This section describes and evaluates existing surface water bodies and groundwater resources within the Program project limits.

3.2.1 Environmental Setting

US 50 and SR 89 within the project limits are dominated by forested upland areas, meadows, wetlands, mountainous alpine terrain, and streams. For Tahoe City, approximately 14.0 km (8.7 miles) north of the northern project limit, the average annual precipitation is 813 millimeters (32 inches), and the average annual air temperature is 6.3 degrees Celsius (°C; 43 degrees Fahrenheit [°F]), with average monthly extremes of –7.2°C (19.0°F) in January and 25.4°C (77.7°F) in July.[5] Snowfall typically occurs within the Lake Tahoe Basin between the months of October through May but can occur as early as September and as late as June.

3.2.1.1 Regional Hydrology

The climate of the Lake Tahoe Basin is dominated by strong winter Pacific storms, which yield a significant snow accumulation during the winter and early spring seasons. Summer and fall seasons are mild, with precipitation often limited to convective storms. The resulting hydrology of the Lake Tahoe Basin reflects a strong seasonal pattern of runoff to the Lake, with spring snowmelt dominating the inputs to the Lake through tributary stream flows. Occasional warm winter storms can lead to dramatic “rain on snow” events and can produce significant runoff, flooding, and erosion (Tyler and Ramsing 1997).

The following sections discuss existing natural drainages, stream groups or surface water bodies, groundwater, and local climates. Existing drainage systems include box culverts, inlets, ditches and a few collection basins; see Section 3.2.4 for the approximate locations of existing culverts within the US 50 and SR 89 project limits. All eight segments are within the Lake Tahoe Hydrologic Unit (LTHU). For the purpose of this regional hydrology discussion, all three US 50 segments are discussed together as they are in same South Lake Tahoe area with regard to local conditions and hydrology. SR 89 Segment 1 is discussed by itself because it is located the farthest south of all the segments within the Luther Pass drainage. SR 89 Segments 2 and 3 are discussed together because they are located near the southern shoreline of the South Lake Tahoe area. SR 89 Segments 4 and 5 are discussed together because they are to the north along the western shoreline of Lake Tahoe.

US 50 Segments 1, 2, and 3

Surface water bodies along these segments include lakes, meadow marshes, and wetlands. Figure 3.2-1 in Section 3.2.1.3 depicts the water bodies that intersect US 50 within the project limits. The roadway along Segment 3 ranges in elevation from 1,900 to 1,920 meters (6,230 to 6,290 feet) and slopes generally downward from east to west. The roadway along Segment 2 ranges in elevation from 1,910 to 1,934 meters (6,267 to 6,345 feet) and slopes generally downward from south to north, except where the road descends from the segment’s midpoint to the US 50/SR 89 “Y” intersection. Along Segment 1, the roadway topography is within an elevation range from 1,915 to 2,182 meters (6,282 to 7,160 feet) and slopes generally downward from south to north.

[5] National Weather Service, California Climate Normals for 1914–2003 within the project limits.

SR 89 Segment 1

There are three creeks or water bodies within this segment of SR 89 (see Section 3.2.1.3). The water bodies adjacent to this segment of SR 89 include some lakes or wetlands, in particular, marsh areas within Grass Lake Creek and Big Meadows Creek, and the Upper Truckee River basin. This segment ranges in elevation from 1,920 to 2,440 meters (6,300 to 8,000 feet) and slopes generally downward from south to north.

SR 89 Segments 2 and 3

Thirteen creeks or water bodies are within this portion of SR 89. The water bodies adjacent to this part of the highway include some lakes, wetlands, and bays; specifically, Truckee Marsh, Cascade Lake, Eagle Lake, Emerald Bay, and part of Rubicon Bay. These segments range in elevations from 1,890 to 2,012 meters (6,200 to 6,600 feet) and slope generally downward from north to south.

SR 89 Segments 4 and 5

Five creeks or water bodies are within this portion of SR 89. Some of the water bodies adjacent to this part of the highway are either bays or wetlands; namely, Meeks Bay and parts of Rubicon Bay. These segments range in elevation from 1,890 to 2,100 meters (6,200 to 6,900 feet), sloping generally down from south to north.

3.2.1.2 Groundwater Resources

Groundwater information within the project limits was obtained from the U.S. Geological Survey (USGS) national groundwater database (USGS 2006). The groundwater monitoring locations identified in this section were chosen based on their close proximity to the project segments and whether measurements of groundwater levels have been reported over a period of at least 10 years. Groundwater data were not readily available for many of the segments. The data from the monitoring sites that were closest to segments for which no data were found were assumed to be representative of those segments.

Groundwater information was most readily available for the project area bordered by the US 50 and SR 89 “Y” intersection and the South Lake Tahoe shoreline where US 50 Segments 2 and 3 and SR 89 Segment 2 are located. Along US 50 Segment 2, groundwater is generally between 5 to 11 meters (15 to 35 feet) below ground surface (bgs). Groundwater is between 0 to 21 meters (0 to 70 feet) bgs along US 50 Segment 3. Along the South Lake Tahoe shoreline, groundwater is generally 3 to 6 meters (10 to 18 feet) bgs.

Aquifers in the Lake Tahoe Basin are generally small in extent. The Lake Tahoe Basin is characterized by steep topography dominated by fractured intrusive and extrusive rocks that generally lack significant groundwater resources. Significant groundwater resources appear to be limited to the alluvial and lacustrine sediments that filled the distal portions of the tributary valleys (Tyler and Ramsing 1997). These alluvial aquifers are neither vertically nor laterally extensive in the small watersheds. They are, however, thicker near the lake (Tyler and Ramsing 1997).

Groundwater transmissivity ranges from 19 to 683 square meters (m^2) (205 to 7,352 square feet) per day according to data obtained from groundwater sites in the Upper Truckee/Trout Creek vicinity (Tyler and Ramsing 1997).

Groundwater elevations at the Upper Truckee/Trout Creek area depend on the time of the year when the measurement is taken. Seepage may be encountered in rock fractures, and seepage and groundwater conditions vary according to variations in rainfall, snowmelt, pumping, construction activities, and water levels in Lake Tahoe and the Upper Truckee River.

Groundwater is the primary source of drinking water within the project area. The South Tahoe Public Utility District (STPUD) provides drinking water to the area generally crossed by US 50 Segments 1, 2, and 3 and SR 89 Segments 1 and 2 (STPUD 2004). The Tahoe City Public Utility District (TCPUD) provides water via its Rubicon System to the area generally extending from D.L. Bliss State Park to about Meeks Bay (El Dorado County Water Agency 2003). That portion of the TCPUD is crossed by SR 89 Segments 4 and 5. In the past, drinking water supply included surface water sources (including from Lake Tahoe); however, these service systems now rely on groundwater for drinking water supplies.

3.2.1.3 Surface Water Resources

The following sections discuss the waterways along the five roadway segments on SR 89 and three roadway segments on US 50. The discussions include existing waterways listed on the Lahontan Regional Water Quality Control Board's (Lahontan RWQCB's) 303(d) list, required by the 1972 CWA, which states that waterways that are included on this list do not meet water quality standards and are subject to water quality improvement actions. Lake Tahoe has been classified as impaired by sediment and nutrient inputs, of which road sand and highway runoff are major constituents. Road sand from Caltrans operations and highway runoff including nitrogen and phosphorus are recognized sources of lake pollution.

The 1995 Water Quality Control Plan for the Lahontan Region (Basin Plan) sets water quality standards and effluent limits established to protect water for beneficial uses within the areas of discharge and to meet/achieve water quality objectives. Table 3.2-1 lists the Basin Plan effluent limits for surface discharges and runoff discharges to infiltration systems.

Table 3.2-1
Stormwater Effluent Limits

Surface Discharges	
Surface water runoff which directly enters Lake Tahoe, or a tributary thereto, shall meet the following constituent levels:	
Constituent	Maximum Concentration
Total Nitrogen as N	0.5 mg/L
Total Phosphate (measured as Total Phosphorus)	0.1 mg/L
Total Iron	0.5 mg/L
Turbidity	20 NTU
Grease and Oil	2.0 mg/L
Runoff Discharge to Infiltration Systems	
Waters infiltrated into soils should not contain excessive concentrations of nutrients which may not be effectively filtered out by soils and vegetation.	
Constituent	Maximum Concentration
Total Nitrogen as N	5 mg/L
Total Phosphate (measured as Total Phosphorus)	1 mg/L
Total Iron	4 mg/L
Turbidity	200 NTU
Grease and Oil	40 mg/L

Source: Basin Plan (Lahontan RWQCB 1995)
mg/L = milligrams per liter; NTU = nephlometric turbidity units

US 50 Segments 1, 2, and 3

Natural drainages within the project area that intersect US 50 include the Upper Truckee River and its tributaries; the Upper Truckee River intersects US 50 in three places (Figure 3.2-1). In addition, a large meadow system, likely to be a jurisdictional wetland, occupies the Upper Truckee River basin bordered by the US 50/SR 89 "Y" intersection and Lake Tahoe's southern shoreline. Other surface water bodies within the segments include Lower Echo Lake near the southernmost segment of the US 50 project limit.

SR 89 Segment 1

Sensitive water resources along this segment include stream channels and marsh/wetland areas. The drainage channels that intersect this highway segment are Grass Lake Creek, the stream segment of the Upper Truckee River going north, and Big Meadows Creek. Figure 3.2-2 indicates the approximate locations of the channel crossings and marsh/wetland areas.

Within this portion of SR 89, Big Meadows Creek is listed in the Lahontan RWQCB's 303(d) list of Water Quality Limited Segments. The pollutant/stressor in Big Meadows Creek is likely from pathogen loading from range grazing and runoff from Upper Truckee River, and/or "tourism/recreational activities not related to boating."

Figure 3.2-1. Water Bodies on US 50

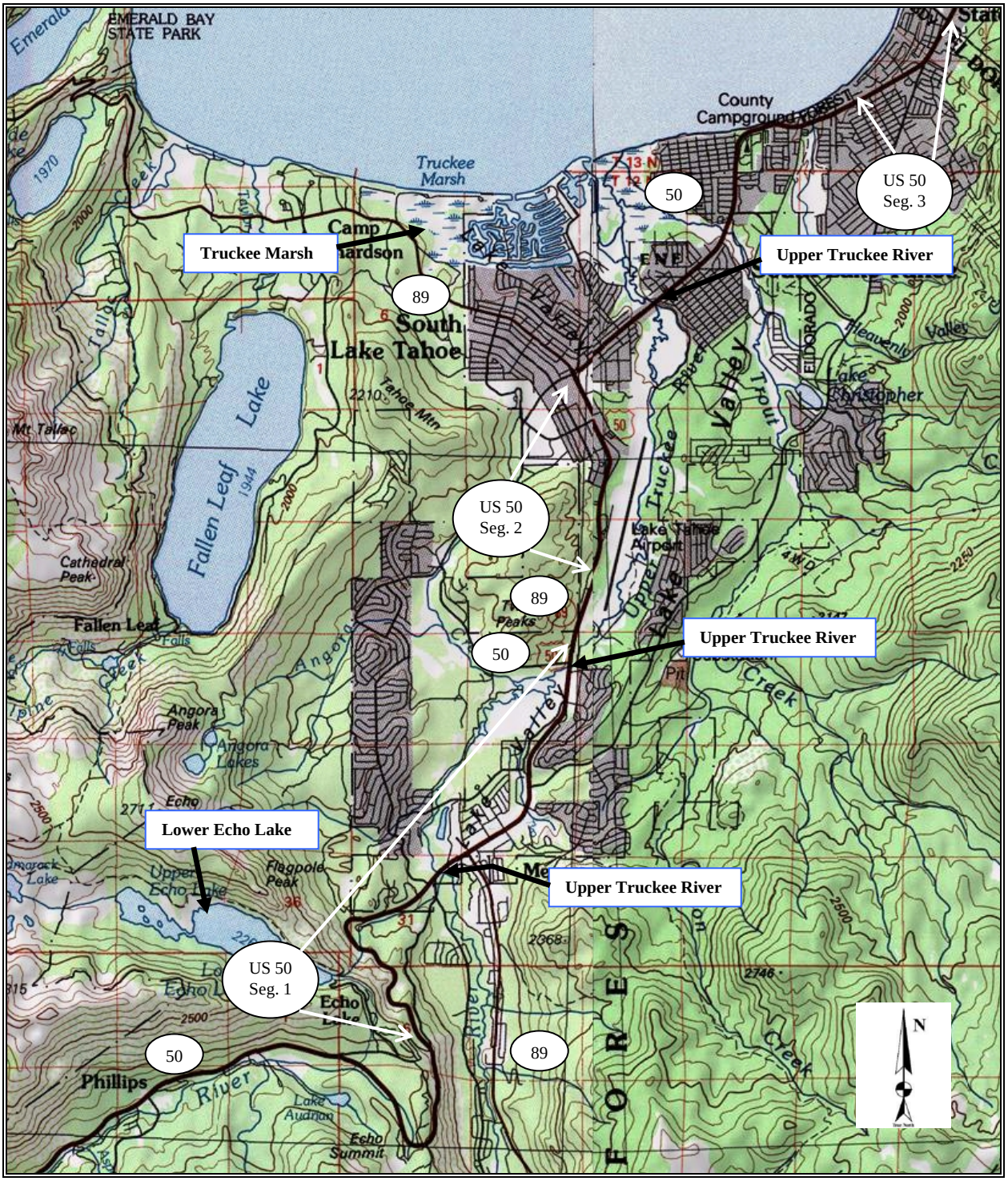
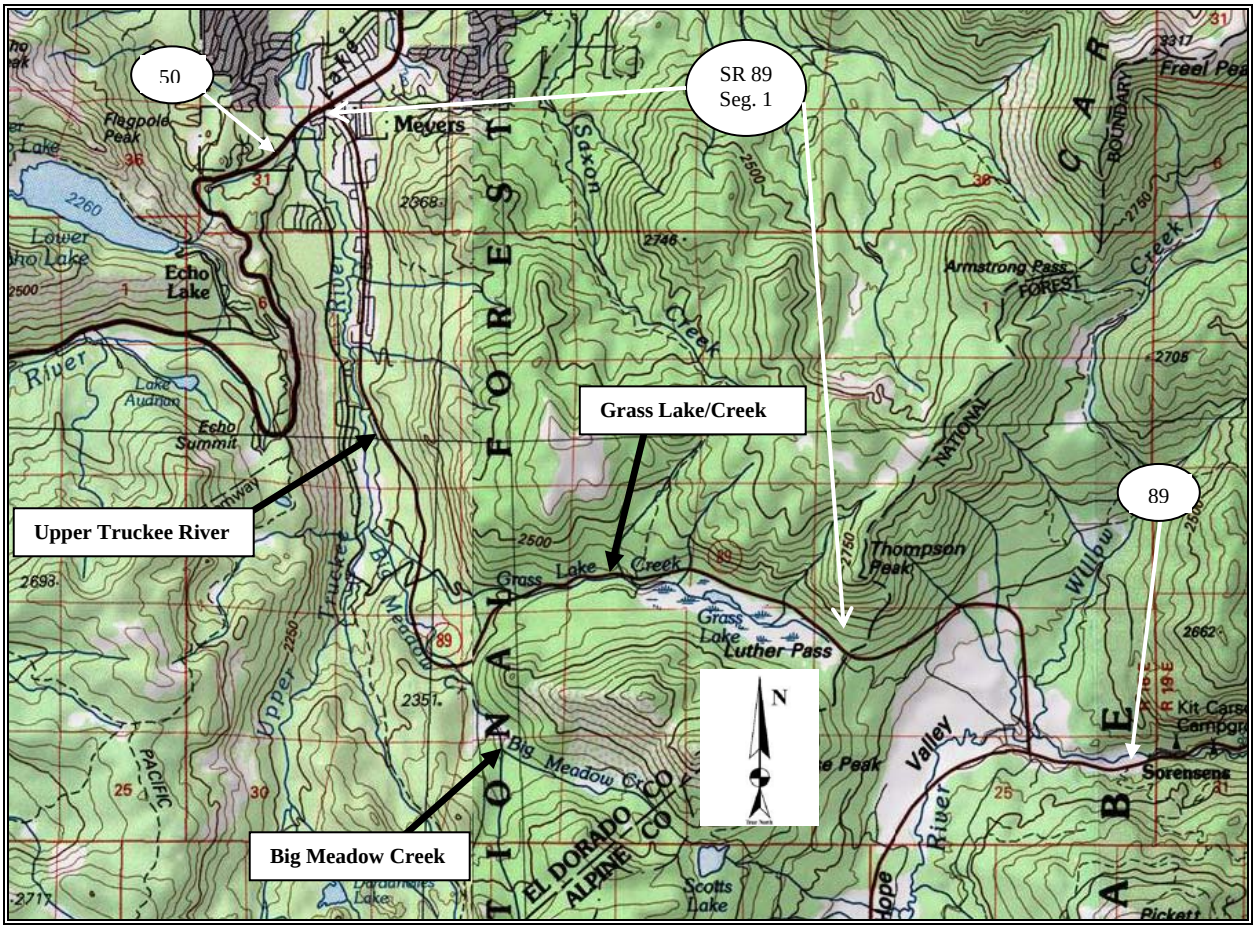


Figure 3.2-2. Water Bodies on SR 89 Segment 1

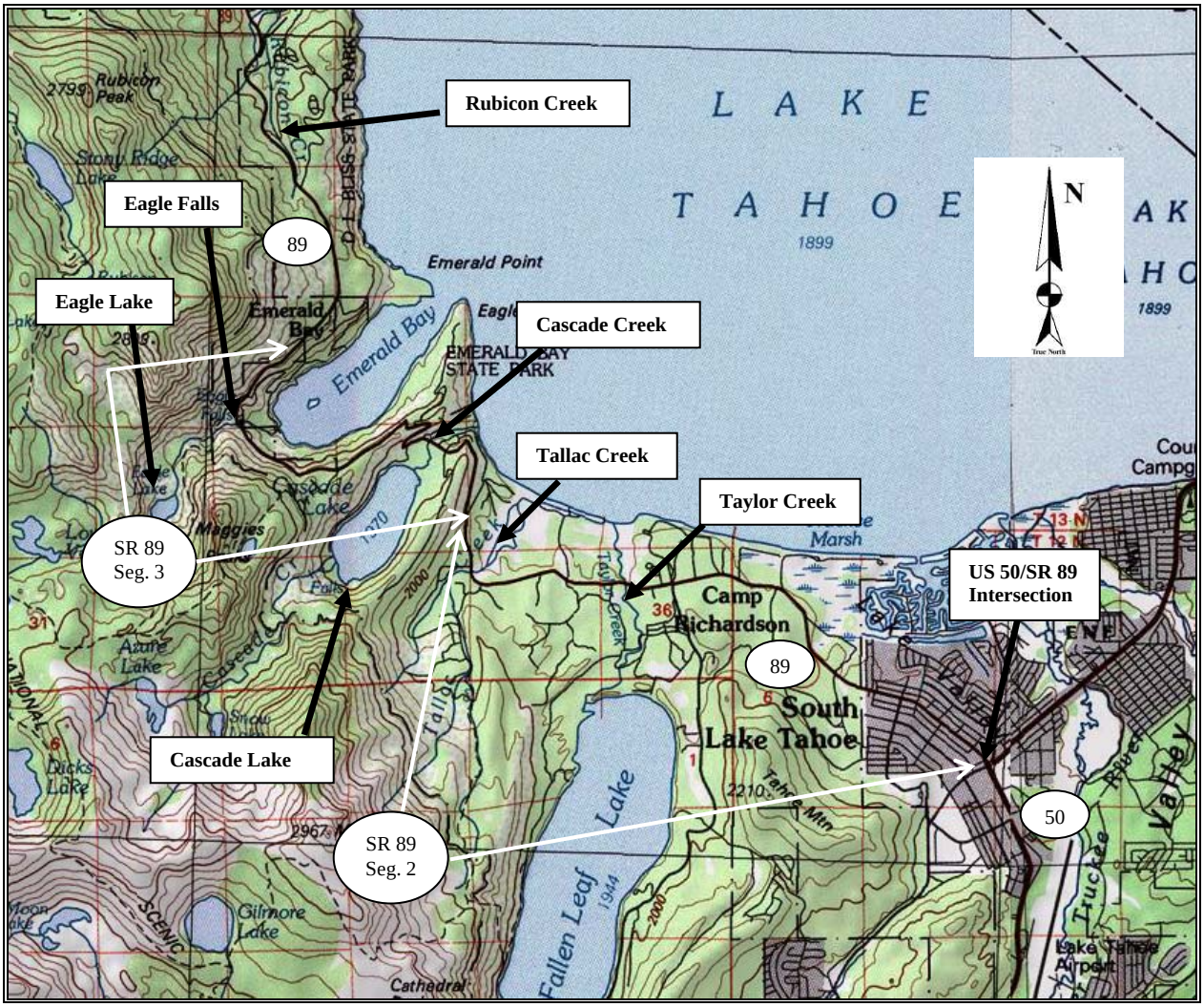


SR 89 Segments 2 and 3

Sensitive water resources along these two segments include stream channels and wetland/marsh areas. The natural drainage channels that intersect these segments are Taylor Creek, Tallac Spring Creek, Cascade Creek, Eagle Falls Creek, and the southern Rubicon Creek stream, which runs parallel to this segment of SR 89. The other water bodies within the general vicinities of these highway segments are Eagle Lake, Cascade Lake, and Emerald Bay. Figure 3.2-3 indicates the approximate locations of the stream crossings and the marsh/wetland areas.

Within this portion of SR 89, Eagle Lake and Tallac Spring Creek are listed in the Lahontan RWQCB's Section 303 (d) list of Water Quality Limited Segments. The pollutants/stressors in Eagle Lake are nitrogen and phosphorus load from runoff from highways or residential developments, on-site septic tanks, atmospheric deposits, and other non-point sources. In the segment of the Tallac Spring Creek below SR 89, pathogens from pasture grazing and riparian grazing are the main sources of the pollutant/stressor in this Water Quality Limited Segment. In the Truckee River, the main pollutant/stressor is sedimentation or siltation, which has its sources from range grazing or riparian grazing, construction/land development, channel erosion, and other non-point sources.

Figure 3.2-3. Water Bodies on SR 89 Segments 2 and 3

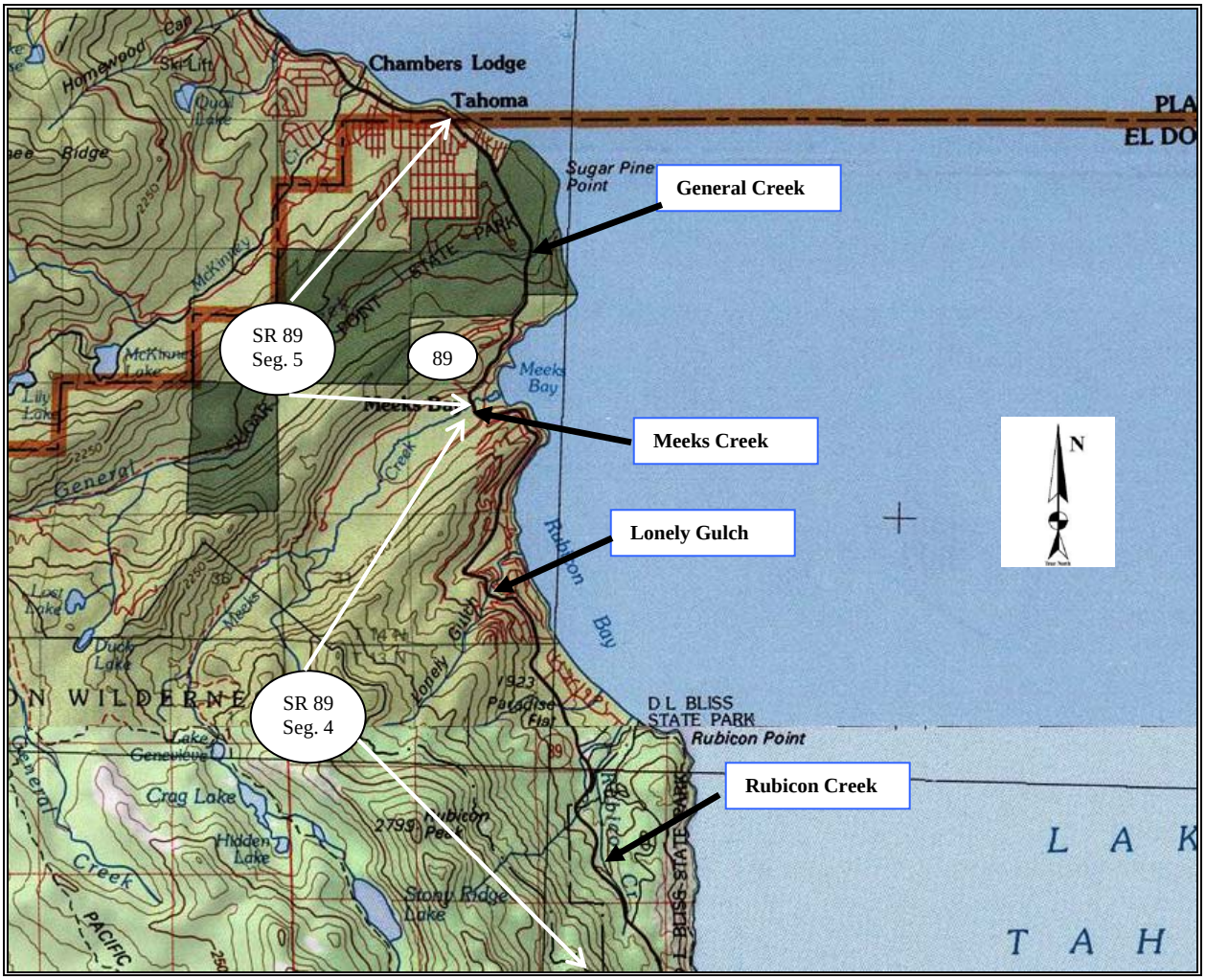


SR 89 Segments 4 and 5

Sensitive water resources along this segment include drainage and wetland/marsh areas. The natural drainage channels that intersect the highway are Lonely Gulch, Meeks Creek, General Creek, and Rubicon Creek. Figure 3.2-4 indicates the approximate locations of the channel crossings and the marsh/wetland areas.

Within this portion of SR 89, General Creek is also listed as a Water Quality Limited Segment. The pollutants/stressors present are iron and phosphorus. The source of iron is mainly from the natural environment, and the sources of phosphorus load are mainly from erosion or siltation, atmospheric deposition, and the natural environment.

Figure 3.2-4. Water Bodies on SR 89 Segments 4 and 5



3.2.1.4 Beneficial Uses of Surface Water

Beneficial uses are critical to water quality management in California. State law defines beneficial uses of California's waters that may be protected against quality degradation to include (but not be limited to): "domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Water Code Section 13050[0]). Protection and enhancement of existing and potential beneficial uses are the primary goals of water quality planning. Substantial points concerning the concept of beneficial uses include the following:

- All water quality problems can be stated in terms of whether there is water of sufficient quantity or quality to protect or enhance beneficial uses.
- Beneficial uses do not include all of the reasonable uses of water. For example, disposal of wastewaters is not included as a beneficial use. This is not to say that disposal of wastewaters is a prohibited use of waters of the state; it is merely a use that cannot be satisfied to the

detriment of beneficial uses. Similarly, the use of water for the dilution of salts is not a beneficial use, although it may, in some cases, be a reasonable and desirable use of water.

- The protection and enhancement of beneficial uses require that certain quality and quantity objectives are met for surface water and groundwater.
- Fish, plants, and other wildlife, as well as humans, use water beneficially.

Table 3.2-2 lists the existing uses of the water in the surface water bodies along the areas adjacent to the segments within the Lake Tahoe Basin.

3.2.2 Regulatory Setting

3.2.2.1 Federal

The Federal Clean Water Act (CWA) established the contemporary legal foundation and structure for regulating water quality throughout the United States. The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the nation's waters." The following are some of the CWA's more important sections that relate to the proposed Program:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for any federal project that proposes an activity that may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the CWA. The waters of the United States include all navigable water bodies and all water bodies that drain to a navigable water body.
- Section 402 established the NPDES, a permitting system for the discharge of any pollutant (except for dredge or fill material) into waters of the United States. The RWQCB administers this permitting program, as discussed in Section 3.2.2.2.
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the United States. The USACE administers this permit program.

The ultimate objective of the CWA is zero pollutant discharge, but it recognizes the need for a system to regulate non-zero pollutant discharges until the zero pollutant objective is feasible. Section 402 of the CWA established the NPDES for this purpose. The NPDES regulates all pollutant discharges, particularly point-source discharges, to the waters of the United States, except for dredge and fill material by issuing limited-duration permits with specifically defined requirements.

The Water Quality Act of 1987 amends the CWA to specifically include stormwater discharges as a type of point-source discharge (industrial discharge), and establishes a framework for regulating municipal and industrial stormwater discharges under the NPDES program. This amendment added stormwater-related discharges associated with construction projects to the list of discharges that require an NPDES permit. This inclusion of stormwater-related discharge is why construction projects are subject to the requirements of the NPDES and must satisfy the requirements of all applicable NPDES permits.

3.2.2.2 State

Permit Requirements

In the State of California, the SWRCB and the nine Regional Water Quality Control Boards administer the CWA regulations. In addition, the 1962 Porter-Cologne Water Quality Act provides the basis for water quality regulation in the state. The Act expanded the mandate and authority of the SWRCB and RWQCBs to regulate water quality, including the requirement of a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of surface or groundwater of the state. These state agencies regulate pollutant discharges through NPDES permits and serve as the primary administrator of water quality regulation requirements through their authority to authorize and enforce these permits. Specifically, the SWRCB administers statewide NPDES permits, and the RWQCBs administer local NPDES permits. The Program would be subject to the requirements of the Caltrans Statewide Permit as well as local NPDES permits. The NPDES permit requirements are all similar, and in general, call for compliance with effluent limitations at point-source discharges from any given facility (e.g., a construction project site) to surface water, groundwater, and municipal stormwater collection systems. Permit requirements also specify that all stormwater runoff through a project's limits must be treated to meet effluent limitations if the on-site stormwater mixes with off-site runoff. The Caltrans Statewide Permit is discussed in greater detail below, and the local NPDES permits required for the Program are described in Section 3.2.2.3.

Caltrans Statewide Stormwater Permit

The SWRCB issued the Caltrans Statewide NPDES Stormwater Permit (Order No. 99-06-DWQ, adopted July 15, 1999) to cover all Caltrans projects and facilities in the state. In compliance with this permit, Caltrans developed the Statewide Stormwater Management Plan (SWMP; Caltrans 2003e) to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout the State of California. The permit expired in 2004 and is currently undergoing SWRCB review for re-authorization, but Caltrans continues to strictly abide by its requirements. Caltrans must also comply with requirements of the Tahoe Construction NPDES General Permit (Board Order No. R6T-2005-0007) or the Waste Discharge Requirements for Construction of Small Projects – Lake Tahoe Basin (Board Order No. 6-91-31) for projects of less than 1 acre. Lahontan RWQCB water quality objectives for the Lake Tahoe Basin also include a non-degradation objective that would apply to the Program.

The Caltrans SWMP describes the minimum procedures and practices that Caltrans uses to reduce the pollutants it discharges from storm drainage systems that Caltrans owns or operates, and outlines procedures and responsibilities for protecting water quality at Caltrans facilities, including the selection and implementation of BMPs. The Program would be expected to follow the guidelines and procedures outlined in the SWMP.

Under the Statewide Permit, Caltrans (i.e., the Caltrans district that is responsible for a given project) requires submission of a Notice of Construction (NOC) and is generally not required to pay filing fees or to file Notice of Intent (NOI).

Also, in the event that a Caltrans project results in discharge of a visible plume that may contain pollutants, Caltrans must test the plume to determine its composition. If the plume contains

Table 3.2-2
Beneficial Uses of Water in Waterways Within the Tahoe Area Hydrologic Unit

Surface Water Bodies/Hydrologic Unit	Water Body Class Modifier	Beneficial Uses																Receiving Water
		MUN	AGR	GWR	FRSH	NAV	REC-1	REC-2	COMM	COLD	WILD	BIOL	RARE	MIGR	SPWN	WQE	FLD	
Willow Creek (Susan River HA, and Snowstorm Mountain HA, in Susanville HU)	Perennial Stream	X	X	X			X	X	X	X	X				X			Susan River
Grass Lake/wetland (South Tahoe HA, in Lake Tahoe HU)	Wetlands	X	X	X			X	X	X	X	X	X			X	X	X	Grass Lake Creek
Big Meadow Creek																		
Grass Lake Creek (South Tahoe HA, in Lake Tahoe HU)	Perennial Stream	X	X	X			X	X	X	X	X				X			Upper Truckee River
Saxon Creek (South Tahoe HA, in Lake Tahoe HU)	Perennial Stream	X	X	X			X	X	X	X	X			X	X			Trout Creek
Grass Lake (South Tahoe HA, in Lake Tahoe HU)	Lake	X	X	X			X	X	X	X	X	X			X			
Upper Angora Creek (South Tahoe HA, in Lake Tahoe HU)	Lake	X	X	X		X	X	X	X	X	X				X			Lower Angora Lake
Upper Truckee River (South Tahoe HA, in Lake Tahoe HU)	Perennial Stream	X	X	X		X	X	X	X	X	X			X	X			Lake Tahoe
Truckee Marsh																		
Taylor Creek (South Tahoe HA, in Lake Tahoe HU)	Perennial Stream	X	X	X			X	X	X	X	X			X	X			Lake Tahoe
Tallac Spring/Creek (South Tahoe HA, in Lake Tahoe HU)	Perennial Stream	X	X	X			X	X	X	X	X				X			Lake Tahoe
Cascade Lake (South Tahoe HA, in Lake Tahoe HU)	Lake	X				X	X	X	X	X	X		X		X			Cascade Creek
Cascade Creek (South Tahoe HA, in Lake Tahoe HU)	Perennial Stream	X	X	X			X	X	X	X	X				X			Lake Tahoe
Eagle Fall/Eagle Creek (South Tahoe HA, in Lake Tahoe HU)	Perennial Stream	X	X	X	X		X	X	X	X	X				X			Lake Tahoe
Emerald Bay																		
Rubicon Creek																		
Lonely Gulch (North Tahoe HA, in Lake Tahoe HU)	Perennial Stream																	Lake Tahoe
Echo Lake																		
Meeks Creek (North Tahoe HA, in Lake Tahoe HU)	Perennial Stream	X	X	X			X	X	X	X	X			X	X			Lake Tahoe
Meeks Bay/Marsh (South Tahoe HA, in Lake Tahoe HU)	Wetlands	X	X	X			X	X		X	X					X	X	Lake Tahoe
General Creek (North Tahoe HA, in Lake Tahoe HU)	Perennial Stream	X	X	X			X	X	X	X	X			X	X			Lake Tahoe
Lake Tahoe (Tahoe Lake Body HA, in Lake Tahoe HU)	Lake	X	X	X		X	X	X	X	X	X	X		X	X			

Source: Basin Plan (Lahontan RWQCB 1995)

AGR = Agricultural Supply
BIOL—Biological Habitats
COLD = Cold Freshwater Habitat
COMM = Ocean, Commercial, and Sport Fishing
FLD—Floodwater Attenuation/Storage
FRSH = Freshwater Replenishment
GWR = Groundwater Recharge
HA = Hydrologic Area
HU = Hydrologic Unit
MIGR—Fish Migration
MUN—Municipal and Domestic Supply
NAV—Navigation
RARE—Preservation of Rare and Endangered Species
REC-1—Water Contact Recreation
REC-2—Non-contact Water Recreation
SPWN—Fish Spawning
WILD—Wildlife Habitat
WQE—Water Quality Enhancements

pollutant, Caltrans must report its findings and pay the required fees for a discharge in violation of its permit requirements. However, for projects and facilities in the LTHU, the Caltrans Statewide Permit specifically refers to the LTHU NPDES Permit.

Sections 4.4 and 4.4.1 in the May 2003 SWMP (Caltrans 2003e) state that where there is potential for a storm drain system to discharge directly or indirectly to a surface water, one or more of the five approved treatment BMPs have to be considered: biofiltration strips and swales, infiltration basins, traction sand traps, and dry weather flow diversion. These are in addition to four Caltrans design BMPs.

If Caltrans rejects all of the five approved BMPs, Caltrans must consult with the Lahontan RWQCB to determine if an acceptable alternative BMP could be incorporated into the Program. If all five proposed BMPs are rejected, then the Program may collect runoff in vaults. These vaults would be drained of the stormwater runoff within 24 to 48 hours.

Soil erosion depends not only on local conditions (soil type, slope, and vegetation) but also on construction practices. Therefore, to minimize the adverse effects of soil erosion on construction incorporating biofiltration strips and biofiltration swales may be necessary.

Regional Criteria

In addition, the governments of Nevada and California, as well as the United States, have identified the Lake Tahoe area as an Outstanding National Resource Water. Accordingly, projects and facilities in the hydrologic unit that drains to Lake Tahoe, that is, the LTHU, must satisfy more stringent requirements than in most other parts of the United States.

Significance Criteria

Potentially applicable CEQA significance criteria for the Program include the following.

- Violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

- Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Inundation by seiche, tsunami, or mudflow.

3.2.2.3 Regional

Permit Requirements

All of the proposed project segments are in the jurisdiction of the Lahontan RWQCB and would be subject to the requirements of the following NPDES permits, which are discussed in greater detail below.

- Lake Tahoe Hydrologic Unit General Construction Permit
- Permit for Stormwater/Urban Runoff Discharge (Caltrans MS4 Phase I Permit)

Lake Tahoe Hydrologic Unit General Construction Permit

Construction activity is subject to the Lake Tahoe Hydrologic Unit NPDES general construction permit (Board Order 6-00-03). As is the case with most NPDES permits, the LTHU permit requires notification of construction for enrollment for projects that include clearing, grading, and excavation that will disturb of 0.4 or more hectares (1 or more acres) of soil. In such cases, the applicant must also implement an effective Stormwater Pollution Prevention Plan (SWPPP). Implementation of the plan starts with the commencement of construction and continues through the completion of the Program. Upon completion of the Program, the applicant must submit a Notice of Termination to the Lahontan RWQCB to indicate that construction is completed.

Municipal Separate Storm Sewer System (MS4) Permit

The U.S. Environmental Protection Agency (USEPA) defines a Municipal Separate Storm Sewer System (MS4) as any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over disposal of stormwater, and designed or used for collecting or conveying stormwater. As part of the NPDES, the USEPA initiated a program requiring that MS4s apply to their local RWQCBs for discharge permits. The program proceeded through two phases. Under Phase I, the program initiated permit requirements for designated municipalities with populations of 100,000 or more that maintain control of a separate storm sewer system. Phase II expanded the program to municipalities with populations less than 100,000.

The NPDES Permit for the City of South Lake Tahoe, El Dorado County, and Placer County Stormwater/Urban Runoff Discharge is an MS4 Phase I Permit. The permit requirements for construction are similar to those of the LTHU permit and the Caltrans Statewide permit. However, the MS4 Phase I permit has the additional requirement that, in order to legally discharge, applicants must reduce the pollutant content of water leaving the site or facility regardless of the origin of the pollutant; that is, the applicant may only discharge water that does

not exceed the specified pollutant discharge levels even if the polluted water arrived on the site from another location.

Tahoe Regional Planning Agency

The TRPA is designated by California, Nevada, and the USEPA as the area-wide water quality planning agency under Section 208 of the federal CWA. It adopted a bi-state plan, entitled the *Water Quality Management Plan for the Lake Tahoe Region* (known as the 208 Plan; TRPA n.d.). The most appropriate provisions of the 208 Plan are incorporated into the Water Quality Control Plan for the North Lahontan Basin.

The TRPA water quality thresholds are as follows:

- WQ-1 – Decrease sediment load as required to attain turbidity values not to exceed 3 Nephlometric Turbidity Units (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.
- WQ-2 – Average Secchi depth, December–March, shall not be less than 33.4 meters (109.6 feet).
- WQ-3 – Annual mean phytoplankton primary productivity shall not exceed 52 gC (or gC/m^2/year, the weight in grams of carbon per square meter per year). California: algal productivity shall not be increased beyond levels recorded in 1967–1971, based on a statistical comparison of seasonal and annual mean levels.
- WQ-4 – attain a 90th percentile value for suspended sediment of 60 milligrams per liter (mg/L).
- WQ-5 – Dissolved inorganic nitrogen, 0.5 mg/L; dissolved phosphorous, 0.1 mg/L; dissolved iron, 0.5 mg/L; suspended sediment, 250 mg/L.
- WQ-6 – Surface water infiltration into the groundwater shall comply with the Uniform Regional Run Off guidelines. For total nitrogen, 5 mg/L; total phosphorous, 1 mg/L; total iron, 4 mg/L; turbidity, 200 NTU; and grease and oil, 40 mg/L.
- WQ-7 – For other lakes in California-Nevada, the standards are the same as the tributary standards.

For Caltrans projects, a Memorandum of Understanding (MOU) between the TRPA and the Lahontan Regional Water Quality Control Board acknowledges that Lahontan is the lead regulator for water quality. Lahontan water quality thresholds can be found in the Lahontan Basin Plan. The Lahontan numeric effluent limits for runoff discharged to infiltration systems mirrors TRPA Threshold WQ-6. The Lahontan numeric effluent limits for surface discharges are similar to TRPA Threshold WQ-5 but also place limits of 20 NTU for turbidity and 2 mg/L for grease and oil.

3.2.3 Impacts

The potential impacts to surface waters would be temporary and would generally occur during construction activities near or directly within waterways. For perennial streams, which flow year-round, the activities involved in culvert replacement would require implementing flow diversion BMPs and other measures listed in Section 3.2.4. Nearly all work in streams during construction

would occur at locations where culverts cross under the roadway and are planned for replacement or upgrading.

3.2.3.1 CEQA Considerations

Surface Water Impacts

Water Quality Standards

The goal of the proposed Program is to improve water quality of the stormwater runoff from State facilities before it reaches the waterways within the vicinities of US 50 and SR 89, with the overall goal to improve the water quality of Lake Tahoe, since it is the receiving water body of the majority of the existing waterways within the project limits. The individual actions taken would include installing stormwater collection and treatment systems such as infiltration basins, sand traps, and asphalt concrete dikes to direct runoff to the treatment features. In addition, the Program would include improving conveyance of stormwater into collection and treatment systems. The construction of these improvements would involve upgrading the roadway to current design standards where feasible, including widening of the roadway shoulders.

The majority of new water quality improvements are expected to involve the installation of infiltration basins along US 50 and SR 89 within each of the project segments. Infiltration basins, which are similar to shallow, earthen-lined ponds, would be located adjacent to or in close proximity to the roadways, and would receive stormwater. Infiltration basins would be constructed on relatively permeable soils that allow some or all of the collected water to infiltrate into the soils instead of continuing to run off directly into surface-water systems. When runoff exceeds the capacity of the basins, released water would flow downstream within the existing drainage. These basins would allow sediments and pollutants to settle out of the water flow, and would capture trash and other large debris. Traction sand traps may also be considered, and would be constructed as subsurface vaults designed to allow suspended sediment to be intercepted or settle out of runoff before it enters receiving waters. These facilities, as well as the erosion control measures listed in Section 3.2.4, would all contribute to improved water quality, and have a positive long-term benefit on meeting water quality standards.

Some of the proposed facilities also have the potential for adverse impacts. The installation of the proposed facilities and roadway improvements would involve construction activities, which have the potential for temporary adverse impacts to water quality. The following sections summarize these effects. Mitigation measures are described in more detail in Section 3.2.4.

Construction Impacts

Over the course of the Program implementation phase, each project segment may require the removal of vegetation, relocation of utilities, installation of traffic signs, construction of maintenance turnouts, installation of sedimentation/infiltration basins, replacement of culverts, widening of shoulders, and bike lane improvements. As a result of the proposed Program activities, there would be clearing of vegetation and excavation. Work would be performed seasonally. There would be an increased potential for soils exposed during construction activity to be transported during the construction phase to adjacent surface water bodies and/or open drainage channels that cross the roadway, either by wind erosion or storm runoff. The major categories of construction impacts are discussed below.

Vegetation Removal and Excavation Activities

Construction activities would require equipment staging areas and stockpiling of materials, access to the construction site, site clearance, and grading and excavation. This work would take place within and along the existing roadway, within areas where the shoulders provide sufficient room, within the state right-of-way, or within temporary construction easements. Where vegetation is cleared and grading/excavation is necessary, the potential for soil erosion is increased. Areas most vulnerable to erosion include sections of the roadway with side slopes in steep terrain, which occur on most of the segments. Eroded soils that leave the construction sites would have an adverse impact on existing water quality. These activities would be subject to the Caltrans NPDES permit, which applies to all construction activities exceeding 1 acre in size. The permit requires a SWPPP that contains specific erosion control measures, which apply throughout the construction period. These requirements would minimize erosion during the construction period.

Erosion at Drainage Channels, Culverts, and Culvert Installation

Annual and seasonal drainages within the project area intersect or run along US 50 and SR 89. Culverts beneath the roadway currently convey flow in most of these channels from reaches uphill of the roadway to reaches downhill of the roadway (see Section 3.2.4 for the approximate locations of the box culverts). The major drainage channels within the project limits of US 50 and SR 89 are Grass Lake Creek, Big Meadow Creek, Upper Truckee River, Taylor Creek, Tallac Creek, Cascade Creek, Eagle Falls Creek, Rubicon Creek and its tributaries, Lonely Gulch, Meeks Creek, and General Creek. The water bodies or marsh wetlands within the project limits are Emerald Bay and Truckee Marsh. Existing culverts along both roadways' segments are planned for replacement as needed. This would require excavation of the existing culvert and replacement at the same location, or installation of a new culvert directly adjacent, with redirection of the stream flow after completion of the installation. There is a potential for addition of sediment to the water from excavations in and around stream banks and during backfill of soil materials.

Potential for Creation of Substantial Additional Sources of Polluted Runoff

The water released or coming out of the proposed basins and stormwater collection facilities would have reduced sediments and pollutant concentrations, as discussed in previous sections. However, where stormwater runoff is collected or is more concentrated, there is an increased potential for erosion, such as areas of exposed soils or basin outlets. To avoid these effects, soil and erosion protection measures would be incorporated into the Program design, and are discussed in Section 3.2.4.

The Program would not increase traffic volumes, as it would not increase the roadway capacity of either US 50 or SR 89, and therefore would not affect on total pollutant emissions or loadings related to vehicle emissions.

Potential Impacts to Groundwater

The Program would include features such as sand traps and infiltration basins that capture surface water runoff, and retain or temporarily detain the water flow within the state right-of-way to remove sediments and pollutants. These facilities would improve surface water quality leaving the right-of-way, but would also increase the amount of surface water that percolates to

groundwater through infiltration. The allowable pollutant levels in this infiltrating water could be bound by TRPA Threshold WQ6, which establishes standards for allowable levels of total nitrogen, total phosphorus, total iron, turbidity, and grease and oil in surface discharge to groundwater.

Data from the Lake Tahoe Interagency Monitoring Program (LTIMP) indicate that groundwater in the Lake Tahoe area generally has higher concentrations of measured pollutants than surface water in the region (Table 3.2-3) (Tyler and Ramsing 1997). The LTIMP oversees a groundwater monitoring program in the Lake Tahoe Basin that provides data to regulatory agencies to assist in the implementation of their programs and to meet the requirements of pollution control policies. In particular, two member LTIMP agencies—the USGS and the TRPA—established a groundwater monitoring network with 32 sampling sites in 1990 to provide a long-term database of groundwater characteristics. According to past groundwater studies, the concentrations of nitrogen, phosphorus, and iron were higher in the groundwater than in the Lake. The studies included field measurements of temperature, pH, dissolved oxygen, specific conductance, and water levels. In addition, the components of the studies included laboratory measurements of dissolved nutrients, including iron.

Table 3.2-3
Average Dissolved Nitrate and Phosphate in Three Lake Tahoe Watersheds

Watershed		Dissolved Nitrate (NO_3) (µg/L)	Phosphate (PO_4^2) (µg/L)
Ward Creek	Groundwater	27-264	44
	Surface Water	12	8.0
Upper Truckee/Trout Creeks	Groundwater	466	18
	Surface Water	23	9
Incline Creek	Groundwater	2,400	54
	Surface Water	26	10

Source: Tyler and Ramsing 1997

Note: Calculated from USGS Water Data, Nevada, Water Years 1989–1995.

µg/L = micrograms per liter

Overall, pollutant loads in groundwater would not be adversely impacted by implementing the proposed improvements that divert, collect, and treat stormwater runoff from road surfaces that would otherwise infiltrate or percolate into the Tahoe area aquifers. Implementing the proposed Program would increase the amount of sediment-entrained pollutants that would be filtered out of surface water in sand traps and catchment basins; this would help reduce or remove these pollutants from entering groundwater. The Program's potential to impact pollutant levels in groundwater from percolation from infiltration basins would be insignificant because the streams that recharge groundwater aquifers in the Tahoe area receive substantial infiltration from sources outside of the project limits (i.e., the general watershed, outside of the right-of-way and roadway surfaces of US 50 and SR 89) in comparison to the area actually affected within the proposed right-of-way.

In 2005 and 2006, following initial scoping, field reviews of the stormwater collection and treatment elements of the Program were performed with TRPA and Lahontan RWQCB

representatives. Input from these agencies was considered, and potential basins were added, eliminated, or relocated based on site-specific field conditions. The Caltrans Tahoe Basin Team, which includes Caltrans, TRPA, and Lahontan RWQCB representatives, meets on issues that are common to the planning, design, construction, and maintenance activities related to Caltrans projects in the Lake Tahoe Basin.

Based on field observations (Caltrans 2003c, 2003d), groundwater should generally not be an issue for the proposed shoulder widening. Seepage was not observed in the existing cut or fill slopes. Depending on the time of year, seepage may be encountered in rock fractures. Seepage and groundwater conditions would vary according to variations in rainfall, snowmelt, pumping, construction activities, and water levels in Lake Tahoe and the Upper Truckee River.

Post-Construction Stormwater Runoff Quality

As noted previously, the Program would generally improve the quality of stormwater that runs off roadway surfaces and ultimately leaves the state highway right-of-way. The method by which the treatment features that are components of the Program would improve the quality of stormwater runoff depends on their design and intended function.

Existing stormwater along the Program segments of US 50 and SR 89 already contains sediments and pollutants, as both roadways are built along mountainous terrain that can be a natural source of readily erodible soil and sediment draining onto roadway surfaces. The proposed asphalt concrete dikes along the lengths of most roadway segments would improve flow by directing sheet and spreading flow from road surfaces into channelized flow along the dikes, thereby reducing the retention and accumulation of sediments on road surfaces. Upon reaching collection traction sand traps installed at the tail end or intermediate portion of most dikes, the sand traps would filter constituent pollutants out of the stormwater and allow them to settle to the bottom of the partitioned sand traps/sand collection vaults. Where stormwater is conveyed into infiltration basins, the basins would isolate debris and other solid material and allow retained water to percolate into the ground. New channels may be lined with rock to allow conveyance of water while minimizing exposure of soils. In all cases, the effectiveness of the proposed systems for improving water quality would be site specific, but overall water quality runoff would improve. This would have a beneficial effect on the quality of water that ultimately drains into Lake Tahoe.

Traction sand traps may be considered. Also known as sand vaults, these devices provide a water quality benefit by collecting sand from runoff that has entrained roadway pollutants such as oils and grease and heavy metals (such as lead), which may adsorb onto the sand particles. The effectiveness of these traps depends on their design and capability to handle stormwater volumes and the maintenance frequency (cleaning of the sand/trap is necessary to maintain their function).

3.2.3.2 TRPA Considerations

The primary objective of the Program is to comply with NPDES permit requirements and improve stormwater treatment on and along the study area. Newly installed infiltration basins and drainage facilities would capture many pollutants before they enter the lake. These improvements would outweigh any potential adverse effects associated with increases in impervious surfaces. Therefore, no adverse impacts to overall water quality are expected as a result of the Program. The Program would benefit water quality in the region.

3.2.3.3 No Project Alternative

The No Project Alternative would consist of not implementing the proposed Program for which Caltrans is the lead agency. Caltrans is required to comply with the Statewide NPDES permit issued by SWRCB and could potentially become in violation of the requirements of this permit if the Program is not constructed.

The No Project Alternative would result in a failure to meet TRPA environmental thresholds. This alternative would not address the environmental problems facing the Lake Tahoe Basin, and therefore is not considered a viable alternative with respect to the purpose and need.

The No Project Alternative would have less immediate impacts to the resources discussed in this report, including biological and cultural resources, and parklands.

The description of work encompasses the only proposed Program alternative. A No Project Alternative could potentially lead to increased levels of turbidity in Lake Tahoe, which would decrease the clarity of the lake over time. Since the early 1960s, Lake Tahoe has lost an estimated average of 0.3 meter (1 foot) of clarity each year, as measured by secchi disk (Strobel, n.d.).

3.2.4 Avoidance, Minimization, and Mitigation

In general, the Program is being implemented to control and improve water quality runoff from the state right-of-way and road surfaces for US 50 and SR 89 within the defined segments in order to meet the goals of the Tahoe EIP program and comply with NPDES requirements. The Program would have a beneficial effect to water quality runoff; however, as for any major construction project, there is the potential for some adverse impacts. The following measures would avoid or minimize the impacts identified in Section 3.2.3.

Drainage systems should be designed to transport stormwater runoff to be collected and treated in structures located outside of delineated SEZs and wetlands. Woody riparian vegetation growing at the waters edge would be kept in place to provide cover for aquatic organisms. Removal of woody stream bank vegetation would need to be avoided to the greatest extent possible.

Pollution prevention measures may be implemented to protect surface water quality degradation to the existing surface water resources within the SR 89 and US 50 project limits, and to prevent erosion of bare soils and potential non-point source pollutant contribution. Typical measures may include the following:

- The Program proposes to install sedimentation/infiltration basins. Infiltration basins are most effective where the soil is porous and can infiltrate the stormwater within 24 to 48 hours. A minimum acceptable spacing between a proposed infiltration basin invert and the maximum seasonal high groundwater is 10 feet, unless otherwise approved by the RWQCB. Caltrans is proceeding with site-specific soil studies to determine suitable locations for infiltration basins and would use the results of those studies to refine the proposed basins and their locations. If the soil condition does not allow for these requirements, consultation with the Lahontan RWQCB during the early stages of planning is recommended.

- Work in streams should be done after seasonal flows have stopped (see next bullet). In perennial streams, a temporary diversion would be required and one or more of the following options can be used:
  - Culverts may be constructed adjacent to the existing culvert (streamflow would continue through the existing culvert during construction of new culvert). Under these circumstances, the stream channel would be rerouted upon completion of the culvert installation/replacement and water would then be diverted through the new culvert.
  - Coffer dams may be constructed and a temporary pipe or channel installed to direct streamflow to an adjacent cross culvert.
  - Where streamflow is minimal, a coffer dam may be constructed upstream of the culvert and streamflow pumped into a water truck for discharge into the downstream channel or onto adjacent soil for infiltration/evaporation.
  - At culverts that will be lined, construction may occur without diversion.
- TRPA and Lahontan RWQCB regulations do not allow for any soil disturbance from October 15 to May 1 of each year. Unless a variance is obtained, construction activities shall conform to this requirement.
- To treat and improve water quality on-site, biofiltration strips and biofiltration swales within the project area should be considered.
- Special attention must be paid when handling and storing contaminated soil, including soil contaminated with aerially deposited lead. The quantity of contaminated soil, its level of contamination, where it will be stored, and when this activity will take place are all stormwater pollution concerns and should be described in detail in the SWPPP to be prepared by construction contractors.
- If the Program has the potential to encounter groundwater or may involve non-stormwater discharges, consultation with the RWQCB or California Department of Toxic Substances Control may be appropriate. A Project-specific Waste Discharge Permit may be required if substantial dewatering is to take place.
- If the Program work limits include or are close to water sensitive areas (wetlands, waterways, etc.) that may be affected during construction activities, or USACE and/or CDFG permits are required, then a 401 Water Quality Certification from the Lahontan RWQCB is required and will be obtained prior to work. The 401 Certification is not required when a sensitive area will not be affected.
- If the Program involves pavement grinding/cutting operations, the discharge from this operation has to be dealt with in coordination with the Lahontan RWQCB.

Temporary/Construction Phase BMPs

The following BMPs are suggested for controlling the potential impacts to existing waterways or storm drainage facilities that are typically included in a SWPPP that is in compliance with regional NPDES requirements for the construction phase of the Program.

Protections for stream banks in creeks are recommended where creeks intersect US 50 or SR 89 and at sites with cross-culverts that are proposed to be replaced or widened. Construction work at

creek crossings often requires excavations on stream banks or next to the banks, which could lead to increased sediment load into the waterways. Protections for stream banks can potentially increase stream bank stabilization and preservation of riparian habitats. Geotextile fabrics and erosion control blankets/mats are suggested stream bank BMPs that can be installed. In addition, a line of stacked sandbag/gravel bag berms can be placed along the channel banks to intercept and slow the flow of sediment-laden sheet flow runoff on road surfaces.

Other construction BMPs may be considered where proposed modifications or grading of slopes may increase runoff and expose soils. Diversion of runoff may be considered during construction where it is necessary to direct stormwater flow around a construction site. Temporary dewatering of a construction site may be necessary to remove accumulated stormwater runoff.

For streambeds or creek embankments subject to unavoidable disturbances, restoration and/or revegetation with weed-free native plant species is required.