3.8 HYDROLOGY AND WATER QUALITY

This section describes the existing water quality and hydrology conditions in the Lake Tahoe Region and the regulations that relate to water resources. The potential water quality and hydrologic impacts that would result from implementation of the Regional Plan Update alternatives are identified and assessed, and mitigation measures are recommended for any significant or potentially significant impacts to water resources.

3.8.1 REGULATORY BACKGROUND

TAHOE REGIONAL PLANNING AGENCY

TRPA was designated as an area-wide planning agency under Section 208 of the federal Clean Water Act (CWA) in 1974. Pursuant to this, and under the authority of the Tahoe Regional Planning Compact, TRPA has adopted standards, policies, and ordinances directed at protecting and improving the water quality of Lake Tahoe and other waters of the Tahoe Region. The focus of water quality enhancement and protection is to minimize the effects of human-made disturbances to the watershed and reduce or eliminate pollutants that result from existing and proposed development. The Compact includes the following statements and direction related to water quality:

- The waters of Lake Tahoe are threatened with deterioration or degeneration, which endangers the natural beauty and economic productivity of the Region (Article (I)(a)(1));
- TRPA shall develop an enforceable land use plan for, among other purposes, the uses of water and other natural resources within the Region (Article (V)(c)(1));
- The Regional Plan shall provide for attaining and maintaining federal, state, or local water quality standards, whichever are the strictest, in the respective portions of the Region for which the standards are applicable (Article (V)(d)); and
- The Regional Plan shall, by ordinance, identify the means and time schedule by which water quality standards will be attained (Article (V)(d)).

ENVIRONMENTAL THRESHOLD CARRYING CAPACITIES

The TRPA Governing Board adopted Resolution 82-11, which established water quality threshold standards for six indicator categories: (1) Lake Tahoe pelagic (deep) waters, (2) Lake Tahoe littoral (nearshore) waters, (3) tributaries, (4) direct surface runoff and storm water discharge to surface waters, (5) stormwater discharge to groundwater, and (6) other lakes (i.e., lakes in the Tahoe Region other than Lake Tahoe). Resolution 82-11 sets out numerical and management standards for water quality. Some of these threshold standards are referenced to state standards; and in other cases, target reference conditions related to specific time periods are noted. The following value statements are used in setting the threshold standards and targets for water quality:

- Attain levels of water quality in the lakes and streams within the Region suitable to maintain the identified beneficial uses of Lake Tahoe.
- Restrict algal productivity (rate of growth) to levels that do not impair beneficial uses or deteriorate existing water quality conditions in the Lake Tahoe Region.
- Prevent degradation of the water quality of Lake Tahoe and its tributaries to preserve the lake for future generations.
- Restore all watersheds in the Region so that they respond to runoff in a natural hydrologic function.

Water quality threshold standards adopted by TRPA set a target to return the Lake to the transparency observed in the late 1960s. Within the six major indicator categories, TRPA uses seven water quality standards to assess the water quality of Lake Tahoe and its tributaries. Table 3.8-1 lists each indicator category and associated standard(s). The status and trend of each threshold relative to the associated standard(s) is described in Section 3.8.2, Affected Environment.

Table 3.8-1. TRPA Water Quality Thresholds

Indicator Category	Standard	Numerical Standard and/or Management Standard
Littoral Lake Tahoe	Sediment Loading	Decrease sediment load as required to attain turbidity values not to exceed 3 NTU in littoral Lake Tahoe. In addition, turbidity shall not exceed 1 NTU in shallow waters of Lake Tahoe not directly influenced by stream discharges.
Deep water (pelagic zone)	Winter clarity, pelagic Lake Tahoe	Average winter Secchi depth, December-March, shall not be less than 33.4 meters.
Deep water (pelagic zone)	Phytoplankton primary productivity	Annual mean phytoplankton primary productivity shall not exceed 52 $gC/M^2/yr$.
Tributary water quality	Annual average concentrations of appropriate constituents	Concentrations of appropriate constituents in any tributary stream for which states have established standards (as mg/l); 90^{th} percentile value suspended sediment of 60 mg/L.
Stormwater runoff quality	Surface discharge to surface water	Pollutant concentrations in surface runoff discharged to surface water shall not exceed the following concentrations at the 90th percentile: 〉 0.5 mg/L dissolved inorganic nitrogen as N 〉 0.1 mg/L dissolved phosphorus as P 〉 2.0 mg/L grease and oil 〉 0.5 mg/L dissolved iron 〉 250 mg/L suspended sediment
Stormwater runoff quality	Surface discharge to groundwater	Surface runoff infiltrated into soils shall not exceed the following concentrations at the 90th percentile: 〉 5.0 mg/L total nitrogen as N 〉 1.0 mg/L total phosphorus as P 〉 4.0 mg/L total iron 〉 40 mg/L grease and oil 〉 200 NTU turbidity Where there is a direct hydrologic connection between ground and surface waters, discharges shall meet the guidelines for surface discharges (WQ-5).
Other lakes	Concentrations of appropriate constituents	Water quality parameters and standards established by California and Nevada.

mg/l = milligrams per liter
NTU = Nephelometric Turbidity Units
$gC/M^2/yr$ = grams of carbon per square meter per year
Source: TRPA 2012a

REGIONAL PLAN

Goals and Policies

TRPA has established a number of goals and policies related to water quality. Goals include the reduction of sediment and nutrients to Lake Tahoe and the elimination or reduction of other pollutants. Policies address a range of issues, including snow removal, wastewater spill prevention, underground storage tanks, dredging, and reduction of impacts from motorized watercraft. The existing goals and policies for water quality protect and enhance lake clarity and beneficial uses within the following regulatory framework:

- Concentration-based discharge standards and infiltration requirements for stormwater treatment that control water quality impacts associated with new development;
- Regulations requiring the retrofitting of developed properties with Best Management Practices (BMPs) that reduce erosion and stormwater runoff;
- Regulatory preservation and restoration of Stream Environment Zones (SEZs) to protect and enhance their water quality values; and
- Prohibiting the discharge of wastewater, toxic waste, and solid waste into Lake Tahoe, its tributaries, and groundwater resources.

Code of Ordinances

The TRPA Code of Ordinances contains a range of requirements intended to help achieve water quality threshold standards, goals, and policies. Chapter 60 of the Code is the primary chapter directed at water quality and the installation of BMPs. A number of other chapters contain provisions pertaining to the protection of water resources and water quality for hydrology, coverage, and grading and excavation (Table 3.8-2).

Table 3.8-2. Selected Code Requirements Related to Water Quality Protection

Code Section	Requirements
Chapter 30	Sets forth regulations concerning the land capability system, land capability districts, prohibition of additional land coverage in certain land capability districts, and transfer and mitigation of land coverage.
Chapter 33.3	Sets standards for grading and excavation.
Chapter 33.4	Sets requirements for special investigations, reports, and plans, determined to be necessary by TRPA to protect the environment against significant adverse effects from grading projects.
Chapter 33.5	Sets forth the requirements for grading and construction schedules when grading or construction is to occur pursuant to a TRPA permit.
Chapter 35	Sets forth regulations pertaining to recognition of natural hazards, including floodplains, prevention of damage to property, and protection of public health relating to such natural hazards.
Chapter 60.1	Sets discharge standards for runoff and discharge to surface and groundwater.
Chapter 60.2	Sets forth requirements that new residential, commercial, and public projects completely offset their water quality impacts.
Chapter 60.3	Contains regulations pertaining to recognition of source water, prevention of contamination to source water, and protection of public health relating to drinking water.
Chapter 60.4	Sets standards for installation and maintenance of BMPs for the protection or restoration of water quality.

Source: TRPA 2012b

Regulations for stormwater discharge are based on maximum allowable concentrations for nitrogen, phosphorus, iron, turbidity, suspended sediments, and grease and oil. Standards for stormwater discharge to surface water are different than those for discharge to groundwater. In general, discharge standards to

groundwater are more lenient because of the natural filtering capacity of soils and the potential for nutrient uptake from vegetation. TRPA discharge standards for surface water and groundwater in the Code are the threshold standards for those indicator reporting categories (see Table 3.8-2). In addition to numerical discharge limits, the Code also restricts the discharge of wastewater and toxic substances, sets requirements for snow removal and control of salts, and sets criteria for pesticide use and fertilizer control.

In addition to stormwater runoff quality standards, regulations are in place for containment of stormwater runoff volumes and flows. These regulations are designed to reduce the hydrologic impacts of urbanization on peak runoff rates and volumes, protect water quality, and protect property and public safety. TRPA regulations require containment, at a minimum, of the stormwater runoff volume generated by a 20-year return period, 1-hour duration "design storm" from impervious surfaces. The calculation of runoff volume is made by multiplying the intensity of the 20-year, 1-hour design storm (taken as 1 inch of rain in 1 hour) by the impervious surface area. Runoff that is contained and subsequently infiltrated is required to meet the maximum concentration requirements for discharge to groundwater (Table 3.8-2).

WATER QUALITY MANAGEMENT PLAN FOR THE LAKE TAHOE REGION (208 PLAN)

The *Water Quality Management Plan for the Tahoe Region* (208 Plan) was prepared by TRPA in compliance with Section 208 of the federal Clean Water Act. The 208 Plan contains overlapping elements with the Regional Plan, including the Handbook of Best Management Practices, the Stream Environment Zone Protection and Restoration Program, and the Capital Improvement Program for Erosion and Runoff Control. The 208 Plan identifies pollution sources, control needs, and management practices to improve water quality.

The 208 Plan contains management programs that pertain to urban runoff and erosion, airborne nutrients, waste management, natural area management, and other water quality issues in Lake Tahoe and the Shorezone. Programs are implemented through designated management agencies, including TRPA, the U.S. Forest Service (USFS), and other federal, state, and local governments. To determine if water quality goals are attained and maintained, water quality programs require continuous scientific monitoring of environmental conditions related to the threshold standards for pelagic Lake Tahoe, littoral Lake Tahoe, tributary streams, surface runoff, groundwater, land coverage, and SEZs. TRPA must publish annual or semi-annual reports on monitoring program implementation and must evaluate the results at least every 5 years (Goals and Policies, p. VII-23).

FEDERAL

FEDERAL ANTIDEGRADATION POLICY

The U.S. Environmental Protection Agency (EPA) has designated Lake Tahoe an Outstanding National Resource Water (ONRW). ONRWs are provided the highest level of protection under EPA's Antidegradation Policy, stipulating that states may allow some limited activities that result in temporary and short-term changes to water quality, but that such changes should not adversely affect existing uses or alter the essential character or special uses for which the water was designated an ONRW. EPA interprets this provision to mean that no new or increased discharges to ONRWs and no new or increased discharge that would result in lower water quality are permitted.

CLEAN WATER ACT

Section 404

The federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. Section 404 of the CWA prohibits the discharge of fill material into waters of the United States, including wetlands,

except as permitted under separate regulations by the U.S. Army Corps of Engineers (USACE) and EPA. To discharge dredged or fill material into waters of the United States, including wetlands, Section 404 requires projects to receive authorization from the Secretary of the Army, acting through the USACE. Waters of the United States are generally defined as "waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; territorial seas and tributaries to such waters."

Section 401

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification for the discharge. The certification must be obtained from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over the affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401. Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States. EPA delegates water pollution control authority under CWA Section 401 to the states.

Section 402

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate discharges of pollutants into waters of the United States. An NPDES permit sets specific discharge limits for point-source discharges of pollutants into waters of the United States and establishes monitoring and reporting requirements, as well as special conditions. EPA delegates water pollution control authority under CWA Section 402 to the states, which oversee compliance.

CALIFORNIA

LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD

The Porter-Cologne Act created the California State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs) in California. The SWRCB protects water quality by setting statewide policy, coordinating and supporting RWQCB efforts, and reviewing petitions that contest RWQCB actions. The RWQCBs issue waste discharge permits, take enforcement action against violators, and jointly administer federal and state laws related to water quality in coordination with EPA and USACE.

The Tahoe Region is located within the jurisdiction of the Lahontan RWQCB (LRWQCB). The LRWQCB Region is approximately 570 miles long, covering an area of 33,131 square miles, from the California-Oregon border to the Antelope Valley watershed in Los Angeles and San Bernardino Counties. In addition to the Tahoe Region, the Lahontan Region includes Death Valley, Mount Whitney, Owens Valley, Mono Lake, and portions of Lassen and Modoc Counties.

On the California side of the Tahoe Region, LRWQCB implements the CWA, 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. LRWQCB has authority to set and revise water quality standards and discharge prohibitions. It issues federal permits, including 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).

Water quality standards and control measures for surface and ground waters of the Lahontan Region are contained in the Water Quality Control Plan for the Lahontan Region (Basin Plan). The Basin Plan designates beneficial uses for water bodies. It establishes water quality objectives, waste discharge prohibitions, and other implementation measures to protect those beneficial uses. Chapter 5 of the Basin Plan, Water Quality Standards and Control Measures for the Lake Tahoe Basin, summarizes a variety of control measures for the protection and enhancement of Lake Tahoe.

NEVADA

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION, BUREAU OF WATER QUALITY PLANNING

The Nevada Division of Environmental Protection (NDEP) Bureau of Water Quality Planning (BWQP) is responsible for several water quality protection functions, including: collecting and analyzing water data, developing standards for surface waters, publishing reports, providing water quality education, and implementing programs to address surface water quality. The BWQP is divided into four branches: water quality standards, monitoring, nonpoint source pollution management, and the Lake Tahoe management program. The branches are responsible for the following duties and responsibilities:

- The Water Quality Standards Branch is responsible for developing and reviewing water quality standards; determining total maximum daily loads and wasteload allocations from point sources; and determining load allocations from non-point sources.
- The Monitoring Branch is responsible for administering the state's water quality monitoring program. This branch maintains and updates water quality data for the national water quality data base (Water Quality Exchange Network - WQX) and is responsible for preparation of Nevada's Water Quality Assessment Report, which is required under CWA Section 305(b) of the Clean Water Act (CWA).
- The Nonpoint Source (NPS) Pollution Management Program aims to control nonpoint sources of pollution in Nevada. NPS pollution results from a variety of diffuse and dispersed human activities.
- The Lake Tahoe Watershed Program unit collaborates with LRWQCB to develop the Total Maximum Daily Load for Lake Tahoe.

LAKE TAHOE TOTAL MAXIMUM DAILY LOAD

Section 303(d) of the Clean Water Act requires states to compile a list of impaired water bodies that do not meet water quality standards and to develop a total maximum daily load (TMDL) for impaired water bodies to determine the key pollutants and contributing sources to the impairment. Lake Tahoe is one of 41,237 impaired waters in the United States listed in EPA's National Summary of Impaired Waters and TMDLs (EPA 2012). While both California and Nevada have identified Lake Tahoe as an impaired water body, the scientific basis for the impaired classification is different between the states:

- California has identified Lake Tahoe's lack of transparency as the primary basis for its impaired status under its Section 303(d) impaired water listings filed with EPA. To comply with California's Lake Tahoe transparency standard, a 25-centimeter (10-inch) white Secchi disk would need to be visible 29.7 meters (97.4 feet) below the surface of Lake Tahoe on an average annual basis.
- Nevada has identified Lake Tahoe's lack of clarity as the primary basis for its impaired status under its Section 303(d) impaired water listings filed with EPA. Clarity is defined as a quantitative measure of the vertical extinction of light (VEC) per meter of depth. A lower VEC reading indicates more clarity to the water. To comply with Nevada's Lake Tahoe clarity standard, a VEC of 0.08 per meter is necessary.

The science supporting the Lake Tahoe TMDL was developed collaboratively by LRWQCB and the NDEP and provides the framework for a comprehensive water quality restoration plan to address identified pollutant sources with shared goals to ultimately achieve the Lake Tahoe transparency and clarity water quality objectives (LRWQCB and NDEP 2010: p. 1-1). However, TMDLs established under CWA Section 303(d) function primarily as planning devices and are not self-executing. Each TMDL represents a goal that may be implemented by adjusting pollutant discharge requirements in individual NPDES permits or establishing nonpoint source controls. Because California and Nevada must comply with, administer, and enforce their own state laws and policies, each state has developed its own Lake Tahoe TMDL to address the impairment of Lake Tahoe as addressed in each state's Section 303(d) filings with EPA. The following items highlight the differences in implementation approaches between the two states:

- California's Lake Tahoe TMDL (dated November 2010 and approved by EPA in 2011) requires attainment of the California transparency objective for Lake Tahoe over a 65-year implementation period. Based on California law, LRWQCB has the obligation to implement and enforce the California Lake Tahoe TMDL through NPDES discharge permits (over which EPA has jurisdiction) issued to California government entities (City of South Lake Tahoe, Placer County, El Dorado County, and the California Department of Transportation).
- Nevada's Lake Tahoe TMDL (dated August 2011 and approved by EPA in 2011) is a modified version of the California Lake Tahoe TMDL. The Nevada Lake Tahoe TMDL clarifies Nevada's regulatory structure and approach to implementation and emphasizes that the proposed implementation timelines may need to be adjusted for a variety of reasons, but particularly based on the availability of future funding. NDEP's stated plan for implementing the Lake Tahoe TMDL for Washoe County and Douglas County is through Memoranda of Agreement (MOA) with each jurisdiction. MOAs are a collaborative, legally non-binding approach to implementing a TMDL. NDEP regulates the Nevada Department of Transportation and the Stateline Stormwater Association with NPDES discharge permits.

3.8.2 AFFECTED ENVIRONMENT

The Lake Tahoe Basin was formed approximately 2–3 million years ago by geologic faulting and volcanic activity. Geologic faults running in a north-south direction allowed the formation of a valley between the uplifting Sierra Nevada and the Carson Range. The northeastern portion of the valley was blocked and dammed by volcanic activity to create the 506-square-mile basin that lies along the California-Nevada border. Precipitation and runoff eventually filled a portion of the basin to create Lake Tahoe, which has a water surface area covering nearly two-fifths of the total basin area (191 square miles).

Lake Tahoe is fed by 63 tributary streams and 52 intervening zones that drain directly to the Lake. The largest tributary is the Upper Truckee River, which accounts for 25 percent of the annual inflow to Lake Tahoe. The Truckee River is the Lake's only outlet, flowing to Pyramid Lake, a terminal lake in Nevada. A dam constructed at Tahoe City in the early 1900s regulates water flow to the Truckee River from the natural rim (6,223 feet above sea level) to the maximum legal lake level of 6,229.1 feet. The Lake is 12 miles wide and 22 miles long with 72 miles of shoreline.

Regional topography is characterized by steep mountain slopes at higher elevations, transitioning to more moderately sloped terrain near the lakeshore. A notable precipitation gradient exists from the western boundary of the Tahoe Region along the crest of the Sierra Nevada Range to the eastern boundary at the crest of the Carson Range. The west shore of Lake Tahoe averages about 35 inches per year of precipitation, while the east shore averages about 20 inches per year. Most precipitation in the Region falls between October and May as snow at higher elevations and as a mixture of snow and rain at lake level. The peak in stream runoff caused by snowmelt in the higher elevations typically occurs in May or June. The snowpack near the lakeshore predominantly melts before the peak in snowmelt and runoff from the higher elevations.

Land cover within the Region is primarily forest, with areas of granitic outcrops and meadows. Less than 4 percent of the land cover in the Region has been converted to impervious surfaces (hard coverage) associated with development. Of this total impervious surface area, approximately 75 percent is found within roughly 2 miles of the lakeshore (Minor and Cablk 2004: p. 58). Development is mostly concentrated around the lakeshore, with the most dense urbanized land uses occurring in the City of South Lake Tahoe in the south, Tahoe City in the northwest, and Incline Village in the northeast. In general, the north and west shores are less densely populated than the south shore and much of the east shore is in public ownership and undeveloped.

POLLUTANTS OF CONCERN

Lake Tahoe is classified by limnologists as an oligotrophic lake, which means the lake has very low concentrations of nutrients that can support algal growth, leading to clear water and high levels of dissolved oxygen (Tahoe Environmental Research Center [TERC] 2011: p. 6.15). The exceptional transparency of Lake Tahoe results from naturally low inputs of nutrients and sediment from the surrounding watershed. Lake Tahoe is designated an ONRW under the federal CWA and is also designated a "water of extraordinary ecological or aesthetic value" by NDEP. Lake Tahoe's famed transparency has declined by roughly 26 feet since monitoring began in the 1960s (TERC 2011: p. 6.2). The transparency decline has been attributed to land disturbance, air pollution, soil erosion, stormwater runoff, and the loss of natural landscapes capable of detaining and infiltrating runoff.

When the current TRPA Regional Plan and threshold standards were developed, scientific research (Goldman 1974: p. 3) identified nitrogen as the primary pollutant of concern for the Lake based on its ability to stimulate algal growth in the Lake's nutrient-poor waters. Presently, scientific research indicates that algal growth is dependent on the availability of both phosphorus and nitrogen, and in many months of the year algal growth is predominantly controlled by the availability of phosphorus (TERC 2011: p. 10.7).

The most recent scientific research points to inorganic fine sediment particles (defined as particles less than 16 micrometers in diameter) as the primary pollutant of concern impairing the Lake's transparency. This finding is based on the ability of inorganic fine sediment particles to efficiently scatter light and decrease observed transparency. Swift et al. (2006) determined that light scattering by inorganic particles for the period between 1999 and 2002 was responsible for roughly 55–60 percent of measured light attenuation in the Lake. Organic particles (algae) were responsible for about 25 percent of measured light attenuation, primarily through adsorption of light. The remaining 15–20 percent of measured light attenuation was attributable to natural absorption of light by water molecules.

STATUS OF WATER QUALITY THRESHOLD STANDARDS

Where applicable data are available, the most recent status and trends of water quality threshold standards described below are taken from the draft 2011 Threshold Evaluation Report (TRPA 2012a).

LITTORAL LAKE TAHOE: SEDIMENT LOADING

The nearshore area is the primary point of contact for most residents and visitors to the Lake. The quality of water in the nearshore area is tracked by measuring turbidity, which is an indication of the cloudiness of water expressed in Nephelometric Turbidity Units (NTU). Higher turbidity measurements indicate cloudier water. Higher turbidity measurements in the nearshore areas of Lake Tahoe, defined by Taylor (2004: p. 29) as levels exceeding 0.25 NTU, appear to be influenced by surface runoff from developed areas. Of the 72 miles of Lake shoreline, Taylor identified roughly 1 mile of shoreline with extremely elevated turbidity, 2.5 miles of shoreline with moderately elevated turbidity, and 5.6 miles of shoreline with slightly elevated turbidity (Taylor 2004: p. iii).

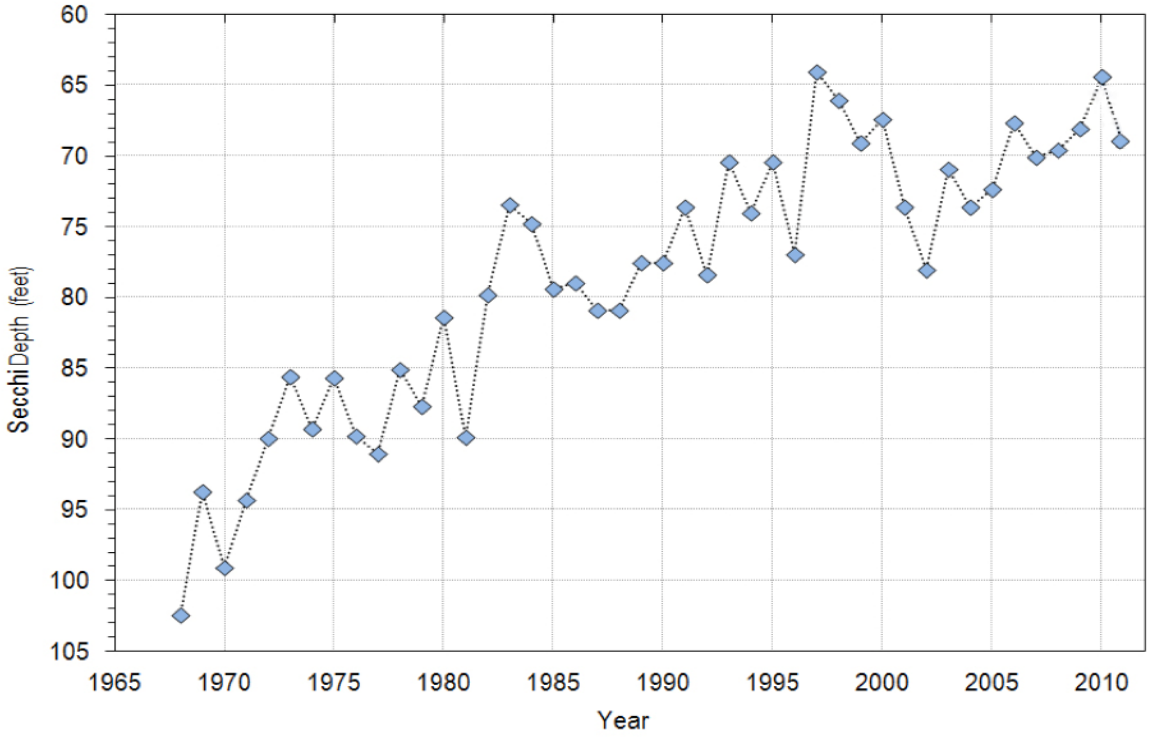
Nearshore turbidity is consistently in attainment with the current threshold standard. However, TRPA, in coordination with Tahoe Science Consortium researchers, is currently evaluating the need to revise the standard

because of concerns that the aesthetic quality of the nearshore area is not adequately protected by or correlated with the current standard (TRPA 2007: pp. 6-30 and 6-31). TRPA is currently collaborating with LRWQCB and NDEP to adjust nearshore turbidity monitoring locations and gather additional information to develop appropriate indicators and standards that better correlate to Lake Tahoe's nearshore water clarity and aesthetics.

PELAGIC LAKE TAHOE WATER QUALITY: SECCHI DISK TRANSPARENCY

Long-term changes to the transparency of Lake Tahoe are influenced by the amount of particulate material in the water, which includes inorganic particles that scatter light (e.g., sediment) and organic particles that absorb light (e.g., suspended algae). Transparency is most commonly measured using a circular plate known as a Secchi disk to determine Secchi depth, or the depth of visibility in the Lake. Measurements of Secchi depth are taken by lowering the disk into the water and recording the depth at which the disk is no longer visible to the human eye. Deeper Secchi depths indicate clearer water, whereas shallower Secchi depths indicate cloudier water. Researchers from TERC have collected transparency measurements of Secchi depth since 1968.

Exhibit 3.8-1 presents average annual measurements of Secchi depth from 1968 to 2010 (adapted from TRPA 2012a), illustrating about a 34-foot decline in Tahoe's transparency since 1968. In 2010, the Secchi depth was 19.6 m (64.4 ft), a decline of 1.1 m (3.7 ft) from the previous year. A 1-meter decline in Secchi depth between consecutive years is not extraordinary in the historical data set; however, the 2010 value is the second worst on record. The worst year on record (1997) had a mean Secchi disk depth of 19.5 m (64.0 ft). In 2011, the Secchi disk depth was 21.0 meters (68.9 feet), which represents an improvement of 4.5 feet of transparency from the previous year. While lake transparency has improved during brief periods since 1968, the overall long-term trend has shown a substantial decline. In the last 10 years, the rate of decline in Lake transparency appears to have slowed relative to the trend prior to 2000. Statistical analysis supports the observation that the decline in Lake Tahoe's transparency has slowed (TRPA 2012a:p. 4-15 to 4-16).



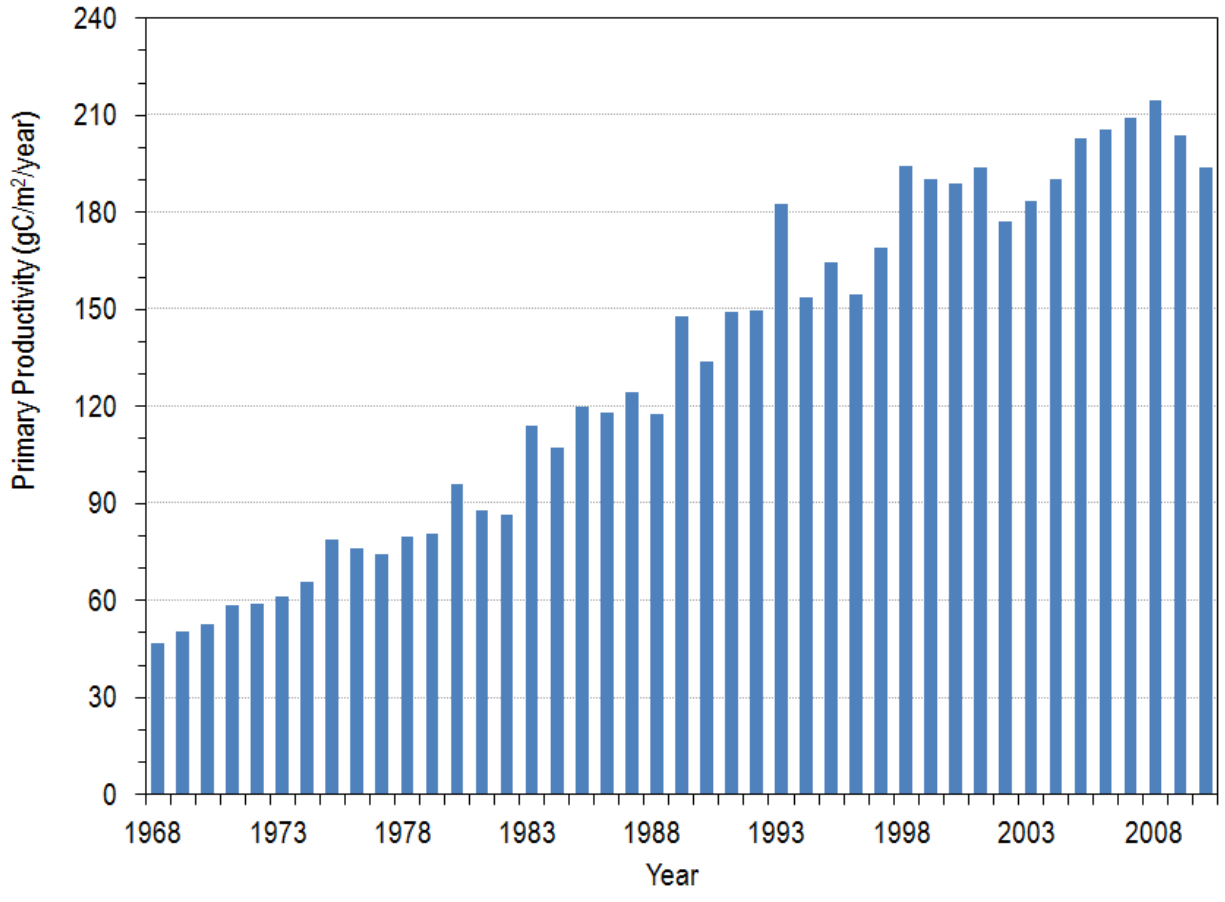
Source: Adapted from TRPA 2012a

Exhibit 3.8-1. Average Annual Secchi Depth

PELAGIC LAKE TAHOE WATER QUALITY: PHYTOPLANKTON PRIMARY PRODUCTIVITY

Primary productivity measures the rate at which algae grow. Measurements of primary productivity are expressed as grams of carbon per square meter per year (gC/m^2/yr). The phytoplankton primary productivity indicator is used to determine compliance with TRPA's Lake Tahoe phytoplankton productivity standard of 52 gC/m^2/yr, which is based on data collected over 4 years (1968-1971).

Exhibit 3.8-2 presents average annual measurements of primary phytoplankton productivity in the Lake, which have been measured by TERC continuously since 1968. Phytoplankton primary productivity has remained well above the standard since it was established in 1982. In 2010, phytoplankton primary productivity was 194 gC/m^2/yr. The status of Lake Tahoe's phytoplankton primary productivity is considerably worse than the standard because the 2010 value is 3.7 times (373 percent) the TRPA's threshold standard. The standard for primary productivity is significantly out of attainment; however, there are concerns that the standard may not be attainable and may no longer be meaningful because it was developed using an algal population that no longer dominates the Lake's ecology. Specifically, the algal population in Lake Tahoe has shifted from dominance by large, non-motile species of phytoplankton in the 1960s to dominance by smaller, motile species of phytoplankton that have naturally higher rates of primary productivity (TRPA 2007: p. 3-26).



Source: Adapted from TRPA 2012a

Exhibit 3.8-2. Primary Productivity of Phytoplankton in Lake Tahoe

Tributaries: State Standards and Annual Loads

Indicators associated with two tributary standards are monitored to document the long-term status and trend of Tahoe Basin tributary waters: (1) attainment of applicable state water quality standards and (2) total annual loads of nutrients (nitrogen and phosphorus) and suspended sediment. State standards use measured concentrations of nutrients and suspended sediment to evaluate status and trends relative to established state numerical standards (i.e., targets).

The status and trends of six indicators were evaluated for the tributary water quality indicator reporting category in the 2011 TRPA Threshold Evaluation Report (TRPA 2012a). Data for the indicators were derived from 10 monitoring sites located at the mouths of 10 different streams. Evaluated indicators included concentrations of suspended sediment, total phosphorus, and total nitrogen and combined tributary loads of sediment, phosphorus, and nitrogen. The status of the indicators and trends are listed below (TRPA 2012a).

Overall Status of the Tributary Water Quality Indicator Category: Somewhat worse than target

Overall Trend: Moderate improvement

- Suspended sediment concentration (all monitored tributaries)
  - Status: Somewhat worse than target
  - Trend: Moderate improvement
- Total phosphorus concentration (all monitored tributaries)
  - Status: Considerably worse than target
  - Trend: Moderate improvement
- Total nitrogen concentration (all monitored tributaries)
  - Status: Considerably worse than target
  - Trend: Little or no change
- Combined tributary suspended sediment load
  - Status: Unknown
  - Trend: Little or no change
- Combined tributary total phosphorus load
  - Status: Unknown
  - Trend: Little or no change
- Combined tributary nitrate and nitrite load
  - Status: Unknown
  - Trend: Little or no change

SURFACE RUNOFF, GROUNDWATER, AND OTHER LAKES

In addition to water quality thresholds and standards that specifically measure the water quality of Lake Tahoe and its tributaries, three additional threshold standards are used by TRPA to assess the quality of water in the Tahoe Region. These threshold standards include standards that define surface runoff concentrations discharged to surface waters, surface runoff concentrations discharged to land surfaces for infiltration, and the quality of other lakes in the Tahoe Region. The 2011 draft TRPA Threshold Evaluation Report (2012a) found available data to be insufficient to evaluate the status and trends of these threshold standards over the past 5 years. The 2006 Threshold Evaluation Report identified these three threshold standards to be in nonattainment but also cited a lack of sufficient data to make conclusive findings on status and trends (TRPA 2007: pp. 3-14 to 3-16).

LAKE TAHOE TMDL RESEARCH AND FINDINGS

The science and analysis supporting the Lake Tahoe TMDL was a collaborative, multi-agency, multi-year effort that developed an extensive body of scientific research that (1) identifies the load, or mass, of pollutants responsible for Lake Tahoe's transparency decline; (2) quantifies the sources of pollutants to the Lake; and (3) establishes load reduction milestones that can be used to develop policies and load reduction plans to progress toward attainment of water quality goals. The collection, analysis, and interpretation of information supporting the Lake Tahoe TMDL included (LRWQCB and NDEP 2010: pp. 14-3 to 14-4):

- Analysis of data sets on (1) long-term lake clarity and transparency and related limnological characteristics, (2) stream hydrology and nutrient and sediment concentrations/loading, (3) stormwater runoff concentrations, and (4) atmospheric deposition;
- Assessment of numerous scientifically accepted documents on Lake Tahoe and the Tahoe Region—Peer reviews have been completed for 101 of the 221 references cited in the Lake Tahoe TMDL report and the Lake Tahoe TMDL Technical Report; and
- Development, calibration, and validation of models using Tahoe-specific data.

The draft Lake Tahoe TMDL report and supporting documentation was submitted for scientific peer review; the package included the Lake Tahoe TMDL Technical Report, Pollutant Reduction Opportunity report, Integrated Water Quality Management Strategy report, summary of the proposed Basin Plan amendments, and copies of all the electronic document references related to the Lake Tahoe TMDL (LRWQCB and NDEP 2010: pp. 16-41 to 16-43).

Given the comprehensive scope and scientific rigor of the research supporting the peer-reviewed Lake Tahoe TMDL report, the analysis and findings published in the Lake Tahoe TMDL are used as the primary reference supporting water quality findings for the Regional Plan Update. The following summarizes key modeling tools and monitoring efforts that supported the development of the Lake Tahoe TMDL.

TMDL STORMWATER MONITORING PROGRAM

In water years 2003 and 2004, researchers under the TMDL Stormwater Monitoring Program collected stormwater quality data to characterize the quality of runoff from urban land uses in the Tahoe Region. Nineteen stormwater monitoring stations throughout the Tahoe Region were used to measure the quality of stormwater runoff from urban land uses. The Stormwater Monitoring Program effort produced the most comprehensive stormwater quality data set in the Tahoe Region, which can be used to characterize and assess urban stormwater runoff quality.

LAKE TAHOE INTERAGENCY MONITORING PROGRAM

The Lake Tahoe Interagency Monitoring Program (LTIMP) is a cooperative program formed in 1979 to primarily monitor flow, nutrient concentrations, and sediment concentrations from a selection of streams that discharge to Lake Tahoe. Streams with substantial flow and water quality data collected through the LTIMP program include Trout Creek, Upper Truckee River, General Creek, Blackwood Creek, Ward Creek, Third Creek, Incline Creek, Glenbrook Creek, Logan House Creek, and Edgewood Creek. The LTIMP program routinely monitored 10 streams through 2010 to track water quality conditions and continuously monitored inflow to Lake Tahoe. Together these 10 streams deliver about 50 percent of the total tributary inflow to Lake Tahoe. Five of the routinely monitored streams are in Nevada: Third, Incline, Glenbrook, Logan House, and Edgewood Creeks; and five of the streams are in California: Trout, General, Blackwood and Ward Creeks and the Upper Truckee River. Of these 10 monitored streams, approximately 90 percent of the cumulative total inflow is from the five California streams and approximately 10 percent is from the five Nevada streams (TRPA 2012a:p. 4-18).

WATERSHED MODEL

The Lake Tahoe Watershed Model (Watershed Model) was developed using EPA's Loading Simulation Program in C++ (LSPC) software platform. LSPC is an EPA-approved model developed to facilitate large-scale, data-intensive watershed modeling applications. The Watershed Model uses long-term, continuous records of Tahoe Region meteorological data and numerous modeling algorithms to simulate hydrology and water quality over 20 land-use types in 184 subwatersheds to collectively estimate runoff and pollutant loads generated in the Tahoe Region that are discharged to Lake Tahoe.

Watershed Model input parameters for average runoff quality generated by urban land uses in the Tahoe Region were derived from the data collected by the TMDL Stormwater Monitoring Program. Runoff and pollutant loading estimates produced by the Watershed Model were calibrated using 11 years (1994-2004) of hydrology and water quality data from 10 LTIMP streams. The calibrated Watershed Model is the primary TMDL tool used to estimate runoff and pollutant loading from all subwatersheds of the Tahoe Region, and expected pollutant loads that might result from potential land use changes formulated to represent Region-wide pollutant reduction strategies.

LAKE CLARITY MODEL

The Lake Clarity Model was developed to estimate Lake Tahoe's response to pollutant loading and to quantify pollutant load reductions necessary to achieve water quality goals, such as TRPA's transparency standard. The Lake Clarity Model was designed to estimate Secchi depth in Lake Tahoe and Secchi depth responses to changes in various environmental inputs. The Lake Clarity Model is a complex modeling platform that includes interacting sub-models for hydrodynamics, plankton ecology, water quality, particle dynamics, and lake optical properties. The model accounts for a number of variables, including algal concentration, suspended inorganic sediment concentration, particle size distribution, and colored dissolved organic matter, to predict Secchi depth.

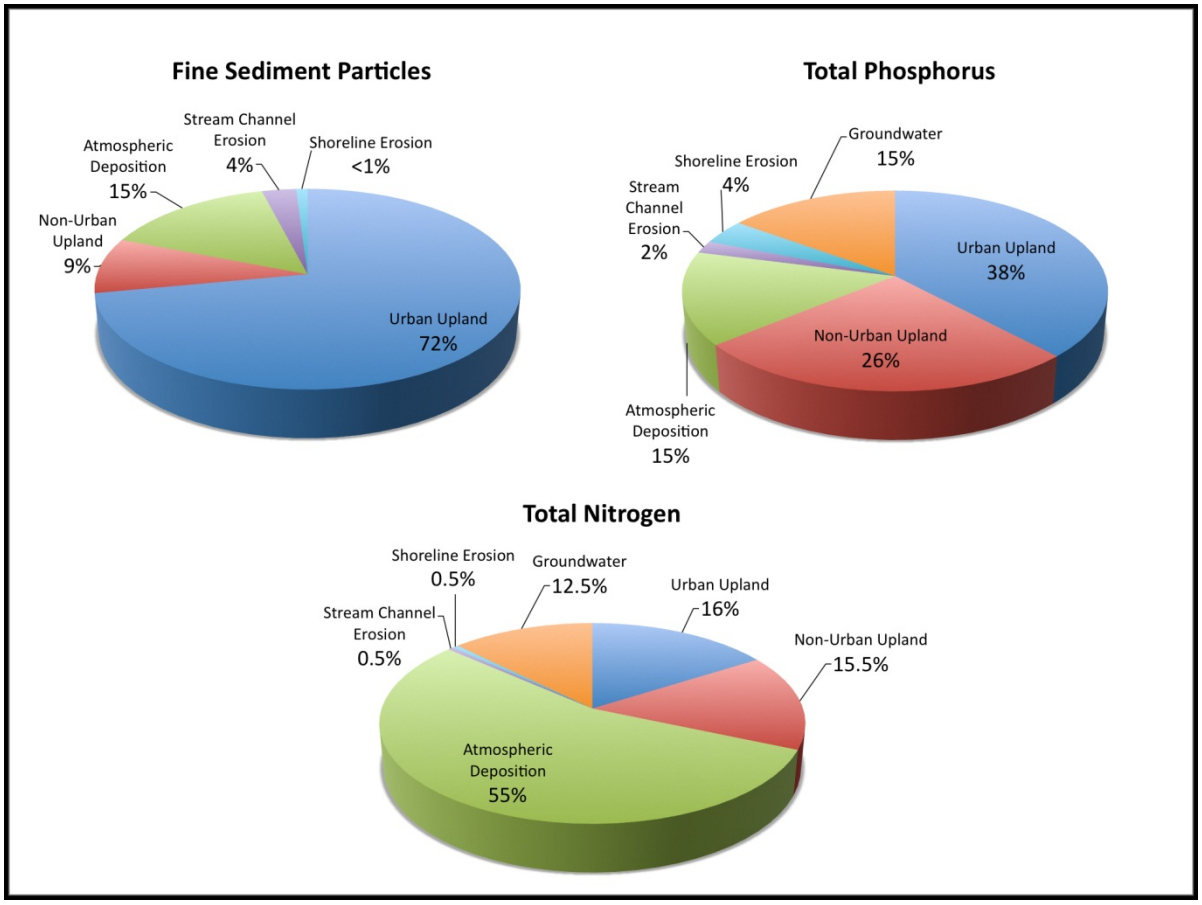
Pollutant Sources

The Lake Tahoe TMDL research included an analysis of pollutant sources to identify the magnitude of pollutant loads to Lake Tahoe from various source categories. These pollutant sources are defined as surface runoff from developed lands (urban watershed); atmospheric deposition, forested runoff (non-urban watershed), stream channel erosion, groundwater, and shoreline erosion.

Exhibit 3.8-3 displays the relative distribution of average annual pollutant loading to Lake Tahoe for each pollutant of concern among the source categories (LRWQCB and NDEP 2010: pp. 7-2 and 7-3). As shown in Exhibit 3.8-3, the TMDL identifies surface runoff from developed lands as the most significant source of pollutant loading for fine sediment particles (the primary pollutant of concern) and phosphorus. Surface runoff from developed lands (urban watershed) is estimated to deliver more than 70 percent of the average annual fine sediment particle load and roughly 40 percent of the average annual phosphorus load to the Lake. For nitrogen, atmospheric deposition is identified as the most significant source of loading to the Lake, contributing 55 percent of the average annual load.

LOAD REDUCTION MILESTONES

The Lake Tahoe TMDL indicates that to achieve TRPA's transparency standard, total Region-wide loads of fine sediment particles, phosphorus, and nitrogen need to be reduced by 65 percent, 35 percent, and 10 percent, respectively (LRWQCB and NDEP 2010: p. 10-4). Load reductions are expressed as a percentage of baseline pollutant loads calculated for 2004.



Source: Adapted from LRWQCB and NDEP 2010: pp. 7-2 and 7-3

Exhibit 3.8-3. Sources of Pollutants of Concern to Lake Clarity

Through the Lake Tahoe TMDL, LRWQCB and NDEP have established 5-year load reduction milestones to help assess progress toward meeting the overall load reduction goals. The TMDL sets a 15-year interim goal, termed the Clarity Challenge, to reduce Region-wide loading of fine sediment particles, phosphorus, and nitrogen by 34 percent, 14 percent, and 4 percent, respectively. Attainment of the Clarity Challenge goal is estimated to return the Lake to an average annual transparency of about 80 feet (LRWQCB and NDEP 2010: p. 8-7).

Given that the majority of pollutant loads for fine sediment particles and phosphorus are delivered to the Lake from developed lands, LRWQCB and NDEP have prioritized this source category as the greatest opportunity for pollutant control. The Lake Tahoe TMDL identifies various practices and treatment options as Implementation Actions to achieve the TMDL that include, but are not limited to, removal of impervious coverage, installation and maintenance of BMPs, advanced deicing strategies (to reduce or eliminate abrasive application), and controlling retail fertilizer sales within the Region (LRWQCB and NDEP 2010).

Pollutant load allocations and load reduction targets will be specified for each jurisdiction in the Tahoe Region through NPDES permits for El Dorado County, Placer County, the City of South Lake Tahoe, and the California and Nevada Departments of Transportation. For local jurisdictions in Nevada (Washoe County and Douglas County), NDEP is developing an MOA that will set load reduction goals and guide the implementation of projects and actions to achieve TMDL milestones. Through either an NPDES permit or an MOA, each jurisdiction is expected to develop load reduction plans that prioritize water quality projects and actions to reduce loading from developed lands to meet the TMDL milestones shown in Table 3.8-3.

Table 3.8-3. Load Reduction Milestones from Developed Lands[1]			
Pollutant of Concern	2016 Target	2021 Target	2026 Clarity Challenge
Fine Sediment Particles	10%	21%	34%
Total Phosphorus	7%	14%	21%
Total Nitrogen	8%	14%	19%

[1] Load reductions are expressed as a percentage of baseline pollutant loads calculated for 2004.

3.8.3 ENVIRONMENTAL CONSEQUENCES AND RECOMMENDED MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Lake Tahoe TMDL research provides current scientific context with which to evaluate changes that affect attainment of TRPA water quality threshold standards. The TMDL load reduction milestones focus on reductions in nutrients (nitrogen and phosphorus) and fine sediment particles, and the research identifies runoff from developed lands as the most significant source of fine sediment and phosphorus to Lake Tahoe. Implementation of the Regional Plan Update would result in a significant adverse effect on hydrology or water quality and attainment of water quality threshold standards if it would:

- cause short-term accelerated soil erosion and/or release of pollutants to water bodies associated with construction activities;
- increase nutrient loading (primarily phosphorus and nitrogen) to surface water or groundwater;
- increase sediment loading (primarily fine sediment particles) to surface water; or
- increase the volume of stormwater runoff and associated pollutant loads discharged from developed lands.

These significance criteria relate directly to both TMDL load reduction goals and attainment of TRPA water quality threshold standards, and are used below to evaluate potential water quality impacts associated with each of the Regional Plan Update alternatives.

IMPACT ANALYSES AND MITIGATION MEASURES

Impact 3.8-1 **Soil Erosion and/or Release of Pollutants to Water Bodies from Construction Activities.** All five alternatives would allow for new construction through the use of remaining allocations and additional allocations authorized for each alternative. Soil disturbance associated with construction could cause accelerated soil erosion and sedimentation and the release of other pollutants to nearby water bodies. Potential short-term impacts from construction activities in the Tahoe Region are presently mitigated through existing state, federal, local, and TRPA regulations, which require at a minimum the implementation and maintenance of temporary BMPs to protect water quality during construction. Because construction associated with any proposed project would be required to conform to all applicable state, federal, local, and TRPA regulations pertaining to protection of water quality from construction-related discharges, this impact would be **less than significant**.

ALTERNATIVE 1: NO PROJECT

Alternative 1 would include the remaining development rights and allocations from the 1987 Regional Plan, and would allow redevelopment of existing land uses in accordance with existing regulations. Remaining allocations

include 86 residential allocations, 874 residential bonus units, 342 tourist accommodation units (TAUs), and 383,600 square feet of commercial floor area (CFA). Alternative 1 would result in the lowest level of new development among the alternatives.

Any new development, redevelopment, or infrastructure improvements (e.g., water quality improvement projects, transportation projects, utility improvements, stream restoration projects) that would occur under Alternative 1 would require construction activities that could adversely affect surface and groundwater quality. Construction activities typically involve vegetation removal, grading, excavation, and temporary stockpiling of soils, all of which could expose soils to wind and water erosion and potentially transport pollutants to surface water bodies, particularly during storm events. In addition, construction activities involve on-site staging of construction equipment and vehicles, as well as construction-related vehicle trips. Fuels and other construction-related chemicals could be accidentally spilled or leaked, or could otherwise be discharged into drainages. If pollutants reach drainages, they could ultimately be discharged to Lake Tahoe.

Construction projects in the Tahoe Region must meet multiple requirements and regulations of TRPA, LRWQCB (California), NDEP (Nevada), and federal and local (city and county) agencies. Temporary construction BMPs that may be required through existing regulations, such as Chapter 33 of the TRPA Code of Ordinances, would include but not be limited to:

- Temporary erosion control BMPs (e.g., silt fencing, fiber rolls, drain inlet protection) installed and maintained to prevent the transport of earthen materials and other waste from a construction site.
- Tree protection fencing installed around trees that are to remain in place throughout construction.
- Mandatory pre-grading inspections by regulatory agencies at the construction site to ensure proper installation of the temporary construction BMPs prior to the initiation of construction activities.
- Requirements to limit the area and extent of all excavation to avoid unnecessary soil disturbance.
- Requirements to winterize construction sites by October 15 to reduce the water quality impacts associated with winter weather. Winterization typically includes installation of erosion controls, vegetation protection, removal of construction debris, site stabilization, and other measures.
- Dust control measures to prevent transport of materials from a project site into any surface water or drainage course. Dust control measures typically include sweeping, watering, covering of disturbed soils and stockpiles, vehicle washing, and other measures.
- Requirements to remove surplus or waste earthen materials from project sites, as well as requirements to stabilize and protect stockpiled material.
- Stabilization of drainage swales disturbed by construction activities with appropriate soil stabilization measures (e.g., revegetation, rock armoring) to prevent erosion.
- Temporary BMPs to capture and contain pollutants from fueling operations, fuel storage areas, and other areas used for the storage of hydrocarbon based materials. These may include spill prevention plans and other measures.
- Temporary BMPs to prevent the tracking of earthen materials and other waste materials from project sites to offsite locations, including stabilized points of entry/exit for construction vehicles/equipment, designated vehicle/equipment rinse stations, and sweeping operations.
- Regular inspection and maintenance of temporary BMPs.

All construction projects in California with greater than 1 acre of disturbance must, in advance of the construction, prepare a Storm Water Pollution Prevention Plan (SWPPP) pursuant to the NPDES Phase II Stormwater Program. In Nevada, projects are required to comply with the NDEP Stormwater General Permit which also includes a requirement for the preparation and implementation of a SWPPP. A project-specific SWPPP describes the site, construction activities, proposed erosion and sediment controls, means of waste

disposal, maintenance requirements for temporary BMPs, and management controls for potential pollutant sources other than stormwater runoff. Water quality controls outlined in a SWPPP must be consistent with TRPA requirements, the federal antidegradation policy, and maintain designated beneficial uses of Lake Tahoe. Stormwater quality sampling and reporting may also be required on a project-specific basis.

Any proposed project and associated construction under Alternative 1 would be subject to existing laws and regulations requiring erosion and sediment controls, implementation and maintenance of temporary construction BMPs, waste control measures, and management controls for stormwater runoff. Because regulatory protections are in place to minimize erosion and transport of sediment and other pollutants during construction, and appropriate project-specific measures would be defined to secure necessary permits and approvals, construction related impacts would be minimized. Because of the requirements to comply with all applicable state, federal, local, and TRPA regulations pertaining to protection of water quality from construction-related discharges, this impact would be **less than significant**.

Alternative 2: Low Development, Increased Regulation

Alternative 2 proposes the use of remaining development rights and allocations from the 1987 Regional Plan (described above) and authorization of 200,000 square feet of new CFA and 2,600 new residential allocations. Under Alternative 2, new CFA would be available to Community Plan areas and Development Transfer Zones (DTZs) under the existing system, but only after the remaining CFA is used and 70 percent commercial occupancy is achieved.

Any proposed project and associated construction under Alternative 2 would be subject to same requirements and regulations described for Alternative 1. For reasons described above for Alternative 1, this impact would be **less than significant.**

Alternative 3: Low Development, Highly Incentivized Redevelopment

Alternative 3 proposes the use of remaining development rights and allocations from the 1987 Regional Plan, plus 200,000 square feet of new CFA, 2,600 new residential allocations, and 600 new residential bonus units. Any proposed project and associated construction under Alternative 3 would be subject to same requirements and regulations described for Alternative 1. For reasons described above for Alternative 1, this impact would be **less than significant.**

Alternative 4: Reduced Development, Incentivized Redevelopment

Alternative 4 proposes the use of remaining development rights and allocations from the 1987 Regional Plan, plus 400,000 square feet of new CFA, 4,000 new residential allocations, and 200 new Tourist Accommodation Units (TAUs). Any proposed project and associated construction under Alternative 4 would be subject to same requirements and regulations described for Alternative 1. For reasons described above for Alternative 1, this impact would be **less than significant.**

Alternative 5: Similar Rate of Development and Regulatory Structure to the 1987 Regional Plan

Alternative 5 proposes the use of remaining development rights and allocations from the 1987 Regional Plan, plus 600,000 square feet of new CFA, 5,200 new residential allocations (limited to 4,091 new residential units based on the number of remaining development rights), and 400 new TAUs. Any proposed project and associated construction under Alternative 5 would be subject to same requirements and regulations described for Alternative 1. For reasons described above for Alternative 1, this impact would be **less than significant.**

MITIGATION MEASURES

No mitigation is required for any of the alternatives.

Impact 3.8-2	**Nutrient Loading to Surface Water and Groundwater.** Alternatives 2 through 4 include provisions to allow the use of treated municipal wastewater for wildfire suppression, which could release additional pollutants to the environment, potentially affecting water quality and environmental health. However, because this provision would only be used in response to wildfires, the frequency and size of which, though variable and dependent on specific conditions in a given year, is generally an infrequent occurrence. Because of its potential to protect property and land that might otherwise be damaged by wildfire, which if burned could create additional water quality impacts such as increased nutrient loading in streams, the impact to water quality would be **less than significant**. Alternatives 1 and 5 would result in continuation of existing policies and would result in a **less-than-significant** impact. Alternative 2 would prohibit the use of fertilizers that introduce nitrogen and phosphorus into the Region, with limited exceptions. Alternatives 3 and 4 would take a more gradual approach, encouraging the phasing out of the sale and use of phosphorus-containing chemical fertilizers in the Region by 2017, with limited exceptions, through public education and outreach. Use of fertilizers in the Region creates the potential for increased transport of nutrients (primarily phosphorus and nitrogen) to Lake Tahoe that stimulate algal growth (TERC 2011: p. 10.7). Because fertilizer use in the Region creates the potential for increased nutrient loading of pollutants of concern for Lake clarity, and Alternatives 2, 3, and 4 would reduce the use of fertilizer in the Region (with more immediate cessation of use and thus more immediate reduction of nutrients in the environment under Alternative 2), these alternatives would result in a **beneficial** impact with respect to nutrient loading. Alternative 1 and 5 would result in continuation of existing policies. Because existing policies restrict and control the use of fertilizers in the Tahoe Region, maintaining existing policies would not result in an increase in nutrient loading; Alternative 1 and 5 would result in a **less-than-significant** impact. With the exception of Alternative 1, all Regional Plan Update alternatives would include a new water quality threshold standard to support actions to reduce the extent and distribution of attached algae in the nearshore. Because the new threshold standard represents a new requirement to address an important and emergent water quality issue where none exists today, Alternatives 2 through 5would have a **beneficial** effect on water quality. Alternative 1 would result in a **less-than-significant** impact.

This impact analysis of nutrient loading to surface water and groundwater is focused on 1) nutrient loading from the expanded use of treated municipal wastewater for fire suppression, 2) nutrient loading from fertilizer use, and 3) the proposed addition of a new water quality threshold standard for nearshore algae. This is because these are the three areas of proposed policy or standard change specific to nutrient loading proposed in one or more of the Regional Plan Update alternatives. Existing goals, policies, Code, and other regulations also address nutrient loading, but are not proposed for change and therefore, would not result in impacts on the environment.

Alternatives 2 through 5 of the Regional Plan Update also propose amendments to water quality threshold standards pertaining to Deep Water (Pelagic) Lake Tahoe Transparency and Aquatic Invasive Species. These standards are assessed in Impact 3.8-4, Stormwater Runoff and Pollutant Loads, below, and in Impact 3.10-5, Invasive Weeds and Aquatic Invasive Species, in Section 3.10, Biological Resources.

ALTERNATIVE 1: NO PROJECT

Nutrient Loading from Expanded Use of Treated Municipal Wastewater for Fire Suppression

Under Alternative 1, existing policies would remain unchanged. Current policy prohibits discharge of treated municipal wastewater in the Tahoe Region except for existing development operating under approved alternative plans for wastewater disposal, and catastrophic wildfire protection to prevent the imminent destruction of the STPUD Luther Pass Pump Station. Currently, there are three South Tahoe Public Utility District (STPUD) fire hydrants located on Grass Lake Road that are served by treated wastewater.

Continuation of policies under Alternative 1, which allow use of treated municipal wastewater for the protection of the Luther Pass Pump Station from fire, would limit the use of potential resources that could otherwise support establishment of a fire break along the wildland/urban interface in the event of a wildfire. Research has shown that wildfires tend to increase nutrient loading in streams after a fire, because fire converts nutrients bound in plant materials and the soil surface into forms that can be more readily transported by runoff and groundwater flows to downstream receiving waters. For example, TERC identified roughly a doubling in nitrogen and phosphorus concentrations in Angora Creek for a two year period (2008-2009) following the Angora fire which burned 3,100 acres in the southern portion of the Tahoe Region in 2007 (TERC 2010: p. 6.3). While a large wildfire may be expected to cause a greater increase in nutrient loading than the loading discharged to the environment from the use of treated municipal wastewater to fight the fire, it is not possible to reasonably forecast how the current policy under Alternative 1 might affect nutrient loading by restricting the uses of treated municipal wastewater to control the severity of a wildfire in the Region. Because continuation of the existing policy would not, in and of itself, cause an increase in nutrient loading to the Tahoe Region, this would be a **less-than-significant** impact.

Nutrient Loading from Fertilizer Use

Under Alternative 1, existing water quality regulations pertaining to the use of fertilizer in the Tahoe Region would remain in place. Existing applicable Code provisions are as follows (Section 60.1.8):

- Use of fertilizer within the Tahoe Region shall be restricted to uses, areas, and practices identified in the BMP Handbook.
- Fertilizers shall not be used in or near stream and drainage channels, or in stream environment zones, including setbacks, and in Shorezone areas.
- Fertilizer use for maintenance of preexisting landscaping shall be minimized in stream environment zones and adjusted or prohibited if found, through evaluation of continuing monitoring results, to be in violation of applicable water quality discharge and receiving water standards.
- Any existing or planned property with one or more cumulative acres of turf must account for fertilizer use through a fertilizer management plan that must be submitted to TRPA for review and approval.

Existing water quality policies and Code provisions related to fertilizer use regulate the locations where fertilizer may be applied in the Region and the manner and volume in which they are used. Regulations specifically prohibit use in or near stream and drainage channels where they could be conveyed to Lake Tahoe and thereby contribute to algal growth that could impair Lake clarity. Regulations also limit the amount of fertilizer that may be used in specific areas, which minimize the potential for application of amounts in excess of that required by lawns and landscaping, in turn reducing the potential for conveyance of nutrients to the Lake. Fertilizer management plans require detailed descriptions of turf uses; soil analyses that support fertilizer use and justify fertilizer formulas; fertilizer application amounts, timing, and frequency; irrigation systems; storage and disposal; proximity of SEZ, Shorezone, and other sensitive areas; monitoring plans; and other details. Taken together, these requirements help protect water quality by regulating the management, type, and amount of fertilizer use in the Region and thereby decreasing the potential for nutrients to be transported to Lake Tahoe.

Therefore, the continuation of existing regulations would not result in an increase in nutrient loading. Alternative 1 would result in a **less-than-significant** impact.

Water Quality Threshold Amendment: Nearshore Attached Algae

Under Alternative 1, there would be no change or addition to water quality threshold standards. Alternative 1 would result in a **less-than-significant** impact.

ALTERNATIVE 2: LOW DEVELOPMENT, INCREASED REGULATION

Nutrient Loading from Expanded Use of Treated Municipal Wastewater for Fire Suppression

Alternative 2 would allow use of treated municipal wastewater for wildfire suppression. It is important to note that on the California side of the Tahoe Region, the expanded use of treated municipal wastewater for wildfire suppression could not be implemented from a change to TRPA policy alone, but may also require an amendment to the Porter-Cologne Act (Section 13952.1 of the California Water Code) or some other statutory or regulatory change.

The use of treated municipal wastewater for wildfire suppression would release pollutants into the environment during a wildfire event or when wildfire suppression is otherwise required, potentially affecting water quality and environmental health. Treated municipal wastewater contains pollutants of concern to Lake clarity (predominantly phosphorus and nitrogen) and can be of concern for environmental health given the typical levels of biological oxygen demand (BOD) and chemical oxygen demand (COD). (Application of treated municipal wastewater on land to suppress wildfires may also cause erosion and sediment transport, but this effect is not linked to the quality of the water used.) Table 3.8-4 presents the average quality of treated municipal wastewater exported out of the Region by South Tahoe Public Utility District (STPUD) over the last 5 years for specific water quality constituents of concern, as well as the average flow rate. The data in Table 3.8-4 represent typical concentrations of pollutants of concern for Lake clarity and environmental health that can be expected from treated municipal wastewater exported out of the Region.

Table 3.8-4. Average Water Quality of Treated Effluent

Parameter	5-Year Average (2007-2011)	Units
Suspended solids	3.2	mg/L
Total Kjehdal nitrogen	24.8	mg/L
Total phosphorus	3.4	mg/L
Biological Oxygen Demand	6.8	mg/L
Chemical Oxygen Demand	43.8	mg/L
Average flow rate	4.0	Million Gallons per Day (MGD)

Source: STPUD 2012

The expanded sources of treated municipal wastewater for wildfire suppression would be limited to specific locations in the Tahoe Region with wastewater treatment facilities: (1) the South Shore, with treatment facilities operated by STPUD and the Kingsbury General Improvement District (KGID); and (2) Incline Village, with a treatment facility operated by the Incline Village General Improvement District (IVGID). Sewage generated on the west and north shore is pumped out of the Region for treatment and disposal in Truckee, California. In the near term, the most feasible option for expanding the availability of treated municipal wastewater for fire suppression would be to retrofit the existing STPUD export line with fire hydrants, which would provide water for fire suppression along the SR 89 corridor to Luther Pass. On the south shore, use of treated municipal wastewater for fire suppression would likely be limited to creating a fire break along the wildland/urban interface, which would be supplied with water by a new line connected to the existing STPUD export line. This new line would be equipped with fire hydrants and would be completely separate from potable water lines. In

the event of a wildfire, the line could be pressurized by the treated municipal wastewater export line to provide water for fire suppression along the fire break (Ryan, pers. comm., 2012).

Extrapolating from the values presented in Table 3.8-4, the potential increase in pollutant loading from use of treated municipal wastewater for wildfire suppression was analyzed for total nitrogen and total phosphorus. To provide context to evaluate a potential increase in pollutant loading associated with the activity, and given the infrequent and unpredictable nature of a wildfire event, a number of conservative assumptions were developed to evaluate changes in pollutant loading on an average annual basis from the episodic use of treated municipal wastewater for wildfire suppression. This approach was taken to allow comparison of changes in pollutant loading to available estimates of average annual stormwater pollutant loading, which have been produced to meet Lake Tahoe TMDL requirements. The following assumptions were made to provide a conservative estimate of increased average annual loading under one potential scenario for wildfire recurrence and duration:

- The available average flow of treated municipal wastewater (4.0 MGD) would be used to fight a wildfire at the wildland/urban interface for a 2-day period, equating to 8 million gallons. Actual use could be shorter or longer for any given incident depending on the size, intensity, and location of the fire.
- Half of the total volume of discharged treated wastewater would reach surface waters and Lake Tahoe, meaning that half of the discharged pollutant load would reach Lake Tahoe. This estimate is considered conservative because much of the wildland/urban interface where treated wastewater might be applied for fire suppression is not in close proximity to surface waters or other drainages, and would have more of an opportunity to infiltrate the ground surface or evaporate.
- The system would be used once every 10 years. The recurrence interval could be longer or shorter for any given incident depending on the size, intensity, and location of the fire, but 10 years was selected as a conservative assumption for the probable frequency of use of the system, for incidences in which a wildfire would threaten to cross through the wildland/urban interface.
- The pollutant load assumed to be discharged from one 2-day fire suppression event was divided by 10 years (estimated recurrence interval for use of the system) to calculate average annual loading from the activity. This approach was taken to compare Region-wide nutrient loads to the City of South Lake Tahoe's estimate of average annual baseline loading for stormwater runoff (City of South Lake Tahoe [CSLT] 2011). This comparison allows an estimation of the magnitude of increased nutrient loading that might occur from the use of treated municipal wastewater for fire suppression.

The results of the analysis are shown in Table 3.8-5 and compared to baseline loads estimated by the City of South Lake Tahoe for stormwater runoff (CSLT 2011: p. 1). A minor increase in average annual nutrient loading (1 percent) relative to the City's estimated baseline load for stormwater runoff is predicted for nitrogen and phosphorus. Given the potential for the proposed activity to protect property and land that might otherwise be damaged by wildfire, which could then discharge increased levels of nutrients and sediment post-fire, the loading impact from this activity as shown in Table 3.8-5 as compared to the loading that could occur during and after a wildfire is considered to be minor. For example, TERC research identified roughly a doubling of nitrogen and phosphorus concentrations in Angora Creek for a 2-year period (2008-2009) following the Angora fire (TERC 2010: p. 6.3).

Table 3.8-5. Pollutant Load Evaluation for Pollutants of Concern to Lake Clarity

Parameter	Increased Load from Treated Wastewater (lb/year)	City Baseline Load Estimate (lb/year)	Percent Increase
Total nitrogen	83	7,410	1.1%
Total phosphorus	11	1,740	0.7%

Treated municipal wastewater can be an environmental concern because of potentially elevated levels of parameters such as BOD, COD, and fecal coliform, especially when discharged to surface water. While the pollutant loading analysis above conservatively estimated that half of the discharged treated wastewater would reach surface waters, it is likely that much of the treated wastewater that would be used to fight a wildfire would be applied to land and would infiltrate through soils. The use of treated municipal wastewater for disposal through land application and for irrigation is a common and accepted practice nationally. For example, treated municipal wastewater exported by STPUD out of the Tahoe Region is discharged to Harvey Place Reservoir where it is subsequently used for land irrigation. Limited and infrequent discharge of the quality of water shown in Table 3.8-5 for wildfire suppression would not create long-term environmental concerns, even if discharged to an SEZ, because of uptake of nutrients by aquatic and terrestrial plants.

The potential impact to nutrient loading from the proposed policy under Alternative 2 would be **less than significant** because of the infrequent and limited scale of this potential activity and associated pollutant loading, and the potential for this activity to protect property and land that might otherwise be damaged by wildfire, which if burned could create additional water quality impacts such as increased erosion and increased nutrient loading in nearby streams.

Nutrient Loading from Fertilizer Use

Alternative 2 proposes to prohibit all chemical fertilizers that introduce additional nitrogen and phosphorus to the Tahoe Region, with limited exceptions, such as when soil analyses support fertilizer use. Lake Tahoe is classified by limnologists as an oligotrophic lake, which means the Lake has clear water, high levels of dissolved oxygen, and very low concentrations of nutrients that support algal growth (TERC 2011: p. 6.15). The exceptional transparency of the Lake results from naturally low inputs of nutrients and fine sediment particles from the surrounding watershed. Scientific research indicates that limitations on algal growth in Lake Tahoe are dependent on the availability of both phosphorus and nitrogen, and in many months of the year algal growth is predominantly controlled by the availability of phosphorus (TERC 2011: p. 10.7).

While existing regulations are in place to control and manage fertilizer use in the Tahoe Region, the proposed prohibition of fertilizer use under Alternative 2 would further reduce the potential for transport of nutrients from fertilizer applications through surface water and groundwater to Lake Tahoe and therefore would be a **beneficial** impact with respect to nutrient loading in the Region.

Water Quality Threshold Amendment: Nearshore Attached Algae

Alternative 2 would include the proposed water quality threshold amendment for nearshore attached algae. While existing threshold standards makes reference to reducing nutrients known to facilitate the growth of attached algae, there is no existing threshold standard for attached algae in the nearshore of Lake Tahoe. By definition, the nearshore (littoral zone) environment extends 350 feet from the shoreline or to a Lake bottom elevation of 6193.0 (Lake Tahoe Datum), whichever is farther from shore. The nearshore is of particular concern because it is highly visible and receives more recreational use than other areas of the Lake (e.g., beach use), and recent reports indicate increased algal growth in portions of the nearshore.

The proposed amendment would create a new interim management standard that would support actions to reduce the degree and distribution of attached algae in the nearshore. This management standard would temporally guide management actions, policy, and project review to prevent increases in attached algae. The management standard would remain in place until research is completed to establish numerical targets for nearshore attached algae, which would potentially be based on a numerical index of algal biomass. Because the proposed amendment is a new standard that would address the important issue of attached algae in the nearshore and support actions to reduce it, this threshold amendment would have a **beneficial** effect on water quality.

ALTERNATIVE 3: LOW DEVELOPMENT, HIGHLY INCENTIVIZED REDEVELOPMENT

Nutrient Loading from Expanded Use of Treated Municipal Wastewater for Fire Suppression

Alternative 3 would also allow the use of treated municipal wastewater to assist with catastrophic wildfire suppression efforts, as described in Alternative 2. For reasons described above in Alternative 2, this impact would be **less than significant.**

Nutrient Loading from Fertilizer Use

Alternative 3 would encourage phasing out the sale and use of phosphorus-containing chemical fertilizers in the Region by 2017, with limited exceptions, through public education and outreach. Exceptions could be granted for establishment of new vegetation and for soils with a demonstrated need for phosphorus to maintain healthy vegetation, as confirmed by a soil test.

While existing regulations are in place to control and manage fertilizer use in the Tahoe Region, the proposed education and outreach program proposed under Alternative 3, and the phasing out of the sale and use of phosphorus-containing chemical fertilizers in the Region by 2017 would likely reduce, compared to existing conditions, the potential for transport of nutrients from fertilizer applications through surface water and groundwater to Lake Tahoe and would be a **beneficial** impact with respect to nutrient loading in the Region.

Water Quality Threshold Amendment: Nearshore Attached Algae

Alternative 3 would also include the proposed water quality threshold amendment for nearshore attached algae, as described in Alternative 2. For reasons described above in Alternative 2, this impact would be **beneficial**.

ALTERNATIVE 4: REDUCED DEVELOPMENT, INCENTIVIZED REDEVELOPMENT

Nutrient Loading from Expanded Use of Treated Municipal Wastewater for Fire Suppression

Alternative 4 would also allow the use of treated municipal wastewater to assist with catastrophic wildfire suppression efforts, as described in Alternative 2. For reasons described above in Alternative 2, this impact would be **less than significant.**

Nutrient Loading from Fertilizer Use

Alternative 4 would apply the same education and outreach approach to phase out the sale and use of phosphorus-containing chemical fertilizer as discussed for Alternative 3. For reasons described above in Alternative 3, this impact would be **beneficial.**

Water Quality Threshold Amendment: Nearshore Attached Algae

Alternative 4 would also include the proposed water quality threshold amendment for nearshore attached algae, as described in Alternative 2. For reasons described above in Alternative 2, this impact would be **beneficial**.

ALTERNATIVE 5: SIMILAR RATE OF DEVELOPMENT AND REGULATORY STRUCTURE TO THE 1987 REGIONAL PLAN

Nutrient Loading from Expanded Use of Treated Municipal Wastewater for Fire Suppression

Alternative 5 would continue policies described under Alternative 1, which allow use of treated municipal wastewater for the protection of the Luther Pass Pump station from fire. For reasons described above in Alternative 1, this impact would be **less than significant.**

Nutrient Loading from Fertilizer Use

Alternative 5 would continue fertilizer policies described in Alternative 1. For reasons described above in Alternative 1, this impact would be **less than significant.**

Water Quality Threshold Amendment: Nearshore Attached Algae

Alternative 5 would also include the proposed water quality threshold amendment for nearshore attached algae, as described in Alternative 2. For reasons described above in Alternative 2, this impact would be **beneficial**.

MITIGATION MEASURES

No mitigation is required for any of the alternatives.

Impact 3.8-3 **Sediment Loading to Surface Water.** Each Regional Plan Update alternative proposes revised policies with the potential to affect sediment loading, including fine sediment particles, to Lake Tahoe and its tributaries. These include (1) requirements that all property owners implement water quality BMPs that are consistent with fire defensible space guidelines, (2) changes to policies that would affect operation and maintenance of roads for water quality, and (3) restoration of off-highway vehicle (OHV) trails.

Because numerous resources have been developed to provide guidance on fire defensible space practices that are compatible with BMP requirements, and because TRPA, Resource Conservation Districts, and Fire Protection Districts continue to provide support to homeowners in the Tahoe Region to implement defensible practices, sediment loading from such practices would be **less than significant** for all alternatives.

Because fine sediment particles generated from roadways in the Tahoe Region have been identified as the biggest source of loading of this pollutant to Lake Tahoe and the biggest threat to Lake clarity (LRWQCB and NDEP 2009), continuation of existing winter road practices under Alternatives 1 and 5 would constitute a **potentially significant** impact to water quality. Taken together, existing and proposed policies of Alternative 2, 3, and 4 would be **beneficial** for water quality by improving roadway operation and maintenance practices that currently generate high pollutant loads of sediment and fine sediment. These policies would also reduce fine sediment loading by increasing the potential for funding water quality operations and maintenance.

Alternatives 1, 3, 4, and 5 would not revise policies with regard to BMP requirements for OHV trails and impacts would be **less than significant** for these alternatives. Because Alternative 2 would require BMPs to be installed on all active OHV trails or be decommissioned by 2015, Alternative 2 would result in a **beneficial** impact on water quality.

This impact analysis of sediment loading to surface water focuses on 1) sediment loading from defensible space practices, 2) roadway operations and maintenance practices, and 3) policies pertaining to OHV trails. These issues are of primary relevance for sediment loading because the Regional Plan Update alternatives include policy changes related to defensible space practices, road operations, and OHV trails. This is because these are the three areas of proposed policy change specific to sediment loading proposed in one or more of the Regional Plan Update alternatives. (Impact 3.8-4, Stormwater Runoff and Pollutant Loads, below, addresses water quality impacts from additional development, coverage and development transfer policies, and BMP retrofit requirements.) Existing goals, policies, Code, and other regulations also address sediment loading, but are not proposed for change and therefore, would not result in impacts on the environment.

ALTERNATIVE 1: NO PROJECT

Sediment Loading from Defensible Space Practices

Through guidelines implemented in 2009, TRPA requires BMPs to be compatible with fire defensible space practices. Under Alternative 1, BMPs would be required to be compatible with defensible space practices, but the 2009 guidelines would not be incorporated into the Goals and Policies. The TRPA BMP Handbook defines fire

defensible space as "the area between a structure and oncoming wildfire where the vegetation is actively managed to reduce the wildfire threat and, where possible, allows fire fighters to safely defend the house" (TRPA 2011a: p. 13). Defensible space guidelines cited by TRPA (University of Nevada Cooperative Extension 2011: p. 8-9) define three distinct defensible space zones, each with different recommended practices: (1) a noncombustible zone within 5 feet of a structure; (2) a "lean, clean, and green" zone within 5–30 feet of a structure; and (3) a wildland fuel reduction zone beyond 30 feet from a structure.

Existing TRPA policy related to BMP requirements specifies that property owners shall protect vegetation from disturbance and restore disturbed soils on their land. The potential remains, however, for property owners in the Tahoe Region to implement defensible space practices that are not compatible with BMP requirements and potentially expose bare soil, which could increase the potential for runoff and erosion on properties within the Region.

Suggested practices for each defensible space zone are discussed below in the context of potential impacts to water quality.

Noncombustible Zone within 5 Feet of Structures

Combustible materials are prohibited in the noncombustible zone, including wood borders for infiltration trenches (TRPA 2011a: p. 5-13). Most TRPA-approved BMPs implemented within this zone are infiltration trenches, which are typically rock-filled trenches ranging from 2 to 5 feet in width that collect, store, and infiltrate runoff from a structure. Minor design alterations ensure that infiltration trenches, or functionally equivalent BMPs, are compatible with defensible space guidelines within this zone. For example, borders and cross-members of infiltration trenches within 5 feet of a structure must be constructed with nonflammable materials. Given that most materials used for BMP design within this zone are nonflammable, the proposed practice would not alter the design or water quality function of the BMPs.

"Lean, Clean, and Green" Zone within 5–30 Feet of Structures

Defensible space guidelines cited by TRPA (University of Nevada Cooperative Extension 2011: p. 8-9) define the characteristics of this zone as follows:

- Only a small amount of flammable vegetation, if any, should be present.
- Little or no accumulation of dead vegetation or flammable debris should be present during the fire season.
- Plants should be kept healthy, green, and irrigated during the fire season.

Based on the size of the average residential lot in the Tahoe Region, this zone represents the majority of the residential landscape. Typical water quality problems occurring in this zone result from compacted or unprotected soils that, because of their reduced ability to infiltrate water and exposure to the elements, accelerate the rate of erosion and potential transport of sediment to drainage systems and receiving waters. Existing BMP Handbook guidelines specify that pine needles and vegetative litter within this zone should be removed annually by May 1 to the duff layer (a layer of moderately to highly decomposed material between the mineral soil and litter layer) (TRPA 2011a: p. 4-61). However, the residential landscape commonly lacks a duff layer because of landscaping and disturbance associated with residential uses, and property owners may not recognize or use appropriate caution to maintain a duff layer while removing pine needles and vegetative litter. To address concerns over the appropriate implementation of defensible space practices in the "lean, clean, and green" zone, a number of resources have been generated and made available to the public, including the following documents and activities:

- Defensible space guidelines on the TRPA BMP website and Resource Conservation District websites, which provide information on how residential property owners can obtain free property evaluations from TRPA, the Resource Conservation Districts, and the Fire Protection Districts to identify BMP needs and defensible space requirements.

- Staff members from water quality agencies and fire protection agencies attend community outreach events and BMP Contractors' Workshops to communicate how homeowners can achieve BMP and defensible space requirements.
- The *Home Landscaping Guide for Lake Tahoe and Vicinity* (University of Nevada Cooperative Extension 2011) includes a chapter (Chapter 5) describing defensible space practices that are compatible with BMP requirements.
- The TRPA BMP Handbook describes appropriate defensible space practices in the Vegetation and Soils Management chapter and soil protection practices in the Bare Soil Protection BMP guidelines (TRPA 2011a).
- A multi-agency produced video *Best Management Practice/ Defensible Space for the Homeowner* is accessible from the TRPA BMP website: http://www.tahoebmp.org/Media.aspx
- The document *How to Install Residential BMPs – A Manual for Building and Landscape Professionals* (University of Nevada Cooperative Extension 2003) describes appropriate practices for raking pine needles.

These resources provide instruction to homeowners and contractors in the Tahoe Region regarding methods for protecting bare soil to prevent sediment and fine sediment particles from reaching Lake Tahoe, while adhering to defensible space practices. Specific recommended methods include emphasizing use of low-growing herbaceous plants in residential landscaping, use of inorganic mulches that protect soil from erosion, and use of proper techniques for raking pine needles.

Wildland Fuel Reduction Zone Beyond 30 Feet from Structures

Guidelines for this zone specify practices such as removing ladder fuels and maintaining the accumulation of organic mulch and vegetative litter on the ground to a maximum of 3 inches. Because the guidelines for this zone do not create the potential to expose bare soil to accelerated erosion, no water quality and hydrology impacts are anticipated from the specified practices.

Because numerous resources have been developed to provide guidance on fire defensible space practices that are compatible with BMP requirements, including within the "lean, clean, and green" zone that dominates the residential landscape, and because TRPA, Resource Conservation Districts, and Fire Protection Districts continue to provide support to homeowners in the Tahoe Region to implement defensible practices that are compatible with water quality objectives, this impact would be **less than significant**.

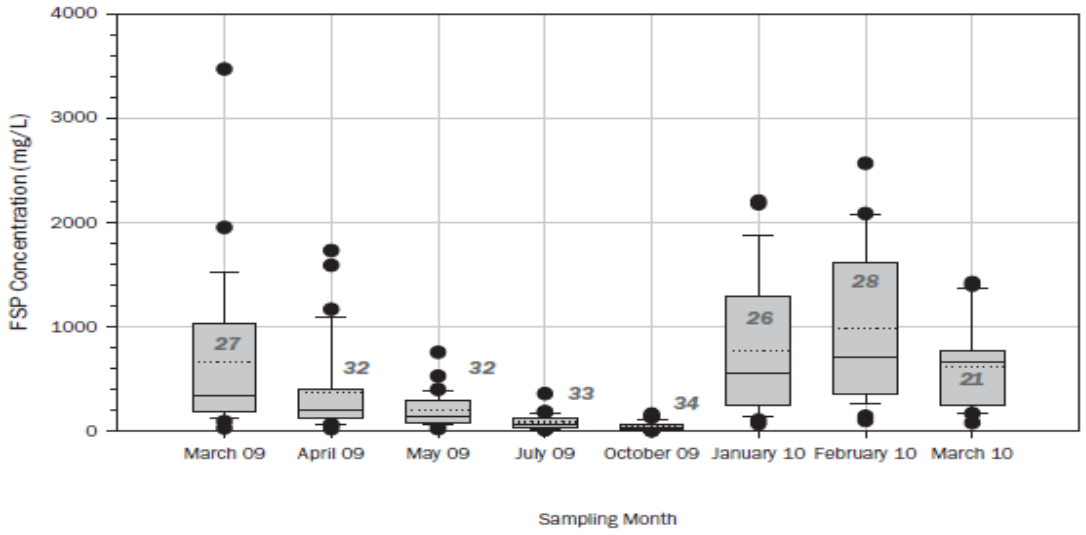
Sediment Loading from Road Operations

Current TRPA policy requires that institutional users of de-icing salt maintain a tracking program to monitor use of this material. The interpretation of this policy has been expanded in the current Code to include a tracking program for both de-icing salt and road abrasives (Section 60.1.5), which are applied to roads in the Tahoe Region to improve safety in winter driving conditions.

Based on analysis of stormwater monitoring data collected during development of the Lake Tahoe TMDL, roads in the Tahoe Region are estimated to generate the highest amount of pollutants of concern to Lake clarity on a unit-area basis (LRWQCB and NDEP 2009: Figures 4-33, 4-37, and 4-40). Additionally, roads have been shown to generate the highest proportion of fine sediment particle loading in stormwater runoff among developed land uses in the Region (LRWQCB and NDEP 2009: Table 4-24).

Recent research has shown that the worst water quality observed on roads in the Tahoe Region occurs during the winter months (2NDNATURE et al. 2010). Exhibit 3.8-4 presents data collected from a sampling program that isolated and measured the concentration of pollutants washed off the impervious road surface. (The data do not assess other sources of pollutant generation from road runoff, such as road shoulder erosion.) The data are organized by month and display the number of unique observations made during each month, which were used to generate the statistics shown. As illustrated in Exhibit 3.8-4, generation of fine sediment particle (FSP) concentrations is highest in winter months, which is also when concentration variability is highest. Based on the

results shown in Exhibit 3.8-4 and with consideration of the sampling program design for the research conducted, the authors of the study conclude that the poor runoff quality from roads is linked to the application of de-icing salt and road abrasives (2NDNATURE et al. 2010: pp. 6.8-6.12).



The strong seasonal pattern of urban road condition is demonstrated by the box and whisker plots of Tahoe Basin road FSP concentrations measured during the controlled experiments for WY09 and WY10 (2NDNATURE 2010a, 2010b). The dotted horizontal line is mean value, and the solid line is median for each sampling effort. n values (number of observations per month) are presented for reference.

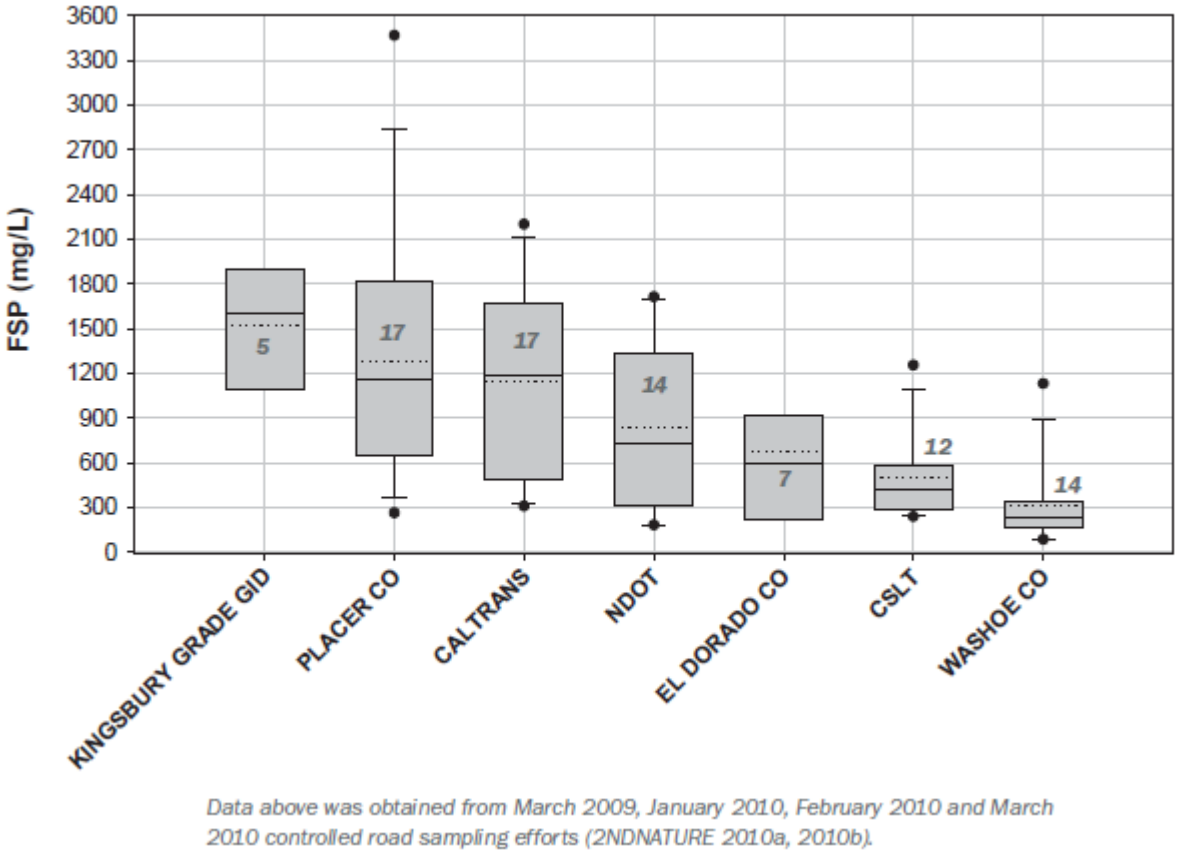
Source: (2NDNATURE et al. 2010: Figure 6.3)

Exhibit 3.8-4. Statistical Analysis of Monthly FSP Concentrations from Roads

Additionally, recent research has shown that average FSP concentrations generated from roads in winter vary markedly among agencies in the Tahoe Region that apply road abrasives (2NDNATURE et al. 2010). Exhibit 3.8-5 displays data on FSP concentrations from winter water quality sampling during 2009 and 2010, where winter was defined as the period between January and March. Exhibit 3.8-5 displays the number of samples taken from roads within each agency's jurisdiction and the statistics developed from those samples. Exhibit 3.8-5 demonstrates that the agencies averaging the lowest FSP concentrations in runoff also have the lowest variability in concentration.

It should be noted that some variability among the agencies shown in Exhibit 3.8-5 is likely caused by the physiographic characteristics of the road system managed by an agency, and therefore the results cannot directly be used to identify an inefficient operational practice. For example:

- Agencies that manage primary roads in the Region (e.g., Caltrans and NDOT) typically need to apply higher amounts of road abrasives per lane mile to manage high traffic volumes and higher traffic speeds.
- Agencies with roads on the west shore may need to apply higher amounts of road abrasives relative to agencies on the east shore because of higher amounts of snowfall and to manage ice formation on roads shaded from sunlight.



Source: (2NDNATURE et al. 2010: Figure 6.5)

Exhibit 3.8-5. Statistical Comparison of FSP Concentrations from Roads by Agency

While specific decisions on operational practices necessary to maintain traffic safety are the responsibility of the agencies that manage public road rights-of-way in the Tahoe Region, current TRPA policies under Alternative 1 do not include provisions to optimize winter road operations for water quality protection. Because FSP generated from roadways in the Tahoe Region have been identified as the biggest source of loading of this pollutant to Lake Tahoe and the biggest threat to Lake clarity, continuation of existing operation practices constitutes a **potentially significant** impact to water quality.

Sediment Loading from Off-Highway Vehicle Trails

Under Alternative 1, no change is proposed to existing TRPA policies that require limitation of OHV use to designated roads, trails, and areas, and requires the installation of BMPs for trails associated with OHV use in the Region.

OHV trails can create highly compacted soil surfaces that impede infiltration and increase runoff, resulting in soil erosion and transport of sediment to downstream surface waters. Because most OHV use occurs on USFS lands in the Region, USFS has historically monitored and managed water quality with respect to roads and trails that permit OHV use (USFS 2000: p. 73) and is responsible for BMP implementation and OHV trail decommissioning. Because the continuation of existing policies under Alternative 1, which are implemented through a TRPA/USFS Memorandum of Understanding (TRPA 1989), would not increase sediment loading from OHV trails, and existing USFS programs are in place to retrofit OHV trails with BMPs, Alternative 1 would result in a **less-than-significant** impact on sediment loading.

ALTERNATIVE 2: LOW DEVELOPMENT, INCREASED REGULATION

Sediment Loading from Defensible Space Practices

Alternative 2 would require that all property owners continue to implement water quality BMPs that are consistent with defensible space guidelines. The proposed policy would formally recognize within the TRPA Goals and Policies the guidelines implemented by TRPA in 2009 to require that BMPs be compatible with defensible space. For the reasons described above for Alternative 1, this impact would be **less than significant**.

Sediment Loading from Road Operations

Alternative 2 proposes to require that all road abrasives have a high resistance to pulverization into fine sediment particles and include zero or very low phosphorus content, and allow for an increased proportion of TRPA water quality mitigation fees to be used for water quality related operations and maintenance activities.

Historically, the primary source of funding for water quality improvement projects in the Tahoe Region has been grant funds. Current grant funding policies prohibit the use of grant funds for operations and maintenance activities, including activities related to water quality protection. Consequently, local jurisdictions typically have resources to construct capital improvements for water quality through the use of grant funds but have struggled to locate, secure, and sustain funding to pay for water quality maintenance activities. TMDL-related research indicates that improvements to road operations for water quality, including increased maintenance activities, could be the most cost-effective strategy in the near term to achieve notable pollutant load reductions of fine sediment particles (Placer County 2011: pp. ES.2 – ES.4).

Because use of road abrasives with higher resistant to pulverization into fine sediment particles and low-phosphorus or phosphorus-free road abrasives would reduce the potential for generation and transport of these pollutants to surface waters; and because increase availability of funding for operations and maintenance activities that protect water quality has been shown to be a cost-effective strategy for reducing pollutant loading, implementation of the proposed policies of Alternative 2 would result in a **beneficial** impact.

Sediment Loading from Off-Highway Vehicle Trails

Alternative 2 would require that all roads and trails currently allowing OHV use in the Tahoe Region install BMPs or be decommissioned by 2015. OHV trails can create highly compacted soil surfaces that impede infiltration and increase runoff, resulting in soil erosion and transport of sediment to downstream surface waters. Because most OHV use occurs on USFS land within the Region, USFS has historically monitored and managed water quality with respect to roads and trails that permit OHV use (USFS 2000: p. 73) and is responsible for BMP implementation and OHV trail decommissioning.

Alternative 2 would create an aggressive timeline for BMP compliance on trails where OHV use is permitted. Because BMP retrofit or decommissioning of OHV trails would provide a water quality benefit by decreasing the potential transport of sediment to Lake Tahoe and other water bodies in the Tahoe Region, the proposed policy would result in a **beneficial** impact.

ALTERNATIVE 3: LOW DEVELOPMENT, HIGHLY INCENTIVIZED REDEVELOPMENT

Sediment Loading from Defensible Space Practices

Alternative 3 would require that all property owners continue to implement water quality BMPs that are consistent with defensible space guidelines. The proposed policy would formally recognize within the TRPA Goals and Policies the guidelines implemented by TRPA in 2009 to require that BMPs be compatible with defensible space. For the reasons described above for Alternative 1, this impact would be **less than significant**.

Sediment Loading from Road Operations

Alternative 3 includes revised policies that would:

- Support Lake Tahoe TMDL programs and pollutant/stormwater load reduction plans produced by each jurisdiction in the Region.
- Require public road maintenance and snow disposal operations in the Region to minimize the discharge of de-icers, FSP, traction abrasives, and other contaminants in addition to salt (currently required) as specified in the BMP Handbook.

TRPA support of pollutant/stormwater load reduction plans produced by local agencies would include actions such as updating the Environmental Improvement Program (EIP) program project list and funding priorities to reflect the prioritized strategies identified by local agencies for reducing pollutant loads to meet TMDL milestones. As described above, TMDL-related research indicates that improvements to road operations for water quality, including increased maintenance activities, could be the most cost-effective strategy in the near term to achieve notable pollutant load reductions of FSP (Placer County 2011: pp. ES.2 – ES.4). While pollutant/stormwater load reduction plans are just now beginning to be developed by agencies regulated under the Lake Tahoe TMDL, all agencies have indicated to TRPA that they will assess improved road operation activities as a potential action to achieve load reductions as a component of pollutant/stormwater load reduction plans. For example, Placer County has identified improved road operations as a component of their draft load reduction strategy (Placer County 2011) and the Nevada agencies have collectively prioritized the study of potential load reductions that may be achieved by enhanced road operations within their recently initiated project to produce a Nevada stormwater load reduction plan, which is being led by the Nevada Tahoe Conservation District. In California, the deadline to submit pollutant load reductions plan is March 2013, and in Nevada, the deadline for submittal of stormwater load reductions plans has not been finalized.

Proposed policies under Alternative 3 provide the framework for TRPA to support and regulate improvements to current practices that are known to generate high pollutant loads of sediment and FSP from roads in the Tahoe Region, where improvements to current practices appear to be the most cost effective strategy to reduce pollutant loads in the near term (Placer County 2011: pp. ES.2 – ES.4). Therefore, Alternative 3 would likely reduce sediment loading and associated fine sediment particle loading and the impact would be **beneficial**.

Sediment Loading from Off-Highway Vehicle Trails

Under Alternative 3, no change is proposed to existing policies related to the installation of BMPs for OHV trails in the Tahoe Region. For reasons described above for Alternative 1, this would be **less than significant**.

ALTERNATIVE 4: REDUCED DEVELOPMENT, INCENTIVIZED REDEVELOPMENT

Sediment Loading from Defensible Space Practices

Alternative 4 would require that all property owners continue to implement water quality BMPs that are consistent with defensible space guidelines. The proposed policy would formally recognize within the TRPA Goals and Policies the guidelines implemented by TRPA in 2009 to require that BMPs be compatible with defensible space. For the reasons described above for Alternative 1, this impact would be **less than significant**.

Sediment Loading from Road Operations

Alternative 4 proposes the same policies as described above for Alternative 3. For the reasons described above for Alternative 3, this impact would be **beneficial.**

Sediment Loading from Off-Highway Vehicle (OHV) Trails

Under Alternative 4, there would be no change to existing policies related to the installation of BMPs for OHV trails in the Tahoe Region. For reasons described above in Alternative 1, would result in a **less-than-significant** impact.

ALTERNATIVE 5: SIMILAR RATE OF DEVELOPMENT AND REGULATORY STRUCTURE TO THE 1987 REGIONAL PLAN

Sediment Loading from Defensible Space Practices

Alternative 5 would require the same BMP and fire defensible space provisions as Alternative 1. For the reasons described above for Alternative 1, this impact would be **less than significant**.

Sediment Loading from Road Operations

Under Alternative 5, no change is proposed to existing policies related to road operations. For reasons described above for Alternative 1, this impact would be **potentially significant.**

Sediment Loading from Off-Highway Vehicle Trails

Under Alternative 5, no change is proposed to existing policies related to the installation of BMPs for OHV trails in the Tahoe Region. For reasons described above for Alternative 1, this impact would be **less than significant**.

MITIGATION MEASURES

No mitigation is required for Alternatives 2, 3, and 4. The following mitigation is required for Alternatives 1 and 5.

Mitigation Measure 3.8-3: Facilitate Improved Roadway Operations and Maintenance Practices that Protect Water Quality.

For Alternatives 1 and 5: TRPA will adopt a policy that supports load reduction plans developed under the TMDL, including elements that improve road operations and maintenance to benefit water quality. TRPA will coordinate implementation through TRPA approved plans, project permitting, or projects/programs developed in coordination with local or other governments. As part of this policy, TRPA will require that public road operations and maintenance minimize the discharge of de-icers, FSP, traction abrasives, and other contaminants associated with roads consistent with public safety objectives. Specific actions that will be evaluated for incorporation into TRPA Code include:

- *developing a regional abrasive standard for the Tahoe Region that identifies source(s) of approved abrasives that are resistant to pulverization into fine sediment particles and that contain zero or very little phosphorus;*
- *establishing regional standards for the use of best available technology to minimize the amount of abrasives that are applied for winter traffic safety and best available technology to maximize recovery of abrasives after application on roads;*
- *updating the EIP program project list to reflect priorities in the load reduction plans, including those related to road operations and maintenance for improved water quality; and*
- *increasing the availability of water quality mitigation fees for funding improved road operation and maintenance with water quality benefits.*

Significance After Mitigation

Because implementation of Mitigation Measure 3.8-3 would establish policies that would serve to reduce loadings of sediment and fine sediment from roadways in the Tahoe Region where no such policies are in place

today, the impact would be adequately addressed by the mitigation and would result in a **beneficial** effect for Alternatives 1 and 5.

Impact 3.8-4	**Stormwater Runoff and Pollutant Loads**. All Regional Plan Update alternatives would: (1) result in additional development and associated impervious coverage, the level of which is dependent upon the number of new authorized allocations; (2) permit higher levels of allowable impervious coverage (either 50 percent or 70 percent, or a combination thereof) on high capability land within certain community centers, than on lands outside those areas; (3) allow coverage transfers within the Region under different proposed rules and transfer ratios; and (4) continue or modify requirements for BMP retrofit of existing development. Additionally, Alternatives 3 and 4 propose new policies that would allow for specific coverage exemptions. When policies across Alternatives 1, 2, and 5 are considered in aggregate, the alternatives present a **less than significant** impact to stormwater runoff and pollutant loading because they do not substantially change the existing policies related to: (1) the potential for proposed coverage transfer policies to reduce coverage impacts in low capability lands by transferring coverage that meets BMP requirements to high capability lands, and (2) the opportunity to retrofit existing development with BMPs through existing or revised policies. Alternative 3 proposes substantial incentives to transfer coverage, existing development, and development rights out of SEZ and other sensitive lands into community centers (see Section 2,6.3), which in and of themselves, would be more beneficial than other alternatives in terms of its potential for coverage removal, restoration, and environmentally-beneficial redevelopment. Alternatives 3 and 4 also propose exemptions of specific uses from coverage requirements, however, which have the potential to result in adverse water quality impacts. When policies across Alternatives 3 and 4 are considered in aggregate, the alternatives present a **potentially significant** impact to stormwater runoff and pollutant loading given that proposed coverage exemptions could allow aggregate coverage in excess of currently allowable coverage limits as defined by the Bailey land capability system, which are considered necessary in the Region to protect water quality and preserve environmental balance at the individual parcel scale (Bailey 1974:p. 24). With the exception of Alternative 1, all Regional Plan Update alternatives would include a new water quality threshold standard to replace existing winter average Secchi depth standard with California's annual average Secchi depth transparency standard. Because the new threshold standard would create consistency with state standards and protocols for evaluating and reporting this water quality metric and would be equally stringent as that replaced, this would result in a **less-than-significant** impact.

Policies proposed under each of the Regional Plan Update alternatives would allow for different amounts of additional development and associated additional impervious coverage. Rates and volumes of runoff are affected by development through multiple mechanisms, but the most important of these are: (1) the conversion of vegetated or pervious surfaces to impervious surfaces such as roofs and pavement; and (2) the development of drainage systems that connect these impervious surfaces to streams and other water bodies, thus increasing the rate of runoff and eliminating storage and infiltration that would otherwise occur along natural drainage paths. As water runs off of the land surface, it collects and carries material that accumulates on that surface. If the entrained material has potentially harmful effects on receiving waters downstream (e.g., fine sediment particles in Lake Tahoe), the material is defined as a stormwater pollutant. Runoff from impervious surfaces can become concentrated, causing land surface erosion and subsequent sediment transport into streams and Lake Tahoe.

Although many urbanized areas face similar challenges in managing stormwater runoff, the Tahoe Region is especially sensitive to changes in land use condition due to the naturally low runoff potential of land surfaces and exceptional natural quality and clarity of surface waters. Since its formation, TRPA has placed a high priority on managing changes in land uses and conditions that affect runoff quantity and quality. The Bailey Land Capability System was developed in 1974 as a means to manage impervious coverage, and the Individual Parcel Evaluation System (IPES) was adopted in 1987 to more specifically address development eligibility and allowable coverage on specific parcels.

Additional impervious coverage that may be created under proposed alternatives is assessed against two potential impacts to water quality: (1) increases in stormwater runoff volumes; and (2) increases in pollutant loading. A key premise of the analysis contained herein is that the quality of stormwater runoff can be reasonably predicted based upon the source of the impervious coverage from which the stormwater runoff originates; higher quality stormwater runoff (i.e., less pollutant loading) can be easier to mitigate and create less potential for adverse impacts relative to poorer quality stormwater runoff (i.e., high pollutant loading). For example, higher quality or cleaner runoff would be expected from roofs, decks, and pedestrian or bike trails, and lower quality runoff associated with motorized vehicles would be expected from driveways, parking lots, and roads. This premise is supported by the most recent scientific studies in the Tahoe Region, including the Lake Tahoe TMDL, which identify increasing concentrations of pollutants of concern across land uses within the Region as the intensity of vehicular use increases. Specifically, the Lake Tahoe TMDL identifies increasing concentrations of pollutants of concern in the following order (lowest to highest) for land uses in the Tahoe Region: single family residential; multi-family residential; commercial; secondary roads serving neighborhoods with relatively low levels of traffic, and primary roads, which are the major arterial roads in the Region with high levels of traffic (LRWQCB and NDEP 2009: p. 4-60).

Alternatives 2 through 4 would modify existing coverage transfer policies to incentivize to varying degrees the transfer of coverage out of low-capability lands (LCDs 1 through 3, including LCD 1b) to higher capability lands (LCDs 4 through 7). A key premise of the Bailey Land Capability system is that lower capability lands have a very low tolerance for development, where even small amounts of impervious coverage (e.g., greater than 1 percent) can impair the environmental balance of those lands. Conversely, high capability lands indicate increased tolerance for higher intensity use and increased coverage (Bailey 1974: pp. 22-24). Furthermore, the surface conditions of higher capability lands (e.g., relatively flat, high infiltration rates, low erosion rates) typically make it easier to mitigate the impacts of development through BMP implementation. Therefore, the analysis views the transfer of coverage out of low capability lands (where it is more difficult to mitigate impacts) to high capability lands (where it is easier to mitigate impacts) as a beneficial action for decreasing stormwater runoff and pollutant loading when transferred coverage meets all other existing water quality requirements.

Alternatives 2 through 5 of the Regional Plan Update include a proposed amendment to the water quality threshold standards pertaining to Deep Water (Pelagic) Lake Tahoe Transparency, as described in Chapter 2, Regional Plan Update Alternatives and assessed below. Alternatives 2 through 5 also include the proposed addition of new water quality threshold standards for nearshore algae and for aquatic invasive species. These standards are assessed in Impact 3.8-2 Nutrient Loading to Surface Water and Groundwater, above, and in Impact 3.10-5, Invasive Weeds and Aquatic Invasive Species, in Section 3.10, Biological Resources.

ALTERNATIVE 1: NO PROJECT

Stormwater Runoff from Allowable Development

Under Alternative 1, new development would be limited to the unused allocations of the 1987 Regional Plan: 86 unused residential allocations, 874 residential bonus units, 342 TAUs, and 383,600 square feet of CFA.

Because the Lake Tahoe TMDL included detailed studies and modeling of potential build-out of the Tahoe Region, it is used as the primary reference supporting findings of the potential build-out scenarios of the Regional Plan Update alternatives (LRWQCB and NDEP 2010: pp. 16-41 to 16-43). The Lake Tahoe TMDL estimated changes in pollutant loading resulting from a build-out scenario for all remaining vacant parcels with development rights in the Tahoe Region by assuming that 3,959 parcels would be developed for residential uses, 33 parcels would be developed for commercial uses, 783 parcels would be permanently conserved as open space, and 200,000 square feet of additional CFA would be created (Hessenflow and Halsing 2006: p. 6). In total, the Lake Tahoe TMDL analysis estimated that 373 acres of additional impervious coverage would be created at built-out in the Tahoe Region (LRWQCB and NDEP 2010: p.14-7).

Based on the modeling and analysis, the Lake Tahoe TMDL estimated that fine sediment particle loading to Lake Tahoe would increase by up to two percent at build-out, where new development was modeled as meeting current regulatory requirements for BMP installation and for BMP maintenance to ensure continued effectiveness. The Lake Tahoe TMDL considered this potential increase in loading to be conservative, noting that it was unlikely for future allowable development to follow the modeled scenario, which assigned development status to eligible parcels with the greatest potential to contribute pollutants to the Lake instead of conserving these parcels (LRWQCB and NDEP 2010: p. 14-6). Furthermore, the Lake Tahoe TMDL states that the estimate was considered to be within the range of modeling uncertainties and therefore was not considered to be a significant increase in pollutant loading.

The Lake Tahoe TMDL analysis supports the finding that limited new development, when primarily focused on residential build-out of eligible parcels with existing development rights, and implemented under the current regulatory environment and BMP requirements, would cause a minor increase in pollutant loading to Lake Tahoe. While the Lake Tahoe TMDL analysis indicates that a minor increase in pollutant loading may result from the build-out scenario analyzed, existing TRPA regulations specify that additional development is not permitted to adversely affect water quality. Therefore, in addition to the erosion control and stormwater runoff benefits from implementing required BMPs on a parcel, new development is required to completely offset potential impacts of additional coverage by (1) paying water quality mitigation fees; or (2) implementing an offsite water quality control project (Section 60.2.3). Furthermore, TRPA regulations that govern development would remain in place to protect against the creation of new road networks or the expansion of the urban boundary.

Table 3.8-6 includes estimates of additional coverage that could result from each alternative as described in Section 3.7, Geology, Soils, Land Capability, and Coverage. The coverage calculations consider only new residential, CFA, TAU, and bonus units and illustrate the net increase in estimated coverage for the Region, which accounts for estimated transfers of coverage as described in Section 3.7. Table 3.8-6 does not include assumptions regarding decreases or increases in coverage resulting from other public facilities, transportation projects, environmental improvement projects, proposed coverage exemptions, or other infrastructure. The additional coverage estimated under the Lake Tahoe TMDL build-out scenario in Table 3.8-6 is described in the Lake Tahoe TMDL (LRWQCB and NDEP 2010:p. 14-6 to 14-7).

The level of remaining new development from the existing Regional Plan that would occur under Alternative 1 is markedly lower than the build-out scenario analyzed in the Lake Tahoe TMDL (Table 3.8-6) and the amount of coverage that would result from use of allocations proposed for each of the other Regional Plan Update alternatives is also less than the total new coverage considered in the Lake Tahoe TMDL (Table 3.8-6). As described above, the Lake Tahoe TMDL conservatively estimated that the build-out scenario analyzed would result in a 2-percent increase in fine sediment loading to Lake Tahoe. Because the scale of remaining new development in Alternative 1 would: (1) avoid creation of additional road networks or expansion of the urban boundary; (2) require BMPs to be installed and maintained to meet current regulatory requirements; and (3) require potential impacts to be completely offset using a mitigation structure that reflects actual costs of

mitigation, the water quality impact associated with the additional allowable development under Alternative 1 would be **less than significant**.

Table 3.8-6. Estimated Additional Coverage

Scenario	Additional Coverage in Community Centers (acres)	Additional Coverage Outside Community Centers (acres)	Coverage Reductions from Transfers (acres)	Net Difference in Coverage (acres)
Alternative 1	28	4	-26	6
Alternative 2	38	126	-61	103
Alternative 3	64	82	-92	53
Alternative 4	48	192	-71	169
Alternative 5	56	196	-53	200
Lake Tahoe TMDL Analysis	Not calculated in analysis			373

Stormwater Runoff from Allowable Coverage in Community Centers

Existing coverage regulations for high-capability lands (LCDs 4–7) within Community Plan areas allow for coverage transfers for commercial facilities and for land uses classified as tourist (5 units or more), public service, and recreation:

- 50 percent allowable coverage for existing development, where existing coverage in excess of allowable coverage is required to be removed or mitigated in connection with an approved project
- 70 percent allowable coverage for new development

The area required to construct infiltration BMPs to mitigate surface runoff and associated pollutant loads generated by the current levels of coverage in the designated Community Plan areas was calculated on a per-acre basis and is presented in Table 3.8-7. While many different design criteria and BMPs could be used on a specific site to meet regulatory requirements, the following assumptions and methods representing a typical infiltration BMP design for the Region were used to support the analysis and calculations shown in Table 3.8-7:

- 1 acre parcel at LCD 4 or greater
- Infiltration BMPs used to meet current regulatory standard (i.e., storage of 20-year, one hour storm, equivalent to 1 inch per hour of runoff from all impervious surfaces on the parcel)
- Storage depth of runoff in infiltration BMPs averages 0.5 feet
- Infiltration rate averages 1 inch/hour
- Values in Table 3.8-7 were calculated using the algorithms developed for the NRCS BMP Volume Sizing worksheet developed for the Tahoe Region

Table 3.8-7 provides a calculation of the minimum surface area that would be necessary to site infiltration BMPs to meet current regulatory requirements using the assumptions above. As shown in Table 3.8-7, a parcel with LCD 4 or greater and either 50 percent or 70 percent land coverage could accommodate infiltration BMPs sized to meet current regulatory requirements, assuming the physical attributes of a specific parcel (e.g., utilities, rock outcrops) would not conflict with the siting of adequately sized BMPs.

Table 3.8-7 demonstrates that high capability land with 50 percent or 70 percent coverage could accommodate the design and construction of BMPs of sufficient size to mitigate the impacts of the impervious coverage. Furthermore, exiting regulations require a project to incorporate stormwater BMPs into the project design to meet TRPA stormwater and infiltration requirements and to maintain BMPs to ensure continued effectiveness (TRPA 2012b: Section 60.4).

Table 3.8-7. Infiltration BMP Feasibility Analysis		
1 Acre Parcel with LCD 4 or Greater	Proposed Maximum Allowable Coverage	
	50%	70%
Parcel Size (sf)	43,560	43,560
Maximum Allowable Coverage (sf)	21,780	30,492
Runoff volume for storage and infiltration (cf)	1,815	2,541
Minimum area needed for storage and infiltration (sf)	3,150	4,350
Maximum available land area for siting BMPs to mitigate Maximum Allowable Coverage (sf)	21,780	13,068

The net effect of new development authorized under Alternative 1 for Community Plan areas is estimated to result in 28 acres of additional impervious coverage in high capability lands. To achieve the increased coverage, restoration and transfers of existing coverage would be required. Alternative 1 is estimated to reduce impervious coverage in low capability lands (LCDs 1–3) by 7–11 acres, 3–5 acres of which is estimated to be removed from SEZs (see Section 3.7, Geology, Soils, Land Capability and Coverage for analysis of potential changes in coverage). Because the additional coverage would be limited to high capability lands and would be required to meet existing BMP standards to control potential increases in stormwater runoff and pollutant loading from the additional coverage, including maintenance requirements, the impact would be **less than significant**.

Coverage Transfers and Excess Coverage Mitigation

Existing policy under Alternative 1 allows coverage transfers for commercial facilities within Community Plan areas as follows:

- 1:1 up to 50 percent to LCD 4-7, developed
- 1:1 up to 50 percent to LCD 4-7, undeveloped; then sliding scale ranging from 1.05:1 to 2:1 from 51 percent up to 70 percent
- Ratios are unchanged regardless of land capability of sending parcel

The 1987 Regional Plan partitions the Tahoe Region into a series of nine Hydrologically Related Areas (HRAs) based on the boundaries of multiple adjacent sub-watersheds (see Exhibit 2-3). Existing regulations require that transfers of coverage occur within the same HRA. The intent of the HRA concept is described in the EIS for the 1987 Regional Plan (TRPA 1986, p. II-17), which states: "[TRPA] will limit transfers of coverage to a reasonable distance from the receiving site, so that the effect of coverage on water quality within the area is no worse than if the development were confined to the respective parcels."

Existing policy under Alternative 1 allows for excess coverage mitigation as follows:

- A project proposed on a site with existing coverage in excess of that allowed by the land capability regulations for the site must mitigate excess coverage by either (1) directly removing coverage, on- or off-site, or (2) paying an excess coverage mitigation fee.
- The excess coverage mitigation fee is used by a land bank (either the California Tahoe Conservancy or the Nevada Division of State Lands) to remove or retire coverage which, based on existing regulations, must be from within the same HRA as the project generating the excess coverage mitigation fees.

The Lake Tahoe TMDL uses a watershed-scale approach to comprehensively assess and prioritize pollutant sources throughout the Tahoe Region as a singular watershed. The watershed-scale approach used in the Lake Tahoe TMDL has been promoted by the USEPA since the early 1990s as a means to efficiently and effectively

manage the quality of surface waters through a comprehensive analysis of sources, impairments, and management options (EPA 1991). Environmental benefits of watershed TMDLs include: (1) comprehensive assessment and prioritization of pollutant sources affecting an impaired water body; (2) increased cost savings and success rates through programmatic management and coordination of region-wide TMDL efforts among multiple stakeholders; and (3) increased flexibility in implementing management options (EPA 2008).

The existing HRA regulations may diminish water quality benefits by limiting the locations from which coverage may be transferred or retired to a set of sub-watersheds within the Tahoe Region (see also Section 3.7, Geology, Soils, Land Capability, and Coverage for a full discussion of HRA history, purpose, and limitations). High priority sites for coverage removal and restoration include low capability lands where by virtue of slope, soil type and other characteristics, coverage results in more adverse effects with respect to water quality, soils, and vegetation, and where it is more difficult to mitigate coverage impacts. Appropriate receiving sites are higher capability lands where by virtue of flatter slopes, lower erosivity, superior drainage, and other characteristics, coverage impacts are more easily mitigated. Existing HRA regulations may diminish the potential water quality benefit that may be achieved from excess coverage removal by reducing the flexibility of land banks to target the most economical and environmentally beneficial coverage removal opportunities in the Tahoe Region with the greatest potential for water quality improvement. While the challenges presented by the existing HRA regulations have been noted, existing coverage transfer policies do allow for impervious coverage removal from low capability lands. The net effect of proposed impervious coverage transfer policies under Alternative 1 is to reduce impervious coverage in low capability lands (LCD 1–3) (see Section 3.7 for analysis of potential changes in coverage from coverage transfer policies). Because transfers of impervious coverage out of low capability lands to high capability lands that occur in accordance with existing regulations and Code provisions would continue to reduce stormwater runoff and pollutant loading, Alternative 1 would have a **less than significant** impact.

Stormwater Runoff from Coverage Exemptions

Under Alternative 1, there would be no change to coverage exemptions policies. Alternative 1 would not result in the creation of additional coverage through additional exemptions, and therefore creates a **less-than-significant** impact to stormwater runoff or pollutant loading.

BMP Retrofit Requirements

Under Alternative 1, there would be no change to existing policies regarding BMP requirements (Section 60.4), which are summarized as follows:

- All developed properties in the Tahoe Region are required to mitigate impacts of development by installing and maintaining permanent BMPs for sediment source control and to capture and infiltrate the runoff volume generated by the 20-year, one-hour storm event. Properties that have properly sized and functioning BMPs are issued a BMP Certificate of Completion. The calculation of runoff volume is made by multiplying the intensity of the 20-year 1-hour design storm (taken as one inch of rain in one hour) by the impervious coverage on a parcel.
- Before the sale of a property, the owner shall disclose the property's BMP compliance status to the buyer who must then provide the disclosure form to TRPA within 30 days of sale. The current disclosure system alerts the buyer of a property to their responsibilities for complying with BMP regulations related to the property.

TRPA's Stormwater Management Program implements BMP requirements in the TRPA Code of Ordinances and represents the private sector contribution to the Environmental Improvement Program (EIP). Since its inception in 1998, this program has focused on public education and outreach and continues to provide free technical assistance, informational materials, and permitting to property owners to facilitate voluntary BMP implementation. However, limited success of voluntary, Region-wide compliance over time required a new approach to accelerate BMP implementation. In 2007, TRPA developed the Accelerated BMP Implementation

Program to direct compliance efforts and accelerate BMP implementation in areas with the greatest potential for water quality improvement. Target areas include:

- Drainage catchments with large areas of impervious surfaces (pavement and other non-porous areas).
- Areas in which an EIP water quality improvement project has previously been implemented, or is currently being implemented.
- Locations where opportunities exist to explore area-wide water quality solutions that integrate private and public BMPs.
- Areas in proximity to Lake Tahoe, stream environment zones, and other sensitive lands.

As of December 2011, the TRPA Stormwater Management Program has initiated accelerated implementation for nearly 350 commercial and large multi-family properties and 1,000 single family properties within the Tahoe Region. Overall, this enforcement program has been successful in increasing BMP compliance rates, with approximately 30 percent of targeted properties achieving BMP compliance, typically within one to three years after receiving an official notice from TRPA. In addition, 40 percent of targeted single family properties and 63 percent of commercial and multi-family parcels are actively working with TRPA and Resource Conservation Districts to achieve BMP compliance (TRPA 2011b: p. 2).

To date, 14,714 of 43,470 parcels in the Tahoe Region have obtained a BMP Certificate by installing BMPs that meet TRPA requirements. This equates to 56 percent compliance in Nevada and 25 percent compliance in California with total compliance in the Tahoe Region at 34 percent (TRPA 2011b: p. 2). Because the TRPA Stormwater Management Program would continue its targeted enforcement strategy to increase BMP compliance for prioritized parcels with the greatest potential for water quality improvement, continuance of existing policies under Alternative 1 would result in further reductions in stormwater runoff volumes and associated pollutant loads. Alternative 1 would have a **beneficial** impact.

Water Quality Threshold Amendment: Deep Water (Pelagic) Lake Tahoe Transparency

Under Alternative 1, there would be no change or addition to water quality threshold standards. Alternative 1 would result in a **less-than-significant** impact.

Alternative 2: Low Development, Increased Regulation

Stormwater Runoff from Allowable Development

In addition to new development associated with unused CFA, TAUs, residential bonus units, and residential allocations remaining from the 1987 Regional Plan, Alternative 2 would authorize 200,000 square feet of new CFA and 2,600 new residential allocations. New CFA would be available to Community Plan areas and Development Transfer Zones (DTZs) under the existing system, but only after the remaining CFA is used and 70 percent commercial occupancy is achieved.

Additional impervious coverage that would be created under Alternative 2 would result primarily from additional residential development serviced by existing roads and infrastructure (see Section 3.7, Geology, Soils, Land Capability, and Coverage for analysis of potential changes in coverage). Based on stormwater monitoring data collected to support the Lake Tahoe TMDL, residential land uses in the Tahoe Region are estimated to generate stormwater runoff with relatively low concentrations of pollutants of concern, as compared to commercial land uses and roads (LRWQCB and NDEP 2009: p. 4-60).

Additional impervious coverage that would potentially be created under Alternative 2 is lower than the build out scenario analyzed in the Lake Tahoe TMDL (Table 3.8-6). As described above, the Lake Tahoe TMDL conservatively estimated that the build-out scenario analyzed would result in a 2 percent increase in fine sediment loading to Lake Tahoe. Because the scale of remaining new development in Alternative 2 would: (1)

avoid creation of additional road networks or expansion of the urban boundary; (2) require BMPs to be installed and maintained to meet current regulatory requirements; and (3) require potential impacts to be completely offset using a mitigation structure that reflects actual costs of mitigation, the water quality impact associated with the additional allowable development under Alternative 2 would be **less than significant**.

Stormwater Runoff from Allowable Coverage in Community Centers

Alternative 2 would modify allowable coverage policies as follows:

- Define boundaries of DTZs, which would be the only areas where new commercial and tourist development may be transferred with limited exceptions for specific industrial areas as shown in Exhibits 2-6 through 2-8.
- Set maximum allowable coverage in Community Plan areas and DTZs at 50 percent for both existing development and new development for LCDs 4 through 7.

Relative to Alternative 1, Alternative 2 would reduce maximum allowable coverage in Community Plan areas and the proposed DTZs from 70 percent to 50 percent. However, Alternative 2 would expand the area from which coverage could be transferred into DTZs, and the net effect of proposed new development allocations under Alternative 2 for Community Plan areas and DTZs is estimated to result in 38 acres of additional impervious coverage in high capability lands as compared to existing conditions, 10 acres greater than the additional coverage estimated for Community Plan areas under Alternative 1. To achieve the increased coverage, restoration and transfers of existing coverage would be required. Alternative 2 is estimated to reduce impervious coverage in low capability lands (LCDs 1–3) by 16–22 acres, 7–9 acres of which is estimated to be removed from SEZs (see Section 3.7, Geology, Soils, Land Capability and Coverage for analysis of potential changes in coverage). While coverage in Community Plan areas and DTZs would increase relative to Alternative 1, the additional coverage would still be limited to high capability lands and would be required to meet existing BMP standards to control potential increases in stormwater runoff and pollutant loading from the additional coverage, including maintenance requirements, and therefore this impact would be **less than significant**.

Coverage Transfers and Excess Coverage Mitigation

Alternative 2 would modify coverage transfer policies as follows:

- Provide relatively more incentive for transfer of existing coverage from SEZ and other sensitive lands (defined as LCDs 1–3) to higher capability lands (defined as LCDs 4–7) by adjusting coverage transfer ratios based on the land capability of the sending parcels to favor the transfer of coverage from low capability land. Specific transfer policies would be as follows (sending to receiving):
  - 1:1 from SEZ (LCD 1b);
  - 1.25:1 from LCDs 1a, 1c, 2, 3;
  - 2:1 from LCD 4 and 5; and
  - 3:1 from LCD 6 and 7.
- Reduce existing HRA restrictions by allowing coverage from anywhere in the Tahoe Region to be transferred into the South Shore DTZ, and from anywhere in Placer County to be transferred into the Kings Beach or Tahoe City DTZs. In all other cases, coverage transfers would only be allowed within the same HRA, in accordance with existing policy.
- Limit allowable transfer of soft coverage to bike trails that use pervious materials. Otherwise, prohibit the transfer of soft coverage off-site, and the conversion of soft coverage to hard coverage.

Alternative 2 would modify excess coverage mitigation policies as follows:

- Limit the use of excess coverage mitigation fees to the removal of existing impervious coverage within the same HRA, and allow the use of coverage mitigation fees only for coverage removal, not for retirement of potential coverage.
- Prioritize hard coverage removal from SEZs.

While Alternative 2 would not eliminate current HRA restrictions on transfer of impervious coverage out of low capability lands, it would slightly reduce coverage transfer restrictions as compared to existing conditions by allowing coverage transfers into the South Stateline DTZ from any HRA and into the other two other DTZs from Placer County HRAs. The impact of these changes on coverage transfers is expected to be minor to negligible, because the developable parcels in the South Stateline DTZ greatly exceed allowed coverage, making coverage transfers unnecessary for development and unlikely to occur. Transfers to the Tahoe City and Kings Beach DTZs would not be substantially accelerated, because the one HRA entirely within Placer County and the two additional HRAs partially within Placer County already have an abundance of available coverage and capacity for added coverage is limited. The net effect of proposed impervious coverage transfer policies under Alternative 2 is to continue reducing impervious coverage in low capability lands (LCDs 1–3) (see Section 3.7, Geology, Soils, Land Capability, and Coverage for analysis of potential changes in coverage). Because transfers of impervious coverage out of low capability lands to high capability lands would serve to reduce stormwater runoff and pollutant loading, Alternative 2 would have a **less-than-significant** impact.

As discussed under Alternative 1, existing HRA regulations may diminish the potential water quality benefit that may be achieved from excess coverage removal by reducing the flexibility of land banks to target the most economical and environmentally beneficial coverage removal opportunities in the Tahoe Region with the greatest potential for water quality improvement. Nevertheless, Alternative 2 would target removal of existing impervious coverage that has ongoing impacts instead of potential coverage, which does not represent an existing impact, and by current TRPA regulations must meet BMP requirements when converted to impervious coverage. Because Alternative 2 would target removal of existing impervious coverage with ongoing adverse impacts, Alternative 2 would likely reduce stormwater runoff and associated pollutant loading and would be a **beneficial** impact.

Stormwater Runoff from Coverage Exemptions

No changes to coverage exemptions policies are proposed in Alternative 2. No additional coverage would be created through additional exemptions, and impacts would be **less than significant**.

BMP Retrofit Requirements

Alternative 2 would require that that either (1) a property is in compliance with BMP requirements at the point-of-sale or (2) a financial guarantee is posted at the point-of-sale equal to the cost of implementing BMPs for the property. Current TRPA regulations require that before sale of a property, the owner shall disclose the property's BMP compliance status to the buyer who must then provide the disclosure form to TRPA within 30 days of sale (Section 60.4). The current disclosure system alerts the buyer of a property to their responsibilities for complying with BMP regulations related to the property, but does not enforce BMP requirements at the point-of-sale. Because Alternative 2 would result in an increase in BMP implementation in the Tahoe Region as real estate transactions are completed, and because BMPs serve to decrease stormwater runoff and associate pollutant loading to Lake Tahoe and other water bodies in the Tahoe Region, Alternative 2 would result in a **beneficial** impact.

Water Quality Threshold Amendment: Deep Water (Pelagic) Lake Tahoe Transparency

Alternative 2 would include the proposed water quality threshold amendment for Deep Water (Pelagic) Lake Tahoe Transparency. The standard is a winter average (December to March) of 33.4 meters or greater of Secchi

disk transparency, and is proposed to be changed to an annual average of 29.7 meters or greater. The annual average would be more representative of overall Lake transparency because it would incorporate transparency measurements during spring runoff periods when concentrations of pollutants that reach the Lake are higher. This change would also create consistency with state standards and protocols for evaluating and reporting this water quality metric.

Historic data on the annual average Secchi transparency is available, so it is possible to assess the long-term trend in annual average Secchi transparency. The historical reference period that will be used for annual average standard is the same as that currently used for the winter average indicator, and thus reflects the same historical conditions as the basis for the standard. The general long-term trends in the winter seasonal and annual average data are similar, and use of the annual average allows a single standard to be adopted with confidence that the standard is equally as stringent as the current standard. Data on winter average Secchi transparency will still be collected and can easily be reported in addition to annual average Secchi transparency to ensure all relevant information continues to be available to policy makers and the public. Because the proposed standard is equally stringent to the one being replaced, this threshold amendment would have a **less-than-significant** impact on water quality.

ALTERNATIVE 3: LOW DEVELOPMENT, HIGHLY INCENTIVIZED REDEVELOPMENT

Stormwater Runoff from Allowable Development

In addition to new development associated with unused CFA, TAUs, residential bonus units, and residential allocations remaining from the 1987 Regional Plan, Alternative 3 would authorize 200,000 square feet of new CFA, 2,600 new residential allocations, and 600 new residential bonus units.

Additional impervious coverage that would potentially be created from new residential, commercial, and tourist accommodation developments under Alternative 3 is lower than the build-out scenario analyzed in the Lake Tahoe TMDL (Table 3.8-6). For reasons described above in Alternative 2 related to allowable development potential, the scale and type of allowable new development under Alternative 3 would result in a **less-than-significant** impact.

Stormwater Runoff from Allowable Coverage in Community Centers

Alternative 3 would modify allowable coverage policies as follows:

- Define boundaries of areas designated as Town Centers, the Regional Center, and the High Density Tourist District into which development may be transferred (Exhibits 2-10 through 2-15).
- Set maximum allowable coverage in areas defined as Town Centers, the Regional Center, and the High Density Tourist District to 70 percent for both existing development and new development for LCDs 4–7.

Relative to Alternative 1, Alternative 3 would increase maximum allowable coverage in Town Centers, the Regional Center, and the High Density Tourist District for developed parcels from 50 percent to 70 percent. The net effect of new development allocations authorized under Alternative 3 for Town Centers, the Regional Center, and the High Density Tourist District is estimated to result in 64 acres of additional impervious coverage in high capability lands as compared to existing conditions, and 38 acres greater than the additional coverage estimated for Community Plan areas under Alternative 1. To achieve the increased coverage, restoration and transfers of existing coverage would be required. Alternative 3 is estimated to reduce impervious coverage in low capability lands (LCDs 1–3) by 23–35 acres, 10–15 acres of which is estimated to be removed from SEZs (see Section 3.7, Geology, Soils, Land Capability, and Coverage for analysis of potential changes in coverage). While coverage in Town Centers, the Regional Center, and the High Density Tourist District would increase relative to that estimated for Alternative 1, the additional coverage would still be limited to high capability lands and would be required to meet existing BMP standards to control potential increases in stormwater runoff and pollutant

loading from the additional coverage, including maintenance requirements, and therefore this impact would be **less than significant**.

Coverage Transfers and Excess Coverage Mitigation

Alternative 3 would modify coverage transfer policies as follows:

- Provide more incentive for transfer of existing coverage from lower capability, or sensitive lands (defined as LCDs 1–3) to higher capability lands (defined as LCDs 4–7) by adjusting coverage transfer ratios between sending and receiving parcels to favor the transfer of coverage from low capability sending parcels. Specific transfer policies would be as follows (sending/receiving):
  - 1:1 from sensitive lands (LCD 1, 2, or 3)
  - 1:1 up to 50 percent to LCDs 4–7, then sliding scale ranging from 1.05:1 to 2:1 from 51 percent up to 70 percent, from non-sensitive (LCDs 4–7)
- Eliminate existing HRA restrictions for coverage transfers.
- Allow legally existing and verified soft coverage to be transferred from SEZs (LCD 1b) to Town Centers, the Regional Center, and the High Density Tourist District.
- Allow excess coverage (termed "nonconforming" coverage in the draft policy statement LU-2.13.H) to be maintained when existing development is relocated to Town Centers, Regional Center, or the High Density Tourist District in accordance with all other TRPA Policies and Ordinances and when the prior site is restored and retired.

Alternative 3 would modify excess coverage mitigation policies as follows:

- Allow for excess coverage mitigation fees to be used to remove coverage from any location in the Tahoe Region.

Alternative 3 would eliminate current HRA restrictions on impervious coverage, which would likely increase the total amount of coverage transferred and impervious coverage removed from low capability lands. The net effect of proposed impervious coverage transfer policies under Alternative 3 is to reduce impervious coverage in low capability lands (LCDs 1–3) (see Section 3.7, Geology, Soils, Land Capability, and Coverage for analysis of potential changes in coverage).

Within the definition of land coverage, TRPA defines soft coverage to be "lands so used before February 10, 1972, for such uses as for the parking of cars and heavy and repeated pedestrian traffic that the soil is compacted so as to prevent substantial infiltration." Under the existing Regional Plan, legally existing and verified soft coverage may be transferred following the rules for hard coverage transfers, except soft coverage may not be transferred to commercial or tourist accommodation uses or facilities (with one exception for the South "Y" Industrial Tract Community Plan). Alternative 3 would expand the current ability to transfer legally existing soft coverage out of SEZs into impervious coverage in Town Centers, the Regional Center, and the High Density Tourist District. Because by definition soft coverage substantially restricts infiltration and is typically a highly compacted soil surface, soft coverage can have hydrologic and water quality impacts similar to or greater than hard coverage. For example, soft coverage can generate similar stormwater runoff volumes relative to hard coverage. However, because soft coverage is an erodible surface, the stormwater runoff generated can cause erosion and transport elevated levels of sediment similar to an unpaved road.

Transfers of impervious coverage and legally existing soft coverage out of low capability lands to high capability lands would result in a decrease in stormwater runoff and pollutant loading when transferred impervious coverage and soft coverage meet all existing water quality requirements and are consistent with required BMPs. As discussed under Alternative 1, existing HRA regulation may diminish the potential water quality benefit that may be achieved from excess coverage removal by reducing the flexibility of land banks to target the most

economical and environmentally beneficial coverage removal opportunities in the Tahoe Region with the greatest potential for water quality improvement. Alternative 3 would remove HRA restrictions and would allow for greater flexibility in the use of excess coverage mitigation fees to target removal of coverage from lands with the greatest potential to reduce stormwater runoff and associated pollutant loads, and, as such Alternative 3 would be a **beneficial** impact.

Coverage Exemptions

Alternative 3 includes implementation measures that would exempt, or partially exempt, certain types of coverage from regulations as follows:

- Exempt from coverage calculation requirements, "re-locatable," or temporary coverage without a permanent foundation, of 120 square feet or less on high-capability lands (LCDs 4–7) and that does not require a grading permit under the Code.
- Exclude from the definition of coverage, new pervious decks of up to 500 square feet on high capability lands (LCDs 4–7) subject to design and maintenance requirements to minimize and mitigate impacts. For decks between 501 and 1,000 square feet, the exempted area shall decline on a sliding scale from 100 percent to zero percent. Existing decks would not qualify for exemption through coverage banking or other mechanisms.
- Allow a 25 percent credit for pervious coverage on high capability lands (LCDs 4–7), subject to design and maintenance requirements to minimize and mitigate impacts.
- Exempt non-motorized public trails from coverage calculations, subject to siting and design requirements that minimize and mitigate impacts of additional coverage.

The implementation measures would exempt the types of coverage listed above from allowable coverage calculations, or in the case of pervious coverage provide a credit, but BMPs would continue to be required for all coverage exemptions. Each proposed coverage exemption policy under Alternative 3 is analyzed below.

Temporary Coverage Exemption

By definition, temporary coverage lacks a permanent foundation, and while not explicitly defined, this definition is interpreted for analysis purposes to exclude structures or facilities used for motorized vehicle access, parking, or storage from the exemption. Because temporary coverage would not be associated with motorized vehicles (i.e., driveways, parking lots, and roads), it would likely generate relatively high quality runoff with low levels of sediment that will readily infiltrate on high capability lands. For the proposed temporary coverage exemption, the maximum allowance of 120 square feet of impervious surface would generate a relatively small runoff volume (10 cubic feet of runoff over the current TRPA design storm of 1-inch of precipitation per hour). Assuming runoff from the temporary coverage flowed to an adjacent pervious area of high-capability land, the runoff volume generated during the TRPA design storm could be retained and infiltrated in a standard sized infiltration trench (TRPA 2011a: p. 4-19), or another type of pre-approved BMP described in the BMP Handbook. Because of the low runoff volume and the high quality of the runoff, and that BMPs meeting current TRPA standards would be required, water quality impacts from exemption of temporary coverage would be **less than significant**.

Pervious Deck Exemption

Pervious decks would generate relatively high quality runoff with low levels of sediment that should readily infiltrate on high capability lands. Based on the quality of runoff, minimal maintenance requirements would be necessary to ensure continued infiltration of runoff from pervious decks that freely allow precipitation and runoff to pass through the surface of the deck to the underlying ground. For decks, existing TRPA design requirements specified in the BMP Handbook require deck armoring with 3 inches of drain rock or cobble under the entire area of a deck (TRPA 2011a: p. 4-65). Drain rock has a void ratio of roughly 40 percent, therefore 3 inches of drain rock provides 1.2 inches of storage for runoff when installed on a level surface. Based on the amount of runoff storage created by existing design requirements, existing policy and requirements would

provide adequate mitigation for potential runoff impacts for a pervious deck exemption on high capability land. However, without explicit design requirements, the pervious deck exemption could result in construction of new surfaces that do not allow adequate passage of water through the surface, do not adequately infiltrate runoff beneath the deck, and could lead to erosion and stormwater runoff. This would be a **potentially significant** impact.

Analysis of Proposed Pervious Coverage Exemptions

While not defined within the proposed implementation measure, pervious coverage is assumed to refer to pervious pavement or permeable pavers, which are typically comprised of a surface (typically porous concrete or impermeable blocks separated by spaces and joints) that allows for movement of water through the surface into an underlying storage layer that can infiltrate stormwater runoff.

Pervious pavements can be highly effective for reducing stormwater runoff volumes because the design provides a large surface area for infiltration and the capacity of the underlying storage layer will typically exceed current regulatory standards for storage of precipitation (e.g., 20-year 1-hour design storm). For example, design recommendations contained within the TRPA BMP Handbook call for a base course of 12 inches of uniformly graded crushed rock with an average void space of 30–40 percent beneath pervious pavement. Assuming pervious pavement is designed to only infiltrate precipitation that directly falls on its surface; current design TRPA design guidelines provide a storage capacity of roughly 4 inches of precipitation (TRPA 2011a: BMP 4.1.1.1).

However, performance of pervious pavements can markedly decline if the voids in the surface layer clog over time, and continued effectiveness may require frequent maintenance to preserve the infiltration rate through the surface layer. Based on the potential need for frequent maintenance, pervious pavement should be sited to infiltrate high quality runoff with low sediment loads as specified in the BMP Handbook. The currently proposed implementation measure does not specify siting requirements for pervious coverage, and therefore the proposed exemption could allow for siting of pervious pavement in areas with poor quality stormwater runoff that could cause the pervious coverage to rapidly clog and potentially require frequent maintenance to restore infiltration capacity. As such, the effectiveness could be diminished over the long term, and therefore the pervious coverage could become ineffective at allowing runoff to pass though the surface and could increase stormwater runoff, creating a **potentially significant** impact.

Analysis of Aggregate Effect of Coverage Exemptions and Credits

The implementation measures create coverage exemptions of (1) up to 120 square feet of temporary coverage; (2) up to 750 square feet of pervious decking; and a coverage credit for 25 percent of the total amount of pervious coverage installed on a parcel. These proposed implementation measures do not relate the size of proposed coverage exemptions or credit to the size of a parcel or the Bailey land capability system. Exhibit 3.8-6 presents the potential aggregate coverage impacts from coverage exemptions graphically by showing the amount of base allowable coverage, temporary coverage, and pervious decking that would be allowed relative to the size of a parcel for LCD 6 and LCD 7 (base allowable coverage of 30 percent). As shown in Exhibit 3.8-6, smaller parcels could potentially achieve very high levels of aggregate coverage and coverage exemptions. Potential additional coverage from a pervious coverage credit is not shown in Exhibit 3.8-6, as the additional coverage created would depend on the amount of pervious coverage created. However, the pervious coverage credit would have a similar effect as the coverage exemptions shown.

The potential scenario described under the proposed policies could allow aggregate coverage exemptions well in excess of currently allowable coverage limits under the Bailey land capability system, which are considered necessary in the Region to protect water quality and preserve environmental balance at the individual parcel scale (Bailey 1974:p. 24). Because the proposed implementation measures create exemptions and credits that are not explicitly linked to the Bailey land capability system or the size a parcel, the implementation measures may result in coverage impacts that cannot be adequately mitigated by remaining pervious areas on a parcel,

and therefore the implementation measures would be a **potentially significant** impact to stormwater runoff and associated pollutant loading.

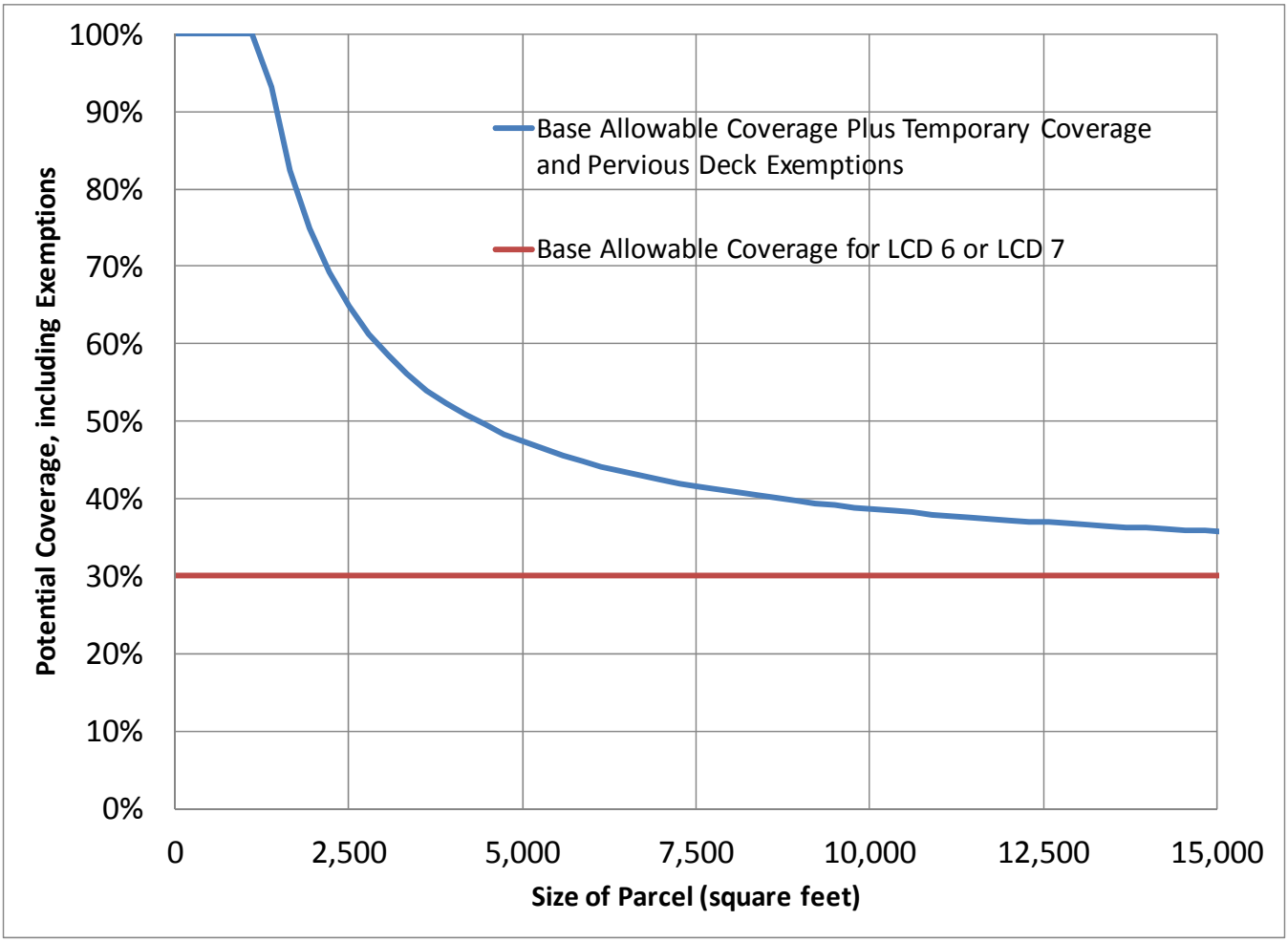


Exhibit 3.8-6. Effect of Static Coverage Exemptions

Analysis of Proposed Non-Motorized Trail Exemptions

Non-motorized trail exemptions would create additional impervious coverage associated with bike trails or shared use paths that would not be associated with vehicle use. Two recent studies assessed the potential environmental impacts of bike trails or shared use paths in the Tahoe Region (Alta Planning and Design [Alta] 2009, NHC 2011). Both studies noted a lack of previous research and data as a limited factor in drawing conclusions on the potential water quality effect of bike trails in the Region. However, both studies offered similar general findings as summarized below (Alta 2009:p. 4):

- Although bicycle paths may contribute in small amounts to urban runoff through addition of impervious coverage, they do not have the same adverse impacts on water quality as roadways because traction materials (e.g., sand, salt) are not typically applied and they do not collect pollutants typical of motor vehicle use (e.g., hydrocarbons, heavy metals).
- The construction of a new path would encourage some people to shift their motor vehicle trip to a bicycle or walking trip. However, recent research suggests that the dust and emissions associated with reducing VMT only have a minor effect on water quality.
- Construction of new bicycle facilities can adversely affect SEZs in several ways, including disturbing vegetated areas, disturbing wildlife, and altering flow and drainage patterns. However, within the Tahoe Region, the TRPA Code of Ordinances requires mitigation of all SEZ impacts, and in cases where mitigation is

not possible (such as in the case of loss of encroachment into sensitive wildlife habitat), does not allow bicycle paths to be constructed.

- In general, if mitigated properly, the adverse impacts to water quality from construction of non-motorized paths are small.

The proposed exemption of non-motorized trails from coverage calculations does not relate the size of a proposed coverage exemption to the size of a parcel or the Bailey land capability system. Furthermore, the proposed implementation measure does not set an explicit limit on the amount of additional coverage that may be created under this exemption. To assess the overall impact of the proposed policy, an estimate of additional coverage that may be created under the proposed implementation policy using the trail networks identified in the *Lake Tahoe Region Bike Trail and Pedestrian Plan* (TMPO 2010). Table 3.8-8 presents the estimate of additional coverage by LCD.

Table 3.8-8. Estimated Additional Coverage from Non-Motorized Trail Exemption Using Trail Networks Identified in the Lake Tahoe Region Bike Trail and Pedestrian Plan

Land Capability District	Estimated Additional Coverage (Acres)
1a	11-23
1b (SEZ)	3-5
1c	2-9
2	10-11
3	4-10
4	9-20
5	30-36
6	26-39
7	7-14
Total	127-141

Source: TMPO 2010

The following analyzes potential impacts based on three categories of LCDs where potential bike trails might be sited (higher capability: LCDs 4–7; lower capability: LCDs 1a, 1c, 2, and 3; and SEZ: LCD 1b).

Higher Land Capability Districts: 4 through 7

Because additional coverage would not be associated with motorized vehicles, it would likely generate relatively high quality runoff with low levels of sediment that will readily infiltrate on high capability lands. Trails sited away from other development on high capability lands that are designed to sheet flow runoff to pervious receiving areas could rely on the natural environment as treatment (NEAT) approach for mitigating potential impacts to stormwater runoff. The NEAT approach is a new methodology developed by Caltrans, and accepted by LRWQCB, which recognizes that in specific environmental setting in the Tahoe Region sheet flow of runoff from roadways can naturally be treated by the surrounding pervious area and not create a water quality impact. A NEAT segment of Caltrans roadway is defined as "a segment of roadway where pollutants that would be transported by storm water runoff are adequately addressed by the natural environment. This may be accomplished through infiltration and/or absorption by vegetation. Due to distance and/or the topography of the down gradient land, a NEAT segment may be reasonably assumed to be incapable of discharging storm water runoff generated from the roadway surface to a receiving water body" (Wood Rodgers 2010:p. 3).

While the impacts of additional coverage may be adequately mitigated from non-motorized trails with relatively high quality runoff when sited and designed to meet specific guidelines for sheet flow of runoff to pervious receiving areas, the implementation measure might allow substantial increases in the percent coverage on some

parcels, and this approach is inconsistent with Bailey land capability system. Furthermore, the proposed implementation measure does not set an explicit limit on the amount of additional coverage that may be created under this exemption and therefore the extent of the potential impact is unknown and could be a **potentially significant** impact.

Lower Land Capability Districts: 1a, 1c, 2, and 3

As defined by Bailey (1974), LCDs in this category are the least suitable for development. LCDs 1a, 1c and 2 are defined as having extremely steep slopes (greater than 30 percent) with a high erosional potential. Consequently, allowable land coverage is limited to 1% for LCDs 1a, 1c, and 2. LCD 3 is only slightly more suitable for development, as this class of land is defined as having steep slopes (9–30 percent) and a moderate erosional potential. Allowable land coverage is limited to 5% of for LCD 3.

As shown in Table 3.8-8, the proposed non-motorized trail exemption could create a notable increase in coverage in these lower LCDs (the total estimate of additional coverage ranges from 27-53 acres). However, this estimate does not adequately convey the total area of potential water quality impacts. Construction of bike trails within these lands would disturb adjacent land and would create notable cut and fill slopes based on these lands having (1) extreme slopes, (2) naturally high erosion potential, and (3) limited ability to support vegetation. Given the highly erodible and steep environment within these lands, the construction of the non-motorized trails would likely produce erosional impacts from cut and fill slopes and therefore the impact would be **significant**.

Land Capability District: 1b (SEZ)

Where bike paths cross SEZs, they have potential impacts on the hydrologic and water quality functions of these highly valued and sensitive environments. Adopted water quality plans and code for TRPA and LRWQCB establish mandatory requirements to minimize disturbance in SEZs. The US Army Corps of Engineers, LRWQCB, and Nevada Department of Environmental Protection regulate disturbance in wetlands and waters of the United States. In the Tahoe Region, any increase in impervious coverage in the SEZ land capability class requires compensation in the form of new or banked coverage removal in SEZ. In addition to specific water quality plan and code requirements, compliance with federal, state, and regional environmental regulation requires assessment of a full range of potential impacts (NHC 2011: p. 30).

Various design approaches may be used to minimize water quality and hydrologic impacts to an SEZ associated with construction of new bicycle and pedestrian facilities. Most recently, the document *SEZ Bike Trail and Construction* (NHC 2011) analyzed three different design methods for crossing SEZs for trails meeting the definition of a Class 1 Bikeway (Shared Use Path):

- Boardwalk: 10 to 12 feet wide, 18 to 30 inches above grade, no railing, spans less than 20 feet between supports
  - Traditional: Poured footings with wood decking
  - Non-traditional: Pin-type or helical pier footings with fiberglass or recycled material decking
- Causeway: 10 feet asphalt/concrete surface, 2 feet clear zone each side, 12 to 18-inch elevation with riprap side slope protection (1:1)
- Bridge: 12 feet wide, 3 to 5 feet above grade with railing, spans 20 to 50 feet between supports

Alternative 3 estimated that the non-motorized trail exemption would result in an increase of 3-5 acres of coverage in SEZs (Table 3.8-8) by assuming the bike paths created by the exemption would follow, and be limited to, the routes defined by the Lake Tahoe Region Bike Trail and Pedestrian Plan (TMPO 2010). The amount of impervious coverage that may be removed from SEZs under Alternative 3 based on revised coverage transfer policies is estimated at 10–15 acres, and therefore the net effect under Alternative 3 may be a reduction of 7-10 acres of impervious coverage in SEZs. However, as mentioned previously, the proposed implementation measure does not set an explicit limit on the amount of additional coverage that may be

created under this exemption and therefore the estimated increase in coverage in SEZs in uncertain, and therefore the implementation measure could be a **potentially significant** impact.

BMP Retrofit Requirements

Under Alternative 3, there would be no change to existing policies related to BMP retrofit requirements to target enforcement strategies to increase BMP compliance for prioritized parcels with the greatest potential for water quality improvement. Under Alternative 3, a proposed revision to TRPA policy would highlight the use of areawide water quality treatment facilities and funding mechanisms as an alternative to meeting regulatory requirements with site-, parcel-, or project-specific BMPs when areawide treatment facilities can be shown to provide equal or greater water quality benefits relative to parcel-specific BMP implementation. While areawide treatment solutions have been implemented on a limited basis under current TRPA policy to facilitate BMP compliance on properties with special circumstances that constrain BMP implementation (e.g., Stateline Stormwater Association in Stateline, Nevada), the revised policy would expand the ability to implement areawide treatment facilities to any area in the Region where the water quality benefit of the approach can be demonstrated to meet or exceed existing water quality requirements. In general, areawide water quality treatment facilities are expected to be more cost effective for large projects in community centers to implement, inspect, and maintain because the strategy allows for greater flexibility in siting and designing treatment systems and may lead to more efficient maintenance practices relative to conducting the maintenance activities on many smaller and widely distributed individual parcels and sites.

Because the TRPA Stormwater Management Program would continue its targeted enforcement strategy to increase BMP compliance for prioritized parcels with the greatest potential for water quality improvement, and because areawide treatment systems would be required to provide the same or greater water quality benefit as individual BMP systems, Alternative 3 would result in further reductions in stormwater runoff volumes and associated pollutant, which would be a **beneficial** impact.

Water Quality Threshold Amendment: Deep Water (Pelagic) Lake Tahoe Transparency

Alternative 3 would also include the proposed water quality threshold amendment for deep water (pelagic) Lake Tahoe transparency, as described in Alternative 2. For reasons described above in Alternative 2, this impact would be **less than significant**.

ALTERNATIVE 4: REDUCED DEVELOPMENT, INCENTIVIZED REDEVELOPMENT

Stormwater Runoff from Allowable Development

In addition to new development associated with unused CFA and residential allocations under the existing Regional Plan, Alternative 4 would authorize 400,000 square feet of new CFA, 4,000 new residential allocations, and 200 new TAUs.

Additional impervious coverage that would potentially be created from new residential, commercial, and tourist accommodation developments under Alternative 4 is lower than the build out scenario analyzed in the Lake Tahoe TMDL (Table 3.8-6). For reasons described above in Alternative 2, the scale and type of allowable new development under Alternative 4 would be a **less-than-significant** impact.

Stormwater Runoff from Allowable Coverage in Community Centers

Alternative 4 would modify allowable coverage as follows:

- Define boundaries of areas designated as Pedestrian- and Transit-Oriented Development (PTOD) transects into which development may be transferred (Exhibits 2-17 through 2-24).
- Set maximum allowable coverage in areas defined as Community Plans and PTOD transects to 70 percent for both existing development and new development for LCDs 4–7.

Relative to Alternative 1, Alternative 4 would increase maximum allowable coverage in areas classified as PTOD transects for existing development from 50 percent to 70 percent. The net effect of new development allocations authorized under Alternative 4 for PTOD transects is estimated to result in 48 acres of additional impervious coverage in high capability lands, which is 20 acres greater than the additional coverage estimated for Community Plan areas under Alternative 1. To achieve the increased coverage, restoration and transfers of existing coverage would be required. Alternative 4 is estimated to reduce impervious coverage in low capability lands (LCDs 1–3) by 18–27 acres, where 8–12 acres of that total is estimated to be removed from SEZs (see Section 3.7, Geology, Soils, Land Capability, and Coverage, for analysis of potential changes in coverage). While coverage in PTOD transects would increase relative to that estimated for Alternative 1, the additional coverage would still be limited to high capability lands and would be required to meet existing BMP standards to control potential increases in stormwater runoff and pollutant loading from the additional coverage, including maintenance requirements, and therefore this impact would be **less than significant**.

Coverage Transfers and Excess Coverage Mitigation

Alternative 4 would modify coverage transfer policies as follows:

- Provide more incentive for transfer of existing coverage from lower capability, or sensitive lands (defined as LCDs 1–3) to higher capability lands (defined as LCDs 4–7) by adjusting coverage transfer ratios between sending and receiving parcels to favor the transfer of coverage from low capability sending parcels. Specific transfer policies would be as follows (sending/receiving):
  - 1:1 from sensitive (LCDs 1–3)
  - 2:1 from non-sensitive (LCDs 4–7)
- Allow coverage transfers across HRA boundaries from an impaired watershed (an HRA that exceeds, in aggregate, its allowable coverage) to an HRA that is not impaired.
- Allow transfer of soft coverage from sensitive lands (LCDs 1, 2, or 3) into Community Plan areas and PTOD transects.

Alternative 4 would modify excess coverage mitigation policies as follows:

- Allow for excess coverage mitigation fees to be used to removal of coverage from sensitive lands (LCDs 1, 2, or 3) across HRA boundaries, or removal of coverage from any LCD within the same HRA.

Alternative 4 would allow impervious coverage to be transferred from an “impaired” HRA to a “non-impaired” HRA. An impaired HRA is defined to have existing impervious coverage exceeding allowable base land coverage when aggregated across all LCDs. Based on TRPA analysis (2011c), three of the nine HRAs in the Tahoe Region are considered impaired: South Stateline HRA; Cave Rock HRA; and Incline HRA. The net effect of proposed impervious coverage transfer policies under Alternative 4 is to reduce impervious coverage in low capability lands (LCDs 1–3) (see Section 3.7, Geology, Soils, Land Capability, and Coverage for analysis of potential changes in coverage).

Because transfer of impervious coverage and legally existing soft coverage out of low capability lands (where it is more difficult to mitigate impacts) to high capability lands (where it is easier to mitigate impacts) can decrease stormwater runoff and pollutant loading when transferred impervious coverage and soft coverage meets all existing water quality requirements as well as mitigation measures required herein, Alternative 4 would have a **beneficial** impact.

As discussed under Alternative 1, existing HRA regulation may diminish the potential water quality benefit that may be achieved from coverage removal by reducing the flexibility of land banks to target the most economical and environmentally beneficial coverage removal opportunities in the Tahoe Region with the greatest potential for water quality improvement. While Alternative 4 would not eliminate HRA restrictions, it would allow excess

coverage mitigation fees to be used to remove coverage on low capability lands regardless of the location in the Tahoe Region. Because Alternative 4 would reduce HRA restrictions and would allow for greater flexibility in the use of excess coverage mitigation fees, Alternative 4 would could reduce stormwater runoff and associated pollutant loads and would be a **beneficial** impact.

Coverage Exemptions

Alternative 4 would include the same coverage exemptions described and analyzed for Alternative 3 for temporary coverage, pervious coverage, and pervious decks. For the reasons described under Alternative 3, the impacts of these coverage exemptions would be **potentially significant**.

In addition to coverage exemptions included under Alternative 3, Alternative 4 would include the following coverage exemption:

- Land coverage underlying building access ramps and other facilities that are required to be installed by the Americans with Disabilities Act (ADA) are exempt from the calculation of land coverage, subject to the following limitations:
  - This exemption applies only to ADA facilities that are constructed on or after January 1, 2013 to serve buildings that were constructed before January 1, 2013;
  - The ADA facilities shall be constructed with the minimum amount of new coverage necessary to provide required access to buildings;
  - Where new coverage is required, decking or other pervious surfaces shall be used wherever possible;
  - Facilities shall be constructed on high capability land wherever possible;
  - Parcels shall have a BMP Certificate to qualify for this exemption.

The net effect of proposed coverage exemption under Alternative 4 is estimated to result in an increase of 5 acres in coverage in the Region associated with the retrofit of existing buildings to meet ADA requirements (see Section 3.7, Geology, Soils, Land Capability, and Coverage for analysis of potential changes in coverage). The potential runoff impacts from the proposed exemption appear to be feasible to mitigate under existing BMP requirements because (1) runoff generated would be of relatively high quality with low levels of sediment associated with building runoff; (2) coverage on an individual parcel basis would be minimally increased to that required to comply with ADA access for a building; and (3) it would require a parcel to have a BMP Certificate to qualify for the ADA coverage exemption. However, the proposed policy does not explicitly exclude structures or facilities used for motorized vehicle access, parking, or storage from the exemption, and therefore the policy could be interpreted to include parking facilities, which could notably increase the amount of allowable coverage under the policy and create a **potentially significant** impact to stormwater runoff and associated pollutant loading.

BMP Retrofit Requirements

Under Alternative 4, there would be no change to existing policies related to BMP retrofit requirements. For reasons described above in Alternative 1, continuance of existing policy through the TRPA Stormwater Management Program with its targeted enforcement strategy to increase BMP compliance for prioritized parcels with the greatest potential for water quality improvement would be a **beneficial** impact.

Water Quality Threshold Amendment: Deep Water (Pelagic) Lake Tahoe Transparency

Alternative 4 would also include the proposed water quality threshold amendment for deep water (pelagic) Lake Tahoe transparency, as described in Alternative 2. For reasons described above in Alternative 2, this impact would be **less than significant**.

ALTERNATIVE 5: SIMILAR RATE OF DEVELOPMENT AND REGULATORY STRUCTURE TO THE 1987 REGIONAL PLAN

Stormwater Runoff from Allowable Development

In addition to new development associated with unused CFA and residential allocations under the existing Regional Plan, Alternative 5 would authorize 600,000 square feet of new CFA, 5,200 new residential allocations, and 400 new TAUs.

Additional impervious coverage that would potentially be created from new residential, commercial, and tourist accommodation developments under Alternative 5 is lower than the build out scenario analyzed in the Lake Tahoe TMDL (Table 3.8-7). For reasons described above in Alternative 2, the scale and type of allowable new development under Alternative 5 would be a **less-than-significant** impact.

Stormwater Runoff from Allowable Coverage in Community Centers

Alternative 5 would maintain the existing coverage regulations for high-capability lands (LCDs 4–7) within Community Plan areas.

The net effect of development allocations authorized under Alternative 5 in Community Plan areas is estimated to result in 56 acres of additional impervious coverage in high capability lands, which is 28 acres greater than the additional coverage estimated for Community Plan areas under Alternative 1. To achieve the increased coverage, restoration and transfers of existing coverage would be required. Alternative 5 is estimated to reduce impervious coverage in low capability lands (LCDs 1–3) by 13–23 acres, where 6–10 acres of that total is estimated to be removed from SEZs (see Section 3.7, Geology, Soils, Land Capability, and Coverage, for analysis of potential changes in coverage). While coverage in Community Plan areas would increase relative to that estimated for Alternative 1, the additional coverage would still be limited to high capability lands and would be required to meet existing BMP standards to control potential increases in stormwater runoff and pollutant loading from the additional coverage, including maintenance requirements, and therefore this impact would be **less than significant**.

Coverage Transfers and Excess Coverage Mitigation

Alternative 5 includes the same existing policies related to coverage transfers and excess coverage mitigation as Alternative 1, which would allow for impervious coverage removal from low capability lands. The net effect of proposed impervious coverage transfer policies under Alternative 5 is to reduce impervious coverage in low capability lands (LCDs 1–3) (see Section 3.7, Geology, Soils, Land Capability, and Coverage, for analysis of potential changes in coverage). Because transfer of impervious coverage out of low capability lands (where it is more difficult to mitigate impacts) to high capability lands (where it is easier to mitigate impacts) can decrease stormwater runoff and pollutant loading when transferred impervious coverage meets all existing water quality requirements as well as mitigation measures required herein, Alternative 5 would be a **beneficial** impact.

Coverage Exemptions

Under Alternative 5, there would be no change to coverage exemptions policies. Alternative 5 would not result in the creation of additional coverage through additional exemptions, and the impact would be **less than significant**.

BMP Retrofit Requirements

Alternative 5 would require that that either (1) a property is in compliance with BMP requirements at the point-of-sale; or (2) a financial guarantee is posted at the point-of-sale equal to the cost of implementing BMPs for the property. Policies proposed under Alternative 5 for BMP retrofit requirements are identical to those proposed under Alternative 2. For reasons described above in Alternative 2, this impact would be **beneficial**.

Water Quality Threshold Amendment: Deep Water (Pelagic) Lake Tahoe Transparency

Alternative 5 would also include the proposed water quality threshold amendment for deep water (pelagic) Lake Tahoe transparency, as described in Alternative 2. For reasons described above in Alternative 2, this impact would be **less than significant**.

MITIGATION MEASURES

The following mitigation measures are required for Alternatives 3 and 4.

Mitigation Measure 3.8-4: Coverage Exemption Requirements

For Alternatives 3 and 4, as applicable, TRPA will, through Code amendments, TRPA-approved plans, project permitting, or projects/programs developed in coordination with local or other governments:

A. Temporary Coverage

- *Specify that the temporary coverage exemption does not apply to structures or facilities used for motorized vehicle access, parking, or storage.*

- *Specify that only parcels with installed and maintained BMPs meeting TRPA requirements shall qualify for the temporary coverage exemption. As part of this provision, the exempted temporary coverage must also have BMPs installed and maintained to meet TRPA requirements.*

- *Limit the temporary coverage exemption to 2 percent of the total amount of high capability land on a parcel or 120 square feet, whichever is less, provided that the temporary coverage meets BMP requirements and is located on high capability land (LCDs 4-7).*

B. Pervious Decks

- *Specify that only residential parcels with installed and maintained BMPs meeting TRPA requirements shall qualify for the pervious deck exemption.*

- *Include design characteristics that qualify a pervious deck for exemption that can be easily interpreted by both TRPA staff and homeowners in the Region. For example: "a pervious deck shall have gaps that allow water to pass freely and in a distributed fashion to deck armoring underneath the deck meeting BMP requirements in the BMP Handbook."*

- *Limit the pervious deck exemption to 5 percent of the total amount of high capability land on a parcel or 750 square feet, whichever is less, provided that the pervious deck meets BMP requirements and is located on high capability land (LCDs 4-7).*

C. Pervious Coverage Exemption

- *Specify that only parcels with installed and maintained BMPs meeting TRPA requirements shall qualify for the pervious coverage exemption.*

- *Restrict the coverage credit of pervious coverage to locations with low sediment loads (e.g., locations that don't receive road abrasives, locations that are not tributary to runoff that may contain road abrasives, locations that are not tributary to runoff associated with erodible surfaces) unless a redundant infiltration BMP is in place.*

D. Aggregate of Coverage Exemptions and Credits on Developed Parcels

- *Restrict the total exemption for temporary coverage and pervious decks; and the pervious coverage credit to be in aggregate no more than 10 percent of total amount of high capability land on a parcel.*

E. Non-Motorized Trail Exemption

- *Develop and require design guidelines for non-motorized trails that address sensitivity of conditions in LCDs 1a, 1b, 1c, 2, and 3.*

- *Limit the maximum amount of allowable exempted coverage under this policy for high capability lands to the trail networks identified in the Lake Tahoe Region Bike Trail and Pedestrian Plan (TMPO 2010) and other necessary trail connections to the trails identified in the Lake Tahoe Region Bike Trail and Pedestrian Plan.*

F. ADA Exemption (Alternative 4)

- *Explicitly clarify in the policy that exempted coverage may not be associated with vehicle use (e.g., parking spaces).*

- *Specify that only parcels with installed and maintained BMPs meeting TRPA requirements shall qualify for the ADA Exemption.*

Significance After Mitigation

Implementation of Mitigation Measure 3.8-4 would reduce impacts under Alternatives 3 and 4 to a **less-than-significant** level because implementation of Mitigation Measure 3.8-4 would require eligibility for coverage exemptions to be linked to BMP requirements, design guidelines, and the Bailey land capability system.

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