carrying capacity of the range.*
- livestock use shall not conflict with the attainment of water quality standards*
- new livestock confinement facilities shall be developed in conformance with the BMP Handbook, and*

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- *livestock shall be excluded from banks of streams where soil erosion or water quality problems exist."*

The BMP Handbook (TRPA 1988, Vol. II, BMP 79) contains the following additional control measures:

"The location of livestock containment facilities is important and sites should be carefully chosen based on the following guidelines.

1. *Facilities shall not be located within 100 feet of a stream environment zone (SEZ).*
2. *Facilities shall not be located in areas subject to overland flow from upslope areas.*
3. *Facilities must be located on gently sloping to flat land (5% slope or less).*
4. *Facilities shall not be located in areas which have less than 4 feet from the soil surface to the groundwater table at any time of the year.*

In addition to the proper location of livestock confinement facilities, the following guidelines must be followed:

1. *Surface runoff from these facilities or animal waste stockpiles shall not be allowed to flow into an SEZ.*
2. *Stockpiling of animal wastes within 100 feet of an SEZ is prohibited.*
3. *No manure storage or waste piles are to be located on the site unless they are protected from precipitation and surface runoff.*
4. *Facilities shall be equipped with an infiltration system designed for the 5-year, 6-hour storm or have an area of natural vegetation capable of infiltrating and providing treatment of the runoff.*
5. *Manure shall be properly disposed of."*

The BMP Handbook further provides that livestock confinement facilities shall be located, designed, and constructed under the direction of qualified professionals. If the facility is to be served by vehicles, the site must have loading-unloading areas that are outside of SEZs.

The 208 Plan provides that existing livestock confinement facilities not in conformance with the BMP Handbook shall be brought into conformance by July 1, 1992. This deadline was not met; however,

TRPA adopted revised BMP retrofit schedules in 1992.

The SEZ Restoration Program (Vol. III) of the 208 Plan includes several projects which involve the reduction or elimination of grazing impacts upon SEZs.

Programs adopted by local governments to control onsite surface runoff problems under municipal stormwater permits should also set controls for stormwater from grazing and livestock confinement on private lands (see the discussions of municipal stormwater NPDES permits earlier in this Chapter and in Chapter 4). The Lahontan Regional Board shall issue waste discharge requirements or cleanup orders where local governments fail to set adequate controls.

5.15 OUTDOOR RECREATION

Water quality problems and control measures related to dispersed and developed recreation throughout the Lahontan Region are discussed in Chapter 4 of this Basin Plan. Impacts of recreation are of special concern in the Lake Tahoe Basin, which receives as many as 20 million visitors annually. TRPA's regional environmental threshold carrying capacity standards include policies directing TRPA, in development of its Regional Plan:

1. *"to preserve and enhance the high quality recreational experience, including preservation of high quality undeveloped shorezone and other natural areas"*
2. *to "consider provisions for additional access, where lawful and feasible, to the shorezone and high quality undeveloped areas for low density recreational uses,"* and
3. *"to establish and insure a fair share of the total Basin capacity for outdoor recreation is available to the general public."*

Implementation of the last policy includes consideration of the availability of regionally limited "infrastructure" such as domestic water supplies and wastewater treatment capacity. TRPA regulates recreational capacity (and evaluates infrastructure needs) through the concept of "people at one time" (PAOT); overnight and day use PAOT capacities are assigned for planning purposes to specific areas.

The Regional Board may issue waste discharge permits to developed recreation facilities and/or take appropriate enforcement action to address the impacts of new construction, stormwater discharges, and maintenance activities such as fertilizer and pesticides use. Some recreational facilities may be subject to stormwater NPDES permits.

Under the 208 Plan (TRPA 1988, Vol. I, pages 151-152), outdoor recreation facilities are subject to the same types of voluntary and mandatory requirements for retrofit of Best Management Practices for erosion and stormwater control as are other types of development. Recreational facilities and activities are also subject to TRPA's Ordinance Chapter 9 enforcement program.

Public outdoor recreation projects may be exempted from TRPA's restrictions on development of land

capability Class 1, 2, and 3 and SEZ lands, and from the Regional Board's discharge prohibitions related to land capability and SEZs if specific findings regarding necessity, lack of reasonable alternatives, and mitigation can be made. The exemption criteria are set forth in the section of this Chapter on development restrictions. Exemptions are granted only for public outdoor recreation projects which "by their very nature" must be sited on sensitive lands; Table 5.7-3 provides specific guidance to be used in making this finding.

Land coverage for recreational projects outside of community plan areas is limited to the Bailey land capability coefficients, without the availability of excess coverage by transfer. Within community plan areas, recreation projects may be allowed 50 percent land coverage by transfer (see the discussions of land capability and coverage elsewhere in this Chapter). The 208 Plan provides that existing recreation facilities in environmentally sensitive areas shall be encouraged, through incentives, to relocate to higher capability lands, except for those facilities that are slope dependent, such as downhill skiing.

Campgrounds and Day Use Areas

The potential exists for construction and expansion of campground and day use facilities on both public and private lands in the Tahoe Basin. TRPA's Regional Plan (TRPA 1987) includes density limits for campsite spaces; the Plan Area Statements identify areas where new campground and day use facilities are permissible.

Construction of new campgrounds should be subject to the same restrictions as apply to other development in the Tahoe Basin, including:

- Development shall not be permitted on high erosion hazard lands or in Stream Environment Zones, unless required exemption findings can be made.
- Coverage shall conform to the land capability system, unless required exemption findings can be made.
- Drainage, infiltration and sediment control facilities must be installed wherever water is concentrated by compacted or impervious surfaces.
- Best Management Practices for construction sites and temporary runoff management must be followed.

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The 208 Plan (TRPA 1988, Volume I, Table 16, reproduced as Table 5.7-3 of this Basin Plan) states that the following facilities and activities associated with campgrounds need not “by their very nature” be located within SEZs or on class 1b lands:

“Facilities and activities such as campsites, toilets, parking areas, maintenance facilities, offices, lodges, and entrance booths, except for facilities such as pedestrian and vehicular stream crossings, utilities, and erosion control facilities.”

Table 5.7-3 includes similar provisions for campgrounds on land capability classes 1a, 1c, 2 and 3, except for the reference to stream crossings. These provisions effectively preclude the adoption of exemption findings for the facilities specified in connection with any campground project requiring a TRPA or Regional Board permit.

The 208 Plan (TRPA 1988, Vol. I, page 151) also states that new campground facilities shall be located in areas of suitable land capability and in proximity to the necessary infrastructures, and that development of day use facilities shall be encouraged in or near established urban areas, wherever practical.

Dirt roads in developed campgrounds should be surfaced or closed and revegetated. Other control measures may be required at specific sites including stabilization of cut and fill slopes; installation of drainage, infiltration and sediment control facilities; and modification or relocation of facilities in stream environment zones to minimize surface disturbance and interference with natural drainage. The measures required will depend on the specific characteristics of the campground site.

The Regional Board should continue to issue and enforce waste discharge permits for the construction, remodeling, and expansion of campgrounds and day use areas in the Tahoe Basin. The need for retrofit of BMPs, especially for facilities in SEZs, shorezone areas, and near tributary lakes and streams, should be evaluated, and WDRs can be used to require retrofit where necessary. Campgrounds and day use projects which involve one-time or cumulative soil disturbance of five acres or more will be subject to construction stormwater NPDES permits. Campground and day use facilities which accommodate large numbers of recreational vehicles should have properly designed and operated wastewater dumping stations, to discourage illegal dumping. (See the section of this Chapter on wastewater treatment, export, and disposal for a

discussion of the requirement to export sewage from the Lake Tahoe Basin.) The Nevada Division of Environmental Protection should ensure that similar controls are enforced in Nevada.

Local or regional ordinances adopted to require surfacing or revegetation of private driveways or forest roads should also apply to dirt roads in campgrounds. Other control measures for existing campgrounds would require review of existing sites.

Construction of a developed campground on private land in the Lake Tahoe Basin requires permits from the city or county where the campground is built, and from TRPA. Permits for private campgrounds should prohibit development in SEZs or in excess of land capability, and should enforce the BMPs needed to prevent water pollution. Local governments in the Tahoe Basin should consider control of stormwater discharges from existing and potential private campgrounds and day use sites as part of their planning activities under their municipal stormwater NPDES permits.

Ski Areas

Water quality problems and control measures associated with ski areas are discussed in a regionwide context in Chapter 4 of this Basin Plan. Special provisions apply to ski areas in the Lake Tahoe Basin. TRPA's regional land use plan limits the potential for new or expanded ski areas by limiting the total allowable recreational capacity in “people at one time” (PAOT) through the year 2007. The 208 Plan does not include specific BMPs for ski areas. However, like other types of development in the Lake Tahoe Basin, ski areas are required to implement BMPs for new construction and to “retrofit” BMPs for existing development. TRPA requires preparation of a master plan before a ski area can be expanded. Once approved by TRPA, the master plan becomes part of that agency's regional land use plan.

TRPA's 1990 Ski Area Master Plan Guidelines provide direction on procedures for preparing master plans and associated environmental documents, and on the required contents of a ski area master plan. Topics to be addressed include physical plans of existing and proposed ski facilities, operations, mitigation for environmental problems related to existing and new facilities, and a monitoring plan. TRPA and the U.S. Forest Service, Lake Tahoe Basin Management Unit require use of the Cumulative Watershed Effects (CWE) methodology to evaluate existing watershed disturbance at ski areas and the potential impacts of new development

(see Chapter 4 of this Basin Plan). Under TRPA-approved ski area master plans, new projects are expected to be phased in relation to remedial watershed restoration work. CWE methods will be used to evaluate the adequacy of specific restoration projects to reduce the risk of significant cumulative sediment loading impacts. The Ski Area Master Plan Guidelines provide further information on the CWE.

Ski areas are subject to the TRPA land use restrictions, State discharge prohibitions and exemption criteria related to land coverage and SEZ protection which are discussed elsewhere in this Chapter. One of the required exemption findings for a recreational project is that “by its very nature,” it must be located on sensitive lands. The 208 Plan (Volume I, Table 16) specifies that the following activities and facilities associated with ski areas need **not**, by their very nature, be located within SEZs or on land capability class 1b lands:

“Any activity or facility which causes additional land coverage or permanent disturbance, except for stream crossings for ski runs provided no more than five percent of SEZ area in the ski area is affected by the stream crossings, and except for facilities otherwise exempt such as utilities and erosion control facilities.”

The 208 Plan also specifies that the following activities and facilities associated with ski areas need not by their very nature be located on land capability class 1a, 1c, 2, or 3 lands:

“Activities or facilities such as parking areas, base lodge facilities and offices, and retail shops, unless there is no feasible nonsensitive site available, the use is a necessary part of a skiing facility, and the use is pursuant to a TRPA-approved master plan, except for facilities otherwise exempted such as utilities and erosion control facilities.”

Proposals for ski resort expansion must be carefully reviewed to prevent increases in erosion and surface runoff. New road construction must be kept to an absolute minimum, and is prohibited on high erosion hazard lands or in Stream Environment Zones unless the exemption findings for public recreation projects can be made. (Modern construction techniques permit ski lift construction without road construction.) These provisions will limit the extent of disturbance of sensitive lands for the expansion of ski areas, and will thus protect water quality.

In 1980, the State Board provided the following additional direction for ski area maintenance activities:

“Ski run and trail maintenance vehicles and equipment must not be operated in a manner that disturbs the soil. Snow moving, packing, and grooming must not be conducted when the snow cover is insufficient to protect the underlying soil from disruption.”

The Regional Board has adopted waste discharge requirements for all ski areas in the California portion of the Lake Tahoe Basin. These requirements address stormwater control (especially for large parking lots), and ongoing operation, maintenance, and remedial watershed restoration activities. They are periodically updated to reflect proposed new projects and activities within the ski area. Stormwater NPDES permits may be necessary for future ski area construction projects. Local governments in the Lake Tahoe Basin must address the stormwater impacts of ski facilities on private lands under their municipal stormwater NPDES permits.

Regional Board staff should continue to participate in interagency review of proposed ski area master plans, and should update waste discharge permits as necessary for new projects carried out under master plans.

Golf Courses

Many of the existing golf courses in the Lake Tahoe Basin were constructed in Stream Environment Zones, and have thus disrupted the natural capability of these areas to provide treatment for nutrients in stormwater. Some golf courses are located within or very near the shorezone of Lake Tahoe, or in areas with high ground water tables. Proposals have been made for expansion and/or remodeling of some Tahoe Basin golf courses. General control measures for water quality problems associated with golf courses are discussed in Chapter 4 of this Basin Plan. Existing and future golf course development in the Lake Tahoe Basin requires special control measures to prevent further eutrophication of surface waters and contamination of drinking water supplies.

Waste discharge requirements issued by the Lahontan Regional Board for golf courses in the California portion of the Lake Tahoe Basin implement policies to prevent wastes, such as fertilizer nutrients, pesticides, herbicides, and products of erosion from entering surface waters of Lake Tahoe. They also require use of BMPs for control of stormwater from

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parking lots, rooftops, and other impervious areas, and for prevention and control of erosion problems.

Each golf course in the Tahoe Basin should follow a control plan detailing nutrient loads, pathways, and control strategies. The use of fertilizer in stream environment zones is prohibited by the 208 Plan; the use of chemicals other than fertilizer should also be prohibited in stream environment zones. The control strategies for golf courses shall include:

- strict annual, monthly, and daily fertilizer limitations;
- controlled drainage, including holding ponds where necessary;
- maintenance of drainage systems; and
- surface and ground water monitoring programs.

TRPA also considers existing golf courses high priorities for retrofitting with BMPs because of their potential for significant water quality impacts from fertilizer and runoff. It encourages the states to issue waste discharge requirements or NPDES permits for these facilities.

The 208 Plan (TRPA 1988, Vol. I, page 136) provides that golf courses in SEZs shall be encouraged to redesign layouts and modify fertilization in order to prevent the release of nutrients to adjoining ground and surface waters. The 208 Plan also recognizes the need for careful fertilizer management, particularly within SEZs and by golf courses. The expansion or redevelopment of golf courses within SEZs will be subject to the same review procedures and exemption findings required of all recreation projects under TRPA's 1987 Regional Plan. Table 5.7-3 specifically lists types of golf course facilities which "by their very nature" need **not** be sited in sensitive lands. This would preclude the adoption of TRPA or Regional Board exemption findings to permit the following on SEZ or class 1b lands:

"Facilities and activities such as greens, fairways, and driving ranges, which require mowing, vegetative disturbance or fertilizer; clubhouses, retail services, proshop, parking areas, offices, maintenance facilities, and accessory uses, except for facilities otherwise exempted such as pedestrian and vehicular stream crossing, utilities, and erosion control facilities."

Similar provisions, with the exception of the reference to stream crossings, would apply to golf course facilities on land capability classes 1a, 1c, 2 and 3.

Golf course remodeling projects may involve proposals for relocation of coverage or disturbance within a SEZ rather than for new SEZ disturbance. Criteria for relocation of existing coverage in SEZs are discussed in the section of this Chapter on land capability. In evaluating proposals for relocation of golf course facilities in SEZs, Regional Board staff should pay particular attention to the requirement that the relocation be for the net benefit of the SEZ.

One example of possible SEZ coverage relocation within a golf course is that of paved or compacted, "hard coverage" golf cart paths. **New** coverage for golf cart paths could probably not be approved under the SEZ exemption criteria above; however, relocation of existing paths would be permissible if relocation criteria are met. Existing unpaved golf cart paths in SEZs which meet the definition of "hard coverage" should be paved to prevent erosion.

Offroad Vehicles

Water quality impacts of offroad vehicle (ORV) use are discussed as a regionwide problem in Chapter 4 of this Basin Plan. Erosion, soil compaction and damage to vegetation from ORVs are of special concern in the Lake Tahoe Basin because of the high erodibility of many of its soils, the difficulty of revegetation, and the sensitivity of surface waters. ORV damage to SEZs disturbs their capacity to treat sediment and nutrients in stormwater. TRPA estimates that more than one third of the annual sediment load to Lake Tahoe from erosion on forest lands is directly attributable to dirt roads and jeep trails.

In addition to the summer use of wheeled ORVs, snowmobile use during the winter can also affect water quality. Compacted snow on heavily traveled snowmobile routes is a good thermal conductor which can cause underlying soil to freeze readily. Rapid soil freezing and thawing loosens the soil surface and can dislodge small plants, contributing to the risk of erosion upon snowmelt.

The State Board's *Lake Tahoe Basin Water Quality Plan* provides additional information on ORV impacts.

Control Measures for ORVs

Offroad vehicle use in the Lake Tahoe Basin must be restricted to designated areas where high erosion

hazard lands, stream environment zones, and sensitive vegetation are not threatened.

The 208 Plan, (Vol. I, page 151) provides that offroad vehicle use is prohibited in the Tahoe Region except on specified roads, trails, or designated areas where the impacts can be mitigated. This policy prohibits the use of motorized vehicles in areas other than those designated. Areas for this form of recreation shall be determined by TRPA in cooperation with ORV clubs, the USFS, and state and local governments. Continued use of designated areas will depend on compliance with this policy and the ability to mitigate impacts. Owners or operators of lands with existing ORV roads and trails which are not in compliance with the BMP Handbook shall be required to apply BMPs as a condition of approval for any project, and to schedule retrofit of BMPs.

The 208 Plan also includes specific guidance on types of public outdoor recreation facilities which need not, by their very nature, be located on sensitive lands, and which therefore are not eligible for exemptions from TRPA land use restrictions and California discharge prohibitions (Table 5.7-3). For ORV courses, this guidance states that the following types of facilities need not, by their very nature, be sited in SEZs and Class 1b lands:

“Facilities and activities such as ORV trails, staging areas, parking areas, maintenance facilities, and first aid stations, except for bridged stream crossings, and facilities otherwise exempted such as erosion control facilities.”

The guidance includes a similar statement which would preclude exemptions for the facilities and activities mentioned above in relation to Class 1a, 1c, 2, and 3 lands “unless the ORV course is pursuant to a comprehensive TRPA-approved ORV management plan for resolving resource management problems associated with ORV activity.”

The USFS Lake Tahoe Basin Management Unit adopted an ORV management plan in 1976, and is in the process of updating it. This plan also restricts ORV use to designated roads and trails. The current plan should be strictly enforced, and Regional Board staff should continue to work with the USFS and TRPA to ensure that the updated plan provides at least the same level of water quality protection.

To ensure that vehicles stay out of areas where ORV use is not permitted, some old roads must be closed or blocked off. The USFS is conducting a program of

blockading roads and trails used in violation of its offroad vehicle plan. National Forest areas damaged by ORV use will be restored and revegetated as part of the ongoing USFS watershed restoration program. As noted above, the 208 Plan allows limited opportunities for relocation of offroad vehicle trails and facilities (to high-rated lands) if this is done under an approved USFS plan.

To the extent that ORV use in the Lake Tahoe Basin is confined to existing dirt roads, the water quality impacts can generally be contained by the application of standard BMPs for erosion and runoff control. However, if the ORV use damages the control devices (e.g., water bars) or aggravates erosion of the road surface, additional controls may be necessary. Following its 1991-92 review of the attainment of regional environmental threshold carrying capacity standards, TRPA identified needs for additional dust control to prevent air quality problems, which could lead to more stringent controls on ORV use.

The current relatively low-intensity, dispersed snowmobile use in the Lake Tahoe Basin limits the severity of snow compaction problems. If snowmobiles are driven on adequate snow cover and in designated areas outside fragile locations, the water quality impacts can be minimized.

More vigorous enforcement of local and regional ordinances to control ORV use on private lands is necessary. Private landowners need to post land so that local law enforcement officials can enforce offroad vehicle restrictions.

Direct Regional Board enforcement of state water quality laws against offroad vehicle users would not be very effective. The Regional Board can issue waste discharge permits to operators of commercial ORV facilities (e.g., snowmobile courses) to prevent and control water quality problems. In some cases, waste discharge requirements and cleanup orders may be issued to property owners requiring them to prevent or correct water quality problems caused by offroad vehicle use on their property.

Recently enacted legislation directs the Regional Board to conduct a study of ORV impacts in the Lake Tahoe Basin once funding is made available.

Boating and Shorezone Recreation

The “Shorezone Protection” section of this Chapter (see Section 5.7) summarizes water quality problems

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related to shorezone development, TRPA's general shorezone protection programs, and guidelines for Regional Board use in evaluation of shorezone projects. Chapter 4 of this Basin Plan includes a general discussion of water quality problems and control measures related to boating and shorezone recreation activities. Problems include wastewater disposal from boats, fuel spills from boats and marinas, marina stormwater pollutants, and resuspension of sediment and associated pollutants through dredging and underwater construction. These problems are of special concern in the Lake Tahoe Basin because of the sensitivity of the Lake and the heavy recreational use it receives. The following is a summary of special control measures by problem type.

Vessel Wastes

The discharge of vessel wastes to Lake Tahoe is prohibited, but violations still occur. Boat launching facilities, piers, and buoys around Lake Tahoe have a maximum theoretical capacity (as of 1988) of about 6000 boats at one time. Many of the boats in use have built-in toilets and holding tanks or portable toilets, creating a large potential for intentional or unintentional dumping of wastewater into Lake Tahoe. Many boats are not equipped with self-contained heads, and there is no inspection program. Discharge of vessel toilet wastes introduces pollution which can affect domestic wastewater intakes from Lake Tahoe and other lakes such as Fallen Leaf and Echo Lakes. Although not in themselves a serious threat to the clarity of Lake Tahoe, vessel wastes contribute cumulatively to nutrient loading and present a public health risk.

In California, the Harbors and Navigation Code authorizes the State Board to require marinas or other marine terminals to install pumpout facilities. The State Board has adopted procedures by which the Regional Boards can determine the need for pumpout facilities, and request the State Board to require specific terminals to install them. Under these provisions, the Lahontan Regional Board shall continue to determine the need for additional pumpout facilities at Lake Tahoe, and request the State Board to require installation where such facilities are necessary. The Regional Board currently requires that all public marinas on the California side of Lake Tahoe have pumpout facilities available.

The U.S. Coast Guard is primarily responsible for enforcing prohibitions against vessel waste discharges to Lake Tahoe, and should include an

inspection program as part of its enforcement effort. Other federal and state agencies should assist the Coast Guard. Permits issued by the U.S. Army Corps of Engineers, state lands agencies, and TRPA for marinas, buoys, and other facilities serving vessels on Lake Tahoe should require compliance with the prohibitions against discharge of vessel wastes. These agencies should also assist in the inspection program. The Regional Board shall assist the Coast Guard in the program to enforce the discharge prohibitions and shall bring its own enforcement actions where necessary.

The Regional Board has adopted waste discharge requirements for existing marinas at Lake Tahoe which include provisions for vessel waste pumpout facilities, and should continue to adopt waste discharge requirements for new and expanded marinas.

The 208 Plan (Vol. I, pages 104 and 157) provides that liquid and solid wastes from boats shall be discharged at approved pumpout facilities and other relevant facilities in accordance with the BMP Handbook. The 208 Plan, and TRPA's Code of Ordinances (Chapter 54) require that pumpout facilities for boat sewage shall be provided at all new and expanded commercial marinas, harbors, launching facilities and other relevant facilities, and may be required by TRPA at other existing marinas as conditions of project approval. The BMP Handbook (208 Plan, Vol. II) lists pumpout facilities as a BMP for marinas and related facilities.

Following adoption of the 1988 208 Plan, TRPA initiated a program coordinated with the Lahontan Regional Board, the Nevada Division of Environmental Protection, local governments, and the sewage collection and treatment facilities, to obtain prompt compliance with the BMP calling for pumpout facilities at marinas.

Piers

In recognition of the potential adverse impacts of continued proliferation of piers and other mooring structures in Lake Tahoe, the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Game (DFG), and the Nevada Department of Wildlife have adopted policies recommending strongly against the approval of new facilities within sensitive fish habitat (USFWS 1979 & 1980, DFG 1978). See Figure 5.8-1.

The 208 Plan (Vol. I, page 348) recognizes that the policy of the DFG is to recommend against approval

of any private pier and buoy projects proposed in prime fish habitat areas, and to recommend against any proposed development that will have an adverse impact on a marsh. The policies of other federal and state agencies also protect prime fish habitat, significant fish spawning areas, biologically important stream inlets, and marsh or riparian habitats from the impacts of construction of public and private docking facilities.

Piers and jetties should not be allowed to block currents. They must be constructed so as to allow current to pass through. Pier construction must be prohibited in significant spawning habitat. Pier construction should also be prohibited in waters in or immediately offshore of biologically important stream inlets. Pier construction must be discouraged in prime fish habitat areas. Further study of the effects of piers should be continued. The controls called for here may be modified, or additional controls required, based on the findings of that study.

In 1980, the State Board adopted the following prohibition against new pier construction in significant spawning habitat or offshore of biologically important stream inlets:

“The discharge or threatened discharge, attributable to new pier construction, of solid or liquid wastes, including soil, silt, sand, clay, rock, metal, plastic, or other organic, mineral or earthen materials, to significant spawning habitats or to areas immediately offshore of important stream inlets in Lake Tahoe is prohibited.”

The prohibition against discharges immediately offshore of important stream inlets shall apply up to a thirty-foot contour. Discharges to the inlets themselves are subject to the prohibition against discharges to Stream Environment Zones.

The determination whether an area is significant spawning habitat or an important stream inlet shall be made on a case-by-case basis by permitting agencies, in consultation with the USFWS and state fish and wildlife agencies. Maps which have been produced by these agencies may be used as a guide. Because of the scale on which the maps have been produced, however, and the possibility that additional information may become available, the maps will not necessarily be determinative. [TRPA has adopted fish habitat maps for Lake Tahoe which differ somewhat from those prepared by the fish and wildlife agencies, and has designated additional important stream inlets by ordinance.]

The term “pier,” as used in the prohibition above, includes any fixed or floating platform extending from the shoreline over or upon the water. The term includes docks and boathouses. The prohibition does not apply to maintenance, repair, or replacement of piers at the same site. The prohibition shall also be subject to the exceptions which apply to the prohibitions setting restrictions on development. (See the sections of this Chapter on development restrictions and shorezone protection for information on exemption criteria.)

Under Section 401 of the federal Clean Water Act, the U.S. Army Corps of Engineers cannot issue any permit if the state water quality agency denies certification that the permitted discharge is in compliance with the applicable state water quality standards (see the separate section of this Chapter on 401 and 404 permits). The prohibitions in this plan are part of California's water quality standards for Lake Tahoe, effectively precluding the Corps of Engineers from issuing permits for pier construction in violation of the prohibitions.

This plan does not prohibit the use of mooring buoys, which are now used as alternatives to piers in many cases, although the USFWS (1979) has recommended against their approval in sensitive fish habitat because of the adverse effects of powerboat use.

Permitting agencies should also discourage construction of new piers in prime fish and aquatic habitat, emphasizing alternatives such as use of existing facilities. These permitting agencies include the Corps of Engineers, state lands agencies, the Tahoe Regional Planning Agency, and the Lahontan Regional Board. Where permits for pier construction are issued, they should require construction practices to contain any sediment disturbed by placing structures in Lake Tahoe. When piers or other structures are placed in Lake Tahoe, they should be surrounded by vertical barriers to contain any disturbed sediment. The permits should also prohibit any construction which will alter the flow of currents in Lake Tahoe. If necessary, the Lahontan Regional Board shall issue permits to require compliance with practices to prevent water quality problems from construction of piers and other shorezone structures. In addition to the special considerations above, such permits should reflect the regionwide criteria for piers and shorezone construction in Chapter 4 of this Basin Plan.

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In reviewing pier projects, the California State Lands Commission generally requires that construction be done from small boats, and that construction wastes be collected on these vessels or on tarps and disposed of properly. The State Lands Commission also implements a special plan for protection of the endangered shorezone plant, Tahoe yellow cress. Pier construction, and other underwater/shorezone construction activities, are subject to all applicable water quality standards, including the nondegradation objectives contained in this Basin Plan.

The 208 Plan (TRPA 1988, Vol. I) provides for regulation of piers as part of TRPA's larger shorezone and fish habitat protection programs. The 208 Plan states that TRPA shall regulate the placement of new piers, buoys, and other structures in the foreshore and nearshore to avoid degradation of fish habitat, interference with littoral drift, and other concerns. TRPA shall regulate the maintenance, repair, and modification of piers and other structures in the nearshore and foreshore. TRPA has sponsored a university study of the impacts of piers on fish habitat, and may propose changes in its regional land use plan based on the results.

Dredging

Chapter 4 of this Basin Plan includes additional discussion of water quality problems related to dredging, and regionwide dredging guidelines. Construction (e.g., of piers) and dredging in Lake Tahoe can cause localized pollution problems, by disturbing sediments: this increases turbidity and reintroduces nutrients which had settled out of the water. The sediments may also be redeposited elsewhere. Construction in Lake Tahoe may also affect current flow, causing currents to disturb bottom sediments. If disposal of dredged material is done improperly, nutrients from these wastes could cause water quality problems. Dredging and disposal of marina sediments are of special concern because very high levels of tributyltin (an antifouling ingredient of boat paint) have been detected in sediments and biota of one Lake Tahoe marina.

The 208 Plan (Vol. I, page 105) states that construction and dredging in Lake Tahoe are potential sources of sediment and nutrients which could threaten fish habitat due to excessive turbidity, sedimentation of feeding and spawning grounds, or substrate alteration. Water quality problems may result from resuspension of sediment and nutrients on the lake bottom or in backshore lagoons and marinas. These impacts vary depending upon the

type of construction or dredging used. Suction dredging generally resuspends less sediment than clamshell dredging and construction of open piling piers resuspends less sediment than construction of sheet piling structures.

Water quality certification for U.S. Army Corps of Engineers nationwide Section 404 permits for "headwater" dredge and fill activities has been denied for the Lake Tahoe Basin by the State of California. Therefore, any dredging and filling in the Lake Tahoe Basin requires an individual Corps of Engineers permit, which must itself receive state certification.

Methods of dredging which stir up bottom sediments, as when backhoes or drag lines are used, should not be permitted. Under most circumstances, only suction dredging should be allowed. However, even with turbidity barriers, suction dredging followed by interim storage of dredged material in an "inner harbor" situation may create more problems than bucket dredging. Localized problems related to turbidity may result from repeated disturbance of stored dredged material for final disposal. Regional Board staff should evaluate proposed dredging methods based on site-specific circumstances and require the method which results in the lowest degree of threat to water quality. Disposal of dredged materials must follow practices to prevent sediments from being discharged into Lake Tahoe. The Best Management Practices Handbook (TRPA 1988, Volume II) includes BMPs for the dredging process and for disposal of dredged material. Consideration should be given to the use of dredged material in reclamation of abandoned mines, quarries, and borrow pits outside of the Tahoe Basin.

The Lahontan Regional Board should review all proposed dredging in the Lake Tahoe Basin and should not permit the dredging unless the practices called for in this plan are followed.

The 208 Plan includes the following provisions related to dredging of Lake Tahoe and other lakes within TRPA's jurisdiction (TRPA 1988, Vol. I, pages 158-59):

"Filling and dredging in the lakes of the region are permissible activities, but are subject to ordinance provisions to protect water quality and the natural functions and dynamics of the shore lines and lake beds. TRPA shall apply state and TRPA water quality thresholds, standards, and guidelines to activities which involve construction within Lake Tahoe. Where

turbidity curtains are used to prevent the mixing of turbid waters near the construction site with clear lake waters, TRPA shall apply and enforce the Uniform Runoff Guidelines for discharge of surface runoff to surface waters at the point or points of discharge from the turbidity curtain. Ambient water quality thresholds and standards applicable in the littoral zone shall be applied and enforced at a reasonable distance from the construction activity. Filling is limited to dredging, shore line protective measures, beach replenishment, or other activities that can be found to be beneficial to existing shorezone conditions or water quality and clarity."

The "Uniform Runoff Guidelines" cited above are the 1980 California stormwater effluent limitations; a revised version of these limitations is contained in Table 5.6-1 of this Basin Plan.

Dredging and filling activities are subject to the Regional Board discharge prohibitions and exemption criteria discussed elsewhere in this Chapter.

Dredged material may be disposed of inside or outside of the Lake Tahoe Basin, but the Regional Board will set effluent limitations based on the numbers in Table 5.6-1 and on appropriate receiving water standards. Proposals for dredged material disposal in shorezones, floodplains or SEZs will be evaluated against the relevant discharge prohibitions (see the section of this Chapter on development restrictions).

TRPA's regulations on dredging techniques and discharge standards are set forth in the BMP Handbook (208 Plan, Vol. II). The 208 Plan directs TRPA, in coordination with other agencies such as the Lahontan Regional Board, the Nevada Division of Environmental Protection, the U.S. Army Corps of Engineers, state fish and game agencies, and state lands agencies, to recognize potential water quality impacts from spoils disposal, as well as from dredging itself, in its permitting process for filling and dredging activities.

Marinas

The Lahontan Regional Board has maintenance waste discharge requirements on all marinas in the California portion of the Lake Tahoe Basin which address stormwater discharges, fueling and sewage disposal operations. New or revised requirements should be adopted to address any new marina construction activity or changes in the nature of discharges or threatened discharges from existing

marinas. A detailed discussion of water quality problems and control measures associated with marina discharges is provided in a regionwide context in Chapter 4 of this Basin Plan. As noted in that Chapter, some marinas may require stormwater NPDES permits.

TRPA regulates the creation, expansion, and remodeling of marinas in the Lake Tahoe Basin through its Regional Plan limits on recreation capacity (in "People at One Time," or PAOT) and through its master planning and permitting processes. Following a lengthy interagency review period, which included Regional Board staff input, TRPA adopted detailed guidelines for the preparation of marina master plans (TRPA 1990). These guidelines require each master plan to include a physical plan, an operations plan, a mitigation plan, and a monitoring plan. Water quality-related topics to be addressed include land coverage, fish habitat, shoreline stability, inspection and maintenance of boat washing and fueling facilities, wastewater pumpout facilities, stormwater control, spill prevention and response, dredging, and marina water treatment systems. The guidelines also summarize shorezone development standards for new and expanded marinas from TRPA's Code of Ordinances, and provide guidance on the design of breakwaters, jetties, and shoreline protection structures.

Although conceptual proposals have been made for marina water treatment systems, none are currently operating in the Lake Tahoe Basin (the Tahoe Keys Property Owners Association operates a chemical/physical treatment plant which provides phosphorus removal for the waters of its artificial lagoons). TRPA's guidelines state that, in the broad sense, "any treatment which is employed to improve and maintain water quality would be a component of the water treatment system." Possible treatment methods discussed include artificial circulation and aeration, pretreatment of stormwater discharges, and interception of stormwater constituents from driveways, launching ramps, and boat washing facilities by slotted drains directed into sumps which can be pumped and possibly equipped with absorbent material. If tributyltin is found to be a problem, marina sediments containing it may have to be removed.

The TRPA guidelines state that commercial marinas and harbors are required to have public restrooms, fueling facilities, chemical fire retardant distribution systems, and pumpout facilities for boat sewage.

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Disposal facilities for portable sewage containers should also be provided. Prevention of boat sewage waste pollution will be in accordance with an enforcement program to be developed by the Marina Owners Association and approved by TRPA. Boat washing facilities, if any, must be connected to a sewer system or an acceptable alternative such as a debris trap and sump which will be emptied regularly. Connections to sewer systems may require special arrangements with the service district such as permits, pretreatment of discharges, and fees for service. Gas pumping facilities are required to have emergency and standard shut-off systems. A water treatment system for waters contained within the marina must be provided.

Fuel, sewage pumpout and portable sanitation flushing facilities at marinas need to be carefully placed. The TRPA guidelines state that they should be located in a convenient place to encourage use by all boaters (including boaters from private piers and non-commercial moorings. Emergency spill containment equipment must be at hand at such facilities, not stored ashore.

TRPA's marina master plan guidelines also provide guidance on environmental analysis, including directions for cumulative impacts analysis. In 1994, a regionwide study and environmental document were in preparation to evaluate the cumulative impacts of potential marina expansion on Lake Tahoe.

Regional Board staff should continue to participate in interagency review of proposed marina master plans and marina development projects. Proposals for "experimental" facilities such as marina water treatment systems should be carefully evaluated on a case-by-case basis.

5.16 OTHER WATER QUALITY PROBLEMS

Fertilizer Use

Water quality problems and control measures associated with fertilizer use are discussed in the section on agriculture in Chapter 4 of this Basin Plan. However, fertilizer use on golf courses, other large turf areas, and in home landscaping is of special concern in relation to the sensitive surface waters of the Lake Tahoe Basin. Nutrients in fertilizer can reach surface waters through stormwater or by percolation through ground water, and can contribute to eutrophication. Nitrogen from fertilizer which accumulates in ground water can contribute to violation of the drinking water standard. Fertilizer impacts can occur cumulatively with nutrient loading from other sources such as urban runoff.

As noted in the section of this Chapter on golf courses, the Regional Board has placed all golf courses on the California side of the Lake Tahoe under waste discharge requirements which include conditions related to fertilizer management. Other types of projects involving significant fertilizer use should be considered for similar types of permits.

The 208 Plan (TRPA 1988, Vol. I, page 95) states that, while the use of fertilizer may be necessary in some applications, such as establishing erosion control vegetation, management practices are necessary to limit the addition of fertilizer which may leach from the soil and become a component of runoff waters. The 208 Plan (Vol. I, page 139) provides that the use of fertilizer in within the Tahoe Region shall be restricted to uses, areas, and practices identified in the Best Management Practices Handbook.

The BMP Handbook (TRPA 1988, Vol. II, BMP63) states that fertilizer use, except as necessary to establish and maintain plants, is not recommended in the Tahoe Basin; that fertilizers shall not be used in or near stream channels and in the shorezone areas; and that fertilizer use shall be lowered in stream environment zones and eliminated if possible. This BMP includes discussion of appropriate fertilizer types and practices. It states that maintenance applications of fertilizers should be made when loss of vigor or slow growth indicates a possible nutrient deficiency. At least one additional application is required following the original grass seeding and should be applied in the spring immediately following snow melt.

Revegetation of disturbed sites requires the use of species approved by TRPA; lists of approved species are included in the BMP Handbook (BMP55, BMP56, BMP57, and BMP58). The 208 Plan directs TRPA to prepare specific policies designed to avoid the unnecessary use of landscaping which requires long-term fertilizer use.

According to the TRPA Code of Ordinances, projects that include landscaping or revegetation shall, as a condition of approval, be required to prepare fertilizer management plans that address: the appropriate type of fertilizer to avoid the release of excess nutrients, the rate and frequency of application, appropriate watering schedules; preferred plant materials, landscape design that minimizes the impacts of fertilizer applications, critical areas, the design and maintenance of drainage control systems, and surface and ground water monitoring programs, where appropriate.

Because of the large number of potential sites where property owners or managers may wish to apply fertilizer, and the ready availability of fertilizer from commercial outlets, public education is a very important aspect of the 208 Plan's implementation program for fertilizer management BMPs. The 208 Plan states that TRPA shall emphasize fertilizer management in its public education program, and shall make educational materials such as the Guide to Fertilizer Use in the Lake Tahoe Basin (TRPA 1987) available to the widest possible audience.

At the request of TRPA, uses that require regular fertilizer maintenance, (e.g., golf courses, parks, cemeteries, ball fields, and residential yards) are required to submit fertilizer management programs for review and approval by TRPA. Failure to comply may result in remedial action under Chapter 9 of the TRPA Code of Ordinances. Large users of fertilizer, as identified by TRPA shall initiate a tracking program to monitor fertilizer use on lands under their control. Such users shall present annual reports to TRPA, including information on the rate, amount, and location of use (TRPA 1988, Vol. I, page 140). The 208 Plan also directs the states of California and Nevada to continue to issue waste discharge permits for large fertilizer users.

In planning for compliance with municipal stormwater permits, local governments in the Lake Tahoe Basin should consider control of cumulative nutrient contributions from urban fertilizer use. Areawide landscape design guidelines should be revised to emphasize low maintenance plant species rather than turf and other fertilizer intensive plantings. Since they have negligible capital costs and may actually

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reduce operating costs, fertilizer management practices are cost-effective means of protecting water quality.

Local government ordinances requiring the use of drought-tolerant landscaping (xeriscaping) may, by encouraging the use of native plants, result in lower urban fertilizer use. Educational programs promoting xeriscaping should also emphasize BMPs for fertilizer use.

Pesticides

Although there is no agricultural use of pesticides in the Lake Tahoe Basin, potential water quality problems from pesticide use in landscaping, turf management, silviculture, and wood preservatives are of concern. High levels of tributyltin (TBT), an antifouling compound formerly used in boat paint, have been measured in and near a marina in Lake Tahoe. Rotenone has been used for fisheries management in some waters of the Tahoe Basin.

Regionwide water quality objectives for pesticides, and related objectives for nondegradation and toxicity, essentially preclude direct discharges of pesticides such as aquatic herbicides. The Lahontan Regional Board's regionwide control measures for pesticides, discussed in Chapter 4 of this Basin Plan, are applicable in the Lake Tahoe Basin.

The 208 Plan (TRPA 1988, Vol. I, page 102) notes that because of its harsh climate, short growing season, and high elevation, the Lake Tahoe Basin has fewer insect and fungal pests than many other areas in California and Nevada; however, there is some pesticide use for silviculture and turf management. The 208 Plan recognizes that controls are needed on the use of pesticides to ensure that detectable levels of toxic substances do not migrate into the surface or ground waters of the region, but also recognizes the possibility of limited exceptions for the use of rotenone in fisheries management.

The 208 Plan states (Vol. I, page 154) that the use of insecticides, fungicides, and herbicides shall be consistent with the BMP Handbook (TRPA 1988, Vol. II), and that TRPA shall discourage pesticide use for pest management. Prior to applying any pesticide, potential users shall consider integrated pest management (IPM) practices, including alternatives to chemical applications, management of forest resources in a manner less conducive to pests, and reduced reliance on potentially hazardous chemicals.

The 208 Plan provides that only chemicals registered with the USEPA and the state agency of appropriate jurisdiction shall be used for pest control, and then only for their registered application. No detectable concentration of any pesticide shall be allowed to enter any SEZ unless TRPA finds that the application is necessary to attain or maintain its "environmental threshold carrying capacity" standards. Pesticide storage and use must be consistent with California and Nevada water quality standards and TRPA thresholds.

The 208 Plan recognizes that antifouling substances painted on the hulls of boats, such as TBT, may contribute to water quality problems. California legislation in 1988 prohibited the use of TBT paints except on aluminum vessel hulls and vessels 25 meters or more in length. Vessels painted with TBT before January 1, 1988 may still be used, but may not be repainted with TBT so long as they comply with other applicable requirements. The USEPA has also banned the use of TBT on non-aluminum hulls of vessels less than 82 feet in length and has limited the release rate of TBT from other hulls to 0.4 ug/cm²/day. [The "no detectable pesticides" water quality objective in this Basin Plan is probably more stringent than this effluent limitation.] Controls on antifouling coatings and boat and marina maintenance practices are necessary to protect Lake Tahoe from the addition of toxic substances from this source. The 208 Plan (Vol. I, page 158) provides that antifouling coatings shall be regulated in accordance with California and federal laws, by the Lahontan Regional Board and TRPA. The BMP Handbook incorporates the California and federal restrictions on use of paints containing TBT, and applies those restrictions to all portions of the Tahoe Region.

Additional monitoring of water, sediment, and biota should be done at other marinas within Lake Tahoe to determine the extent of TBT problems. TBT should be considered an issue in permits for dredging at or near marinas, and for dredged material disposal.

The 208 Plan's BMP Handbook does not contain specific practices for pesticides other than antifouling coatings. (The use of native and adapted plant species, which are listed in the BMP Handbook, for landscaping and revegetation may reduce the need for pesticide use on landscaping in the Tahoe Basin.) TRPA should consider developing or incorporating more specific management practices to prevent significant water quality impacts from other types of pesticide use.

Atmospheric Deposition

As noted in Chapter 4 of this Basin Plan, wet and dry atmospheric deposition of nutrients and acids onto surface waters is an issue of concern throughout the Sierra Nevada. Atmospheric deposition is considered a significant part of the nitrogen budget of Lake Tahoe. Precipitation chemistry in the Lake Tahoe Basin has been monitored on an ongoing basis since the early 1980s. Direct wet and dry deposition on the Lake have also been studied by the University of California Tahoe Research Group. The relative importance of long distance transportation of nitrogen oxides from outside of the Lake Tahoe Basin and of nitrogen oxides from vehicle and space heater emissions within the Basin has not been conclusively established. Atmospheric nutrients are important considerations for Lake Tahoe because of the lake's large surface area in relation to the size of its watershed, and the long residence time of lake waters (about 700 years).

The Tahoe Regional Planning Agency has adopted a regional "environmental threshold carrying capacity" standard to reduce annual "vehicle miles traveled" (VMT) within the Lake Tahoe Basin by 10% from the 1981 level in order to reduce nitrogen oxide emissions and consequent atmospheric deposition to the Lake. The 208 Plan (TRPA 1988), outlines control measures to be implemented by TRPA and local governments to reduce atmospheric nutrient deposition. These include increased and improved mass transit; redevelopment, consolidation, and redirection of land uses to make transportation systems more efficient; controls on combustion heaters and other stationary sources of air pollution; protection of vegetation, soils, and the duff layer, and controls on offroad vehicles to control suspension of nutrient-laden dust. In order to reduce transport of airborne nutrients from upwind areas, the 208 Plan commits TRPA to work with California legislators "to encourage additional research into the generation and transport of nitrogen compounds, to require regular reports on the subject from the CARB [California Air Resources Board] and to provide incentives or disincentives to control known sources of NO_x emissions upwind from the Tahoe Region. TRPA shall actively participate in the review and comment on draft air quality control plans from upwind areas to encourage additional NO_x control measures." TRPA is also committed to further monitoring of the nature and extent of transport of airborne nutrients into the Tahoe Region.

Regional Board staff should continue to review reports on atmospheric deposition in the Lake Tahoe

Basin, long-distance transport of airborne pollutants to the Basin, and impacts of acid deposition on beneficial uses of Tahoe Basin waters. Where data gaps exist, additional monitoring and research should be encouraged. The results of ongoing CARB-sponsored research on acid deposition impacts elsewhere in the Sierra Nevada should be useful in evaluating data from the Lake Tahoe Basin.

5.17 MONITORING

Monitoring of Lake Tahoe, its tributary surface and ground waters, and pollutant sources such as atmospheric deposition and stormwater is a very important part of the implementation program. Long-term monitoring of an "Index Station" in Lake Tahoe by the University of California at Davis' Tahoe Research Group has documented the trends in clarity and productivity shown in Figures 5-1 and 5-2. Further long-term monitoring is essential to document progress toward attainment of the water quality standards for these parameters, which are based on 1968-71 figures.

Monitoring and special studies have been carried out in the Tahoe Basin by a variety of agencies (including the U.S. Forest Service's Lake Tahoe Basin Management Unit, the California Department of Water Resources, the University of Nevada at Reno, and the U.S. Geological Survey), but long-term records are available only for Lake Tahoe and a few tributary streams. In response to the recommendations of the 1980 *Lake Tahoe Basin Water Quality Plan*, special studies were carried out on sewer exfiltration into ground water, nearshore phytoplankton and periphyton productivity in Lake Tahoe, and atmospheric deposition. The *Water Quality Management Plan for the Lake Tahoe Region* ("208 Plan," Volume I) contains a summary of the results of water quality monitoring and special studies through 1988. The State Board organized the Lake Tahoe Interagency Monitoring Program in 1979; annual reports of this program have been published by the University of California at Davis' Institute of Ecology. The U.S. Forest Service's Lake Tahoe Basin Management Unit monitors water quality impacts of a variety of land use activities on National Forest lands. The Tahoe Research Group is using data from the Interagency Monitoring Program to construct a model of the nutrient budget of Lake Tahoe.

The 208 Plan (Vol. I, page 177) directs the Tahoe Regional Planning Agency (TRPA) to maintain an operational monitoring program, consisting of planning and administration, data collection, data storage and retrieval, and data analysis, and to use the products of the program to identify problems and evaluate progress under TRPA's Regional Plan. The monitoring program shall include continuous scientific monitoring of environmental conditions related to the thresholds for pelagic Lake Tahoe, littoral Lake Tahoe, tributary streams, surface runoff, ground water, land coverage, and SEZs. TRPA also

monitors tributary streams as one of the conditions of implementing the Individual Parcel Evaluation System (IPES); see the section of this Chapter on land capability.

The TRPA currently has responsibility for coordinating the Lake Tahoe Interagency Monitoring Program, with the advice of an interagency technical advisory committee. Recent additions to the program include monitoring of "other lakes" than Lake Tahoe (including Fallen Leaf, Echo, and Cascade Lakes). TRPA has also sponsored a study on fish habitat in Lake Tahoe and the impacts of nearshore human activities on habitat quality. As a condition of approval of the 208 Plan, the State Board directed TRPA to conduct additional monitoring and to publish annual reports summarizing monitoring results.

The 208 Plan identifies future research needs including details of Lake Tahoe's nutrient budget, the nutrient inputs and outputs of the watershed and the airshed, and the effectiveness of BMPs and other control measures. Specifically, research needs have been identified in the following areas: (1) development of a database on the treatment of runoff in natural and artificial wetlands and SEZs, (2) the quantity and quality of urban runoff and the contributions of urban runoff to Lake Tahoe's nutrient budget, (3) effectiveness of erosion and runoff control projects, (4) transport of airborne nutrients, particularly nitrogen, from upwind areas into the Tahoe Region, (5) effects of fertilizer use on water quality and effectiveness of fertilizer management programs, and (6) effectiveness of Stream Environment Zone restoration projects and techniques.

Regional Board staff have been carrying out a stormwater monitoring program for remedial erosion control projects which were implemented with State Assistance Program (SAP) funding. Results will be used to evaluate the success of the projects. Several other studies of the effectiveness of BMPs for erosion/stormwater control in the Lake Tahoe Basin were in progress in 1993. Additional needs for monitoring and research in the Lake Tahoe Basin identified by Regional Board staff include: (1) further study of the role of ground water in nutrient loading to Lake Tahoe, (2) baseline biological monitoring in all types of water bodies, (3) monitoring of priority pollutants in surface runoff, and sediment sampling in marinas for priority pollutants and tributyltin, and (4) follow-up on the shoreline erosion study which began in the 1980s.

Together with long-term continuation of the basic Lake Tahoe Interagency Monitoring Program, such

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special studies will enable evaluation of the adequacy of existing control programs and the need for new control measures to ensure attainment and maintenance of standards. Additional monitoring and research will also provide the basis for: (1) the establishment of numerical nutrient objectives for additional water bodies, (2) the establishment of biological, and possibly sediment quality objectives, and (3) the update of the regional runoff guidelines to include priority pollutants.