DRAFT
Environmental Impact Report/
Environmental Impact Statement/
Environmental Impact Statement

Upper Truckee River and Marsh Restoration Project

Volume 1
SCH# 2007032099

Lead Agencies:

California Department of General Services

California Tahoe Conservancy

Tahoe Regional Planning Agency Lake Tahoe Environmental Improvement Program

U.S. Department of Interior Bureau of Reclamation

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EXECUTIVE SUMMARY

ES.1 PROJECT LOCATION AND SETTING

The California Tahoe Conservancy (Conservancy), U.S. Bureau of Reclamation (Reclamation), and Tahoe Regional Planning Agency (TRPA) are pursuing a restoration project along the most downstream reach of the Upper Truckee River, at the mouth of Lake Tahoe. The Upper Truckee River and Marsh Restoration Project is identified in TRPA's Environmental Improvement Program (EIP) as a project that is necessary to restore and maintain environmental thresholds for the Lake Tahoe Basin (EIP Project #s 560, 650, 981, and 1002). EIP projects are designed to achieve and maintain environmental thresholds that protect Tahoe's unique and valued resources.

The 592-acre study area is located in South Lake Tahoe, California, bounded by U.S. Highway 50 (U.S. 50) and the Highland Woods neighborhood to the south, the Al Tahoe neighborhood to the east, Tahoe Islands/Sky Meadows and Tahoe Keys neighborhoods to the west, and Lake Tahoe to the north. It consists of parcels owned by the Conservancy, the City of South Lake Tahoe (CSLT), the California Department of Transportation (Caltrans), and private landowners. It includes the downstream reaches of Trout Creek and the Upper Truckee River, adjacent wetland (Upper Truckee Marsh) and upland habitats, and the Lower West Side Wetlands Restoration Project site (located in the northwest portion of the study area, just east of the Tahoe Keys Marina).

The primary purpose of the Upper Truckee River and Marsh Restoration Project is to restore natural geomorphic processes and ecological functions along this reach of river while providing recreation access. Four alternative approaches to implementing the proposed project are being considered, along with the No-Project/No-Action Alternative. Depending on which alternative is selected, the proposed restoration project may include a minimum, moderate, or maximum recreation component (described below).

ES.2 OVERVIEW OF THE EIR/EIS/EIS PROCESS

This joint document is an environmental impact report (EIR) prepared on behalf of the Conservancy pursuant to the California Environmental Quality Act (CEQA); an environmental impact statement (EIS) prepared on behalf of the Tahoe Regional Planning Agency (TRPA) pursuant to Article VII of the Tahoe Regional Planning Compact and Chapter 3 of the TRPA Code of Ordinances; and an EIS prepared on behalf of the U.S. Bureau of Reclamation (Reclamation) pursuant to the National Environmental Policy Act (NEPA) and Council of Environmental Quality (CEQ) regulations implementing NEPA.

ES.2.1 CALIFORNIA TAHOE CONSERVANCY

The Conservancy is a lead agency for this project, pursuant to CEQA. As part of its environmental review process, the Conservancy, jointly with TRPA, prepared and circulated a Notice of Preparation (NOP) informing responsible agencies and the public that the project could have a significant effect on the environment, and soliciting their comments. The NOP was filed with the California and Nevada State Clearinghouses and released publicly on October 4, 2006. The NOP identified November 2, 2006 as the closing date for submitting scoping comments. A continuation was filed on March 13, 2007, to extend the closing date for scoping comments to April 30, 2007. A copy is included in Appendix A of this Draft EIR/Draft EIS/Draft EIS (DEIR/DEIS/DEIS). This DEIR/DEIS/DEIS addresses comments received during the NOP scoping period.

Section 21091(a) of the California Public Resources Code requires lead agencies to circulate DEIRs for a minimum of 45 days. However, because this document is also an EIS, pursuant to the TRPA Code of Ordinances and NEPA, it is being circulated for at least 60 days. During this time, the Conservancy is holding a public hearing to present the conclusions of the DEIR/DEIS/DEIS and receive oral comments from the public and responsible agencies. After the 60-day comment period, a Final EIR/EIS/EIS will be prepared that includes

comments received on the DEIR/DEIS/DEIS; written responses to comments that raise environmental issues; a list of all persons, organizations, and agencies commenting on the DEIR/DEIS/DEIS; any necessary revisions to the DEIR/DEIS/DEIS; recommendations on selection of a preferred alternative, and a mitigation monitoring and reporting plan.

ES.2.2 U.S. Bureau of Reclamation

Reclamation is a lead agency for the project, pursuant to NEPA. The project has received federal funding through Reclamation for the planning phase and may receive funding for implementation. As part of its environmental review process, a Notice of Intent (NOI) was published in the Federal Register on September 5, 2006, informing federal agencies and the public that the project could have a significant effect on the environment, and soliciting their comments. A copy of the NOI is included in Appendix A of this DEIR/DEIS/DEIS.

Pursuant to Reclamation procedures, this DEIR/DEIS/DEIS is being circulated for public comment for at least 60 days. After the 60-day comment period, a Final EIR/EIS/EIS will be prepared as described above under Section ES.2.1.

ES.2.3 Tahoe Regional Planning Agency

TRPA is a lead environmental review agency for the project, pursuant to Article VII of the Tahoe Regional Planning Compact and the TRPA Code of Ordinances. The NOP prepared by the Conservancy also served as the NOP under the Tahoe Regional Planning code. A copy is included in Appendix A of this DEIR/DEIS/DEIS.

Pursuant to Section 3.7.1 of the TRPA Code of Ordinances, this DEIR/DEIS/DEIS is being circulated for public comment for at least 60 days and a public hearing will be held in front of the Governing Board. After the 60-day comment period, a Final EIR/EIS/EIS will be prepared as described above under Section ES.2.1.

ES.3 SUMMARY DESCRIPTION OF THE PROJECT ALTERNATIVES

ES.3.1 Purpose and Need and Project Objectives

The need for the project originates from the environmental degradation that the Upper Truckee River has historically experienced as a result of human alterations to the river and watershed. The purpose of the proposed action is to restore natural geomorphic processes and ecological functions in this lowest reach of the Upper Truckee River and the surrounding marsh to improve ecological values of the restoration area and help reduce the river's discharge of nutrients and sediment that diminish Lake Tahoe's clarity.

The following basic objectives of the project were developed for the proposed action to meet the purpose and need:

- Objective 1: Restore natural and self-sustaining river and floodplain processes and functions.
- Objective 2: Protect, enhance, and restore naturally functioning habitats.
- Objective 3: Restore and enhance fish and wildlife habitat quality.
- Objective 4: Improve water quality through enhancement of natural physical and biological processes.
- Objective 5: Protect and, where feasible, expand Tahoe yellow cress populations.
- Objective 6: Provide public access, access to vistas, and environmental education at the Lower West Side and Cove East Beach consistent with other objectives.

- Objective 7: Avoid increasing flood hazards on adjacent private property.
- Objective 8: Design with sensitivity to the site's historical and cultural heritage.
- Objective 9: Design the wetland/urban interface to help provide habitat value and water quality benefits.
- Objective 10: Implement a public health and safety program, including mosquito monitoring and control.

Five alternatives are being considered and are analyzed at a comparable level of detail in this environmental document. A preferred or proposed alternative has not yet been defined. Following receipt and evaluation of public comments on the DEIR/DEIS/DEIS, the lead agencies will determine which alternative or combinations of features from multiple alternatives will become the preferred alternative. A discussion of the decision will be included in the Final EIR/EIS/EIS.

A summary description of the alternatives is presented below. The detailed description of each alternative is presented in Chapter 2.

ES.3.2 Alternative 1. Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

To restore the river channel and its connection to the floodplain, Alternative 1 would increase channel length and decrease channel capacity. A key element of this restoration would be the use of engineering elements (primarily structures in the channel) to cause sediment deposition that raises the channel bed and decreases channel capacity, and would slightly reduce the capacity of the channel mouth at Lake Tahoe. Alternative 1 would also restore a natural-functioning lagoon in the vicinity of the existing Sailing Lagoon, lagoon and wet meadow conditions at the Trout Creek Lagoon, floodplain functions at the TKPOA Corporation Yard (contingent on TKPOA consent), and sand ridges ("dunes") at Cove East Beach. In addition, Alternative 1 would remove user-created trails within the "core habitat" area that contains sensitive marsh habitats within the center of the study area.

Under Alternatives 1–4, public access and recreation infrastructure is proposed near the perimeter of the study area. Alternative 1 provides a potential "maximum" level of public access and recreation infrastructure that includes parking, two kiosks, stabilization of an existing river access for boat take-out, observation areas, boardwalks, and a connected system of bicycle paths. Bicycle paths would be Class I/Shared-Use Paths (as described in TRPA and TMPO 2010). Bridges over Trout Creek and the Upper Truckee River (and a boardwalk) would connect the proposed bicycle paths. Bicycle paths would connect to existing regional trails near the study area.

ES.3.3 Alternative 2. New Channel – West Meadow (Minimum Recreation Infrastructure)

To restore the river channel and its connection to the floodplain, Alternative 2 would directly raise the streambed elevation, increase the channel length, and decrease channel capacity. A key element of this restoration would be the excavation of a new river channel that has less capacity than the existing channel. The existing river mouth would be replaced with a new smaller river mouth, similar in size to the historical river mouth prior to dredging. Unlike Alternative 1, the river channel and floodplain restoration elements of Alternative 2 would require two existing stormwater discharge locations to be modified and/or relocated. Alternative 2 also includes all of the other restoration and enhancement elements of Alternative 1.

Alternative 2 would provide a "minimum" level of public access and recreation infrastructure that includes signage, a modified pedestrian trail to Cove East Beach (which would be Americans with Disabilities Act (ADA) accessible), five viewpoints, a boat take-out, and a fishing platform. Except for four viewpoints along the eastern

perimeter of the study area, adjacent to the Al Tahoe neighborhood and the boat take-out near U.S. 50, this infrastructure is located from Venice Drive to Cove East Beach.

ES.3.4 ALTERNATIVE 3. MIDDLE MARSH CORRIDOR (MODERATE RECREATION INFRASTRUCTURE)

To restore the river channel and its connection to the floodplain, Alternative 3 would promote the development, through natural processes, of a new main channel and/or distributary channels in the central portion of the study area. A "pilot" channel, similar to the channel segments constructed under Alternatives 1 and 2, would be constructed from the existing river channel in the southern portion of the study area and connected to historical channels in the center of the study area. No construction would occur in the central or northern portions of the study area, rather, natural processes would be allowed to dictate the flow path(s), bed and bank elevations, and capacities of the channel(s) through the central and northern portions of the study area. The existing river mouth would be retained, but its capacity would be reduced. In addition, by boring two culverts under U.S. 50, an area of isolated floodplain would be reactivated. The river channel and floodplain restoration elements of Alternative 3 would require two existing stormwater discharge locations to be modified and/or relocated. Also, like Alternatives 1 and 2, Alternative 3 would restore a natural-functioning lagoon in the vicinity of the Sailing Lagoon and floodplain functions at the TKPOA Corporation Yard and would enhance areas of "core habitat" and forest. However, Alternative 3 would not restore lagoon and wet meadow conditions at the Trout Creek Lagoon (by removal of existing fill) or dunes at Cove East Beach.

Alternative 3 would provide a "moderate" level of public access and recreation infrastructure that includes three pedestrian trails, a bicycle path, a kiosk, one observation area, six viewpoints, a fishing platform, a boat take-out area, and signage at multiple locations. Similar to Alternative 2, the modified pedestrian trail to Cove East Beach would be ADA accessible, a fishing platform would be installed at the restored lagoon, and stabilization of an existing boat take-out area near U.S. 50. Alternative 3 would include a bicycle path and a pedestrian trail near the Highland Woods neighborhood (and connected to Macinaw Road), and a pedestrian trail adjacent to the Al Tahoe neighborhood, from Capistrano Avenue to East Barton Beach (two segments of which would be boardwalks).

ES.3.5 ALTERNATIVE 4. INSET FLOODPLAIN (MODERATE RECREATION INFRASTRUCTURE)

To restore the river channel and its connection to the floodplain, Alternative 4 would lower bank heights by excavating an inset floodplain along much of the river channel and by localized cut and fill to create meanders in the existing straightened reach. The existing river mouth would be retained and its capacity would not be reduced. Although Alternative 4 would include the enhancement of core and forest habitats, it would not include the restoration of floodplain functions at the TKPOA Corporation Yard, a natural-functioning lagoon in the vicinity of the existing Sailing Lagoon, or dunes at Cove East Beach.

Similar to Alternative 3, Alternative 4 would provide a "moderate" level of public access and recreation infrastructure that includes a bicycle path, two pedestrian trails, a kiosk, stabilization of an existing river access for boat take-out, two observation areas, five viewpoints, and signage at multiple locations. The bicycle path would be adjacent to the Highland Woods neighborhood (and connected to Macinaw Road), and the pedestrian trails would be near the Tahoe Keys, from Venice Drive to Cove East Beach (in part replacing the existing pedestrian trail), and adjacent to the Al Tahoe neighborhood, from Capistrano Avenue to San Francisco Avenue (one segment of which would be a boardwalk).

ES.3.6 ALTERNATIVE 5. NO PROJECT/NO ACTION

Alternative 5 would not provide any actions to restore the river channel and its connection to the floodplain in the study area. This alternative would allow but not facilitate the long-term, passive recovery of the river system via natural processes. The existing river mouth location, size, and bed elevation would continue to adjust to lake levels, streamflows, and sediment loads. The previously eliminated Upper Truckee River–lagoon connection would not be restored, leaving the direct open-water connection between the Tahoe Keys Marina channel, the

Sailing Lagoon, and Lake Tahoe unchanged. The previously leveled area between Cove East Beach and the Sailing Lagoon would not be modified. Alternative 5 would not protect an extensive area of core habitat. However, the Conservancy has been decommissioning some user-created trails, and similar actions would likely continue to be implemented.

Alternative 5 would not take any direct steps to construct additional, extensive public access and recreation infrastructure. However, this alternative would likely maintain existing infrastructure and might result in the construction of some additional, smaller elements (i.e., signage).

ES.3.7 Alternatives and Alternative Elements Considered but Eliminated from Further Evaluation

Off-site alternatives were eliminated from further evaluation because off-site alternatives would not fulfill the purpose and primary objectives of the project. An important part of the project's purpose and objectives is to restore natural geomorphic processes and ecological functions to improve ecological values of the study area and help reduce the river's discharge of nutrients and sediment that diminish Lake Tahoe's clarity, while still providing access to vistas and environmental education to the public. Off-site actions upstream along the Upper Truckee River or elsewhere in the watershed could reduce the river's discharge of nutrients and sediment but would not substantially improve ecological values of the study area.

While the four preliminary conceptual alternatives were being developed and refined, several facilities were removed from the alternatives, in particular a full-service visitor center and restrooms. As described further below, these facilities were determined to be inconsistent with the project objectives and the principles for alternative development given above.

Initial conceptual plans for Alternative 1 included a full-service visitor center located near the end of Venice Drive. This facility was included to ensure that the maximum amount of feasible recreational infrastructure was considered. However, the need for visitor centers on the south shore has been largely met by the Taylor Creek Visitor Center, the Meyers Visitor Center, and the Explore Tahoe Visitor Center. The creation of a full-service visitor center on the project site would be an unnecessary duplication of services provided in multiple nearby locations. A full-service visitor center would require substantial operations and maintenance costs, which would place an ongoing financial burden on the State while providing services that exist elsewhere. The facility was therefore removed from the alternative.

Furthermore, a full-service visitor center was determined to be inconsistent with the scale and type of use of the site and of the study area as a whole. The site is located adjacent to a residential neighborhood, has a small beach area, and is generally used for dispersed recreation. A visitor center would have the potential to attract an increased number of users seeking an interior interpretive experience. The resulting type and amount of use could negatively affect the existing dispersed uses, which are more compatible with the size and setting of the site in the study area. Therefore, a full service-visitor center has been replaced with a kiosk that is compatible with the size and setting of the study area. In addition, the infrastructure required to support a visitor center would be inconsistent with the limitations of the site.

Initial conceptual plans for Alternatives 1, 3, and 4 also included restrooms at the full-service visitor center and at Cove East Beach. However, refinement of the alternatives reduced the need for these facilities, and it was determined that the reduced need would be met by the restrooms at the Tahoe Keys Marina. In part, the restroom facilities were intended to support a full-service visitor center, which has been removed from the alternatives.

ES.4 KEY ENVIRONMENTAL IMPACTS, MITIGATION MEASURES, ISSUES TO BE RESOLVED, AND AREAS OF CONTROVERSY

This DEIR/DEIS/DEIS is a full-scope environmental document that evaluates a broad range of potential environmental impacts at a comparable level of detail for all five alternatives. The analysis identifies and addresses several key environmental issues where significant or potentially significant effects on the environment would occur. Where significant or potentially significant impacts are identified, the document describes feasible mitigation measures. The summary of impacts and mitigation measures for the alternatives addressed in the DEIR/DEIS/DEIS is presented in Table ES-1 below.

Regarding issues to be resolved and areas of controversy (a requirement of CEQA for the summary), several issues have been the subject of public and/or affected agency interest. These are the key issues for which controversy may arise or that will require resolution during the consideration of a preferred alternative. The issues are summarized, as follows:

- Installation of a bridge over the mouth of the Upper Truckee River and associated scenic and Tahoe yellow cress impacts (Alternative 1).
- Potential for flooding-related changes in the neighborhood west of the study area (Alternatives 1, 2, 3, and 4).
- Potential for long-term disruption of fish passage and migration patterns as the channel adjusts (Alternative 3).
- Short-term risks of erosion, turbidity, and water quality impacts from construction associated with river restoration and the maturation period following construction (Alternatives 1, 2, 3, and 4).
- Changes in public access for recreation users (Alternatives 1, 2, 3, and 4).
- Potential for noise and scenic impacts to nearby residences (Alternatives 1, 2, 3, and 4).

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.2 Air Quality and Global Climate Change						
3.2-1: Short-Term Emissions of Criteria Air Pollutants and Precursors during Construction	1–4	Short term	EC 1	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.2-2: Long-Term Operational (Regional) Emissions of Criteria Air Pollutants and Precursors	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.2-3: Long-Term Operational (Local) Emissions of Carbon Monoxide by Mobile Sources	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.2-4: Exposure of Sensitive Receptors to Odors	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.2-5: Exposure of Sensitive Receptors to Emissions of Hazardous Air Pollutants	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.2-6: Short-Term or Long-Term Operational (Regional) Emissions of GHGs	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.3 Archaeological and Historical Resources						
3.3-1: Damage to or Destruction of Documented Potentially Significant Cultural Resources during Construction	1–4	Long term	EC 2	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.3-2: Damage to or Destruction of Undocumented Potentially Significant Cultural Resources during Construction	1–4	Long term	EC 2	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.3-3: Damage to or Destruction of Previously Undocumented Human Remains during Construction	1–4	Long term	EC 3	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.3-4: Damage to or Destruction of Documented Potentially Significant Cultural Resources Resulting from Public Access Features	1–4	Long term	EC 2	LTS	No mitigation is required.	LTS
	5	Long term	NA	LTS	No mitigation is required.	LTS

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.4 Biological Resources: Vegetation and Wildlife						
3.4-1: Introduction and Spread of Invasive Plants by Construction Activities	1–4	Long term	EC 4	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.4-2: Introduction and Spread of Invasive Plants by Recreational Activities	1 and 5	Long term	NA	LTS	No mitigation is required.	LTS
	2	Long term	NA	B	No mitigation is required.	B
	3 and 4	Long term	NA	B	No mitigation is required.	B
3.4-3: Damage to or Mortality of Special-Status Plants Resulting from Construction Activities	1–4	Short term	NA	PS	Mitigation Measure 3.4-3: Conduct Protocol-Level Preconstruction Surveys and Avoid or Mitigate Impacts on Tahoe Yellow Cress Plants.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.4-4: Altered Extent of Special-Status Plant Habitat	1, 3, and 4	Long term	NA	LTS	No mitigation is required.	LTS
	2	Long term	NA	B	No mitigation is required.	B
	5	NA	NA	NI	No mitigation is required.	NI
3.4-5: Damage to or Mortality of Special-Status Plants Resulting from Recreational Activities	1	Long term	NA	S	No additional mitigation beyond Mitigation Measure 3.4-3 is feasible.	SU
	2, 3, and 4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.4-6: Short-Term Disturbance of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Construction Activities	1–4	Short term	ECs 5 and 6	S	Beyond ECs 5 and 6, no additional mitigation is feasible.	SU
	5	NA	NA	NI	No mitigation is required.	NI
3.4-7: Enhancement and Creation of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Ecosystem Restoration	1–4	Long term	NA	B	No mitigation is required.	B
	5	NA	NA	NI	No mitigation is required.	NI

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.4-8: Disruption of Wildlife Habitat Use and Loss of Wildlife Resulting from Construction Activities	1–4	Short term	NA	S	Mitigation Measure 3.4-8A: Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers if Necessary. Mitigation Measure 3.4-8B: Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary.	SU
	5	NA	NA	NI	No mitigation is required.	NI
3.4-9: Altered Extent and Quality of Wildlife Habitats Resulting from River, Floodplain, and Other Restoration and Enhancement Elements	1–4	Long term	NA	B	No mitigation is required.	B
	5	NA	NA	NI	No mitigation is required.	NI
3.4-10: Altered Quality of Wildlife Habitats Resulting from Altered Recreational Use	1	Long term	NA	LTS	No mitigation is required.	LTS
	2, 3, and 4	Long term	NA	B	No mitigation is required.	B
	5	NA	NA	NI	No mitigation is required.	NI
3.4-11: Conversion of Forest Land to Nonforest Use	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.4-12: Interference with Wildlife Use of Established Movement Corridors	1–4	Short term	ECs 5 and 6	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.5 Fisheries						
3.5-1: Short-Term Aquatic Habitat Degradation	1–4	Short term	ECs 5 and 6	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.5-2: Stranding of Aquatic Biota from Dewatering Work Sites and Abandoning the Old Channel	1–4	Short term	EC 7	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.5-3: Short-Term Disruption of Fish Passage/Migration	1–4	Short term	NA	LTS	No mitigation is required	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.5-4: Long-Term Disruption of Fish Passage/Migration	1, 2, and 4	Long term	NA	LTS	No mitigation is required.	LTS
	3	Long term	NA	PS	No mitigation is feasible.	SU
	5	NA	NA	NI	No mitigation is required.	NI
3.5-5: Introduction and Spread of Aquatic Invasive Species by Construction Activities	1–4	Short term	EC 4	LTS	No additional mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.6 Geology and Soils, Mineral Resources, and Land Capability and Coverage						
3.6-1: Soil Erosion, Sedimentation, and Loss of Topsoil	1–4	Long term	ECs 5, 6, and 8	LTS	No mitigation is required.	LTS
	5	Long term	NA	LTS	No mitigation is required.	LTS
3.6-2: Risks to People and Structures Caused by Strong Seismic Ground Shaking	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.6-3: Reduction and Relocation of Land Coverage	1	Long term	NA	LTS	No mitigation is required.	LTS
	2, 3, and 4	Long term	NA	B	No mitigation is required.	B
	5	NA	NA	NI	No mitigation is required.	NI
3.7 Human Health/Risk of Upset						
3.7-1: Potential Hazards to the Public from Use of Hazardous Materials	1–4	Short term	ECs 5 and 6	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.7-2: Potential Hazards to Human Health from Exposure to Existing On-Site Hazardous Materials	1, 2, and 3	Short term	EC 9	PS	Mitigation Measure 3.7-2a: Prepare and Implement a Health and Safety Plan and Provide Qualified Oversight of Fill Removal Related to the Corporation Yard. Mitigation Measure 3.7-2b: Notify Appropriate Federal, State, and Local Agencies if Contaminated Soils Are Identified, and Complete Recommended Remediation Activities.	LTS
	4 and 5	NA	NA	NI	No mitigation is required.	NI
3.7-3: Potential Hazardous Emissions or Handling of Hazardous or Acutely Hazardous Materials, Substances, or Waste within One-Quarter Mile of an Existing or Proposed School	1–4	Short term	EC 9	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.7-4: Potential Increase in Public Health Hazards from Mosquitoes Resulting from Increased Floodplain Inundation	1–4	Long term	EC 10	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.7-5: Potential for Airspace Safety Hazards Associated with Restoration and Enhancement of Habitat for Hazardous Wildlife	1–4	Long term	NA	LTS	No mitigation is required	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.7-6: Potential for Wildland Fire Caused by Construction Equipment	1–4	Short term	EC 9	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.8 Hydrology and Flooding						
3.8-1: Increased Runoff Volumes and Peak Flows	1–4	Long term	EC 11	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.8-2: Effects on Channels from Reconfiguration of Stream Channels and Lagoon Surface Water Features	1, 2, and 4	Long term	NA	B	No mitigation is required.	B
	3	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI

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Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.8-3: Modified 100-Year Flood Flow Directions or Floodplain Boundaries	1–5	Long term	NA	LTS	No mitigation is required.	LTS
3.8-4: Increased Overbank Flooding for Small Streamflow Events	1–4	Long term	NA	B	No mitigation is required.	B
	5	Long term	NA	LTS	No mitigation is required.	LTS
3.8-5: Modified Groundwater Levels and Flow Patterns	1–3	Long term	NA	B	No mitigation is required.	B
	4 and 5	Long term	NA	LTS	No mitigation is required.	LTS
3.8-6: Exposure to Seismically Generated Wave Hazards	1–5	Long term	NA	LTS	No mitigation is required.	LTS
3.9 Geomorphology and Water Quality						
3.9-1: Short-Term Risk of Surface Water and Groundwater Degradation during Construction	1–4	Short term	ECs 5 and 6	S	All feasible measures to avoid, minimize, or mitigate this impact have already been incorporated into the design of these alternatives.	SU
	5	Short term	NA	NI	No mitigation is required.	NI
3.9-2: Short-Term, Project-Related Risk of Surface Water Degradation Following Construction	1–4	Short term	NA	S	Mitigation Measure 3.9-2: Adaptively Manage Potential Flood Disturbance in the Interim Period after Construction.	SU
	5	NA	NA	NI	No mitigation is required.	NI
3.9-3: Upper Truckee River Channel Erosion within the Study Area	1–4	Long term	NA	B	No mitigation is required.	B
	5	Long term	NA	LTS	No mitigation is required.	LTS
3.9-4: Trout Creek Channel Erosion within the Study Area	1 and 2	Short term	NA	B	No mitigation is required.	B
	3 and 5	Short term	NA	LTS	No mitigation is required.	LTS
	4	NA	NA	NI	No mitigation is required.	NI
3.9-5: Erosion of Backfilled and/or Remnant Channel Segments on the Floodplain	1, 2, and 3	Short term	NA	LTS	No mitigation is required.	LTS
	4 and 5	NA	NA	NI	No mitigation is required.	NI
3.9-6: Retention of Fine Sediment and Nutrients within the Study Area	1–4	Long term	NA	B	No mitigation is required.	B
	5	Long term	NA	LTS	No mitigation is required.	LTS

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.9-7: Decreased Delivery of Coarse Sediment to Cove East and Barton Beaches	1 and 3	Short term	NA	PS	Mitigation Measure 3.9-7: Monitor and Adaptively Manage Delivery of Coarse Sediment to Cove East and Barton Beaches.	LTS
	2	Short term	NA	LTS	No mitigation is required.	LTS
	4	NA	NA	NI	No mitigation is required.	NI
	5	Short term	NA	TSMC	No mitigation is required.	TSMC
	1–5	Long term	NA	TSMC	No mitigation is required.	TSMC
3.9-8: Stormwater Drainage and Treatment	1–4	Short term and long term	ECs 5, 6, and 11	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.10 Land Use						
3.10-1: Potential to Physically Divide an Established Community	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.10-2: Potential Conflict with Land-Use Plans, Policies, or Regulations Intended to Protect the Environment.	1–5	Long term	NA	LTS	No mitigation is required.	LTS
3.10-3: Potential Conflict with Regional Conservation Strategy for Tahoe Yellow Cress	1	Long term	NA	S	All feasible measures to reduce effects on Tahoe yellow cress, and thus reduce the potential conflict with the regional conservation strategy, have been included in the Conservancy's Tahoe yellow cress management plan for the study area, which would be implemented as a component of Alternative 1.	SU
	2–5	Long term	NA	LTS	No mitigation is required.	LTS
3.11 Noise						
3.11-1: Short-Term Project Construction Noise Levels Exceeding Applicable Thresholds	1–4	Short term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.11-2: Long-Term, Project-Related Generation of Stationary- and Area-Source Noise	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.11-3: Long-Term Generation of Project-Related Traffic Noise	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.11-4: Land Use Compatibility of Study Area Noise Levels and Surrounding Land Uses	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.11-5: Short- and Long-Term Increases in Groundborne Vibration Levels	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.12 Public Services						
3.12-1: Potential for Longer Emergency-Vehicle Response Times Caused by Roadway Obstruction during Construction	1–4	Short term	EC 12	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.12-2: Potential Need for Additional Public Services or Facilities as a Result of Increased Demand for Public Services	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.13 Recreation						
3.13-1: Short-Term Increase in Use of Existing Neighborhood and Regional Parks and Recreation Facilities during Construction	1–4	Short term	EC 13	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.13-2: Short-Term Construction Impacts of Recreation Facilities That May Have an Adverse Physical Effect on the Environment	1–4	Short term	NA	SU	See Section 3.4, "Biological Resources: Vegetation and Wildlife," Section 3.5, "Fisheries," and Section 3.9, "Geomorphology and Water Quality."	SU
	5	NA	NA	NI	No mitigation is required.	NI
3.13-3: Short-Term Decrease or Loss of Public Access and Recreation Opportunities within Lakes, Waterways, or Public Land during Construction	1–4	Short term	ECs 13 and 14	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.13-4: Long-Term Change in Use of Surrounding Neighborhood and Regional Parks and Recreation Facilities	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.13-5: Long-Term Operation and Expansion of Recreation Facilities That May Have an Adverse Physical Effect on the Environment	1	Long term	NA	S	All feasible management measures to reduce effects on Tahoe yellow cress have been included in the Conservancy's Tahoe yellow cress management plan for the study area and would be implemented as a component of Alternative 1.	SU
	2, 3, and 4	Long term	NA	LTS	No mitigation is required.	LTS
	5	Long term	NA	LTS	No mitigation is required.	LTS
3.13-6: Long-Term Decrease or Loss of Public Access and Recreation Opportunities within Lakes, Waterways, or Public Lands	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	Long term	NA	NI	No mitigation is required.	NI
3.13-7: Conflicts with Regional PAOT Allocations	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.14 Scenic Resources						
3.14-1: Potential for Short-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33, Roadway Travel Unit 35, or the Visual Character or Quality of the Study Area	1–4	Short term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.14-2: Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Boardwalk and Observation Platforms	1, 3, and 4	Long term	NA	LTS	No mitigation is required.	LTS
	2 and 5	NA	NA	NI	No mitigation is required.	NI

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.14-3: Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Upper Truckee River Bridge and Ramps	1	Long term	NA	S	Because the composite score was calculated based on use of optimal colors and vegetative screening for the bridge, ramps, and support columns, no additional mitigation is feasible.	SU
	2–5	NA	NA	NI	No mitigation is required.	NI
3.14-4: Potential for Long-Term Degradation of a Scenic Highway or the Scenic Quality of Roadway Travel Unit 35 and Mapped Scenic Resources	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.14-5: Potential for Long-Term Degradation in Existing Visual Character or Quality of the Study Area	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.14-6: Potential for Increases in Light or Glare	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.15 Socioeconomics, Population and Housing, and Environmental Justice						
3.15-1: Short-term Increase in Population and Housing Demand Resulting from Construction-Related Activities	1–4	Short term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.15-2: Potential Long-Term Effect on Sales or Incomes of Local Businesses Resulting from Additional Visitors to the Study Area	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.16 Transportation, Parking, and Circulation						
3.16-1: Increased Traffic on Regional Circulation System during Construction	1–4	Short term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.16-2: Increased Parking Demand	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.16-3: Potential for Conflicts between Construction Traffic, Local Traffic, Pedestrians, and Bicycles	1–4	Short term	EC 12	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.17 Utilities						
3.17-1: Increased Waste Disposal Requirements Resulting from Construction and Operations	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.17-2: Increased Use of Electrical Power	1	Long term	NA	LTS	No mitigation is required.	LTS
	2–5	NA	NA	NI	No mitigation is required.	NI
3.18 Cumulative Impacts						
3.18-C1: Cumulative Air Quality—Short-Term Emissions of Criteria Air Pollutants and Precursors during Construction	1–4	Short term	EC 1	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C2: Cumulative Air Quality—Long-Term Operational (Regional) Emissions of Criteria Air Pollutants and Precursors	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C3: Cumulative Air Quality—Long-Term Operational (Local) Emissions of Carbon Monoxide by Mobile Sources	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C4: Cumulative Air Quality—Exposure of Sensitive Receptors to Odors	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C5: Cumulative Air Quality—Exposure of Sensitive Receptors to Emissions of Hazardous Air Pollutants	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C6: Cumulative Air Quality—Generation of Greenhouse Gases	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C7: Cumulative Archaeological and Historical Resources—Damage to or Destruction of Potentially Significant Cultural Resources or Human Remains	1–4	Short term	ECs 2 and 3	LTS	No mitigation is required.	LTS
	5	Short term	NA	LTS	No mitigation is required.	LTS
3.18-C8: Cumulative Biological Resources: Vegetation and Wildlife—Introduction and Spread of Invasive Plants	1–4	Short term and long term	EC 4	LTS	No mitigation is required.	LTS
	5	Short term and long term	NA	LTS	No mitigation is required.	LTS

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.18-C9: Cumulative Biological Resources: Vegetation and Wildlife—Construction-Related Effects on Special-Status Plants and Sensitive Habitats (Jurisdictional Wetlands, Riparian Vegetation, and SEZs)	1–4	Short term	ECs 4, 5, and 6	S	No additional mitigation is feasible.	SU
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C10: Cumulative Biological Resources: Vegetation and Wildlife—Long-Term Effects on Special-Status Plants and Sensitive Habitats (Jurisdictional Wetlands, Riparian Vegetation, and SEZs)	1 (Tahoe yellow cress)	Long term	NA	S	No mitigation is feasible.	SU
	1 (other plants/ habitat)	Long term	NA	B	No mitigation is required.	B
	2	Long term	NA	B	No mitigation is required.	B
	3 and 4	Long term	NA	LTS	No mitigation is required.	LTS
	5	Long term	NA	LTS	No mitigation is required.	LTS
3.18-C11: Cumulative Biological Resources: Vegetation and Wildlife—Short-Term Effects on Common or Special-Status Wildlife Resources and Wildlife Movement Corridors	1–4	Short term	NA	S	No mitigation is feasible.	SU
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C12: Cumulative Biological Resources: Vegetation and Wildlife—Long-Term Effects on Common or Special-Status Wildlife Resources and Wildlife Movement Corridors	1–4	Long term	NA	B	No mitigation is required.	B
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C13: Cumulative Fisheries—Short-Term Disruption of Aquatic Habitat and Movement Corridors for Fish	1–4	Short term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C14: Cumulative Fisheries—Short-Term Disruption of Spawning Migration, Rearing, and Holding Activity of Lahontan Cutthroat Trout	1-4	Short term	EC 7	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.18-C15: Cumulative Fisheries—Short-Term Localized Impacts on Fish Abundance and Distribution Related to Rescue and Relocation	1–4	Short term	EC 7	LTS	No additional mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C16: Cumulative Fisheries—Long-Term Increase in Upper Truckee River Habitat Quality	1–4	Long term	NA	B	No mitigation is required.	B
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C17: Cumulative Fisheries—Long-Term Population Level Impacts on Western Pearlshell Mussels	1–4	Long term	EC 7	LTS	No additional mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C18: Cumulative Fisheries—Long-Term Impacts of Aquatic Invasive Species to Aquatic Habitat in the Upper Truckee River	1–4	Long term	EC 7	LTS	No additional mitigation is required.	LTS
	5	Long term	NA	LTS	No mitigation is required.	LTS
3.18-C19: Cumulative Geology and Soils, Mineral Resources, and Land Capability and Coverage—Construction-Related, Short-Term Increases in Soil Erosion, Sedimentation, and Loss of Topsoil	1–4	Short term	ECs 5, 6, and 8	LTS	No additional mitigation is required.	LTS
	5	Short term	NA	LTS	No mitigation is required.	LTS
3.18-C20: Cumulative Geology and Soils, Mineral Resources, and Land Capability and Coverage—Land Coverage Changes	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	Long term	NA	NI	No mitigation is required.	NI
3.18-C21: Cumulative Human Health/Risk of Upset—Potential Hazards to the Public from Use of Hazardous Materials or Exposure to Existing On-Site Hazardous Materials	1–4	Short term and long term	EC 9	LTS	No additional mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C22: Cumulative Human Health/Risk of Upset—Potential Increase in Public Health Hazards from Mosquitoes Resulting from Increased Floodplain Inundation	1–4	Short term and long term	EC 10	LTS	No additional mitigation is required.	LTS
	5	Short term and long term	NA	LTS	No mitigation is required.	LTS

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.18-C23: Cumulative Human Health/Risk of Upset—Potential for Airspace Safety Hazards Associated with Restoration and Enhancement of Habitat for Hazardous Wildlife	1–5	Short term and long term	NA	LTS	No mitigation is required.	LTS
3.18-C24: Cumulative Hydrology and Flooding—Long-Term Increased Stormwater Runoff Volumes and Long-Term Increased Peak Flows Generated	1–4	Long term	EC 11	LTS	No additional mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C25: Cumulative Hydrology and Flooding—Long-Term Increased 100-Year Flood Hazard Area or Elevation	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	Long term	NA	LTS	No mitigation is required.	LTS
3.18-C26: Cumulative Hydrology and Flooding—Long-Term Increased Overbanking during Small Flood Events	1–4	Long term	NA	B	No mitigation is required.	B
	5	Long term	NA	LTS	No mitigation is required.	LTS
3.18-C27: Cumulative Hydrology and Flooding—Long-Term Modified Groundwater Levels and Flow Patterns	1–3	Long term	NA	B	No mitigation is required.	B
	4	Long term	NA	LTS	No mitigation is required.	LTS
	5	Long term	NA	LTS	No mitigation is required.	LTS
3.18-C28: Cumulative Geomorphology and Water Quality—Short-Term Risk of Surface Water Degradation during Construction	1–4	Short term	ECs 5 and 6	PS	All feasible mitigation measures would be expected to be incorporated into the individual restoration project plans and construction BMPs for specific projects. No additional mitigation is feasible.	SU
	5	Short term	NA	NI	No mitigation is required.	NI
3.18-C29: Cumulative Geomorphology and Water Quality—Short-Term Risk of Surface Water Degradation following Construction	1–4	Short term	NA	S	Mitigation Measure 3.18-C29: Implement an Interim Coordinated Adaptive Management Plan on the Upper Truckee River.	SU
	5	Short term	NA	LTS	No mitigation is required.	LTS
3.18-C30: Cumulative Geomorphology and Water Quality—Long-Term Stream Channel Erosion	1–4	Long term	NA	B	No mitigation is required.	B
	5	Long term	NA	LTS	No mitigation is required.	LTS

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.18-C31: Cumulative Geomorphology and Water Quality—Long-Term Fine Sediment and Nutrient Retention	1–4	Long term	NA	B	No mitigation is required.	B
	5	Long term	NA	LTS	No mitigation is required.	LTS
3.18-C32: Cumulative Geomorphology and Water Quality—Long-Term Modifications in Upper Truckee River Coarse Sediment Transport and Effects on Beach Processes	1–5	Long term	NA	TSMC	No additional mitigation is required.	TSMC
3.18-C33: Cumulative Land Use—Potential to Physically Divide an Established Community or Conflict with Land Use Plans, Policies, or Regulations	1	Long term	NA	S	No feasible mitigation is available.	SU
	2–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	Long term	NA	LTS	No mitigation is required.	LTS
3.18-C34: Cumulative Noise—Short-Term or Long-Term Increased Noise and Vibration	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	Short term and long term	NA	NI	No mitigation is required.	NI
3.18-C35: Cumulative Public Services—Increased Demand for and Interference of Public Services	1–4	Short term and long term	ECs 9 and 12	LTS	No additional mitigation is required.	LTS
	5	Short term and long term	NA	NI	No mitigation is required.	NI
3.18-C36: Cumulative Recreation—Construction-Related Loss of Recreational Opportunities and Public Access, Conflicts among Existing and Proposed Recreational Uses, and Increased Use of Existing Recreational Facilities	1–4	Short term	ECs 13 and 14	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C37: Cumulative Recreation—Operation-Related Loss of Recreational Opportunities and Conflicts among Surrounding and Proposed Recreational Uses	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C38: Cumulative Recreation—Construction or Expansion of Recreational Facilities That May Have an Adverse Physical Effect on the Environment	1	Short term and long term	NA	S	No feasible mitigation is available.	SU
	2–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]
3.18-C39: Cumulative Scenic Resources—Short-Term Glare from Construction Activities	1–4	Short term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C40: Cumulative Scenic Resources—Short-Term and Long-Term Effects of Construction Activities and Additional Facilities on Existing Visual Character and Quality	1	Short term and long term	NA	S	No feasible mitigation is available.	SU
	2–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C41: Cumulative Socioeconomics, Population and Housing, and Environmental Justice—Short-Term Increase in Population and Housing Demand Resulting from Construction-Related Activities	1–4	Short term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C42: Cumulative Socioeconomics, Population and Housing, and Environmental Justice—Potential Long-Term Increases in Sales or Incomes of Local Businesses Resulting from Additional Visitors to the Study Area	1–4	Long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C43: Cumulative Transportation, Parking, and Circulation—Construction and Operation Impacts on the Local and Regional Circulation System	1–4	Short term and long term	EC 12	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI
3.18-C44: Cumulative Utilities— Short-Term and Long-Term Impacts on Sanitary Sewer, Potable Water, Natural Gas, Electrical, Storm Drain, and Solid Waste Utilities	1–4	Short term and long term	NA	LTS	No mitigation is required.	LTS
	5	NA	NA	NI	No mitigation is required.	NI

Table ES-1
Summary of Impacts, Environmental Commitments, and Mitigation Measures

Resource Topic/Impact	Alt.	Impact Duration[1]	Environmental Commitment[2]	LOS before Mitigation[3]	Mitigation Measure	LOS after Mitigation[3]

Notes:
Alt. = alternative.
NA = not applicable.
[1] Long term = persisting for years to decades.
Short term = construction-related or otherwise persisting from one to several years.

[2] See Table 2-6 for descriptions of the environmental commitments.
[3] B = beneficial.
LOS = level of significance.
LTS = less than significant.
NI = no impact.
PS = potentially significant.
S = significant.
TSMC = too speculative for meaningful consideration.

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1 INTRODUCTION AND STATEMENT OF PURPOSE AND NEED

This document is a joint draft environmental impact report, environmental impact statement, and environmental impact statement (DEIR/DEIS/DEIS) prepared for the Upper Truckee River and Marsh Restoration Project in compliance with the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and Tahoe Regional Planning Agency (TRPA) Compact and Code of Ordinances. This DEIR/DEIS/DEIS has been prepared by the California Tahoe Conservancy (Conservancy) as lead agency under CEQA, with assistance from the California Department of General Services, Real Estate Services Division; the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) as federal lead agency under NEPA; and TRPA as lead agency in accordance with the Compact and the Code of Ordinances.

This DEIR/DEIS/DEIS is written to comply with the following relevant statutes, regulations, and ordinances:

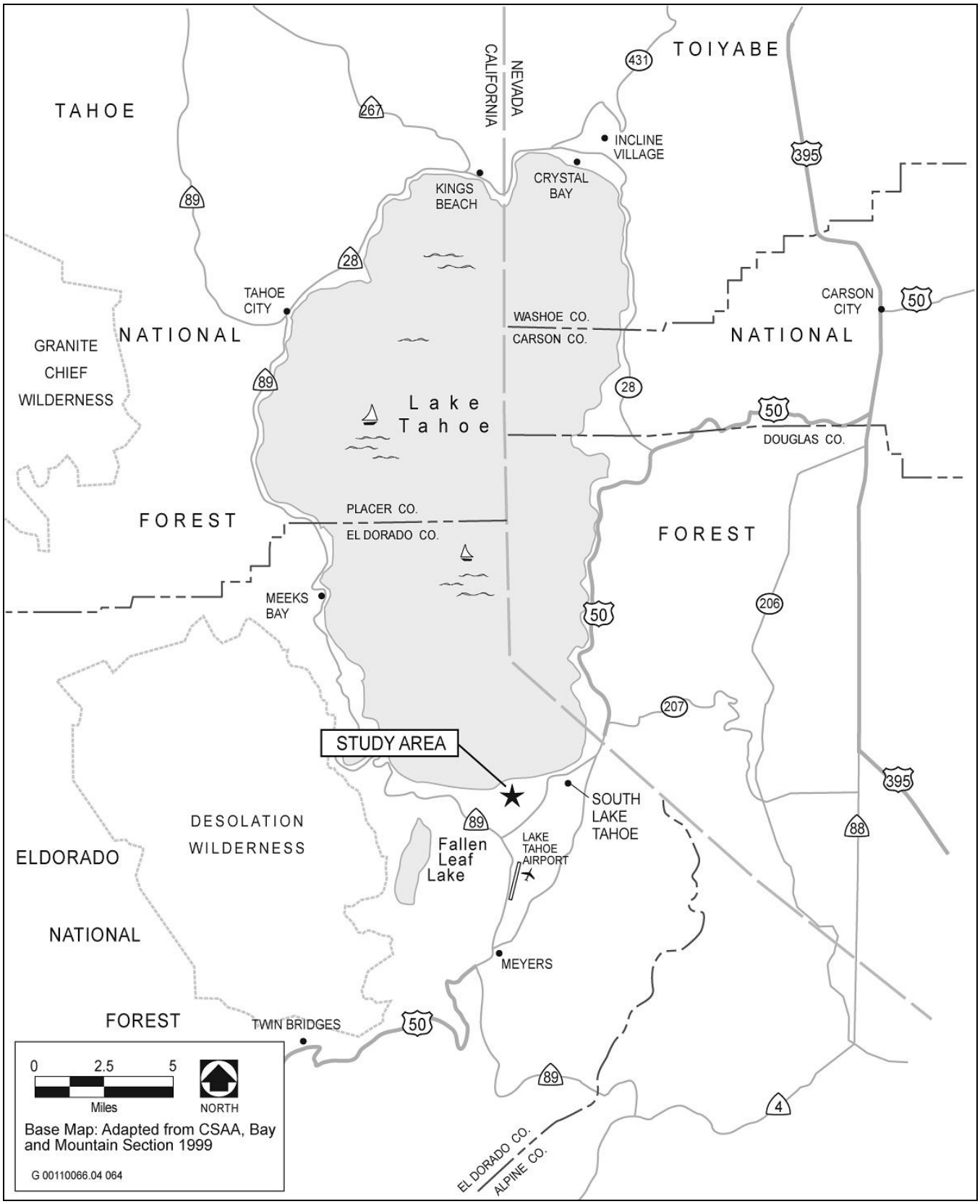
- California Public Resources Code (PRC) Sections 21000 et seq., which is CEQA;
- California Code of Regulations (CCR) Title 14, Division 6, Chapter 3 (State CEQA Guidelines), including Section 15222 ("Preparation of Joint Documents");
- National Environmental Policy Act of 1969, as amended (Public Law [PL] 91-190, 42 United States Code [USC] 4321–4347, January 1, 1970, as amended by PL 94-52 [July 3, 1975], PL 94-83 [August 9, 1975], and PL 97-258, Section 4[b] [September 13, 1982]);
- Council on Environmental Quality's (CEQ) regulations for implementing the procedural provisions of NEPA—Code of Federal Regulations (CFR) Title 40, Sections 1500 et seq., including Sections 1502.25, 1506.2, and 1506.4 (authority for combining federal and state environmental documents);
- The U.S. Department of Interior's Departmental Manual 516, DM 1-7, 14;
- Article VII of the TRPA Compact (PL 96-551, as revised in 1980);
- Chapter 3 of the TRPA Code of Ordinances; and
- Article VI of the TRPA Rules of Procedure.

This DEIR/DEIS/DEIS evaluates the potentially adverse and beneficial impacts on the human and natural environment resulting from implementation of the proposed Upper Truckee River and Marsh Restoration Project, hereinafter referred to as "the project". It also serves as the "proposed action" under NEPA and the "proposed project" under CEQA and the TRPA Code of Ordinances. The DEIR/DEIS/DEIS proposes mitigation measures and alternatives that may reduce or avoid significant adverse impacts. Following public review of the DEIR/DEIS/DEIS, a final EIR/EIS/EIS (FEIR/FEIS/FEIS) will be prepared, in which the joint lead agencies will respond to comments relating to the environmental analysis provided in the DEIR/DEIS/DEIS.

This chapter of the DEIR/DEIS/DEIS provides introductory information to orient the reader to the project and the environmental analysis, which are described in detail in other chapters.

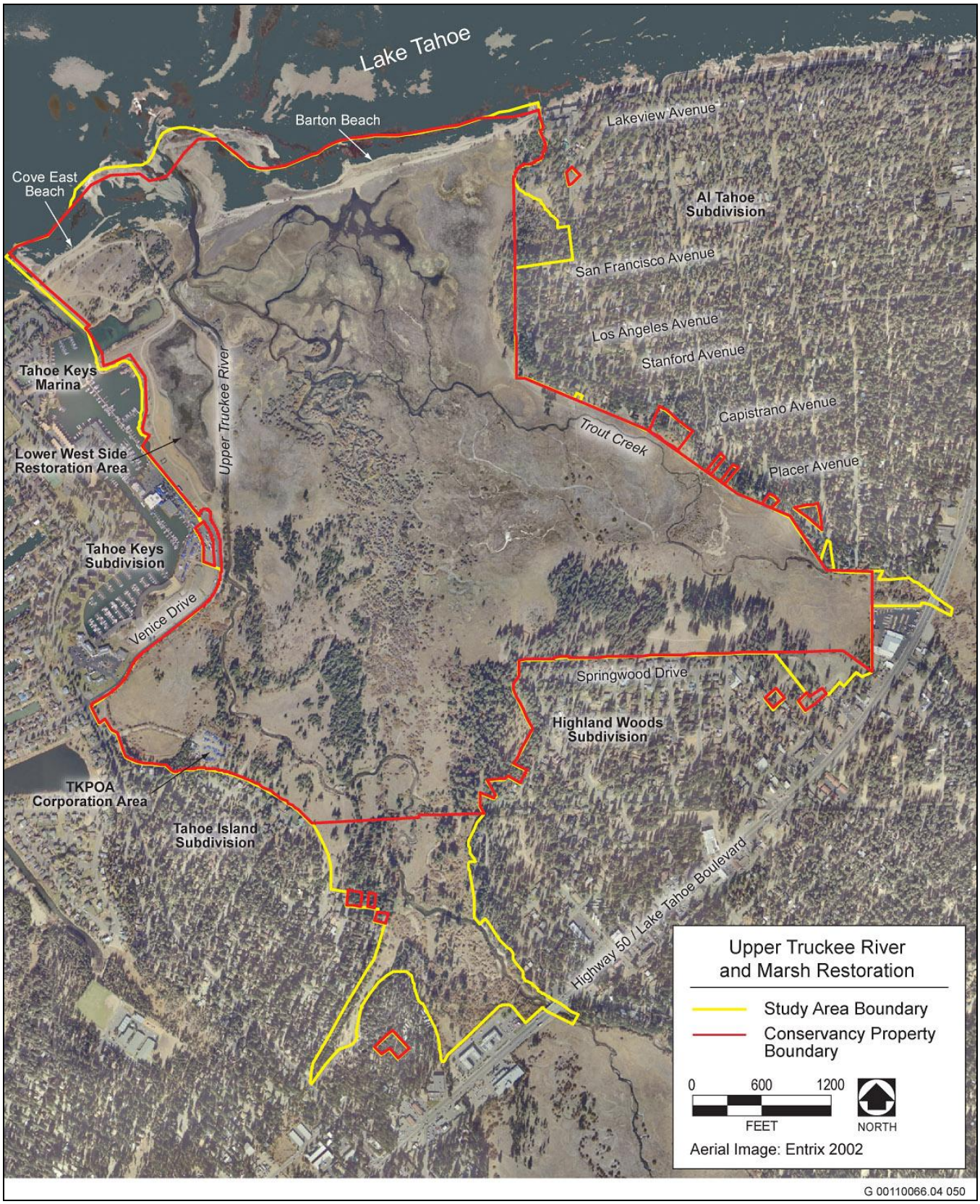
1.1 PROJECT REQUIRING ENVIRONMENTAL ANALYSIS

The Conservancy, Reclamation, and TRPA are pursuing a restoration project along the most downstream reach of the Upper Truckee River, next to Lake Tahoe (Exhibit 1-1). The study area for the project is generally bounded by U.S. Highway 50 and the Highland Woods neighborhood on the south, the Al Tahoe neighborhood on the east, the Tahoe Island/Sky Meadows and Tahoe Keys neighborhoods on the west, and Lake Tahoe to the north (Exhibit 1-2).



Source: Adapted by EDAW (now AECOM) in 2008

Exhibit 1-1 **Regional Location**



Source: Adapted by EDAW (now AECOM) in 2013

Exhibit 1-2 **Study Area Map**

The study area for the project is approximately 592 acres and includes parcels owned by the Conservancy, other public agencies, and private landowners (Exhibit 1-2). It includes the downstream reaches of Trout Creek and the Upper Truckee River, adjacent wetland (Upper Truckee Marsh) and upland habitats, and the Lower West Side Wetlands Restoration Project site (located in the northwest portion of the study area, just east of the Tahoe Keys Marina). The primary purpose of the Upper Truckee River and Marsh Restoration Project is to restore natural geomorphic processes and ecological functions along this reach of river.

The Upper Truckee River and Marsh Restoration Project is identified in TRPA's Environmental Improvement Program (EIP) as a project that is necessary to restore and maintain environmental thresholds for the Tahoe Basin. EIP projects are designed to achieve and maintain environmental threshold carrying capacities that protect the Tahoe Basin's unique and valued resources. An extensive evaluation and restoration planning process has been conducted to identify potentially feasible approaches for restoration of the river and marsh. As a result of that process, the following five alternatives—four action alternatives and a No-Project/No-Action Alternative—have been evaluated at an equal level of detail in this DEIR/DEIS/DEIS:

- Alternative 1. Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)
- Alternative 2. New Channel—West Meadow (Minimum Recreation Infrastructure)
- Alternative 3. Middle Marsh Corridor (Moderate Recreation Infrastructure)
- Alternative 4. Inset Floodplain (Moderate Recreation Infrastructure)
- Alternative 5. No-Project/No-Action

These alternatives are named for their approach to restoring the Upper Truckee River and the associated level of recreation infrastructure. Although the recreation and restoration components have been combined in the alternatives for the analysis, the Conservancy may choose to implement a different combination than presented. Also, restoration and recreation components would be refined during design development after selection of an alternative.It is expected that the analysis in this EIR/EIS/EIS sufficiently addresses the potential environmental effects resulting from implementing these recreational and restoration components, regardless of the ultimate combination, because the alternatives evaluated encompass the reasonable range of potential environmental effects.

For a detailed discussion of these four action alternatives and the No-Project/No-Action Alternative, see Chapter 2, "Project Alternatives."

1.2 PROJECT HISTORY AND PLANNING CONTEXT

Restoration planning for the Upper Truckee Marsh and Restoration Project began in the early 1990s with studies conducted by the University of California. In 1995, the Conservancy commissioned a restoration planning and design study, which identified a tentatively preferred river restoration concept two years later. The study determined that river restoration required using the entire Upper Truckee Marsh east of the Tahoe Keys Marina and subdivision. At that time the center and east side of the marsh were privately owned; therefore, this tentatively selected concept could not be pursued. In 1998, the Conservancy began planning and designing an initial phase of wetland restoration called the Lower West Side Wetland Restoration Project (LWS Project). The LWS Project was located on a 23-acre portion of a study area on the west side of the Upper Truckee River near Lake Tahoe. In this area, the marsh had been filled during the construction of the adjacent Tahoe Keys (Exhibit 1-2). After careful investigations, planning, and design; extensive environmental review; and community outreach, the Conservancy approved restoration of 12 acres of wetland on the 23-acre site through fill removal as the LWS Project in 2001. The removed fill was used to restore a former quarry at Washoe Meadows State Park in Meyers, California. Construction began in Summer 2001 and was completed in Summer 2003.

In 2000, the Conservancy purchased 311 acres of land in the center and east side of the marsh from a private party, bringing nearly the entire Upper Truckee Marsh into public ownership. Currently, the majority of the study area is owned by the Conservancy, including the marsh and meadows surrounding the lower reach of Trout Creek.

Restoration concepts encompassing the marsh and the lower reach of the river have been developed since the acquisition. As part of this process, the Conservancy has planned for public access facilities and recreation use management for the river, marsh, and beach.

Development of the Upper Truckee River and Marsh Restoration Project has proceeded through a sequence of several planning stages. Initially, the Conservancy defined project objectives and desired outcomes to direct the restoration planning process. The Conservancy evaluated and documented the existing natural processes and functions in the study area to begin the formulation and evaluation of alternative plans. This evaluation enabled the identification of potential restoration opportunities and constraints. With detailed information about the river and marsh processes and ecological functions, the Conservancy hosted a design charrette (i.e., interactive workshop) for agencies and other stakeholders to identify the spectrum of potentially feasible restoration ideas to be considered in the development of concept plan alternatives. Four alternative concept plans, all developed to be potentially feasible, were formulated to represent a reasonable range of restoration approaches and levels of public access and recreation facilities. These concepts were refined through hydrologic modeling, regulatory agency review, development of schematic designs, and monitoring. After refinement, the four concepts generated by this extensive planning process became the four action alternatives being evaluated with the No-Project/No-Action Alternative in the DEIR/DEIS/DEIS.

A preferred alternative has not yet been identified. It will be selected after the public has reviewed the five alternatives and provided comments on the DEIR/DEIS/DEIS. The preferred alternative may be one of the five evaluated in the DEIR/DEIS/DEIS, or it may involve a combination of features presented in those alternatives.

To date, key stages of the Upper Truckee River and Marsh Restoration Project have consisted of:

- evaluating existing natural processes and functions of the Upper Truckee River and marsh in 2000 and 2001;
- establishing project objectives and desired outcomes in 2002 and updating them in 2005;
- defining restoration opportunities and constraints in 2002 and 2003;
- conducting a restoration design charrette in 2003 to receive input from stakeholders on project priorities, concerns, and constraints, and design ideas;
- conducting hydraulic modeling studies to support the development and evaluation of alternatives, and initial development and comparative evaluation of four conceptual restoration alternatives in 2004 and 2005;
- regulatory agency review of alternative concepts for key issues and regulatory requirements in 2005;
- further refining and evaluating the alternatives and preparing a concept plan report in 2006;
- developing detailed schematic design drawings in 2007;
- preparing a comprehensive monitoring plan in 2008 that describes a 10-year period of monitoring for the project to characterize baseline conditions, track project performance related to objectives, establish tentative approaches to monitoring for regulatory requirements and construction impacts, and provide information for adaptive management; and
- analyzing environmental impacts of the five alternatives and preparing this DEIR/DEIS/DEIS since 2009.

1.3 PURPOSE AND NEED, AND PROJECT OBJECTIVES

NEPA regulations (40 CFR 1502.13) require that an EIS contain a statement of the purpose and need that “briefly specif[ies] the underlying purpose and need to which the agency is responding in proposing the alternatives,

including the proposed action." State CEQA Guidelines CCR Section 15124(b) requires that the project description contain a clear statement of the project objectives, including the underlying purpose of the project. In the TRPA Compact and Code of Ordinances, there are no requirements specifically addressing the description of a project's purpose and need, or a project's objectives.

1.3.1 PURPOSE AND NEED

Past actions have created a need to restore river and floodplain ecosystems in the Tahoe Basin to improve the clarity of Lake Tahoe and the ecological functions of riparian, wetland, and floodplain ecosystems, including the provision of wildlife habitat. Lake Tahoe is designated as an Outstanding National Resource Water, renowned worldwide for its clarity and purity (Lahontan RWQCB 1995). However, Lake Tahoe's clarity has declined by nearly 20 percent since 1968 (USGS 1997). Studies over the last three decades suggest that the reduction in water clarity of Lake Tahoe is correlated with the delivery of fine sediments from various watersheds in the basin and increased phytoplankton productivity, which in turn has been attributed to an increase in nutrients, especially nitrogen and phosphorus (Goldman 1974, Reuter and Miller 2000, Coats and Goldman 2001, Rowe et al. 2002, Simon et al. 2003, Lahontan RWQCB and UCD 2005, Simon 2006, California Water Boards and NDEP 2007). The increase in sediment and nutrient load is a direct result of increased urbanization in the Tahoe Basin.

The Upper Truckee River, which drains the largest watershed in the Tahoe Basin, has been substantially altered by land practices during the past 150 years. Throughout its watershed, the river has experienced ecological degradation typical of what has occurred elsewhere in the Basin. It has been modified from its original conditions by human activities, such as logging, livestock grazing, roads, gravel mining, fire suppression, golf courses, an airport, and residential, commercial, and industrial developments. In many locations the channel was straightened and enlarged, native vegetation was replaced by turf, and untreated stormwater was directed into the river and its tributaries. The channel has incised and is experiencing accelerated rates of bed and bank erosion. These human influences have resulted in reduced habitat quality for plant, wildlife, and fish species in the watershed and increased sediment and nutrient loads discharging into Lake Tahoe from the river, contributing to the declining clarity of the lake.

Past physical changes to the lower reach of the Upper Truckee River have affected the river's stability, the condition of the wetlands within its floodplain, and the quality of the water it carries into Lake Tahoe. Historical grazing, dredging, log running, and other evidence indicate that the first alterations occurred in the 1800s. With the construction of the Tahoe Keys development beginning in 1959, the river was channelized and relocated west of its original course to its current location, and fill was placed in much of the wetland up to six feet above the natural grade. Over time, the river became deeply incised, effectively eliminating a large portion of the Upper Truckee River's floodplain. These alterations have likely affected water quality by disconnecting the river from its wetlands and floodplains, where sediment and nutrients can be removed from streamflows and runoff. Nutrients, such as nitrogen and phosphorus, can be removed by plant uptake and volatilized by denitrification under certain (anaerobic) conditions found in wetlands. The nutrients are converted to gaseous or organic forms, fixed into the soil, or simply stored within the soil solution. Wetlands and floodplains also remove sediment and other suspended particles by allowing sediment-laden water to pass through densely vegetated floodplains and wetlands. Thus, the water quality of the lake can be protected and improved by restoring the natural functions of wetlands and floodplains in watersheds draining to Lake Tahoe.

The preservation and restoration of riparian areas and wetlands of the Upper Truckee Marsh is important for wildlife. In semiarid regions like the Tahoe Basin, the availability of moisture and cool, shaded microclimates gives wetlands and riparian areas an importance for wildlife that is disproportionate to their areal extent. Unfortunately, in the Tahoe Basin, most wetlands have been filled and developed, which has adversely affected native vegetation, wildlife, and water quality.

The Upper Truckee Marsh is the largest remaining wetland area in the Tahoe Basin. It is one of five marshes in the basin designated as an Ecologically Sensitive Area; the marsh's size, uniqueness, and potential for supporting

high levels of biodiversity are the factors underlying this designation (Murphy and Knopp 2000). Although still ecologically important, wetland habitats in the study area have been degraded by the channelization and subsequent incision of the Upper Truckee River.

Within the study area, there is also the need to provide public access for recreation purposes. The Conservancy acquired the parcels that make up the Upper Truckee Marsh study area to protect the existing ecological values of the site and restore the natural processes and functions of the Upper Truckee River, Trout Creek, and associated wetlands while providing public access for recreation purposes. However, certain parcels that make up the study area were acquired in a litigation settlement (People of the State of California vs. Dillingham Development Company and TRPA, CIV-S-85-0873-EJG [February 25, 1988]). The settlement requires that the Conservancy provide public access to the beach area west of the existing Upper Truckee River mouth. The purpose of this project is to restore natural geomorphic processes and ecological functions in this lowest reach of the Upper Truckee River and the surrounding marsh to improve ecological values of the study area and help reduce the river's discharge of nutrients and sediment that diminish Lake Tahoe's clarity while still providing public access, access to vistas, and environmental education to the public where appropriate. This purpose includes improving habitat values in the study area. Its implementation is an important component of the integrated objectives of the Conservancy, Reclamation, and TRPA to improve environmental quality in the Lake Tahoe region.

1.3.2 PROJECT OBJECTIVES

As discussed in the notice of preparation (NOP) developed by the Conservancy to initiate the CEQA process, the basic objectives of the project are:

- Objective 1: Restore natural and self-sustaining river and floodplain processes and functions.
- Objective 2: Protect, enhance, and restore naturally functioning habitats.
- Objective 3: Restore and enhance fish and wildlife habitat quality.
- Objective 4: Improve water quality through enhancement of natural physical and biological processes.
- Objective 5: Protect and, where feasible, expand Tahoe yellow cress populations.
- Objective 6: Provide public access, access to vistas, and environmental education at the Lower West Side and Cove East Beach consistent with other objectives.
- Objective 7: Avoid increasing flood hazards on adjacent private property.
- Objective 8: Design with sensitivity to the site's historical and cultural heritage.
- Objective 9: Design the wetland/urban interface to help provide habitat value and water quality benefits.
- Objective 10: Implement a public health and safety program, including mosquito monitoring and control.

1.4 INTENDED USES AND TYPE OF EIR/EIS/EIS (CEQA/NEPA/TRPA)

The Conservancy, Reclamation, and TRPA will use this DEIR/DEIS/DEIS to consider the project's environmental effects, mitigation measures, and alternatives. The DEIR/DEIS/DEIS will serve as the State of California's CEQA compliance document, as Reclamation's NEPA compliance document, and as TRPA's compliance document with respect to its Compact and Chapter 3 of the TRPA Code of Ordinances. State responsible and trustee agencies and federal agencies may also use this DEIR/DEIS/DEIS, as needed, for subsequent discretionary actions.

1.4.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

According to the State CEQA Guidelines (14 CCR Section 15064[f][1]), preparation of an EIR is required whenever a project may result in a significant impact on the physical environment. An EIR is an informational document used to inform public agency decision makers and the general public of the significant environmental effects of a project, identify feasible ways to minimize or mitigate the significant effects, and describe reasonable alternatives to the project that could feasibly attain most of the basic objectives of the project while substantially lessening or avoiding any of the significant or potentially significant environmental impacts.

CEQA requires that state and local government agencies consider the environmental effects of projects over which they have discretionary authority before taking action on those projects (PRC Section 21000 et seq.). CEQA also requires that each public agency avoid or fully reduce to less-than-significant levels, wherever feasible, the significant environmental effects of projects it approves or implements. If a project would result in significant and unavoidable environmental impacts that cannot be feasibly reduced to less-than-significant levels, the project can still be approved, but the lead agency must consider and adopt a "statement of overriding considerations" pursuant to CEQA Guidelines Sections 15043 and 15093. Although the primary purpose of CEQA is to fully inform the decision makers and the public about the environmental effects of a proposed project and to identify feasible mitigation measures and alternatives to reduce adverse effects to less-than-significant levels, CEQA nonetheless allows an agency to approve a project even when not all significant adverse impacts can be avoided or reduced to less-than-significant levels. However, that agency must explain and justify its decision to approve such a project through the Statement of Overriding Considerations, setting forth the proposed project's general social, economic, policy, or other public benefits that support the agency's informed decision to approve the proposed project.

1.4.2 NATIONAL ENVIRONMENTAL POLICY ACT

NEPA provides an interdisciplinary framework for federal agencies to develop information that will help them to take environmental factors into account in their decision making (42 USC 4321, 40 CFR 1500.1). According to NEPA, an EIS is required whenever a proposed major federal action (e.g., a proposal for legislation or an activity financed, assisted, conducted, or approved by a federal agency) would significantly affect the human environment.

The project has received federal funding for planning purposes and may receive funding from Reclamation for construction; the project therefore requires the preparation of an EIS. It also requires the preparation of an EIS because its development would require federal permits for one or more of the following activities: discharges of fill material into waters of the United States, which is an activity regulated under Section 404 of the Clean Water Act, and activities affecting plant or animal species protected by the Federal Endangered Species Act (ESA) (16 USC 1531 et seq.).

An EIS is an informational document used by federal agencies in making decisions. An EIS is intended to provide full and open disclosure of environmental consequences before agency action; an interdisciplinary approach to project evaluation; objective consideration of reasonable alternatives; application of measures to avoid or reduce adverse impacts; and an avenue for public and agency participation in decision making (40 CFR 1502.1). NEPA defines mitigation as avoiding, minimizing, rectifying, reducing, or compensating for significant effects of the proposed action (40 CFR 1508.20).

NEPA requires that a lead agency "include (in an EIS) appropriate mitigation measures not already included in the proposed action or alternatives" (40 CFR 1502.14[f]). An EIS shall also include discussions of "means to mitigate adverse environmental impacts (if not fully covered under Section 1502.14[f])." In preparing a record of decision under 40 CFR 1505.2, a lead agency is required to "[s]tate *whether* all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not.

A monitoring and enforcement program shall be adopted and summarized where applicable for *any* mitigation." (Italics added.)

1.4.3 TAHOE REGIONAL PLANNING COMPACT AND THE TRPA CODE OF ORDINANCES

TRPA is the primary permitting agency and the lead agency under the Compact. TRPA is a bi-state regional planning agency created in 1969 by federal law to oversee development on both the California and Nevada sides of Lake Tahoe. Under the Compact, Code of Ordinances, and Rules of Procedure, an EIS is an informational document used in the planning and decision-making process for a proposed project. The purpose of this DEIR/DEIS/DEIS is not to recommend either approval or denial of the project, but to disclose objective information that can be used in the development of a preferred alternative to the project/action for evaluation in the EIR/EIS/EIS.

Article VII of the Compact presents important TRPA policies relevant to the preparation and use of an EIS. Key provisions of the article are presented below:

- Article VII(a)(2) states that when acting upon matters that have a significant effect on the environment, TRPA shall "prepare and consider a detailed environmental impact statement before deciding to approve or carry out any project."

- Article VII(a)(3) states that the EIS shall "study, develop and describe appropriate alternatives to recommended courses of action for any project which involves unresolved conflicts concerning alternative uses of available resources."

- Article VII(a)(4) requires that TRPA "make available to states, counties, municipalities, institutions and individuals, advice and information useful in restoring, maintaining and enhancing the quality of the region's environment."

- Article VII(a)(5) requires TRPA to "initiate and utilize ecological information in the planning and development of resource-oriented projects."

Chapter 3 of the Code of Ordinances provides direction regarding the TRPA environmental documentation. Section 3.7 describes the approach and contents of an EIS. Article VI of the Rules of Procedure, Environmental Impact Statements, provides guidance on the procedural steps necessary for conducting environmental review consistent with Article VII of the Compact and Chapter 3 of the Code.

1.5 SCOPE AND FOCUS OF THE EIR/EIS/EIS

Pursuant to CEQA and NEPA, the discussion of potential effects on the environment is focused on those impacts that the lead agencies have determined may be potentially significant. Pursuant to the TRPA Code of Ordinances, the discussion is focused on any effects on attainment of environmental threshold carrying capacities of the *Lake Tahoe Regional Plan*. (CEQA, NEPA, and TRPA allow a lead agency to limit a discussion of the environmental effects in an EIR/EIS/EIS when the effects are not considered potentially significant.)

On October 3, 2006, the Conservancy and TRPA issued an NOP (Appendix A) to inform agencies and the general public that a joint DEIR/DEIS/DEIS was being prepared. The Conservancy and TRPA invited comments on the scope and content of the document and participation at a public scoping meeting. The NOP was published by the California and Nevada State Clearinghouses and distributed to federal agencies, responsible and trustee agencies, interested parties and organizations, and affected property owners (within 300 feet of the study area boundaries). It was also posted on the internet (at http://edaw.net/site/default/defHome.aspx; currently, project information is available at http://tahoe.ca.gov/upper-truckee-marsh-69.aspx). The NOP was circulated for 30 days as mandated

by CEQA. A specific circulation period is not defined in the TRPA Code of Ordinances, but the 30-day period is a regular practice for TRPA EISs.

Reclamation issued a notice of intent (NOI) (Appendix A) to inform agencies and the general public that a joint DEIR/DEIS/DEIS was being prepared and invited comments on the scope and content of the EIS. The NOI was published in the *Federal Register*, Vol. 71, No. 202, on October 19, 2006. The NOI was also posted on the Upper Truckee River and Marsh Restoration website. At that time Reclamation announced that a public involvement program had been developed allowing opportunities for public participation and involvement in the NEPA process. The NOI also provided information on the dates and times of public scoping meetings. There is no mandated time limit for receiving written comments in response to the NOI under NEPA.

The Conservancy, Reclamation, and TRPA jointly held public scoping meetings on October 24, 2006, at 12:00 and 6:00 p.m. They also jointly presented the project at a TRPA Advisory Planning Commission meeting on October 11, 2006, and a TRPA Governing Board meeting on October 25, 2006, to solicit input from the community and public agencies to be considered in project design, alternatives selection, and on the scope and content of the DEIR/DEIS/DEIS.

Chapter 5, "Compliance, Consultation, and Coordination," summarizes the substantive comments on the NOP and NOI. Copies of the comment letters are provided in the project's Scoping Report (Appendix B).

This DEIR/DEIS/DEIS includes an evaluation of 17 environmental issue areas and other NEPA- and CEQA-mandated topics. The 17 environmental issue areas are:

- air quality and global climate change;
- archaeological and historical resources;
- biological resources: vegetation and wildlife;
- fisheries;
- geology and soils, mineral resources, and land capability and coverage;
- human health/risk of upset;
- hydrology and flooding;
- geomorphology and water quality;
- land use;
- noise;
- public services;
- recreation;
- scenic resources;
- socioeconomics (including population, employment, and housing) and environmental justice;
- Indian trust assets;
- transportation, parking, and circulation; and
- utilities.

The other CEQA- and NEPA-mandated topics included in this DEIR/DEIS/DEIS are:

- cumulative effects;
- growth-inducing effects;
- significant environmental effects that cannot be avoided;
- relationship between short-term uses of the environment and maintenance and enhancement of long-term productivity; and
- environmentally-superior alternative/environmentally-preferred alternative.

The Compact, PL 96-551, as revised in 1980, authorizes TRPA to adopt environmental quality standards, called "environmental threshold carrying capacities" (thresholds), and to enforce ordinances designed to achieve the thresholds, which were adopted by the TRPA Governing Board in 1982. This DEIR/DEIS/DEIS also includes an

evaluation of the project alternatives related to attaining and maintaining TRPA's environmental thresholds to protect the unique values of the Tahoe Basin. The nine resource areas for which thresholds were adopted by TRPA in 1982 are:

- water quality;
- air quality;
- scenic resources;
- soil conservation;
- fisheries;
- vegetation preservation;
- wildlife;
- noise; and
- recreation.

1.6 AGENCY ROLES AND RESPONSIBILITIES

1.6.1 LEAD AGENCIES

The Conservancy is the project sponsor and lead agency under CEQA. It is an independent agency within the Natural Resources Agency of the State of California. It was established in its present form by state law in 1984 (Chapter 1239, Statutes of 1984). The Conservancy was established to develop and implement programs through acquisitions, grants, and site improvements. The Conservancy's mission is to preserve, protect, restore, enhance, and sustain the unique and significant natural resources and recreational opportunities of the Tahoe Basin. Its primary objectives are:

(1) to protect the natural environment of the basin, with priority placed on preserving the exceptional clarity and quality of the waters of Lake Tahoe;

(2) to preserve and enhance the broad diversity of wildlife habitat in the Tahoe Basin; and

(3) to increase public access and recreation opportunities for visitors to the lake and other natural areas.

CEQA requires lead agencies to consider physical environmental effects that may occur with approval of a project and to avoid or substantially lessen significant effects on the environment when feasible. When a project may have a significant effect on the environment, the agency with primary responsibility for carrying out or approving the project (the lead agency) is required to prepare an EIR.

1.6.2 TAHOE REGIONAL PLANNING AGENCY

TRPA is the primary permitting agency in the Basin and the lead agency under the Compact. The project must comply with the Code of Ordinances to receive permits for construction. TRPA permitting requirements include the EIP Permit, Land Capability and Coverage Verifications, and Historic Determination. TRPA is a bi-state regional planning agency created in 1969 by Federal law to oversee development on both the California and Nevada sides of Lake Tahoe. TRPA's mission is to "lead the cooperative effort to preserve, restore, and enhance the unique natural and human environment of the Lake Tahoe Region." Section 1.4.3 details the key provisions of Article VII of the Compact, which presents important TRPA policies relevant to the use of an EIS.

In addition, in accordance with the Code of Ordinances, TRPA may not approve a project if any of the nine TRPA thresholds would be exceeded. If a project would exceed an identified threshold, mitigation must be imposed to reduce the impact and maintain the threshold. Under Chapter 4 of the TRPA Code of Ordinances, findings must be made in writing regarding all significant environmental impacts and their associated mitigation measures, with substantial evidence provided in the record of review before final project approval.

1.6.3 U.S. Department of the Interior, Bureau of Reclamation

Reclamation is the lead agency under NEPA. This DEIR/DEIS/DEIS has been prepared in accordance with NEPA (42 USC 4321 et seq.), CEQ's Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500–1508), and the Department of Interior's Departmental Manual 516 DM 1-7, 14. Reclamation is a federal agency created in 1902 to provide water for 17 western states. Reclamation's mission is "to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American Public.."

NEPA requires federal agencies to consider environmental effects that include, among others, impacts on social, cultural, and natural resources. When a proposed action may have a significant effect on the environment, the federal agency with primary responsibility for carrying out or approving the action (the lead agency) is required to prepare an EIS.

1.6.4 Trustee, Responsible, and Cooperating Agencies

Under CEQA, a trustee agency is a state agency that has jurisdiction by law over natural resources that are held in trust for the people of the State of California. Two trustee agencies, the California Department of Fish and Game and the California State Lands Commission, meet that definition with respect to resources potentially affected by the project.

Under CEQA, a responsible agency is a public agency other than the lead agency that has legal responsibility for carrying out or approving a project or elements of a project (PRC Section 21069). Under NEPA, a cooperating agency is any other federal agency that has jurisdiction by law, or other federal agency that has special expertise with respect to any environmental impact involved in an action. A federal agency becomes a cooperating agency by agreement with the NEPA lead agency and is involved in helping to develop the EIS. Several agencies other than the Conservancy, Reclamation, and TRPA have jurisdiction over the implementation of the elements of the project, as identified below.

Federal Cooperating Agencies

- None

State Responsible Agencies

- California Air Resources Board
- California Department of Fish and Game
- California Department of Transportation
- Lahontan Regional Water Quality Control Board
- State Historic Preservation Officer
- California State Lands Commission

State Trustee Agencies

- California Department of Fish and Game
- California State Lands Commission

Other Interested Agencies

- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Department of Transportation, Federal Aviation Administration

1.6.5 REGULATORY REQUIREMENTS, PERMITS, AND APPROVALS

The following list identifies potential permits and other potential approval actions from federal, state, regional, and local agencies for which this DEIR/DEIS/DEIS may be used during these agencies' decision-making processes. The specific required approvals may vary depending on the selection of the preferred alternative. The following may be under the purview of regulatory agencies other than the lead agencies.

FEDERAL ACTIONS/PERMITS

- **U.S. Bureau of Reclamation:** Consultation for impacts on cultural resources pursuant to Section 106 of the National Historic Preservation Act. Potentially, approval of funding for construction.
- **U.S. Army Corps of Engineers:** Department of the Army permit under Section 404 of the Clean Water Act for discharges of dredged or fill material into waters of the United States.
- **U.S. Environmental Protection Agency:** Review of the EIS, and filing and noticing; concurrence with the Section 401 Clean Water Act permit.
- **U.S. Fish and Wildlife Service:** ESA consultation and issuance of incidental-take authorization for the take of federally-listed endangered and threatened species, if take of a species is anticipated.

STATE ACTIONS/PERMITS

- **California Department of Fish and Game, North Central Sierra Region:** Potential California Endangered Species Act consultation and issuance of take authorization (Fish and Game Code Section 2081), streambed alteration agreement (Fish and Game Code Section 1602), and protection of raptors (Fish and Game Code Section 3503.5).
- **California Department of Transportation:** Possible encroachment permits for work involving the U.S. Highway 50 right-of-way.
- **Lahontan Regional Water Quality Control Board (Region 6):** National Pollutant Discharge Elimination System construction stormwater permit (NOI to proceed under general construction permit) for disturbance of more than one acre, discharge permit for stormwater, general order for dewatering, and Section 401 Clean Water Act certification or waste discharge requirements.
- **California Air Resources Board:** Authority to construct (for devices that emit air pollutants), health risk assessment, and determination of consistency with the air quality management plan.

LOCAL ACTIONS/PERMITS

- **El Dorado County Air Pollution Control District:** Oversees Rule 223 for fugitive dust to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (human-made) fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions.
- **City of South Lake Tahoe:** Regulates grading on both public and private property within the City of South Lake Tahoe to safeguard life, limb, health, property, and public welfare and avoid pollution of watercourses caused by surface runoff or by aerial deposition of pollutants generated from the permit area on or across the permit area.

1.7 PUBLIC PARTICIPATION AND ADDITIONAL STEPS IN THE CEQA/NEPA/TRPA REVIEW PROCESS

This DEIR/DEIS/DEIS is being distributed to interested agencies, stakeholder organizations, and individuals. This distribution ensures that interested parties have an opportunity to express their views regarding the environmental effects of the project and to ensure that information pertinent to permits and approvals is provided to decision makers for the lead agencies and the CEQA, NEPA, and TRPA responsible agencies. This document is available for review by the public during normal business hours at 1061 Third Street, South Lake Tahoe, California, and is posted electronically on the Conservancy's and Reclamation's websites (at http://tahoe.ca.gov/upper-truckee-marsh-69.aspx and http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=2937)
The DEIR/DEIS/DEIS is being distributed for a 60-day review period that will end on April 8, 2013.

Written comments postmarked no later than April 8, 2013 should be sent to the following address:

State of California
California Tahoe Conservancy
Scott Carroll, Environmental Planner
1061 Third Street
South Lake Tahoe, CA 96150
scarroll@tahoe.ca.gov

If comments are provided via e-mail, please include the project title in the subject line, attach comments in Microsoft Word format, and include the commenter's U.S. Postal Service mailing address.

Public information meetings will be held at the following locations:

February 27, 2013
Inn by the Lake
3300 Lake Tahoe Blvd
South Lake Tahoe, CA, 96150
1:30 – 4:00 PM and 6:00 – 8:30 PM

March 28, 2013
Lake Tahoe Community College Board Room
1 College Drive
South Lake Tahoe, CA, 96150
6:00 – 8:30 PM

Public hearings on the DEIR/DEIS/DEIS will be conducted by the Conservancy, Reclamation, and TRPA at the TRPA office, 128 Market Street, Stateline, Nevada, on March 13 and 27, 2013. It is not necessary to provide testimony during the public hearing; comments on the DEIR/DEIS/DEIS will be accepted throughout the meeting and will be recorded at the public comment table. Comments may also be submitted throughout the comment period as described above.

After all comments have been assembled and reviewed, responses will be prepared to address significant environmental issues that have been raised in the comments. The responses will be included in the FEIR/FEIS/FEIS.

1.8 ORGANIZATION OF THIS EIR/EIS/EIS

The content and format of this DEIR/DEIS/DEIS are designed to meet the requirements of CEQA, the State CEQA Guidelines, NEPA, the NEPA regulations issued by CEQ (including Section 1502, "Environmental Impact

Statement" [43 FR 55994, Nov. 29, 1978]), and the TRPA Compact, Code of Ordinances, and Rules of Procedure. The DEIR/DEIS/DEIS is organized in three volumes with a complete table of contents in each volume. Where subject matter presented in the table of contents are not presented within that volume the information is greyed out to clearly present the location of specific information throughout the document. It is organized into the following chapters so that the reader can easily obtain information about the project and its specific environmental issues.

1.8.1 VOLUME 1

- The cover sheet identifies lead and any other involved agencies; contact information for the lead agencies; contact persons; the title of the project and its location; a brief description of the project; a brief abstract; and comment submission information.

- "Summary" presents an overview of the project and alternatives and associated environmental impacts/consequences; a listing of environmental impacts/consequences and mitigation measures; and impact conclusions regarding known areas of controversy and issues to be resolved.

- Chapter 1, "Introduction and Statement of Purpose and Need," explains the CEQA, NEPA, and TRPA processes; lists the lead, cooperating, responsible, and trustee agencies that may have discretionary authority over the project; specifies the underlying purpose and need, and project objectives to which the lead agencies are responding in considering the alternatives; outlines the organization of the document; and provides information on public participation.

- Chapter 2, "Project Alternatives," presents the alternatives. This chapter constitutes the alternatives description and describes the characteristics, components, supporting on- and off-site infrastructure, and alternatives considered but eliminated from further evaluation.

- Chapter 3, "Affected Environment and Environmental Consequences," is divided into 17 sections by topic. Each section describes the affected environment (i.e., regulatory setting and environmental setting), presents the methodology and assumptions used in the environmental analysis, and defines the types of environmental effects. This information is followed by an analysis of direct and indirect impacts at an equal level of detail for all alternatives, including the No-Project/No-Action Alternative, and feasible mitigation measures that would avoid or eliminate significant adverse impacts or reduce them to less-than-significant levels, where feasible. Sections 3.1 through 3.9 are presented in Volume 1.

1.8.2 VOLUME 2

- Chapter 3, "Affected Environment and Environmental Consequences," Volume 2 continues as described above with Sections 3.10 through 3.18. Section 3.18 identifies the cumulative effects of implementing the alternatives, given the combined effects of past, present, and reasonably foreseeable (related) future projects. The last section provides a summary of impacts associated with each alternative.

- Chapter 4, "Other Required Sections," is divided into six sections providing assessments of environmental effects based on the analysis of environmental consequences presented in Chapter 3: "Significant Environmental Effects That Cannot Be Avoided;" "Significant and Irreversible Environmental Changes;" "Relationship between Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity;" "Growth-Inducing Impacts;" "Environmentally Superior Alternative/Environmentally Preferred Alternative;" and "Consequences for Environmental Threshold Carrying Capacities."

- Chapter 5, "Compliance, Consultation, and Coordination," describes the project's compliance with applicable federal statutes and executive orders and state statutes and regulations additional to NEPA, CEQA, and TRPA environmental review provisions, and describes the consultation and coordination undertaken to involve the

public and agencies related to the development of the Upper Truckee River and Marsh Restoration Project and the EIR/EIS/EIS.

- Chapter 6, "List of EIR/EIS/EIS Preparers," identifies individuals who were involved in preparing this DEIR/DEIS/DEIS.
- Chapter 7, "EIR/EIS/EIS Distribution List," identifies elected officials and representatives; federal, state, and local government agencies; and other agencies, organizations, and individuals to whom notification of availability of this DEIR/DEIS/ DEIS is being distributed.
- Chapter 8, "References Cited," provides a bibliography of sources cited in this DEIR/DEIS/DEIS.
- Chapter 9, "Index," contains the NEPA-required index for easy reference of topics and issues.

1.8.3 VOLUME 3

Technical appendices contain the background information that supports the DEIR/DEIS/DEIS. Volume 3 can be found on the CD located in the back of Volume 1.

Hard copies of Volume 3 are available for review at:

State of California
California Tahoe Conservancy
1061 Third Street
South Lake Tahoe, CA 96150

Tahoe Regional Planning Agency
128 Market Street
Stateline, NV 89449

Reclamation
Mid-Pacific Regional Library,
2800 Cottage Way
Sacramento, CA 95825

South Lake Tahoe Library front desk
1000 Rufus Allen Blvd.
South Lake Tahoe, CA 96150

1.9 ACRONYMS AND ABBREVIATIONS

Table 1-1 lists acronyms and abbreviations that are used in this DEIR/DEIS/DEIS.

Table 1-1 Acronyms and Other Abbreviations	
$\mu g/m^3$	micrograms per cubic meter
µin/sec	microinch per second
µm	micrometer
AB	Assembly Bill
AC	Asphalt Cement
ADA	Americans with Disabilities Act
ADT	average daily trips
ALUCs	airport land use commissions
AMWG	adaptive management working group
APC	Advisory Planning Commission
APCD	air pollution control district
AQMD	air quality management district
ARB	Air Resources Board
ATCM	airborne toxics control measure
BA	biological assessment
BACT	best available control technology for toxics
Basin Plan	*Water Quality Control Plan for the Lahontan Region*
Bike/Ped Plan	Bicycle and Pedestrian Master Plan
BMP	best management practice
BO	biological opinion
BP	before present
BPP	*Lake Tahoe Bicycle and Pedestrian Plan*
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CAAQS	California ambient air quality standards
CAFE	corporate-average fuel economy
Cal/EPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
Cal-IPC	California Invasive Plant Council
Cal/OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CCAA	California Clean Air Act
CCAR	California Climate Action Registry
CCR	California Code of Regulations

CCSP	Climate Change Scoping Plan
CDFG	California Department of Fish and Game
CDPH	California Department of Public Health
CEDR	Center for Environmental Design Research
CEQ	Council of Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CH_4	methane
CHABA	Committee of Hearing, Bio Acoustics, and Bio Mechanics
City General Plan	City of South Lake Tahoe *2030 General Plan*
CLUP	*Comprehensive Land Use Plan*
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CNPPA	California Native Plant Protection Act
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
Conservancy	California Tahoe Conservancy
CRHR	California Register of Historical Resources
CSC	State Species of Special Concern
CSLC	California State Lands Commission
CSLT	City of South Lake Tahoe
CTLFC	Carson & Tahoe Lumber & Fluming Company
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
dBA/DD	dBA per doubling of distance
dbh	diameter at breast height
DEIR/DEIS/DEIS	draft environmental impact report, draft environmental impact statement, and draft environmental impact statement
DEM	digital elevation model
DG	Decomposed Granite

diesel PM	diesel particulate matter
DN	dissolved nitrogen
DO	dissolved oxygen
DOE	Department of Finance
DP	dissolved phosphorus
DTSC	Department of Toxic Substances Control
DVTE	Daily Vehicle Trip Ends
EA	environmental assessment
EC	Environmental Commitment
ECR	Environmental Commitments Record
EDCAC	El Dorado County Animal Control
EDCAQMD	El Dorado County Air Quality Management District
EDCVCD	El Dorado County Vector Control District
EIP	Environmental Improvement Program
EIR	environmental impact report
EIS	environmental impact statement
EISA	Energy and Independence Security Act of 2007
EO	Executive Order
EPA	Environmental Protection Agency
EPCA	Energy Policy and Conservation Act
ESA	U.S. Endangered Species Act
ºF	degrees Fahrenheit
FAA	Federal Aviation Administration
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIP	Federal implementation plan
FIRM	Flood Insurance Rate Map
FONSI	finding of no significant impact
FTA	Federal Transit Administration
GB	Governing Board
GHG	greenhouse gas
GIS	geographic information system
GPS	Global Positioning System
GWP	global warming potential
HAP	hazardous air pollutant

HASP	health and safety plan
HCD	Housing and Community Development
HCP	habitat conservation plan
HEC-RAS	Hydraulic Engineering Center's River Analysis System
HU	Hydrologic Unit
I	Industrial
in/sec	inch per second
IPES	Individual Parcel Evaluation System
IS	Initial Study
ITAs	Indian Trust Assets
km	kilometer
lb/day	pounds per day
LCD	land capability district
LCT	Lahontan cutthroat trout
LED	light emitting diode
L_{dn}	day-night noise level
L_{eq}	equivalent noise level
L_{max}	maximum noise level
L_{min}	minimum noise level
LOMR	Letter of Map Revision
LOS	level of service
LTAB	Lake Tahoe Air Basin
LTBMU	Lake Tahoe Basin Management Unit
LUST	leaking underground storage tank
LWS	Lower West Side
L_X	statistical descriptor
M	magnitude
MAA	may adversely affect
MACT	maximum available control technology
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
mg/L	milligram per liter
mg/m^3	milligrams per cubic meter
mL	milliliter
MLD	Most Likely Descendant
MM^{-1}	megameter

MND	mitigated negative declaration
mph	miles per hour
MPN	Most Probable Number
MT	metric ton
MTBA	Migratory Bird Treaty Act
MTBE	methyl tertiary butyl ether
MY	model year
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NAL	numeric action level
NAVD	North American Vertical Datum
NCCP	natural community conservation plan
ND	Negative Declaration
NDOW	Nevada Department of Wildlife
NEHRPA	National Earthquake Hazards Reduction Program Act
NEL	numeric effluent limitation
NEPA	National Environmental Policy Act
NESHAP	national emissions standards for HAPs
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NHTSA	National Highway Traffic Safety Administration
NLAA	not likely to adversely affect
NMFS	National Marine Fisheries Service
NO	nitric oxide
NO_2	nitrogen dioxide
NOI	notice of intent
NOP	notice of preparation
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historical Places
NTU	nephelometric turbidity units
OPR	Office of Planning and Research
OS	Open Space
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PAOTs	persons at one time

PAS	plan area statement
PCE	passenger car equivalent
POP	Public Outreach Plan
$PM_{2.5}$	fine particulate matter
PM_{10}	respirable particulate matter
ppb	parts per billion
ppm	parts per million
PPV	peak particle velocity
PRC	Public Resources Code
project	Upper Truckee River and Marsh Restoration Project
Reclamation	Bureau of Reclamation
Regional Plan	*Regional Plan for the Lake Tahoe Basin*
RMS	root mean square
ROG	reactive organic gas
RS	River Station
RTP	*Lake Tahoe Regional Transportation Plan – Mobility 2030*
RTP-AQP	*Regional Transportation Plan—Air Quality Plan*
RWQCB	regional water quality control board
SA	Special Area
SB	Senate Bill
SDWA	Safe Drinking Water Act
SEL	single-event [impulsive] noise level
SEZ	Stream Environment Zone
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLTFD	South Lake Tahoe Fire Department
SLTPD	South Lake Tahoe Police Department
SMCL	secondary maximum contaminant level
SO_2	sulfur dioxide
SO_X	oxides of sulfur
SP	State Park
SPP	Spill Prevention Plan
SR	State Route
SRA	State Recreation Area
SRAs	State Responsibility Areas
STPUD	South Tahoe Public Utility District

SWPPP	storm water pollution prevention plan
SWRCB	State Water Resources Control Board
T/year	Tons/year
TAC	toxic air contaminant
TAG	technical advisory group
T-BACT	best available control technology for TACs
Tahoe Keys	Tahoe Keys development
TKM	Tahoe Keys Marina
TKN	total Kjeldahl nitrogen
TKPOA	Tahoe Keys Property Owners Association
TMDL	total maximum daily load
TN	total nitrogen
TP	total phosphorus
TPY	tons per year
TRPA	Tahoe Regional Planning Agency
TSM	Transportation System Management
TSS	total suspended solids
TYC	Tahoe yellow cress
U.S. 50	United States Highway 50
USACE	United States Army Corps of Engineers
USC	United States Code
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
UTMLS	Upper Truckee Marsh Land Steward Program
VdB	vibration decibels
VMT	vehicle miles traveled
VOC	volatile organic compound
WY	water year

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2 PROJECT ALTERNATIVES

2.1 OVERVIEW

This chapter describes a range of reasonable alternatives that would meet the purpose, need, and project objectives for the Upper Truckee River and Marsh Restoration Project (project). This range of reasonable alternatives complies with the requirements of Title 14, Section 15126.6 of the California Code of Regulations (14 CCR 15126.6), also referred to as the State CEQA Guidelines; Title 40, Section 1502 of the Code of Federal Regulations (i.e., 40 CFR 1502); Article VII(a)(3) of the Tahoe Regional Planning Agency (TRPA) Compact; and Section 5.8.B of the TRPA Code of Ordinances. Each of these alternatives is feasible, based on relevant economic, environmental, social, technological, and legal factors, although they provide different advantages and disadvantages related to environmental impacts and achievement of the project's purpose, need, and project objectives.

More specifically, this chapter discusses the development of reasonable alternatives; lists those alternatives and project elements considered but eliminated from further evaluation; and describes the elements of the four restoration (action) alternatives (Alternatives 1–4) and the No-Project/No-Action Alternative (Alternative 5), which are analyzed at a comparable level of detail as required by the Council of Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) (i.e., 40 CFR 1502.14). The chapter subsequently describes the resource management and monitoring, construction, and environmental commitments applicable to the alternatives.

Each of the five alternatives evaluated in this DEIR/DEIS/DEIS was named for its approach to restoration of the Upper Truckee River and the associated level of public access and recreation infrastructure:

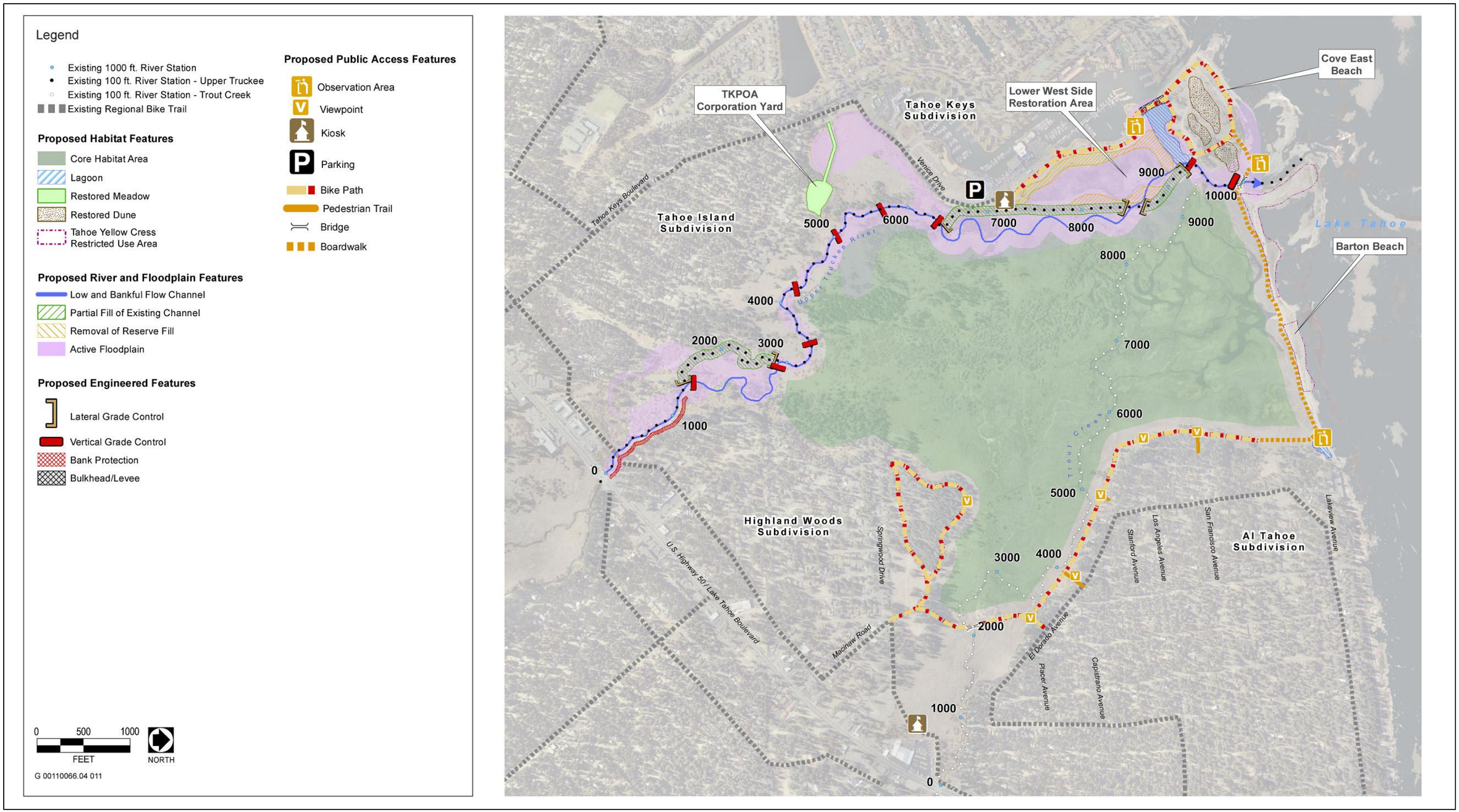
- Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)
- Alternative 2: New Channel-West Meadow (Minimum Recreation Infrastructure)
- Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)
- Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)
- Alternative 5: No-Project/No-Action

Alternatives 1–4 are all intended to meet the basic project objectives, but differ in river restoration treatments and recreation infrastructure that would alter public access (Exhibits 2-1 through 2-4). The differences among alternatives will assist public decision makers in selecting the alternative that best meets the project objectives as well as the needs of the community and the environment. The types of elements included in Alternatives 1–4 are listed in Table 2-1, briefly described in the following paragraphs, and their locations are displayed in Exhibits 2-1 through 2-4. The elements of the alternatives are subsequently described in greater detail in Section 2.3, "Elements of the Alternatives."

- **Alternative 1. Channel Aggradation and Narrowing (Maximum Recreation Infrastructure).** To restore the river channel and its connection to the floodplain, Alternative 1 would increase channel length and decrease channel capacity. A key element of this restoration would be the use of engineering elements (primarily structures in the channel) to cause sediment deposition that raises the channel bed and decreases channel capacity and slightly reduces the capacity of the channel mouth at Lake Tahoe. Alternative 1 would also restore a naturally-functioning lagoon in the vicinity of the existing Sailing Lagoon, lagoon and wet meadow conditions behind the east end of Barton Beach, floodplain functions at the Tahoe Keys Property Owners Association (TKPOA) Corporation Yard (contingent on TKPOA consent), and sand ridges ("dunes") at Cove East Beach. Alternative 1 would enhance forest habitat and an area of "core habitat" that contains sensitive marsh in the center of the study area by removing or relocating volunteer (i.e., user-created) trails. In addition, at the existing location where boaters enter and exit the Upper Truckee River, adjacent to East Venice Drive, the river bank would be stabilized with best management practices (BMPs) to avoid erosion and other resource damage.

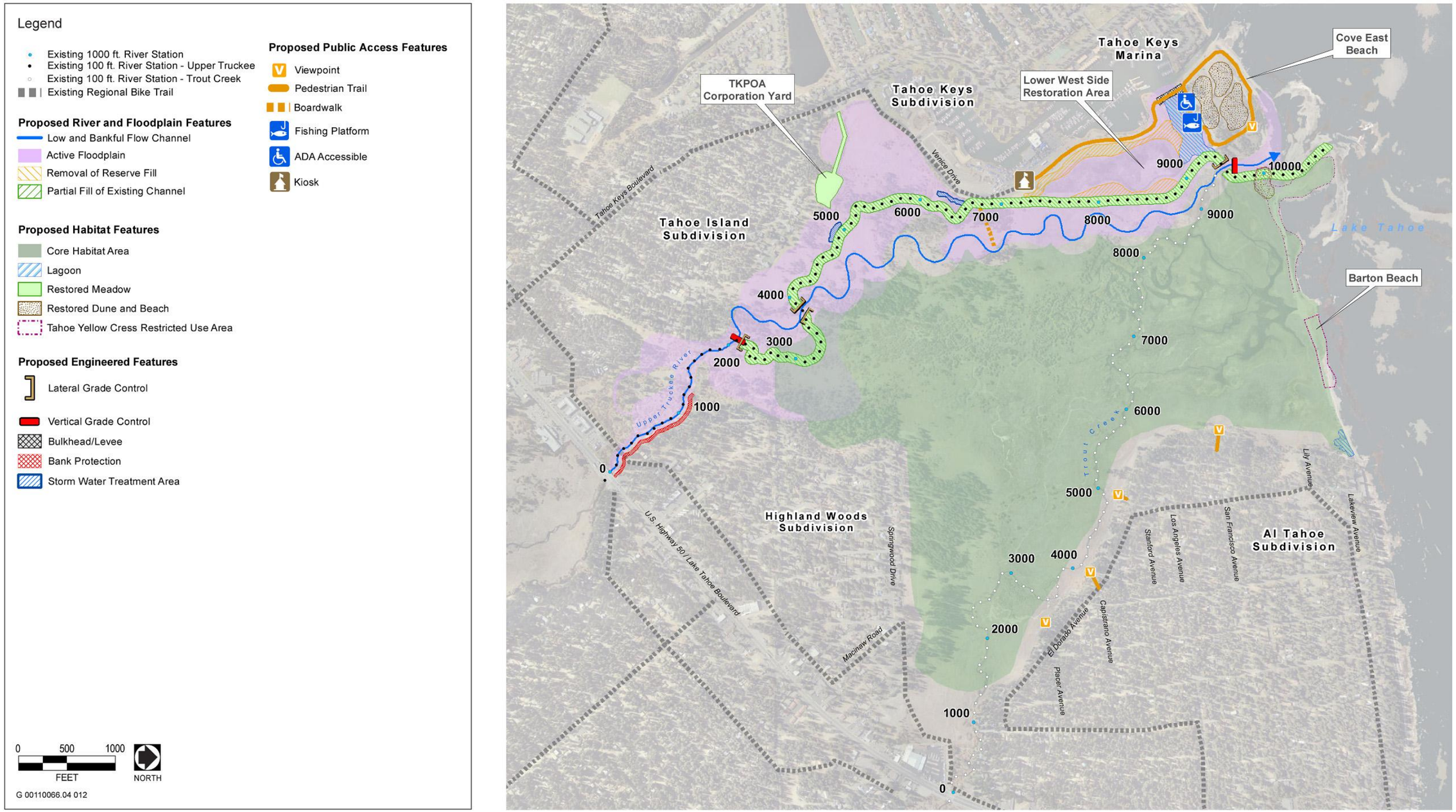
Table 2-1 Elements included in Action Alternatives[1]				
Element	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**
Restoration and Enhancement Elements				
Stabilization of Eroding Banks Downstream of U.S. 50 Bridge	✓	✓	✓	✓
River and Floodplain Restoration[2]	✓	✓	✓	✓
River Mouth Size Reduction	✓	✓	✓	
Removal of Existing Fill from Floodplain	✓	✓	✓	
Reactivation of Floodplain Terrace			✓	
Modification of Existing Stormwater Discharge Locations		✓	✓	
Reestablishment of River Overflow Lagoon	✓	✓	✓	
Removal of Existing Fill from Behind the East End of Barton Beach	✓	✓		
Beach-Dune Restoration	✓	✓		
Forest Enhancement	✓	✓	✓	✓
Core Habitat Enhancement	✓	✓	✓	✓
East Venice Drive Bank Stabilization	✓	✓		✓
Recreation and Public Access Elements				
Bicycle Path(s)	✓		✓	✓
Pedestrian Trail(s)		✓	✓	✓
Observation Areas	✓		✓	✓
Bridges	✓			
Kiosk(s)	✓		✓	✓
Parking lot	✓			
Fishing Platform	✓			
Boardwalk(s)	✓		✓	✓
Viewpoints and Signage	✓	✓	✓	✓

Notes:
[1] No-Project/No-Action Alternative does not include any of these elements.
[2] River and floodplain restoration includes river channel restoration, secondary channel reactivation, floodplain lowering, and fill of abandoned channel segments.



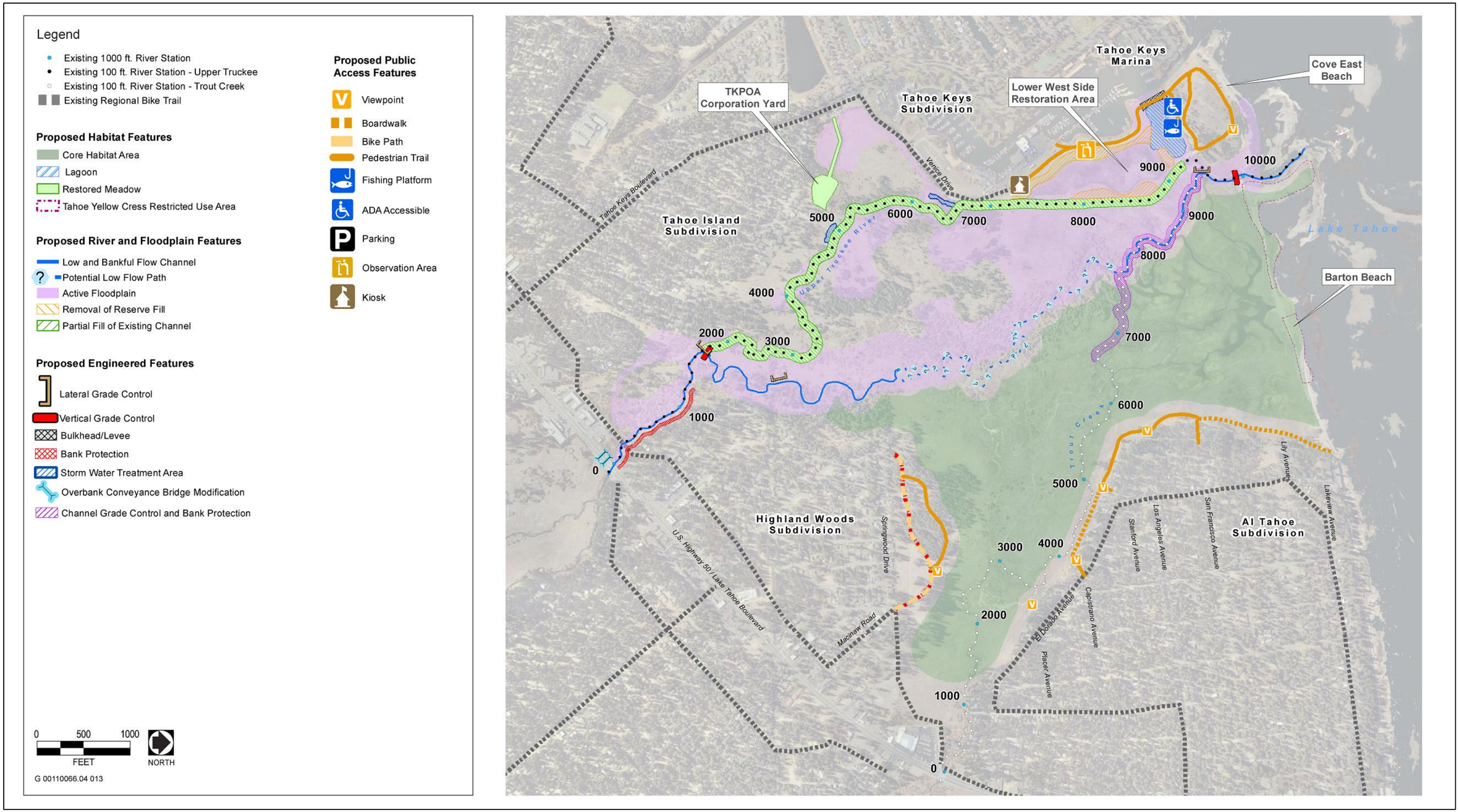
Source: Conservancy and DGS 2007a, adapted by AECOM in 2013

Exhibit 2-1 **Proposed Elements of Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)**



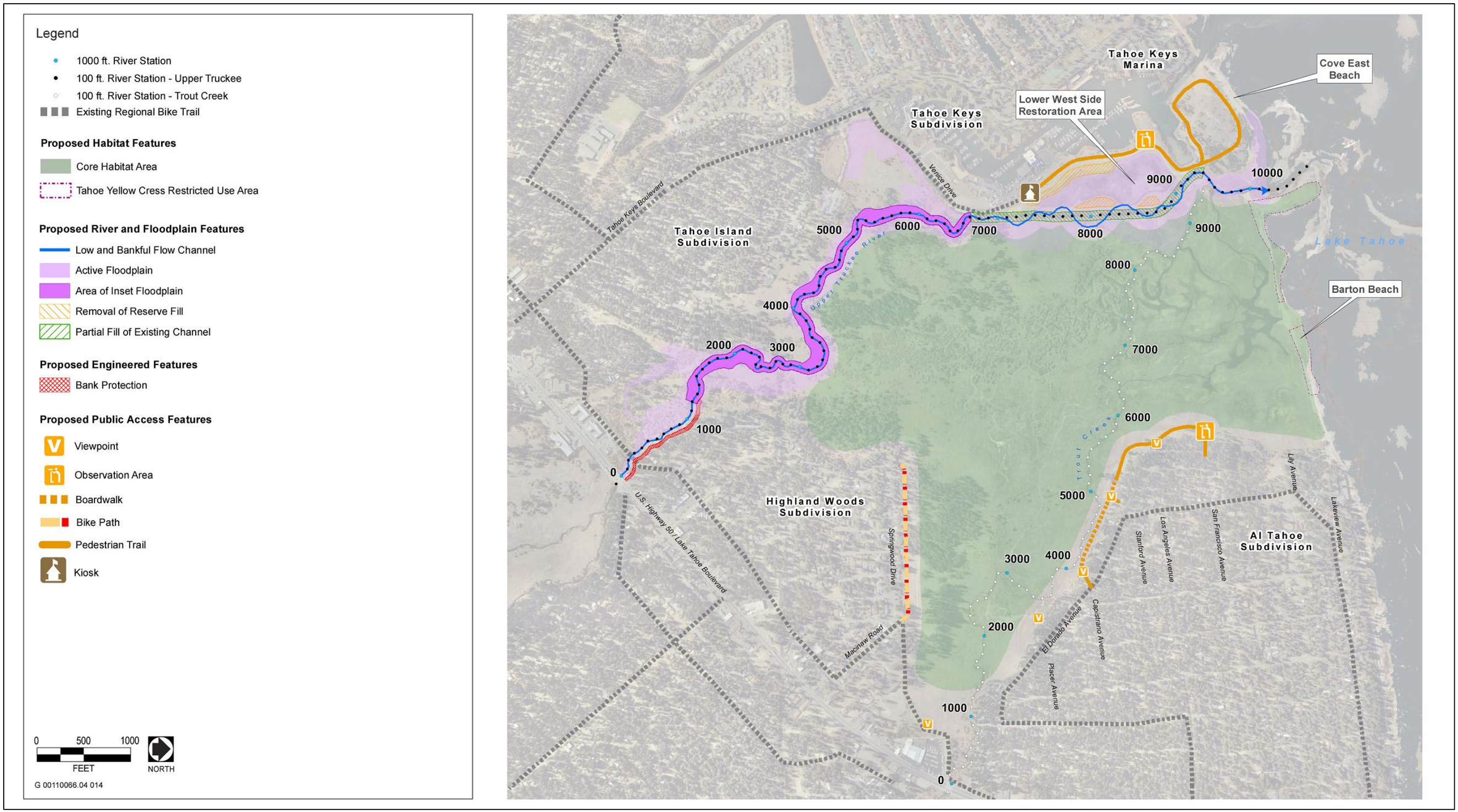
Source: Conservancy and DGS 2007a, adapted by AECOM in 2013

Exhibit 2-2 **Proposed Elements of Alternative 2: New Channel–West Meadow (Minimum Recreation Infrastructure)**



Source: Conservancy and DGS 2007a, adapted by AECOM in 2013

Exhibit 2-3 **Proposed Elements of Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)**



Source: Conservancy and DGS 2007a, adapted by AECOM in 2013

Exhibit 2-4 **Proposed Elements of Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)**

Under Alternatives 1–4, recreation infrastructure is proposed near the perimeter of the study area. Alternative 1 provides a potential "maximum" level of recreation infrastructure that includes parking on the west side of the study area adjacent to the Tahoe Keys Marina, a connected system of bicycle paths, boardwalks, observation areas, two kiosks, and signage. Bicycle paths would be Class I/Shared-Use Paths (as described in TRPA and TMPO 2010). Bridges over Trout Creek and the Upper Truckee River (and a boardwalk) would connect the proposed bicycle paths. Bicycle paths would connect to existing regional trails near the study area.

- **Alternative 2. New Channel-West Meadow (Minimum Recreation Infrastructure)**. To restore the river channel and its connection to the floodplain, Alternative 2 would directly raise the streambed elevation, increase the channel length, and decrease channel capacity. A key element of this restoration would be the excavation of a new river channel that has less capacity than the existing channel. The existing river mouth would be replaced with a new smaller river mouth, similar in size to the historical river mouth prior to dredging. Unlike Alternative 1, the river channel and floodplain restoration elements of Alternative 2 would require two existing stormwater discharge locations to be modified and/or relocated. Alternative 2 also includes all of the other restoration and enhancement elements of Alternative 1. In addition, at the existing location where boaters enter and exit the Upper Truckee River, adjacent to East Venice Drive, the river bank would be stabilized with BMPs to avoid erosion and other resource damage. To protect natural resources, a boardwalk connecting the river to East Venice Drive would be constructed.

  Alternative 2 would provide a "minimum" level of recreation infrastructure that includes a modified Americans with Disabilities Act (ADA)-accessible pedestrian trail to Cove East Beach, five viewpoints, a fishing platform, and signage. Except for four viewpoints along the eastern perimeter of the study area (adjacent to the Al Tahoe neighborhood), this infrastructure is located from East Venice Drive to Cove East Beach.

- **Alternative 3. Middle Marsh Corridor (Moderate Recreation Infrastructure).** To restore the river channel and its connection to the floodplain, Alternative 3 would promote the development through natural processes of a new main channel and/or distributary channels in the central portion of the study area. A "pilot" channel, similar to the channel segments constructed under Alternatives 1 and 2, would be constructed from the existing river channel to historical channels in the center of the study area, but no construction would occur in the central or northern portions of the study area. Rather, natural processes would be allowed to dictate the flow path(s), bed and bank elevations, and capacities of the channel(s) through the central and northern portions of the study area. The existing river mouth would be retained, but its capacity would be reduced. In addition, by boring two culverts under U.S. 50, an area of isolated floodplain would be reactivated. The river channel and floodplain restoration elements of Alternative 3 would require two existing stormwater discharge locations to be modified and/or relocated. Also, like Alternatives 1 and 2, Alternative 3 would restore a natural-functioning lagoon in the vicinity of the Sailing Lagoon and floodplain functions at the TKPOA Corporation Yard and would enhance areas of "core habitat" and forest. However, Alternative 3 would not restore lagoon and wet meadow conditions behind the east end of Barton Beach (by removal of existing fill) or dunes at Cove East Beach.

  Alternative 3 would provide a "moderate" level of recreation infrastructure that includes three pedestrian trails, a bicycle path, a kiosk, one observation area, six viewpoints, a fishing platform, and signage at multiple locations. Similar to Alternative 2, the modified pedestrian trail to Cove East Beach would be ADA-accessible, as well as the fishing platform at the restored lagoon. Alternative 3 would also include a bicycle path and a pedestrian trail near the Highland Woods neighborhood, connected to Mackinaw Road, and a pedestrian trail adjacent to the Al Tahoe neighborhood, from Capistrano Avenue to East Barton Beach, two segments of which would be boardwalks.

- **Alternative 4. Inset Floodplain (Moderate Recreation Infrastructure).** To restore the river channel and its connection to the floodplain, Alternative 4 would lower bank heights by excavating an inset floodplain along

much of the river channel and by localized cutting and filling to create meanders in the existing straightened reach. The existing river mouth would be retained, and its capacity would not be reduced. Although Alternative 4 would include the enhancement of core and forest habitats, it would not include the restoration of floodplain functions at the TKPOA Corporation Yard, a natural-functioning lagoon in the vicinity of the existing Sailing Lagoon, or dunes at Cove East Beach. In addition, at the existing location where boaters enter and exit the Upper Truckee River, adjacent to East Venice Drive, the river bank would be stabilized with BMPs to avoid erosion and other resource damage.

Similar to Alternative 3, Alternative 4 would provide a "moderate" level of recreation infrastructure that includes two pedestrian trails, a bicycle path, a kiosk, two observation areas, five viewpoints, and signage at multiple locations. The bicycle path would be adjacent to the Highland Woods neighborhood, connected to Mackinaw Road, and the pedestrian trails would be near the Tahoe Keys, from East Venice Drive to Cove East Beach, in part replacing the existing pedestrian trail, and adjacent to the Al Tahoe neighborhood, from Capistrano Avenue to San Francisco Avenue, one segment of which would be a boardwalk.

- **Alternative 5. No Project/No Action.** Alternative 5 would not provide any actions to restore the river channel and its connection to the floodplain in the study area. This alternative would allow but not facilitate the long-term, passive recovery of the river system via natural processes. The existing river mouth location, size, and bed elevation would continue to adjust to lake levels, streamflows, and sediment loads. The Upper Truckee River–lagoon connection would not be restored, leaving the direct open-water connection between the Tahoe Keys Marina channel, the Sailing Lagoon, and Lake Tahoe unchanged. The previously leveled area between Cove East Beach and the Sailing Lagoon would not be modified. Alternative 5 would not protect an extensive area of core habitat. However, the Conservancy has been implementing localized decommissioning of some trails, and similar actions would likely continue to be implemented.

  Alternative 5 would not take any direct steps to construct recreation infrastructure elements that alter public access. However, this alternative would likely maintain existing infrastructure and might result in the construction of some additional, smaller elements (e.g., signage).

None of the alternatives are designated as preferred at this time; rather, the lead agencies will identify a preferred alternative after taking into consideration public comment on this DEIR/DEIS/DEIS. The preferred alternative may be one of the five alternatives or a combination of components from these concept plans, assembled into a different variation within the general scope of the range of alternatives.

This chapter presents Alternatives 1–4 at the 30 percent (conceptual) design level, which constitutes a "project-level" analysis. The descriptions include information on the design concept and design elements, modifications to existing facilities and/or new facilities that would be required, the anticipated activities and equipment needed to construct each alternative, and likely operational scenarios.

The description of Alternative 5 (the No-Project/No-Action Alternative) includes existing conditions at the time environmental analysis commenced (i.e., in October 2006, when the CEQA notice of preparation [TRPA and Conservancy 2006] was released) and as required by NEPA conditions expected to occur in the foreseeable future if the project does not occur, based on ongoing physical and ecological processes, current plans, current resource management practices, and existing infrastructure and community services. For most resource issues, existing and foreseeable future conditions are anticipated to be effectively the same. For future conditions anticipated to differ from existing conditions, impacts relative to existing and future conditions are discussed separately.

2.2 ALTERNATIVES DEVELOPMENT

2.2.1 GUIDING PRINCIPLES

Principles that guided the development of these alternatives included:

- **Fulfillment of all project objectives and design directives.** Each alternative was designed to be a "full-spectrum" alternative that addressed, to varying degrees, all project objectives and design directives.
- **Use of modular elements.** Many but not all of the elements in each alternative were modular, and thus could be included in other alternatives.
- **Embodiment of diverse concepts.** The alternatives embody a diverse range of concepts for particular components of the restoration plan.
- **Potential feasibility and implementable approach.** Each alternative is intended to be a potentially feasible and implementable approach; none is a "straw" (i.e., intentionally infeasible) alternative.
- **Critical environmental constraints.** Alternatives were developed within bounds set by various critical constraints, identified and mapped early in the planning process (Conservancy and DGS 2003). This initial information about critical environmental impact issues and the relationship of the alternatives to TRPA thresholds was incorporated.
- **Conformance to land use regulations and purposes of property acquisitions.** All alternatives were developed within the context of existing land use regulations and stated California Tahoe Conservancy (Conservancy) purposes for acquiring properties.
- **Minimal maintenance.** The public access and recreational facility design elements of the alternatives were developed to minimize the need for future maintenance within the study area.

2.2.2 ALTERNATIVES AND ALTERNATIVE ELEMENTS CONSIDERED BUT ELIMINATED FROM FURTHER EVALUATION

Alternative locations were considered but eliminated from further evaluation because off-site alternatives would not fulfill the purpose and primary objectives of the project. An important part of the project's purpose and objectives is to restore natural geomorphic processes and ecological functions to improve ecological values of the study area and help reduce the river's discharge of nutrients and sediment that diminish Lake Tahoe's clarity, while still providing safe access to vistas and environmental education to the public. Off-site actions upstream along the Upper Truckee River or elsewhere in the watershed could reduce the river's discharge of nutrients and sediment, but would not substantially improve ecological values of the study area.

While the four preliminary conceptual alternatives were being developed and refined, several facilities were removed from the alternatives, in particular a full-service visitor center and restrooms. As described further below, these facilities were determined to be inconsistent with the project objectives and the principles for alternative development given above.

Initial conceptual plans for Alternative 1 included a full-service visitor center located near the end of East Venice Drive. This facility was included to ensure that the maximum amount of recreational infrastructure that would be feasible was considered; however, the visitor center was determined to be unnecessary and incompatible with the site and, therefore, was removed from the alternative.

The need for visitor centers on the south shore of Lake Tahoe has been largely met by the Taylor Creek Visitor Center, the Meyers Visitor Center, and the Explore Tahoe Visitor Center. Creating a full-service visitor center on the project site would be an unnecessary duplication of services provided in multiple nearby locations. In addition, the infrastructure required to support the visitor center would be inconsistent with the limitations of the site. The full-service visitor center would require substantial operations and maintenance costs, which would place an ongoing financial burden on the State while providing services that are duplicated elsewhere.

The full-service visitor center also was determined to be inconsistent with the scale and type of use of the site and of the study area as a whole. The site is located adjacent to a residential neighborhood, has a small beach area, and is generally used for dispersed recreation. The visitor center had the potential to attract an increased number of users seeking an interior interpretive experience. The resulting type and amount of use could negatively affect the existing dispersed uses, which are more compatible with the size and setting of the site in the study area. Therefore, the full-service visitor center has been replaced with a kiosk that is compatible with the size and setting of the study area.

Initial conceptual plans for Alternatives 1, 3, and 4 also included restrooms at the full-service visitor center and at Cove East Beach. However, refinement of the alternatives reduced the need for these facilities, and it was determined that the reduced need would be met by the restrooms at the Tahoe Keys Marina. In part, the restroom facilities were intended to support the full-service visitor center, which has been removed from the alternatives.

2.3 ELEMENTS OF THE ALTERNATIVES

This section describes the (1) river restoration, (2) terrestrial habitat restoration and enhancement, and (3) public access and recreation elements of each alternative. For each of these three categories, the section first summarizes the elements common to multiple action alternatives, and then describes the elements or physical characteristics specific to each alternative. Additional information regarding the alternatives is provided in the appendices: Appendix C, “Schematic Plans,” provides additional detail about the elements of each project alternative; Appendix D, “Construction Workers and Equipment for Action Alternatives,” lists the construction workers and equipment associated with specific construction activities; and Appendix E, “Alternative Cost Estimates,” provides cost estimates of the elements and the total cost of Alternatives 1–4 (which were prepared in 2006 for the *Upper Truckee River and Wetland Restoration Project Final Concept Plan Report*).

2.3.1 RIVER RESTORATION ELEMENTS

The primary objective of river restoration in Alternatives 1–4 is to decrease channel capacity and reestablish the channel’s connection to an active floodplain with more frequent overbanking of river flow into adjacent marsh and wet meadow. The active floodplain is defined as the area inundated by streamflow events that occur at least once every couple of years (i.e., two- to five-year storm events). For the Upper Truckee River in the study area, two- to five-year storm events correspond to a river flow of 760–1,660 cubic feet per second (cfs).

The Upper Truckee River downstream of the U.S. 50 bridge is incised and overly wide as a result of direct and indirect human disturbances. Consequently, the channel can convey, on average, at least 800–1,000 cfs without streamflows overbanking into the meadow. This channel capacity is more than double the geomorphic channel-forming flow, approximately 450 cfs, and most of the former (i.e., predisturbance) floodplain has become an infrequently inundated terrace.

Reestablishing an active floodplain and reducing channel capacity would increase the frequency and duration of overbank flows, and thus, the deposition of suspended sediment on the meadow. These restored river processes would in turn enhance plant communities, aquatic and terrestrial habitat, groundwater recharge, water quality, and the ecological and aesthetic values of the study area.

Alternatives 1–4 each would reduce the channel capacity and reestablish an active floodplain connection, but by various means. In general, the proposed actions would reduce the width of the channel, decrease the elevation difference between the channel bed and floodplain surface, or do both.

Alternatives 1–4 share several common river restoration elements:

- stabilization of the banks downstream of the U.S. 50 bridge to reduce sediment inputs;
- restoration of the river channel to reestablish an active floodplain connection with the river and to replace the straightened and enlarged channel adjacent to the Lower West Side (LWS) Restoration Area with a more sinuous, geomorphically-sized channel;
- reactivation of an existing secondary channel to increase floodplain connection with the river;
- modification of the previously dredged river mouth to limit backwater effects from Lake Tahoe;
- lowering of portions of the floodplain to reestablish an active floodplain connection with the river; and
- removal of existing artificial fill from the floodplain to increase the area providing floodplain functions.

Some river restoration elements, however, are not shared by all alternatives:

- fill of channel segments abandoned as a result of channel restoration to increase the area providing floodplain functions (Alternatives 1, 2, and 3);
- reactivation of a floodplain terrace to increase the area providing floodplain functions (Alternative 3);
- modification of existing stormwater discharge locations to allow for river and flood plain restoration elements (Alternatives 2 and 3);
- reestablishment of a river-overflow lagoon (Alternatives 1–3);
- removal of fill from behind the east end of Barton Beach to create additional lagoon and wet meadow conditions (Alternatives 1 and 2); and
- stabilization of river bank adjacent to East Venice Drive to protect natural resources from boaters entering and exiting the Upper Truckee River (Alternatives 1, 2, and 4).

In the design of all of these river restoration elements, the potential effects on flood hazards were considered.

The specific design of the river restoration elements of each alternative and the consideration of flood hazards are described further in the tables and sections below. Table 2-2 provides representative descriptions of the engineered elements that are incorporated into the alternatives, Table 2-3 summarizes the specific elements of each alternative, and the sections below describe the elements in greater detail.

STABILIZATION OF ERODING BANKS DOWNSTREAM OF THE U.S. 50 BRIDGE

Flow constriction and redirection under the U.S. 50 bridge create large hydraulic stresses on the steep and high streambanks downstream. This has accelerated the rates of bank erosion and fine-sediment delivery to the Upper Truckee River and ultimately to Lake Tahoe. With the willing cooperation of relevant private landowners, all of the alternatives would construct permanent bank protection on the east bank downstream of the bridge, using geotechnical methods, bioengineering methods, or both.

Table 2-2
Representative Descriptions of Engineered Restoration Elements of Alternatives 1–4

Engineered Element	Units	Representative Description
River Restoration		
Vertical Grade Control	Quantity (#)	Vertical grade-control structures would be constructed of a combination of large boulders, cobbles, small rock, and logs to hydraulically hold the bed elevation required by the geomorphic design. In some cases, the vertical grade controls would be designed to promote net deposition (aggradation) of bed material, while in other cases they would be designed only to prevent net erosion (degradation) of the bed. The structures would be keyed into streambanks, and the disturbed streambanks would be bioengineered with vegetation.
Lateral Grade Control	Quantity (#)	Lateral grade-control structures would be constructed of a combination of large boulders, cobbles, small rock, and logs, bioengineered with vegetation to hydraulically hold the proposed streambank and channel position. The structures would be located where the existing channel, proposed backfilled channel, and/or proposed new channel intersect and would be designed to prevent unplanned channel migration.
Bank Protection	Length (feet)	Bank protection would be constructed with large boulders at the toe (approximately RS 0+00 to RS 13+00), and bioengineered vegetation treatment to hydraulically protect the banks from stream erosion. The protection would be designed to prevent continued side-slope erosion on the high, steep east bank.
New Channel	Length (feet) Area (square feet)	A new channel would be constructed by excavating one into the existing meadow terrace to improve geomorphic function. Flows would overbank approximately every one to two years (at or above the design flow of ±450 cfs), and the anticipated sediment load would be transported, and thus stability maintained. The bed topography would be somewhat varied, ranging from riffle to pool features where appropriate. The bed material would be composed of a combination of native material and placed clean cobbles, gravel, and sand. The banks of the new channel would be bioengineered with combinations of salvaged/transplanted willows and sod blocks, willow mattresses, and log revetments.
Recontoured Channel	Length (feet) Area (square feet)	The recontoured channel would be constructed by local cut/fill and grading within the existing channel, to improve geomorphic function. The low-flow sinuosity would be increased, bed forms would be more diverse, bank angles would be more varied, and bank materials would be strengthened by bioengineering. The existing bed elevation, channel alignment, and high-flow channel capacity would not be modified.
East Venice Bank Stabilization	Length (feet) Area (square feet)	The river bank adjacent to East Venice Drive where boaters currently enter and exit the Upper Truckee River (RS 65+00) would be treated with BMPs such as rocks, boulders, logs, and signage in order to protect natural resources. The stabilization would be designed to prevent continued soil erosion.
River Mouth Modification	Area (square feet)	River mouth modification would consist of treatments to the river between the beach ridge and the lagoon (approximately RS 100+00 to RS 95+00). Measures would vary, from bioengineering the banks for stabilization and reduced capacity or constructing a vertical grade control with bioengineered margins, to constructing a new channel at the mouth in a new location or placing piles to support a bridge at the existing location.

Table 2-2
Representative Descriptions of Engineered Restoration Elements of Alternatives 1–4

Engineered Element	Units	Representative Description
Floodplain Restoration		
Existing Secondary Channel	Area (square feet)	The existing secondary channel would be activated to improve geomorphic function. Flows would be able to access the existing secondary channel at or above the design flow of the proposed main channel, and hydraulic stress on the main channel banks would be reduced. The existing secondary channel would be activated by locally excavating the channel inlet and outlet to design elevations. Banks would be strengthened using bioengineering.
Complete Backfilling of Old Channel	Length (feet) Area (square feet)	Complete backfilling of the existing channel would involve placing fill in sections of existing channel (those that would be abandoned) up to the elevation of the adjacent terrace/floodplain. Some microtopography variations would be maintained, and the geomorphic function would be similar to the function on the adjacent terrace/floodplain (inundated only during large flood flows). Revegetation of the new surface would incorporate a mixture of salvaged/transplanted sod and willow, willow wattles, and new plantings.
Partial Backfilling of Old Channel	Length (feet) Area (square feet)	Partial backfilling of the old channel would involve placing fill in sections of existing channel that would be abandoned up to an elevation about two to three feet lower than the adjacent terrace/floodplain, to allow geomorphic function as a floodplain overflow channel during streamflows over the design flow of the proposed main channel. The old channelcould be active every few to several years. Some microtopography variations would be maintained on the new surface, but there would be a net flow direction and path to limit stagnant water after flow events. Revegetation of the new surface would incorporate a mixture of salvaged/transplanted sod and willow, willow wattles, and new plantings, and would have more resistant rock or log materials incorporated near the inlet and outlet (adjacent specific vertical and/or lateral grade controls).
Lowered Floodplain	Area (square feet)	Lowering the floodplain would involve excavating terraces between RS 0+00 and RS 29+00 to increase the opportunity for overflow to inundate these isolated floodplain areas and decrease hydraulic stress on the main channel banks. The excavation depth below existing ground would range from about one to three feet, depending on the location. Revegetation of the lowered surface would incorporate a mixture of salvaged/transplanted sod and willow, willow wattles, and new plantings.
Inset Floodplain	Area (square feet)	Inset floodplain would involve excavation directly adjacent to the existing channel to establish an active floodplain that would be inundated at or above the design flow of the proposed main channel and would reduce hydraulic stress on the channel banks. The excavation depth below existing ground would average about three feet. Revegetation of the lowered surface would incorporate a mixture of salvaged/transplanted sod and willow, willow wattles, and new plantings.
Restored Floodplain	Area (square feet)	Restored floodplain would involve excavation of existing (previously imported) fill to the approximate elevation of native ground to improve the geomorphic function of these areas to be similar to adjacent floodplain. Revegetation of the restored surface would incorporate a mixture of salvaged/transplanted sod and willow, willow wattles, and new plantings.

Table 2-2
Representative Descriptions of Engineered Restoration Elements of Alternatives 1–4

Engineered Element	Units	Representative Description
Stormwater Treatment Basin	Area (square feet)	Stormwater treatment basins would be installed as needed to replace and improve the function of existing stormwater pre-treatment outfalls or ditches in locations where the proposed channel would be relocated. The stormwater treatment basins would be excavated in existing high ground and constructed of rock and vegetation to promote sediment settling and infiltration.
Overflow Culverts	Length (feet) Area (square feet)	Overflow culverts would be installed via boring under U.S. 50 between the main channel and the fill at the commercial development located immediately west of the U.S. 50 bridge at an elevation to improve flood flow conveyance when water upstream of the bridge would be out of bank. This would improve geomorphic function by activating the isolated floodplain downstream between U.S. 50 and RS 5+00 and decrease hydraulic stress on the main channel banks.
Lagoon Restoration		
Bulkhead and Levee	Length (feet)	A bulkhead would be constructed of driven sheet pile on the Tahoe Keys Marina (west) side, with placement of an earthen levee on the east side. The bulkhead would extend the existing sheet pile bulkhead across the existing lagoon opening into the marina and be located approximately 30 feet to the east of the existing opening. An earthen levee would be contoured to match the existing embankments on the north and south sides of the lagoon. The levee would incorporate maintenance access along the crest, with remaining areas revegetated using a mixture of woody and herbaceous species suited to the range of moisture conditions from lagoon edge to levee top.
Restored Lagoon	Area (square feet)	The restored lagoon would involve a combination of local excavation, fill removal, and recontouring in areas previously dredged or filled to reestablish shallow lagoon area(s) behind the beach ridge and connected to the stream channel(s). Salvaged soil and vegetation would be used, along with plantings, to revegetate using a mixture of native plant species appropriate for the planned water depths.
Dune/Beach Restoration		
Restored Dune	Area (square feet)	The restored dune would involve excavation and recontouring, in the area between Cove East Beach and the Sailing Lagoon that was previously leveled to reestablish depressions (swales) and dunes (ridges), with increased soil and hydrologic diversity. Salvaged soil and vegetation would be used, along with plantings, to revegetate using a mixture of woody and herbaceous species suited to the range of moisture conditions in the depressions and dunes.

Notes:
cfs = cubic feet per second; RS = River Station; U.S. 50 = U.S. Highway 50
Source: Data provided by Cardno ENTRIX in 2008

Table 2-3
Engineered Restoration Elements under Alternatives 1–4

Element	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Comments
River Restoration					
Vertical Grade Control Quantity (#)	8	2	3	–	**Alt. 1:** The five grade controls between RS 17+00 and RS 29+00 would be designed to encourage bed aggradation, with crest elevations above the existing streambed. The three grade controls at RS 17+00, RS 29+00, and RS 93+00 would be designed to stabilize the bed at its existing elevation. **Alt. 2:** The two grade controls at RS 21+00 and near RS 96+00 would be designed to stabilize the existing and established bed elevations of the existing and new channels, respectively. **Alt. 3:** The two grade controls at RS 17+00 and RS 99+00 on the Upper Truckee River and one grade control near RS 92+00 on Trout Creek would be designed to stabilize the streambed at its existing elevation.
Lateral Grade Control Quantity (#)	6	6	3	–	**Alt. 1:** The four lateral controls at RS 17+00, RS 29+00, RS 63+00, and RS 93+00 would be located at the intersection of the new low-flow channel with the backfilled existing channel. The two lateral controls near RS 85+00 would be located where the new low-flow channel crosses the backfilled existing channel. **Alt. 2:** The lateral control at RS 17+00 would be located at the inlet to an existing secondary channel and be designed to prevent recapture of the secondary channel as a low-flow channel. The lateral control at RS 21+00 would be located at the intersection of the new low-flow channel with the backfilled existing channel and would be designed to prevent recapture of the backfilled channel as a low-flow channel. The lateral controls near RS 38+00 and RS 95+50 would be located where the new low-flow channel crosses the backfilled existing channel and would be designed to prevent recapture of the backfilled channel as a low-flow channel. **Alt. 3:** The lateral control at RS 17+00 would be located at the intersection of the new low-flow channel with the backfilled existing channel and would be designed to prevent recapture of the backfilled channel as a low-flow channel. The lateral control east of RS 28+00 would be located where the new low-flow channel leaves the existing secondary channel and would be designed to prevent recapture of the existing channel as a low-flow channel. The lateral control near RS 95+00 would be located where the existing channel meets the backfilled existing channel and would be designed to prevent recapture of the backfilled channel as a low-flow channel.
Bank Protection Length (feet)	1,300	1,300	1,300	1,300	**Alts. 1-4:** Bank protection would be constructed between RS 0+00 and RS 13+00, alternating sides of the channel as needed to protect the cut banks.
New Channel Length (feet) Area (square feet)	3,890 147,830	8,420 320,000	1,500 57,000	– –	**Alts. 1 and 2:** The new channel would be constructed between RS 63+00 and RS 93+00, with a top width of approximately 38 feet and an average depth of four feet. **Alt. 3:** The new pilot channel would be constructed off the existing secondary channel near RS 28+00 and would extend about 1,500 feet into the meadow, with a top width of approximately 38 feet and an average depth of four feet.

Table 2-3
Engineered Restoration Elements under Alternatives 1–4

Element	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Comments
Recontoured Existing Channel Length (feet) Area (square feet)	1,910 72,580	– –	1,500 57,000	2,400 180,000	**Alts. 1 and 3:** The existing secondary channel (east high-flow branch) between RS 17+00 and RS 29+00 would be modified (excavated/recontoured, banks revegetated) to function as the low-flow channel, with a top width of approximately 38 feet and an average depth of four feet. **Alt 4:** The existing main channel between RS 69+00 and RS 93+00 would be modified to improve low-flow sinuosity and bed diversity and to lower bank angles along point bars (assuming an average width of approximately 75 feet).
East Venice Bank Stabilization Length (feet) Area (square feet)	0 ~300	150 ~300		0 ~300	**Alt. 1 and 4:** The river bank stabilization (RS 65+00) would be designed to use natural materials such as rock and logs to stabilize the bank and minimize resource damage, **Alt. 2:** The river bank stabilization (RS 65+00) would be designed to use natural materials such as rock and logs to stabilize the bank and minimize resource damage, This alternative would incorporate a boardwalk to connect East Venice Drive with the new river channel.
River Mouth Modification Area (square feet)	~200	51,000	~750	–	**Alt. 1:** The river mouth modification would be limited to stabilization treatments such as the revegetation of immediate disturbance around the proposed bridge footings and abutments. **Alt. 2:** The river mouth modification would include part of the new channel construction (20,000 square feet), relocating a smaller capacity mouth to the west, and backfilling and revegetating the existing mouth (31,000 square feet). **Alt. 3:** The river mouth modification would include construction of a vertical grade control to raise the bed and associated revegetation to decrease capacity/increase roughness at the existing mouth (approximately 750 square feet).
Floodplain Restoration					
Existing Secondary Channel Area (square feet)	5,800	5,800	~14,550	5,800	**Alts. 1–4:** The elevation of the inlet (1,800 square feet) and outlet (4,000 square feet) of the existing secondary channel (west high-flow channel) between RS 5+25 and RS 11+00 would be excavated to allow flow into the secondary channel when the total flow exceeds design flow of the main channel. **Alt. 3 (additional):** The existing secondary channel (east high-flow branch) between RS 28+00 and RS 29+00 (8,750 square feet) would be modified (recontoured and revegetated as needed) to function as part of the lowered floodplain between the backfilled existing channel and the lateral grade control on the west bank of the proposed channel.

Table 2-3
Engineered Restoration Elements under Alternatives 1–4

Element	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Comments
Complete Backfill Old Channel Length (feet) Area (square feet)	 3,000 150,000	 5,700 285,000	 3,800 190,000	 – –	**Alt. 1:** The existing channel would be completely backfilled between RS 63+00 and RS 93+00 (3,000 feet) to match the adjacent floodplain/terrace. **Alt. 2:** The existing channel would be completely backfilled between RS 38+00 and RS 95+00 (5,700 feet) to match the adjacent floodplain/terrace. **Alt. 3:** The existing channel would be completely backfilled between RS 17+00 and RS 33+00 (1,600 feet) and from RS 73+00 to RS 95+00 (2,200 feet) to match the adjacent floodplain/terrace.
Partial Backfill Old Channel Length (feet) Area (square feet)	 1,200 26,000	 1,700 50,000	 4,000 120,000	 – –	**Alt. 1:** The existing channel would be partially backfilled between RS 17+00 and RS 29+00 (1,200 feet) to function as a secondary channel during streamflow events when the total flow exceeded the design flow of the main channel. **Alt. 2:** The existing channel would be partially backfilled between RS 21+00 and RS 38+00 (1,700 feet) to function as a secondary channel during streamflow events when the total flow exceeded the design flow of the main channel. **Alt. 3:** The existing channel would be partially backfilled between RS 33+00 and RS 73+00 (4,000 feet) to function as floodplain during large flood events.
Lowered Floodplain Area (square feet)	83,000	173,000	214,000	101,000	**Alts. 1–4:** The existing terrace (83,000 square feet) from RS 5+25 to RS 11+00 between the main channel and the secondary channel would be excavated and lowered an average of three feet to increase the frequency of inundation and decrease high-flow shear stress on the main channel banks. **Alt. 2 (additional):** The existing terrace (90,000 square feet) from RS 21+00 to RS 29+00 between the main channel and secondary channel would be lowered an average of one foot to increase the frequency of inundation and decrease high-flow shear stress on the main channel banks. **Alt. 3 (additional):** The existing terrace (41,000 square feet) from RS 0+00 to RS 5+00 between the main channel and the building pad fill of the commercial development immediately west of the U.S. 50 bridge would be lowered an average of three feet to increase the frequency of inundation, convey high flows from the proposed overflow culverts under U.S. 50 (Lake Tahoe Boulevard), and decrease high-flow shear stress on the main channel banks. The existing terrace (90,000 square feet) from RS 21+00 to RS 29+00 between the main channel and the secondary channel would be lowered an average of one foot to increase the frequency of inundation and decrease high-flow shear stress on the main channel banks. **Alt. 4 (additional):** The existing terrace (18,000 square feet) from RS 0+00 to RS 5+00 between the main channel and the building pad fill of the commercial development immediately west of the U.S. 50 bridge would be lowered an average of 2.5 feet to increase the frequency of inundation and decrease high-flow shear stress on the main channel banks.

Table 2-3
Engineered Restoration Elements under Alternatives 1–4

Element	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Comments
Inset Floodplain Area (square feet)	–	–	–	374,000	**Alt. 4:** The existing terrace (374,000 square feet) from RS 11+00 to RS 69+00 would be excavated to create an active floodplain along both sides of the existing main channel.
Restored Floodplain Area (square feet)	297,000	297,000	297,000	206,000	**Alts. 1–3:** Fill would be excavated and removed from the TKPOA Corporation Yard (91,000 square feet) and the reserved fill areas within the LWS Restoration Area (206,000 square feet) to restore the ground to native elevation. **Alt. 4:** Fill would be excavated and removed from the reserved fill areas within the LWS Restoration Area (206,000 square feet) to restore the ground to native floodplain elevation.
Stormwater Treatment Basin Area (square feet)	–	~24,000	~24,000	–	**Alt. 2 and 3:** Stormwater treatment areas would be created on existing ground near RS 46+50 (12,000 square feet) and RS 66+00 (12,000 square feet) to replace and improve treatment at the existing piped outfall and ditch, respectively.
Overflow Culverts Length (feet)	–	–	225	–	**Alt. 3:** Overflow culverts would be constructed under U.S. 50 through the embankment fill between the existing channel and the building pad fill of the commercial development immediately west of the U.S. 50 bridge. The elevation of the culverts would be at or above the existing floodplain/terrace surface. The culverts would have a flow capacity of about 150 cfs. The culverts would begin taking flow when the river is around 2,000 cfs (between a five-year and a ten-year event).
Area (square feet)	–	–	2,700	–	
Lagoon Restoration					
Bulkhead and Levee Length (feet)	290	290	290	0	**Alts. 1–3:** The existing 290-foot-long opening from the Sailing Lagoon into the Tahoe Keys Marina would be blocked to allow reconnection of the lagoon with the river. The bulkhead would be offset approximately 30 feet east of the existing opening.
Restored Lagoon Area (square feet)	~123,000	~123,000	~105,000	0	**Alts. 1–3:** The existing Sailing Lagoon (approximately 105,000 square feet) would be isolated, pumped, and drained; sediment (including invasive plants and animals) would be disposed off site; and the lagoon would be recontoured and revegetated with a mixture of native plant species appropriate for the planned water depths. **Alts. 1–2 (additional):** The existing imported fill at East Barton Beach would be excavated to native ground elevations to restore a lagoon (approximately 18,000 square feet) and would be revegetated with a mixture of native plant species appropriate for the planned water depths.
Dune/Beach Restoration					
Restored Dune Area (square feet)	~130,000	~130,000	0	0	**Alts. 1–2:** The previously cleared and leveled dunes or sand ridges (approximately 130,000 square feet) between Cove East Beach and the Sailing Lagoon would be recontoured by local excavation and fill to restore dune soil, hydrology, and vegetation diversity.

Notes:
cfs = cubic feet per second; LWS = Lower West Side; RS = River Station; TKPOA = Tahoe Keys Property Owners Association; U.S. 50 = U.S. Highway 50
Source: Data provided by Cardno ENTRIX in 2008

Under Alternatives 1–4, the streambanks immediately downstream of U.S. 50 (from River Station [RS] 0+00 to RS 13+00) would be modified. The modifications would include keyed-in boulders at the base (toe) of the bank and bioengineered revegetation above the boulders. Protection would be installed primarily on the high, actively eroding east bank, but it would also include active existing and proposed cut bank sites on the west bank. Additional protection against bank erosion would be achieved by reactivating the secondary channel from RS 5+25 to RS 11+00 and lowering the floodplain on the west bank from RS 0+00 to RS 11+00; both measures would decrease hydraulic stress on the main channel banks during high streamflows.

Under Alternative 5, the streambanks immediately downstream of U.S. 50 would continue to erode and contribute relatively large volumes of sediment per linear foot, particularly off the high side slope on the east bank.

RIVER CHANNEL RESTORATION

The straightened Upper Truckee River channel not only has excess capacity from dredging, but also has a uniform channel bed morphology that is not diverse enough to support high-quality aquatic habitat. Alternatives 1, 2, and 4 would replace the existing straightened reach near the LWS Restoration Area with a more sinuous (i.e., more curved and thus longer) channel.

The alternatives differ in the alignment of the new geomorphically-sized channel and improved active floodplain connections to the existing meadow surfaces. Alternative 3 also differs from Alternatives 1, 2, and 4 because it would not include construction of a complete new channel to Lake Tahoe. Alternative 3 would replace the existing straightened reach by construction of a short pilot channel to redirect the river flow into the center of the marsh, allowing natural processes to determine flow paths along the meadow surface (which has appropriate, historical floodplain features) and promoting self-formation of a new channel or channels.

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

Alternative 1 proposes to improve the geomorphic function of the river channel and its connection to the surrounding topography by raising the streambed elevation, increasing the channel length, and decreasing channel capacity by a combination of engineering elements in various reaches. Alternative 1 would construct five vertical grade-control structures with crest elevations above the existing bed, to promote bed aggradation within about 3,400 feet of the existing channel (from RS 29+00 to RS 63+00). Over time, bar development in the aggrading reach would also contribute to channel narrowing and reduced capacity. Alternative 1 would directly reshape and resize about 1,910 feet of existing secondary channel to become a geomorphically-sized main channel (about 38 feet wide and 4 feet deep) from approximately RS 14+00 to RS 29+00. Alternative 1 would also directly excavate about 3,890 feet of new geomorphically-sized channel (about 38 feet wide and 4 feet deep) to replace the straightened reach by the LWS Restoration Area (from RS 63+00 to RS 93+00). Existing woody vegetation would be preserved wherever possible, to help provide erosion-resistant areas. The banks of the proposed main channel would also be strengthened by bioengineered revegetation, using salvaged/transplanted willows and sod blocks, willow mattresses, and, in some areas, log revetments.

The proposed main-channel alignment and profile for Alternative 1 are a combination of modified existing reaches and wholly constructed reaches and would require additional engineered elements to stabilize the proposed channel positions and/or size at transitions between treatments and/or intersections of the old and new channels. These elements would include three vertical grade controls to stabilize the bed at existing elevations (at RS 17+00, RS 29+00, and RS 93+00) and four lateral grade controls to hold the proposed streambank and channel locations (at RS 17+00, RS 29+00, RS 63+00, and near RS 85+00). In general, the control structures would be constructed of a combination of rock material and logs, with bioengineered revegetation above the future waterline. The grade control at RS 93+00 would set the bed elevation for the reconnection between the river and lagoon; therefore, it would be designed to simulate the appearance and function of resistant subsurface geologic layers (e.g., consolidated lake sediments) that occur naturally in the study area.

No direct or indirect modifications to Trout Creek are proposed under Alternative 1.

Alternative 2: New Channel–West Meadow (Minimum Recreation Infrastructure)

Alternative 2 would improve the geomorphic function of the river channel and its connection to the surrounding topography by directly raising the streambed elevation, increasing the channel length, and decreasing channel capacity. To achieve these objectives it proposes the construction of 8,420 feet of new, geomorphically-sized channel (about 38 feet wide and 4 feet deep), to replace the existing channel from RS 20+00 to RS 95+50.

Existing woody vegetation in the areas to be disturbed, particularly along proposed finished streambank locations, would be preserved wherever possible and used for erosion control. The banks of the proposed main channel would also be strengthened by bioengineered revegetation, using salvaged/transplanted willows and sod blocks, willow mattresses, and, in some areas, log revetments.

The alignment and profile of the main channel for Alternative 2 would consist primarily of constructed reaches, with some transitions and/or intersections of old and new channels that would require additional engineered elements to stabilize the channel positions and/or size. These elements would include two vertical grade controls (at RS 21+00 and near RS 96+00) to stabilize the bed elevation, and four lateral grade controls (at RS 21+00, RS 38+00, RS 39+00, and RS 95+50) to hold the proposed streambank and channel location. In general, the control structures would be constructed of a combination of rock material and logs, with bioengineered revegetation above the future waterline. The grade control near RS 96+00 would set the bed elevation for the reconnection between the river and lagoon; therefore, it would be designed to simulate the appearance and function of resistant subsurface geologic layers (e.g., consolidated lake sediments) that occur naturally in the study area.

No direct or indirect modifications to the Trout Creek channel are proposed under Alternative 2.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

The geomorphic function of the river channel and its connection to the surrounding topography would be improved by both active and passive restoration means. The active measures would raise the streambed elevation, increase the channel length, and decrease channel capacity by constructing 1,500 feet of new, geomorphically-sized channel (about 38 feet wide and 4 feet deep) downstream of RS 38+00 and reshaping about 1,500 feet of existing secondary channel between RS 17+00 and RS 28+00 as a geomorphically-sized channel. The passive restoration downstream of the pilot channel in the main marsh would replace about 7,100 feet of existing single-thread channel with a network of small channels of varied capacity. No construction would occur within the main meadow channel sections. Therefore, the flow paths, bed and bank elevations, and channel capacities would be dictated by natural processes.

The proposed main-channel alignment and profile for Alternative 3 would have a relatively short constructed reach, with a couple of transitions and/or intersections of old and new channels that would require additional engineered elements to stabilize the proposed channel positions and/or size. These elements include two vertical grade controls to stabilize the bed elevation (at RS 17+00 and RS 99+00), and three lateral grade controls to hold the proposed streambank and channel location (at RS 17+00 and RS 28+00 and near RS 95+00). In general, the control structures would be constructed of a combination of rock material and logs, with bioengineered revegetation above the future waterline. The grade control near RS 95+00 would set the bed elevation for the reconnection between the river and the lagoon, and the grade control at RS 99+00 would set the bed elevation for the river mouth. Both of these would be designed to simulate the appearance and function of resistant subsurface geologic layers (e.g., consolidated lake sediments) that occur naturally in the study area.

Alternative 3 includes channel stabilization on Trout Creek because redirected flows from the Upper Truckee River would affect the lower segment of Trout Creek. Redirecting the flows of the Upper Truckee River's main channel into the remnant channel system of the marsh would be expected to increase streamflow conveyed through the lowest reach of Trout Creek, creating the potential for future channel adjustments such as bed erosion. Therefore, Alternative 3 includes installation of vertical grade control(s) and streambank stabilization measures along about 2,600 feet of lower Trout Creek (from RS 66+00 to 95+00). The vertical grade controls will be of an adequate number and design to maintain the existing average slope and elevation of the channel and remain stable under the 100-year peak flows, assuming the combined peaks of Trout Creek and the Upper Truckee River. The streambank stabilization measures will be designed to remain stable under the 25-year peak flows, assuming the combined peaks of Trout Creek and the Upper Truckee River. The design will also anticipate and address the potential effects of sheet and concentrated overflow returning to the channel off the reactivated floodplain.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

Under Alternative 4, the geomorphic function of the river channel would be improved without raising the streambed elevation or increasing channel length, and without constructing vertical or lateral grade-control elements. Thus, it is fundamentally different from Alternatives 1, 2, and 3. Alternative 4 would directly decrease channel capacity by lowering bank heights.

Alternative 4 proposes to reestablish active floodplain area by creating floodplain surfaces along much of the existing river alignment and profile (from RS 0+00 to RS 69+00). About 6,900 feet of the river would be indirectly modified as part of the floodplain restoration because the new floodplains would be formed by lowering (excavating) existing river banks and adjoining terrace surfaces. The remaining banks would be strengthened by bioengineered revegetation, using salvaged/transplanted willows and sod blocks, willow mattresses, and, in some areas, log revetments.

About 2,400 feet of the river (from RS 69+00 to RS 93+00) would be modified using local cut-and-fill materials to create a more sinuous low-flow channel, increase bed form diversity, and lower bank angles within an overall area of about 180,000 square feet. Existing woody vegetation along the banks would be preserved wherever possible to help provide erosion-resistant areas. The proposed banks would also be strengthened by bioengineered revegetation, using salvaged/transplanted willows and sod blocks, willow mattresses, and, in some areas, log revetments.

Alternative 5: No-Project/No-Action

Alternative 5 would not provide any actions to reestablish and improve floodplain processes or modify the existing degraded channel throughout the study area (from RS 0+00 to RS 100+00). This alternative would allow, but not encourage, enhance, or speed up, the passive recovery of the system via natural processes. Streambank failures, bank retreat, and channel widening combined with point bar deposition within the inset channel would create small active floodplain patches over time, but the surrounding terrace would not be reactivated as floodplain. The straightened reach (from RS 69+00 to RS 93+00) would remain in its existing condition.

Secondary Channel Reactivation

Alternatives 1–4 would reactivate a 5,800-foot-long existing secondary channel by excavation of its inlet and outlet on the main channel (at RS 5+25 and RS 11+00) to allow flow to enter the secondary channel whenever the total streamflow exceeded the main channel's design flow. The banks of the secondary channel would be strengthened by bioengineered revegetation in all disturbed areas. Existing woody bank vegetation along the secondary channel would be preserved to the maximum extent possible, to provide an erosion-resistant edge along the proposed lowered floodplain between the secondary channel and the main channel.

Alternative 5 would not include deliberate modification of secondary channels. Similar to current conditions, the existing secondary channels (from RS 5+25 to RS 11+00 and from RS 17+00 to RS 29+00) would be active only during moderate overbanking flow events where the capacity of the existing channel is exceeded. Although dependent on the magnitude of these events and associated sediment or debris loads, the most likely result will be sediment deposition in the secondary channels during overbank flows. However, during or following major flooding events (i.e., events with deeper and higher velocity flows on the floodplain), erosion of the secondary channels or sedimentation of the main channel may result in reoccupation of the secondary channel location by the low-flow channel, a condition that has occurred in the past.

For all reactivated channels and floodplain areas with remnant channels having accumulated fine sediment and/or organic materials, final project design and revegetation specifications would include measures to minimize the risk that such materials would become mobilized if a large flood flow occurs during the first few years after construction. As feasible, the measures would remove and/or stabilize the materials adequately to resist expected erosive forces if a large flood (i.e., 25-year and higher peak flow) occurred within the first five years after implementation:

- Remove loose, unvegetated, or otherwise unstable fine sediment and/or organic material within remnant channel sections to be reactivated (either directly connected to the restored channel or as part of reactivated floodplain) to eliminate the potential pollutant source. The excavated materials could be salvaged for soil amendment and revegetation use in off-channel areas if suitable or disposed of properly off-site.

- Revegetate loose, unvegetated, or otherwise unstable fine sediment and/or organic material within remnant channel sections to be reactivated (either directly connected to the restored channel or as part of reactivated floodplain) to increase roughness and reduce velocities. Revegetation of these areas will meet species, density, planting methods, irrigation, and success criteria similar to streambank plantings.

RIVER MOUTH SIZE REDUCTION

The incised river mouth is overly wide and deep, allowing lake water inflow even during relatively low water surface elevations in the lake (i.e., low lake stands). The mouth configuration and the incised bed of the straightened river reach allow lake backwater effects to extend more than 2,000 feet up the river during high lake stands and to a somewhat lesser extent during lower lake stands. The lake backwater reduces flow velocities, reduces hydraulic complexity, flattens the channel bed, and limits habitat diversity. Although the project is not intended to address the backwater conditions normally expected during high lake stands, Alternatives 1-3 include modifications to the river mouth that would decrease the width of the river mouth and limit inflow of lake water during low lake levels. Alternatives 1-3 would also raise the minimum bed elevation at the mouth by installing resistant materials to reestablish the approximate elevation of consolidated sediment in the channel that existed before the river was channelized. Below, restoration elements at the river mouth are described in greater detail for each alternative.

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

The present location and bed elevation of the river mouth downstream of RS 95+00 would be retained, but the minimum bed elevation would be raised and the capacity would be reduced at RS 99+00 by installing both an engineered grade control and bioengineered revegetation. The grade control structure would be created at or near the new bridge (RS 99+00) that would be designed to simulate the function of naturally-occurring subsurface geologic layers (i.e., resistant, cohesive lake sediments), to hold the minimum bed elevation at approximately 6,222 feet. This would be lower than median lake level but would restore a higher bed than the historic dredged depth. Over time, vegetation growth between RS 99+00 and near the beach ridge would increase roughness, encourage aggradation, and protect against erosion. Existing woody vegetation in the areas disturbed for grade control would be salvaged and transplanted as part of the bioengineered revegetation activities of the grade control structure and the footings and abutments of the bridge.

Alternative 2: New Channel–West Meadow (Minimum Recreation Infrastructure)

The present river mouth location, elevation, and size would be replaced by a new mouth, excavated in existing topography west of the existing channel, along the same alignment (planform) and with the same profile (bed elevation) and capacity (about 38 feet wide and 4 feet deep) as the proposed new channel. This approach would restore a 20,000-square-foot mouth area of similar size and dimension to a configuration that likely existed before historic dredging. A grade control structure would be installed in the channel near RS 96+00 to provide resistance to vertical changes in bed elevation. The abandoned 31,000-square-foot mouth area would be backfilled to match the adjoining ground and would be revegetated with native species suited to the floodplain, lagoon, and/or beach conditions of the proposed finished elevations.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

The existing river mouth location downstream of RS 95+00 would be retained, but the minimum bed elevation would be raised and the capacity would be reduced at RS 99+00 by installing both an engineered grade control and bioengineered revegetation. The grade-control structure would be designed to simulate the function of naturally-occurring subsurface geologic layers (i.e., resistant, cohesive lake sediments) to hold the minimum bed elevation at approximately 6,222 feet. This would be lower than median lake level but would restore a higher bed than the historic dredged depth. Over time, vegetation growth between RS 99+00 and near the beach ridge would increase roughness, encourage aggradation, and protect against erosion. Existing woody vegetation in the areas disturbed for grade control would be salvaged and transplanted as part of the bioengineered revegetation activities.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

The existing river mouth location, size, and bed elevation would be retained downstream of RS 93+00. Grade control in this lowest segment of the river is not proposed. The existing stream processes, including response to lake level fluctuations, would continue. Channel aggradation would likely occur during high lake stands; downcutting could occur during low lake stands.

Alternative 5: No-Project/No-Action

The existing river mouth location, size, and bed elevation would continue to adjust to lake levels, streamflows, and sediment loads. It would aggrade and/or widen for a few years, then flush out (erode) the accumulated sediment during high-water years and/or floods. Extensive backwater from the lake would continue to move up the deepened, straightened channel reach, particularly when the lake is above median elevation.

FLOODPLAIN LOWERING

In addition to reducing channel capacity, the hydrologic connectivity of the channel and floodplain would be increased by lowering portions of the floodplain. During floodplain lowering operations, removal of existing woody vegetation along the margins would be avoided to the extent possible, to retain the erosion resistance provided by vegetation along the edge of the lowered floodplain. The surface of lowered floodplains and all disturbed areas of the floodplain would be revegetated with a mixture of salvaged/transplanted sod and willow, willow wattles, and new plantings.

The location and extent of areas of lowered floodplain differ among alternatives. These differences are described below.

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

A lowered floodplain (covering about 83,000 square feet) would be excavated into the existing terrace west of the main channel, to improve floodplain function downstream of U.S. 50 from RS 5+25 to RS 11+00. This excavated area between the main channel and the existing secondary channel would be about three feet deep.

Alternative 2: New Channel–West Meadow (Minimum Recreation Infrastructure)

Two lowered floodplain areas (covering 173,000 square feet) would be excavated into the existing terrace between the main and secondary channels, to improve floodplain function between RS 5+25 and RS 11+00 and between RS 21+00 and RS 29+00. From RS 5+25 to RS 11+00, the excavation would cover about 83,000 square feet west of the main channel, and from RS 21+00 to RS 29+00, the excavation would cover about 90,000 square feet east of the main channel, averaging about three feet deep in both areas.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

Under Alternative 3, three lowered floodplain areas (covering 214,000 square feet) would be excavated into the existing terrace between the main and secondary river channels, to improve floodplain function from RS 0+00 to RS 5+00, RS 5+25 to RS 11+00, and RS 21+00 to RS 29+00. From RS 0+00 to RS 5+00, the excavation would cover about 41,000 square feet between the main channel and the building pad of the adjacent commercial development, averaging about 2.5 feet deep. From RS 5+25 to RS 11+00, the excavation would cover about 83,000 square feet west of the main channel, averaging about three feet deep. From RS 21+00 to RS 29+00, the excavation would cover about 90,000 square feet east of the main channel, averaging about one foot deep.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

A lowered floodplain (covering about 101,000 square feet) would be excavated into the existing terrace west of the main channel, to improve floodplain function immediately downstream of U.S. 50 from RS 0+00 to RS 11+00. From RS 0+00 to RS 5+00, the excavation would cover about 18,000 square feet between the main channel and the building pad of the adjacent commercial development, averaging 2.5 feet deep. From RS 5+25 to RS 11+00, the excavation would cover about 83,000 square feet between the main channel and the existing secondary channel, averaging three feet deep.

An inset floodplain would be excavated into the existing terrace on both sides of the main channel from RS 11+00 to RS 69+00 to improve floodplain function. The excavation would cover about 374,000 square feet, averaging three feet deep. The width of the inset floodplain on either side of the channel would vary somewhat, to simulate natural variability and potentially to help avoid disturbing biological and cultural resources.

Alternative 5: No-Project/No-Action

The floodplain would not be lowered.

Removal of Existing Fill from Floodplain

In addition to the floodplain restoration described in the preceding section, Alternatives 1–4 would restore floodplain function by excavating the reserved fill to native ground elevation on about 206,000 square feet of the LWS Restoration Area. Under Alternative 5, the reserved fill at the LWS Restoration Area would remain in place and within the 100-year floodplain.

Alternatives 1, 2, and 3 would also restore floodplain function by excavating previously placed fill at the TKPOA Corporation Yard, similar to adjacent natural surfaces, over an area of about 91,000 square feet. (This restoration of the corporation yard would be contingent on the consent of TKPOA.) Under Alternatives 4 and 5, previously placed fill at the TKPOA Corporation Yard would remain on the terrace and in the 100-year floodplain. If

chemically and physically suitable, the excavated fill would be used to backfill channel segments; otherwise, the material would be hauled to an appropriate off-site disposal site.

After removal of existing fill, the entire restored floodplain surface and all disturbed areas would be revegetated with a mixture of salvaged/transplanted sod and willow, willow wattles, and new plantings.

FILL OF ABANDONED CHANNEL SEGMENTS

Where new channel segments would replace existing segments, the abandoned channel segments would be partially or completely filled. The backfilled channels and all disturbed areas would be revegetated with a mixture of salvaged/transplanted sod and willow, willow wattles, and new plantings. The construction specifications for the filling of abandoned channels would be prepared by a qualified engineer and include standards that minimize the potential for erosion of the backfilled channels. The specifications would include compaction standards to avoid significant differences between the density of fill and surrounding floodplain sediments and limit the potential for differential settlement of the fill. The specifications would be developed on the basis of the range of physical attributes of the soils encountered but would generally require that fill density be within ten percent of the average density of natural soils. Additionally, the specifications would specify maximum slope angles for the slope formed at the edges of the fill (also dependent on soil properties) and vegetative cover.

The alternatives differ in the extent of channel backfilling, as described below.

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

Complete backfill of about 3,000 feet of old channel (from RS 63+00 to RS 93+00) would bring the abandoned channel areas up to the elevation of adjacent terrace/floodplain surfaces and restore floodplain function to about 150,000 square feet. Partial backfill of about 1,200 feet of old channel (from RS 17+00 to RS 29+00) would bring the abandoned channel areas up to within two to three feet of the adjacent existing terrace/floodplain surface, thus providing a secondary channel function on about 26,000 square feet of the floodplain that would be active when total streamflow exceeded design flow in the main channel.

Alternative 2: New Channel–West Meadow (Minimum Recreation Infrastructure)

Complete backfill of about 5,700 feet of old channel (from RS 38+00 to RS 95+00) would bring the abandoned channel areas up to the elevation of adjacent terrace/floodplain surfaces and restore floodplain function to about 285,000 square feet. Partial backfill of about 1,700 feet of old channel (from RS 21+00 to RS 38+00) would bring the abandoned channel areas up to within two to three feet of the adjacent exiting terrace/floodplain surface, and this would provide a secondary channel function on about 50,000 square feet of the floodplain that would be active when total streamflow exceeded design flow of the main channel.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

Complete backfill of about 3,800 feet of old channel (from RS 17+00 to RS 33+00 and RS 73+00 to RS 95+00) would bring the abandoned channel areas up to the elevation of adjacent terrace/floodplain surfaces and restore floodplain function to about 190,000 square feet. Partial backfill of about 4,000 feet of old channel (from RS 33+00 to RS 73+00) would bring the abandoned channel areas up to within two to three feet of the adjacent existing terrace/floodplain surface and provide about 120,000 square feet of floodplain, active only when total streamflow exceeded the design flow of the main channel.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

Channel segments would not be abandoned and backfilled. However, channel segments would be modified during floodplain lowering.

Alternative 5: No-Project/No-Action

No channel segments would be abandoned and backfilled.

REACTIVATION OF FLOODPLAIN TERRACE

Under Alternative 3, floodplain function and connectivity would also be improved across U.S. 50 and between the main channel and the building pad of the adjacent commercial development by boring two overflow culverts through the roadfill. Two corrugated metal pipes would be installed, with the upstream inlet at an elevation that would receive water when the channel upstream of the bridge was out of bank. The culverts would have a flow capacity of about 150 cfs. The culverts would begin taking flow when the river flow is around 2,000 cfs (between the five-year and ten-year event). The downstream outlet would have a rock-lined, energy dissipation–flared section that would activate the isolated terrace west of the channel from RS 0+00 to RS 5+00 (that would become lowered floodplain). The overflow culverts would also provide a small reduction in high flows that would be conveyed under the U.S. 50 bridge, to reduce hydraulic stress on the main channel's banks during large streamflows.

This river restoration element is not included in Alternatives 1, 2, 4, or 5.

MODIFICATION OF EXISTING STORMWATER DISCHARGE LOCATIONS

Under Alternatives 2 and 3, river and floodplain modifications would require relocating and/or modifying existing stormwater discharge locations near RS 46+50 and RS 66+00. At locations near the existing discharge points, stormwater basins would be installed (either excavated from native meadow material or a portion of the abandoned channel). The basins would replace the discharge function and increase the pretreatment of urban runoff before discharge into open surface water of the Upper Truckee River, because they would provide opportunities for settling, infiltration, and percolation. The size and volume would be determined in consultation with the City of South Lake Tahoe (CSLT) and the Lahontan Regional Water Quality Control Board (RWQCB), but the overall shape would simulate naturally occurring floodplain basins and would be vegetated with native plant species.

The restoration elements of Alternatives 1 and 4 would not include modification or relocation of existing stormwater discharge locations. Alternative 5 would not include restoration elements, and thus, also would not modify or relocate existing stormwater discharge locations.

REESTABLISHMENT OF A RIVER-OVERFLOW LAGOON

The lagoon area connected with the Upper Truckee River is a natural feature that was likely larger before human disturbance. The surface water of a dredged lagoon (the Sailing Lagoon) is hydraulically connected to Lake Tahoe through the Tahoe Keys Marina channel. The Sailing Lagoon is not connected to the river. It has been part of Tahoe Keys Marina since the 1950s, resulting from dredging and fill activities to provide for various navigation routes.

Alternatives 1, 2, and 3 would reestablish a hydrologic connection between a restored, naturally functioning lagoon in the general location of the existing Sailing Lagoon and the Upper Truckee River near the river mouth by constructing a bulkhead at the Sailing Lagoon to block its open connection with the marina and Lake Tahoe, and topographically modifying the Sailing Lagoon, including creation of a re-excavated connection with the Upper Truckee River so that the river would become a surface-water source to the lagoon. (The bulkhead would be located approximately 30 feet east of the existing opening.) The restored lagoon would be analogous to what exists behind Barton Beach near Trout Creek, but on a larger scale (approximately 105,000 square feet). For each alternative, the lagoon restoration elements are described in greater detail in the following sections.

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

To restore the natural river/lagoon connection, an engineered 290-foot-long sheet pile bulkhead and earthen levee would be constructed across the dredged west end of the Sailing Lagoon approximately 30 feet east of the existing bulkhead along the marina, and the fill blocking the east end would be removed. Final design would include a flow control feature for water flowing into the Sailing Lagoon during bank overtopping events when the lagoon starting water surface would be low. The control feature (e.g., a rock lined channel or weir structure) would be designed to control the location of overflow into the lagoon and prevent the development of a permanent, uncontrolled erosion channel connecting the river to the lagoon. Invasive species would be addressed through development and implementation of an Invasive Species Management Plan as described in Environmental Commitment 4, Table 2-6 below.

Following control and removal of invasive animals and plants, local cut and fill would then be used to recontour the topography of the lagoon and connect levee areas with adjoining ground. The lagoon, levee, and all disturbed areas would be revegetated using a mixture of woody and herbaceous species, suited to the anticipated range of moisture conditions from lagoon to levee crest. The east end of the lagoon connection with the river would be constructed as a vertical grade-control structure to simulate the appearance and function of naturally occurring resistant geologic layers and would include bioengineered revegetation to increase erosion resistance along the shared bank between river and lagoon. A grade-control structure (whose exact location would differ among Alternatives [see Exhibits 2-1 through 2-4]) would set the minimum bed elevation to protect the west bank from erosion and establish a residual lagoon water surface elevation during low lake levels.

Salvaged soil and vegetation would be used, along with plantings, to revegetate the proposed lagoon area, using a mixture of native plant species appropriate for planned water depths.

Alternative 2: New Channel–West Meadow (Minimum Recreation Infrastructure)

Alternative 2 would reestablish a river-overflow lagoon along the Upper Truckee River at the Sailing Lagoon as described for Alternative 1.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

Alternative 3 would reestablish a river-overflow lagoon along the Upper Truckee River at the Sailing Lagoon as described for Alternative 1.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

The previously dredged/filled Upper Truckee River–lagoon connection would not be modified, leaving the direct open-water connection between the Tahoe Keys Marina channel, the Sailing Lagoon, and Lake Tahoe unchanged.

Alternative 5: No-Project/No-Action

The previously dredged/filled Upper Truckee River–lagoon connection would not be modified, leaving the direct open-water connection between the Tahoe Keys Marina channel, the Sailing Lagoon, and Lake Tahoe unchanged.

Removal of Existing Fill from Behind the East end of Barton Beach

Alternatives 1 and 2 would remove existing artificial fill from behind the east end of Barton Beach to restore lagoon and wet meadow conditions. Removal of this fill would restore lagoon and wet meadow conditions on about 18,000 square feet. Fill would be excavated to native ground elevation, at a depth averaging about two feet. Salvaged soil and vegetation would be used, along with plantings, to revegetate the restored lagoon and wet meadow, using a mixture of native plant species appropriate for planned elevations. Under Alternatives 3–5, the artificial fill behind the east end of Barton Beach would not be removed.

OVERBANK FLOW AND FLOODING CONSIDERATIONS

Under existing conditions, the incised and widened channel does not allow natural overbank flow onto the meadow during small or moderate streamflow events, an important factor for sustaining ecological values of the adjacent marsh and wet meadow. The channel is overtopped only during relatively large flows (approximately 1,000 cfs or greater). Alternatives 1–4 would use a combination of modifications to the existing channel and/or construction of a new channel to decrease the elevation difference between the channel bed and the adjacent meadow, and to reduce channel capacity to a more geomorphically-appropriate size. These changes would reestablish an active floodplain that receives overbank flows during small events (e.g., the two- to five-year storm events).

For reactivated channel and floodplain that has remnant channels with accumulated fine sediment and/or organic materials, final project design and revegetation specifications would include measures to minimize the risk that such materials would become mobilized, as described above under 'Secondary Channel Reactivation.'

The existing flood hazard affecting adjacent neighborhoods would not be increased by Alternatives 1–4. The alternatives would improve the active floodplain's storage volume and flow routing in the valley reach, but would not alter storage for the overall 100-year floodplain. During lower magnitude flow events, floodplain storage would be increased by lowering portions of the floodplain. Hydraulic modeling of existing conditions and each alternative configuration was used to verify that overbank flows could be increased for smaller flow events without an increase in flooding hazards (Conservancy and DGS 2006).

BANK STABILIZATION AT EAST VENICE DRIVE

Under existing conditions, boaters use the Upper Truckee River and Lake Tahoe for non-motorized recreational boating (kayaking, canoeing, rafting, and tubing). Boaters float down the Upper Truckee from various upstream locations and have historically taken their boats out at the point along the Upper Truckee River closest to East Venice Drive. This location has a steep and eroding bank. Boaters also use this location to put boats into the river to float out to Lake Tahoe. To protect banks from erosion from this ongoing use, the alternatives propose bank stabilization, designed to fit into the natural setting and be constructed of boulders, rocks, and logs, with biotechnical elements as feasible.

Alternatives 1 and 4 would stabilize the existing location where boaters enter and exit the river. Alternative 2 would stabilize the bank of the newly constructed channel at the point closest to East Venice Drive. To further protect resources, a boardwalk (approximately 150 feet long) would be constructed to allow users access to the river from the road. Alternative 3 has no stabilizations or infrastructure proposed in this vicinity, since the concept of Alternative 3 does not dictate the location of the channel(s) downstream of the pilot channel. Alternative 3 would allow natural processes to determine flow paths through the marsh. It is possible that boating may only be feasible during relatively high flow periods and/or high water years, but the location(s) for potential boat put in or take out, and of associated bank protection, cannot be readily predicted at this time.

2.3.2 TERRESTRIAL HABITAT RESTORATION AND ENHANCEMENT ELEMENTS OF THE PROJECT

In addition to the restoration and enhancement of aquatic habitats and floodplain hydrologic and geomorphic processes, Alternatives 1–4 would also restore and enhance terrestrial habitats. This restoration and enhancement elements would include the restoration of riparian habitats in conjunction with river channel and floodplain restoration, and also beach dune restoration, forest enhancement, and enhancement of core habitat. These terrestrial habitat restoration and enhancement elements of the project are described below.

WILLOW SCRUB–WET MEADOW RESTORATION

The restoration of willow scrub–wet meadow is included in Alternatives 1–4. The river restoration described previously would create additional willow scrub–wet meadow on the lowered or restored floodplains and other locations.

MONTANE MEADOW RESTORATION

Under Alternatives 1, 2, and 3, montane meadow would be restored from the disturbed land of the TKPOA Corporation Yard. The restoration of the corporation yard would be contingent on the consent of TKPOA.

DUNE/BEACH RESTORATION

Alternatives 1 and 2 include the restoration of sand ridges ("dunes") at Cove East Beach that were graded and leveled as part of the Tahoe Keys development. The restoration would occur in conjunction with removal of fill in the southern portion of Cove East Beach and the modification and reconnection of the Sailing Lagoon to the Upper Truckee River.

In addition, the construction of a new river mouth west of the existing one in Alternative 2 would provide the opportunity for a small area of beach restoration in the existing channel location. Because this area is near existing Tahoe yellow cress (TYC) habitat, the project under Alternative 2 would provide potential TYC habitat in this beach restoration area. Areas around the existing river mouth may also be restored to beach habitat in Alternatives 1–4 because the mouth width would be reduced, and in the case of Alternative 2, relocated.

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

The previously leveled area between Cove East Beach and the Sailing Lagoon would be modified under Alternative 1 to reestablish depressions (swales) and dunes (ridges) with increased soil and hydrologic diversity. Local cut-and-fill materials would be used to simulate linear swales and ridges, parallel to the shoreline. Approximately three acres (130,000 square feet) would be restored, but the exact layout and extent could be adjusted to provide options to protect identified existing biological and/or cultural resources. Salvaged soil and vegetation would be used, along with plantings, to revegetate with a mixture of woody and herbaceous species suited to the anticipated range of moisture conditions.

Alternative 2: New Channel–West Meadow (Minimum Recreation Infrastructure)

The previously-leveled area between Cove East Beach and the Sailing Lagoon would be modified to reestablish depressions swales and ridges as described for Alternative 1. In addition, a portion of the abandoned river mouth would be recontoured and revegetated as beach/dune ridge and face to provide for a small additional area of TYC habitat.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

The previously leveled area between Cove East Beach and the Sailing Lagoon would not be modified.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

The previously leveled area between Cove East Beach and the Sailing Lagoon would not be modified.

Alternative 5: No-Project/No-Action

The previously leveled area between Cove East Beach and the Sailing Lagoon would not be modified.

FOREST ENHANCEMENT

Alternatives 1–4 include enhancement of Jeffrey pine and lodgepole pine forests near the Highland Woods subdivision that have been disturbed by past land uses. Enhancement measures would include the removal or relocation and restoration of user-created trails and some other disturbed areas and invasive-plant control. In particular, these enhancements would be intended to improve the quality of edge habitat between the marsh and the forest and to provide important habitat for terrestrial wildlife species. The acreage of these enhancements is proposed to be the same for Alternatives 1–4 (approximately 7.7 acres).

Alternative 5 would not implement the forest enhancement element of Alternatives 1–4. However, the Conservancy has been implementing localized habitat enhancement (e.g., removal of invasive plants, decommissioning of some trails), and similar actions would likely continue to be implemented.

ENHANCEMENT OF CORE HABITAT

Alternatives 1–4 would all enhance an area of "core habitat" that contains sensitive marsh habitats in the center of the study area (308, 344, 251, and 350 acres for Alternatives 1 through 4, respectively). The enhancement of this area would be intended to provide greater quality habitat by being exposed to less human disturbance. The edges of the core habitat areas would be approximately 150 feet from potential sources of disturbance of wildlife by humans (i.e., study area boundaries, access trails, or the river). Recreational access within the core habitat area would be discouraged through use of habitat protection elements—perimeter trails and overlooks, signs, fences, berms, wet swales, and other design elements—that would direct access away from the core habitat. In addition, existing user-created trails within the core habitat area would be restored to native vegetation, where appropriate.

The location and extent of the core habitat area varies among alternatives, depending on the location of the restored river corridor, which would continue to act as both a disturbance corridor and a barrier to entry into the center of the marsh from the western side of the study area. Alternatives 1, 2, and 4 would keep a river corridor barrier near the existing river corridor. Thus, the river and its associated floodplain would continue to limit access from the west side of the study area. Because Alternative 3 would move the river to the middle of the marsh, this alternative could potentially allow recreational use to expand further into the marsh from the west side of the study area than Alternatives 1, 2, 4, and 5. However, Alternative 3 would create additional wet marsh conditions east of the existing channel, a condition that would limit human activities during spring and early summer.

Alternative 5 would not protect an extensive area of core habitat. However, the Conservancy has been implementing localized decommissioning of some trails, which may help to improve core habitat, and similar actions would likely continue to be implemented.

2.3.3 PUBLIC ACCESS AND RECREATION INFRASTRUCTURE ELEMENTS OF THE PROJECT

Project objectives include balancing public access and recreation infrastructure construction and operation with habitat restoration and protection. Five main assumptions guided the design of the public access and recreation infrastructure in Alternatives 1–4:

1. Based on the study area's location (i.e., adjacent to neighborhoods and a high-use recreation area [Tahoe Keys Marina]) and existing use patterns, people would continue to use the Upper Truckee Marsh to some degree, even with some level of access restrictions.

2. To most effectively protect sensitive wildlife and plant habitat, public access would need to be allowed and managed to the extent that most visitors would be satisfied with their level of access and would not intrude into sensitive areas.

3. Excessive levels of recreation infrastructure and access would compromise the quality and function of sensitive habitats by promoting high levels of disturbance. However, too many overall restrictions would encourage uncontrolled access to sensitive areas.

4. Although public-access and recreation elements, such as pedestrian trails, would disturb vegetation and wildlife directly and indirectly, these elements, if designed appropriately, could be valuable tools for directing most access away from sensitive habitats while maintaining existing recreation opportunities.

5. Some level of well-designed public access infrastructure in non-sensitive areas, combined with protective elements and environmental education, would be the most effective approach to protecting sensitive wildlife habitat in the study area.

Also, the 1988 litigation settlement leading to the acquisition of the Cove East Beach property in the northwest corner of the study area requires that recreational beach access west of the river mouth be maintained (People of the State of California vs. Dillingham Development Company and TRPA, CIV-S-85-0873-EJG [February 25, 1988]). Therefore, the focus of the elements west of the Upper Truckee River, near the LWS Restoration Area and Cove East Beach are intended to provide public access and recreation, while most of the elements proposed for the east and south sides of the study area are intended to protect habitat and direct public access away from sensitive areas of the marsh and thus contribute to the protection of wildlife and sensitive habitat.

Some key design parameters for maintaining access that were evaluated during alternatives development included the number and location of scenic viewpoints, the level of interconnectivity (via trails) between viewpoints or other destinations, connection to trails outside the study area, and access to non-sensitive destinations near the beach or river.

Based on these assumptions and considerations, Alternatives 1–4 each provide infrastructure for public access and recreational use of the site, but at different levels:

- Alternative 1 would provide for a potential “maximum” level of public access and recreation infrastructure that includes two bridges, two kiosks, a 27-space parking lot, three observation areas, signage, boardwalks and pedestrian trails, and bicycle paths.

- Alternative 2 would provide a “minimum” level of infrastructure that includes a pedestrian trail to Cove East Beach (which would replace the existing pedestrian trail), five viewpoints, a fishing platform, and signage.

- Alternative 3 would provide a “moderate” level of infrastructure that includes three pedestrian trails (two segments of which would be boardwalks), a kiosk, one observation area, six viewpoints, a fishing platform, and signage at multiple locations.

- Alternative 4 would provide a “moderate” level of infrastructure that includes three pedestrian trails, a kiosk, two observation areas, five viewpoints, and signage at multiple locations.

- Alternative 5 (No-Project/No-Action) would not take any direct steps to construct public access and recreation infrastructure (e.g., viewpoints or additional trails). This alternative would maintain existing infrastructure and might result in the construction of some additional, smaller elements (e.g., signage).

The infrastructure proposed for recreation and public access elements of each alternative are summarized in Table 2-4 and described in the sections below. In each alternative, the public access and recreation infrastructure and the river restoration elements would not be interdependent. Thus, different combinations of these elements could be feasible. However, the final design and locations of public access and recreational infrastructure elements would be influenced by the restoration elements of the alternative that is selected.

Table 2-4 Public Access and Recreation Infrastructure Elements of the Action Alternatives				
Element	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**
Observation Areas				
Number	3	–	1	2
Area of each (square feet)	200-500	–	200-500	200-500
Materials	Local granite	–	Local granite	DG
Color	Gray	–	Gray	DG color
Viewpoints				
Number	6	5	6	5
Area of each (square feet)	44	0	32	32
Materials	Local granite	Wood/composite/ metal	DG	DG
Color	Gray	Brown	Brown	Same as DG paving
Fishing Platform				
Number	–	1	1	–
Area (square feet)	–	300	517	–
Materials	–	Wood/composite/ metal	Wood/composite/ metal	–
Color	–	Brown	Brown	–
Bicycle Paths				
Length (feet)	13,250	–	2,080	1,600
Width (feet)	8 or 10	–	8 or 10	10
Materials	DG/AC	–	DG	AC
Pedestrian Trails				
Length (feet)	560	5,360	7,850	3,400
Width (feet)	6	4 - 6	4 - 6	4 - 6
Materials	Native surface	Native surface	Native surface	Native surface
Bridges				
Length (feet)	225/34	–	–	–
Width (feet)	12/8	–	–	–
Materials	Concrete/metal/wood/ composite	–	–	–
Color	Brown	–	–	–
Boardwalks				
Length (feet)	4,000	–	2,273	1,040
Elevated Height (feet)	~2	–	~2	~2
Materials	Metal/wood/composite	–		Powder-coated metal
Color	TBD	–	Same as wood/ composite color	TBD

Table 2-4 Public Access and Recreation Infrastructure Elements of the Action Alternatives				
Element	**Alt. 1**	**Alt. 2**	**Alt. 3**	**Alt. 4**
Kiosk				
Number	2	0	1	1
Dimensions of each (feet)	5 x 12	–	5 x 12	5 x 12
Materials	Wood/stone/metal	–	Wood/stone/metal	Wood/stone/metal
Color	Brown	–	Brown	Brown
Signage				
Dimensions (inches)	TBD	TBD	TBD	TBD
Materials	Wood/metal/ composite	Wood/metal/ composite	Wood/metal/ composite	Wood/metal/ composite
Color	Brown	Brown	Brown	Brown
Parking Lot				
Number	1			
Area (square feet)	20,720			
Materials	AC			
Notes: AC = Asphalt Cement DG = Decomposed Granite				

To minimize the potential for adverse hydrology or water quality effects of any proposed public access infrastructure, Environmental Commitment 11, Incorporate Effective Permanent Stormwater Best Management Practices, would be applied as part of the final design.

OBSERVATION AREAS AND VIEWPOINTS

Each alternative proposes a combination of observation areas and viewpoints. These facilities would be interspersed throughout the project area in the various alternatives as can be seen in Exhibits 2-1 – 2-4 and Appendix C, "Schematic Plans." The elements for each of the specific alternatives are described below.

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

Under Alternative 1, an observation area would be constructed on a platform at the end of the boardwalk near East Barton Beach to provide an overlook of the lake, beach, and marsh, yet discourage visitors from entering the beach and using the lagoon. This segment would tie into the proposed boardwalk that would cross the northern edge of the marsh and connect to the proposed bridge over the Upper Truckee River, and thus, connect the east and west sides of the study area. (The bridge is described in "Bicycle Paths, Pedestrian Trails, Boardwalks and Bridges" below.) Final siting of the observation area would emphasize a location that would provide visitors with views of a scenic destination (e.g., well-placed overlooks and vistas and views of Lake Tahoe).

Six viewpoints in addition to the observation area would be constructed along the perimeter path. One of these viewpoints would be located along the loop path near the Highland Woods subdivision, and five would be distributed along the east edge of the study area. In Alternative 1, all six viewpoints would be interconnected via the bicycle path. Like the observation area, the viewpoints would be sited in locations with scenic views across the marsh, providing an alternative that would discourage physical entry into the marsh interior.

Alternative 2: New Channel–West Meadow (Minimum Recreation Infrastructure)

Under Alternative 2, four new viewpoints would be constructed along the east edge of the study area. These viewpoints would be sited in locations with scenic views across the marsh to provide an alternative to and discourage entry into the core marsh habitats. They would be accessed by short pedestrian trails extending from the regional bicycle trail on El Dorado Avenue or other streets in the Al Tahoe subdivision. None of the viewpoints would be interconnected by a trail between them (i.e., they would be "terminal" viewpoints).

Also, on the west side of the study area, one viewpoint would extend from the northeast corner of the loop trail near Cove East Beach. The existing shore zone and river mouth in this area experience high levels of recreational use and disturbances to vegetation, soils, and wildlife. The new viewpoint would provide views across the river mouth and out across the lake as well as views of the meadow and lagoon to the east. This viewpoint would direct some recreation use away from those areas, reducing disturbances to waterfowl and shorebirds.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

Under Alternative 3, five viewpoints would be constructed along the pedestrian trails and bicycle path. One of these viewpoints would be located along the bicycle path near the Highland Woods subdivision, near the junction of the proposed pedestrian trail and bicycle path in that area; four would be distributed along the eastern edge of the study area. Three of the viewpoints along the eastern edge of the study area would be connected by the eastern pedestrian trail; the remaining viewpoint, near the end of Placer Avenue, would not be connected by formalized trails.

West of the Upper Truckee River, by Cove East Beach, a viewpoint would be connected to the pedestrian trail, near Lake Tahoe and the mouth of the Upper Truckee River. An observation area would be connected to the pedestrian trail to Cove East Beach, near the proposed river-connected lagoon. All observation areas and viewpoints these facilities would be sited in locations with scenic views across the marsh and/or lake to provide an alternative to and discourage entry into the marsh interior.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

Under Alternative 4, along the eastern edge of the study area, an observation area would be constructed along the pedestrian trail near the end of San Francisco Avenue to provide an overlook of the marsh, yet discourage users from entering the marsh itself. Five viewpoints in addition to the observation area would also be constructed. One of these viewpoints would be located in the southeastern portion of the study area along the existing bicycle trail near Trout Creek. The other four would be distributed along the eastern edge of the study area. Three of them would be connected by the eastern pedestrian trail.

West of the Upper Truckee River, by Cove East Beach, an observation area would be connected to the pedestrian trail to Cove East Beach, adjacent to the marina and restored wetlands with scenic views of the marsh and/or lake. All observation areas and viewpoints would be sited in locations with scenic views across the marsh and/or lake to provide an alternative to and discouraging entry into the marsh interior.

Alternative 5: No-Project/No-Action

No viewpoints or observation areas would be added to the existing trail system under Alternative 5.

FISHING PLATFORM

Alternatives 2 and 3 include a fishing platform. This fishing platform would be constructed on the edge of the new river-connected lagoon; it would be connected to and accessed by the loop trail around the perimeter of Cove East Beach which would replace the existing pedestrian trail.

BICYCLE PATHS, PEDESTRIAN TRAILS, BOARDWALKS AND BRIDGES

Each alternative proposes a combination of bicycle paths, pedestrian trails, and bridges. All bicycle paths would be Class I/Shared-Use Paths [as described in TRPA and TMPO 2010].) Alternative 1 also includes bridges connecting paths across the Upper Truckee River and Trout Creek. Although these elements are for public recreation and access, the designs will emphasize protecting habitat, especially east of the river. The specific locations of the proposed infrastructure can be seen in Exhibits 2-1 – 2-4. The elements for each of the specific alternatives are described below.

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

Under Alternative 1, the existing trail that provides public access to Cove East Beach would be modified to a bicycle path. The bicycle path would connect to the existing Class 2 bike lanes on East Venice Drive. This path would be eight to ten feet wide and composed of decomposed granite or asphalt concrete. The total length of the bicycle path from East Venice Drive to Cove East Beach, including the loop at the beach, would be approximately 1,040 feet.

Alternative 1 would also include a new boardwalk and bridge, connecting the east and west sides of the study area. The mouth of the Upper Truckee River would be spanned by the bridge that would connect the eastern and western portions of the boardwalk. The boardwalk would be constructed behind (south of) the barrier beach (outside of TYC habitat). On the west side of the study area, the boardwalk would connect with the loop of the bicycle path around the perimeter of Cove East Beach; on the east side, it would tie into a proposed boardwalk and bicycle path along the eastern perimeter of the study area. The boardwalk and bridge would be approximately 4,000 feet and 225 feet long, and 12 feet and eight to ten feet wide, respectively. At its highest point, the bridge would be approximately ten feet above the Upper Truckee River. The boardwalk would be elevated approximately two feet above the ground surface. The final design of the bridge and boardwalk for the trail crossing the river and marsh would ensure that the structure would not obstruct flood flows to cause any effective increase in the elevation of the 100-year event in the study area. The final design would be supported by a hydraulic analysis that evaluates the potential for significant changes to flooding hazards and littoral processes. The design would be adjusted (e.g., for deck height, location of bridge or boardwalk supports, and cross-sectional area of those supports) to ensure that flow capacity through the structure is sufficient to pass the 100-year event without increasing the effective flood elevation.

The bicycle path would continue along the east perimeter adjacent to the Al Tahoe neighborhood with two access points from the regional bicycle trail network along El Dorado Avenue. The path would then continue north across a new bridge constructed over Trout Creek (at approximately RS 21+00 on Trout Creek), and run between the Al Tahoe and Highland Woods subdivisions. On the Highland Woods side the proposed path could be accessed from the regional bicycle trail at the end of Mackinaw Road and along Springwood Drive. The path would include a loop route through the wooded area north of the Highland Woods subdivision. The trail in Alternative 1 is proposed as decomposed granite or asphalt concrete. The path would be approximately 8,650 feet long and eight to ten feet wide, with two-foot-wide shoulders of decomposed granite on either side. The path would emphasize habitat protection through directing and managing use in areas already used by the public and discouraging access to sensitive habitats and the marsh interior.

Alternative 2: New Channel–West Meadow (Minimum Recreation Infrastructure)

Under Alternative 2, the existing trail providing public access to Cove East Beach would be maintained as a pedestrian trail. No additional trails, bicycle paths, or bridges would be constructed under Alternative 2. Access along the eastern perimeter of the study area would end at a series of formal viewpoints with no connecting trails.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

Under Alternative 3, the existing trail providing public access to Cove East Beach would be maintained as a pedestrian trail. In the southern portion of the study area, adjacent to the Highland Woods subdivision, a bicycle path approximately 0.4 mile long would loop through the wooded area. At its eastern end, the proposed path could be accessed from the regional bicycle trail at the end of Mackinaw Road, and at its western end, it could be accessed from along Springwood Drive. The trail would be decomposed granite, eight to ten feet wide; it would also have two-foot-wide shoulders of decomposed granite on either side.

Two pedestrian trails also would be included under Alternative 3. One would be connected at both ends to the bicycle path described above, looping through the same wooded area as the bicycle path. The second pedestrian trail would extend along the northeastern perimeter of the study area from near Capistrano Avenue to near San Francisco Avenue, connecting three viewpoints. Two portions of this second trail would be raised boardwalks that would discourage access to the wetter portions of the study area where people [and dogs] presently walk and disturb wetland vegetation.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

Under Alternative 4, the existing trail providing public access to Cove East Beach would be maintained as a pedestrian trail.

A pedestrian trail would extend along the northeastern perimeter of the study area from near Capistrano Avenue to near San Francisco Avenue. A portion of this trail would be a raised boardwalk. The boardwalk would allow visitors to view the meadow and the lake beyond, while keeping them out of the wetter portions of the study area where they presently walk and disturb wetland vegetation. This trail would be in an area that already experiences recreational use, but would end at an observation area prior to reaching Barton Beach and the lake.

In the southern portion of the study area, a bicycle trail (approximately 0.3 mile long) would run along Springwood Drive at the boundary of the study area and the Highland Woods subdivision. This area already experiences recreational use. This path would be asphalt concrete, ten feet wide, and have two-foot-wide shoulders of decomposed granite on either side.

Alternative 5: No-Project/No-Action

No bicycle paths, pedestrian trails, bridges, or boardwalks would be added to the existing trail system with implementation of Alternative 5.

KIOSKS

Alternatives 1, 3, and 4 include interpretive kiosks that would provide information to support public access, recreation infrastructure, and visitor education and interpretation of the ecological values of the Upper Truckee Marsh (e.g., maps and information regarding sensitive resources). With maximum recreation infrastructure development (Alternative 1), a kiosk would be constructed on high-capability land near the end of East Venice Drive adjacent to the Tahoe Keys Marina, and a second, smaller kiosk would be constructed along the existing bicycle path near the Trout Creek Bridge at U.S. 50, in the southeastern corner of the study area. With moderate recreation infrastructure development (Alternatives 3 and 4), a small kiosk would be constructed at one of two possible locations: the one-acre Conservancy-owned parcel south of the cul-de-sac at the end of East Venice Drive, or just north of the cul-de-sac at the LWS Restoration Area. With minimum recreation infrastructure development (Alternative 2) and the No-Project/No-Action Alternative (Alternative 5), no kiosks would be constructed.

SIGNAGE

Alternatives 1–4 would include development of an interpretive program and installation of additional signage in appropriate locations throughout the site (e.g., along trails, in observation areas, at viewpoints, and near sensitive habitats). This signage would include educational, directional, and safety information to provide public access and dispersed recreation opportunities. Signs would provide maps at trailheads to illustrate the location of open public trails and bicycle path routes and closed areas throughout the study area. Signs would also be placed near sensitive habitats to discourage disturbance of those areas by people and pets, and to engender a resource stewardship ethic in users.

PARKING LOT

Alternative 1 includes a paved parking lot on Conservancy property at the end of East Venice Drive on the left side just before the Tahoe Keys Marina entrance, near the proposed kiosk (shown on sheet S-1). The parking lot is expected to be approximately 280 feet by 74 feet with 27 parking spaces (2 ADA), a four-space bike rack, and one trash can. The final number of spaces and other amenities would be decided in the later stages of design development. No additional parking is proposed under Alternatives 2 through 5. TRPA and the CSLT approved additional Tahoe Keys Marina parking in 2009 and 2010, respectively, but a final agreement has not been completed. This final long-term lease agreement would create more than 100 spaces and would provide additional parking for visitors to the marina and the study area alike. The agreement is not a component of the Upper Truckee River and Marsh Restoration project. As feasible, the final design would include a low-energy parking lot lighting system (e.g., low wattage LED lamps and/or solar lighting).

2.4 RESOURCE MANAGEMENT

The Conservancy has been maintaining existing infrastructure as part of its management of land in the study area implements management actions supporting public access, recreation, and habitat protection. The agency's ongoing management actions in the study area include the following:

- **Maintenance of Facilities.** The Conservancy monitors the condition and use of existing facilities, removes litter and fire pits, and eliminates potentially hazardous conditions (e.g., user-created facilities such as makeshift bridges). Also, the Conservancy funds the Tahoe Resource Conservation District to contract with the Clean Tahoe Program for trash removal services, including weekly inspection and maintenance of 12 garbage cans located throughout the property.

- **Monitoring and Outreach.** Through a Land Steward, the Conservancy conducts outreach to educate visitors regarding the importance of resource protection and to discourage incompatible uses. The Conservancy also monitors recreational use and compliance with Conservancy use policies and CSLT ordinances.

- **Enforcement of Policies.** The Conservancy contracts with El Dorado County Animal Control for assistance with enforcement of CSLT and El Dorado County dog leash ordinances and of the closure to dogs of the area east of the Upper Truckee River during the waterfowl breeding season (May 1 through July 31). The Conservancy also contracts with CSLT to provide security patrols within the study area and to enforce ordinances for City-owned parks.

- **Mosquito Control.** The Conservancy regularly communicates with El Dorado County Vector Control District regarding mosquito production and control. In consultation with the El Dorado County Vector Control District, the Conservancy provides necessary measures for controlling mosquito production.

- **Invasive Plant Control.** The Conservancy monitors for presence of priority invasive species, and to the extent practicable, implements appropriate measures to control and eradicate populations. The Conservancy

also coordinates with the Lake Tahoe Basin Weed Coordinating Group and the Aquatic Invasive Species Working Group regarding the control of aquatic invasive species.

- **Management of TYC Habitat.** The Conservancy has prepared and implements a management plan for TYC in the study area. This management plan contains a number of management actions including the following:
  - maintaining an exclosure to protect the Upper Truckee East TYC population and regularly evaluating the effectiveness of its design and placement;
  - participating in annual basin-wide TYC monitoring activities; and,
  - implementing the Imminent Extinction Contingency Plan, if necessary.

Under the action alternatives and the No-Project/No-Action Alternative, this management would continue. Additional management actions that would be implemented as part of the project are described in Section 2.7, "Environmental Commitments."

2.5 MONITORING

A monitoring plan was developed for the project to:

- characterize baseline conditions;
- track project performance related to desired outcomes from the concept plan report (Conservancy and DGS 2006:2-1 through 2-14);
- document effects on relevant TRPA environmental threshold carrying capacities;
- establish tentative approaches to monitoring for regulatory requirements; and
- provide information to direct adaptive management.

The plan is intended to coordinate prior, existing, and anticipated monitoring to the extent practicable and to be consistent with the guidance on monitoring plans for the Upper Truckee River developed by the Upper Truckee River Watershed Advisory Group (Conservancy 2007).

This monitoring plan describes the variables selected as indicators, a summary of each protocol, quality assurance mechanisms, and reporting procedures. The protocol summaries include sampling design (i.e., location and timing of data collection), data collection methods, and guidance for data analysis. These protocol summaries are provided for all of the following:

- topographic surveys;
- groundwater elevation measurements;
- discharge measurements;
- overbank flow measurements;
- inundation mapping;
- vegetation mapping;
- quantitative vegetation sampling;
- stream bioassessment;
- avian counts;
- nest searching and monitoring;
- small-mammal trapping;
- electrofishing; and

- qualitative site assessment.

Wildlife monitoring would not directly inform as many aspects of project implementation as other variables. Thus, wildlife monitoring would be more dependent on the availability of the necessary staff and budget than other variables. Also, funding may limit implementation of certain components of the plan.

Although this monitoring plan is intended to identify tentative approaches to anticipated regulatory requirements for monitoring of project impacts on the river, riparian, and marsh habitats, additional monitoring might be required. Permit conditions will not be known until a restoration plan has been approved by regulatory agencies.

Monitoring of the condition of TYC on the study area is described in a separate management plan prepared for that plant species (Conservancy and DGS 2007b:24–31). The monitoring of TYC is part of the interagency monitoring of the species throughout the Tahoe Basin that includes a census of all known populations and systematic searches of areas supporting unoccupied, potentially suitable habitat.

2.6 CONSTRUCTION

2.6.1 OVERVIEW

This section summarizes the proposed construction activities and schedule for Alternatives 1–4. Construction would occur between May 1 and October 15 for approximately four years. The actual schedule and construction phasing may vary from what is presented below depending on permit requirements, final design, and contractor selection.

Each year, construction activities would begin with mobilization, including construction and maintenance of haul roads and staging areas, and installation of BMPs and signage in the project vicinity. Similarly, each year, closing activities would include winterization (i.e., installing BMPs in disturbed areas, demobilizing equipment, stabilizing access roads, and shutting down the irrigation system), and in Year 4, project shutdown.

2.6.2 CONSTRUCTION ACTIVITIES AND SCHEDULE

For the action alternatives, construction activities that would occur each year, their location, and duration are described in greater detail in Table 2-5. Appendix C, “Schematic Plans,” also contains additional information regarding construction activities. The anticipated construction workers and equipment associated with each of these activities are listed in Appendix D, “Construction Workers and Equipment for Action Alternatives.” Access locations, proposed haul routes, and potential storage/staging areas for each alternative are shown in Exhibits 2-5 to 2-8.Construction activities would occur from 8:00 a.m. to 6:30 p.m. pursuant to Section 68.9 of the TRPA Code of Ordinances. The construction activities scheduled for each year are summarized below.

The No-Project/No-Action Alternative (Alternative 5) would not conduct specific, planned construction activities. Other than routine maintenance, the only construction activities under Alternative 5 would be emergency response/repair, which could be required in the event that flooding and/or streambank failures on Conservancy portions of the channels adversely threaten or damage public infrastructure or private property.

YEAR 1

Year 1 construction activities would commence with mobilization activities that would take up to one month to complete. These mobilization activities would include constructing staging areas and haul roads, installing BMPs, and placing signage. The initial and primary staging areas for this period would be the California Avenue, LWS, and Sailing Lagoon staging areas. Expected activities would include delivery and storage of construction equipment and materials and worker parking. Public road access to these staging areas would be from Tahoe Keys

Boulevard to California or Washington Avenues or East Venice Drive. All construction equipment and haul trucks would be operated on internal haul roads.

Subsequent activities would include much of the earthwork required for the river and floodplain excavation: recontouring existing channels, lowering the floodplain, modifying the existing secondary channel, constructing the new channel, and lowering the floodplain. Most of these activities would take a month or less to complete, except for new-channel construction under Alternatives 1–3 and floodplain lowering under Alternatives 2–4. These activities would require one to three months to complete.

Significant excavation and soil movement activities would occur onsite in Year 1. The volume of soil excavated under Alternatives 1–4 would be approximately 32,000; 48,000; 48,000; and 253,000 cubic yards, respectively. Under Alternatives 1, 2 and 3, excavated material would be either stockpiled on site at the TKPOA Corporation Yard, LWS, Sailing Lagoon, Rubicon Trail, and/or Highland Woods storage areas. The excavated materials would be transported to the staging areas by truck on internal haul roads. The excavated materials would be temporarily stored in stockpiles with heights generally ranging between three to eight feet and then used for channel backfilling in Year 3. Due to the large volume of excavation required for floodplain lowering under Alternative 4, the majority of this material (except the volume needed for on-site backfilling) would be hauled off site to a location yet to be determined (as approved by TRPA, Lahontan, and other regulatory agencies). After excavation, permanent revegetation and temporary irrigation would be installed in work areas at final grade, as soon as possible.

During construction of new and recontoured channels, it is possible that dewatering of excavations (i.e., removal of collected water) may be required. For all alternatives, a similar strategy for management of dewatering will be applied. To minimize the potential for dewatering, construction activities within the live channel will be avoided whenever possible. When construction within the live channel cannot be avoided, the work areas would be isolated from the live channel by berms. Seepage into the isolated work areas would be pumped and used for irrigation and dust control. If the quantities of water exceed the demands of dust control or could result in irrigation runoff, temporary and portable detention basins would be constructed. The basins would be created using portable containment berms and used to store and treat the groundwater effluent. The stored water would be used for irrigation or dust control or treated to meet surface water discharge requirements and discharged back into the live channel.

During Year 1, the use of staging areas differs among the alternatives. For Alternative 1, the Sailing Lagoon and LWS staging areas would be used for mobilization and storage of equipment for new-channel construction work, soil stockpiling and revegetation/irrigation, and winterization activities. The California Avenue and, if available, TKPOA staging areas would be used for staging equipment for recontouring the existing channel, lowering the floodplain, soil stockpiling, and working on the existing secondary channel. Alternatively, stockpiling of soil generated in these areas may occur at the LWS staging area.

For Alternative 2, all activities would also utilize the Sailing Lagoon and LWS staging areas for equipment staging and stockpiling for channel construction in the lower (northern) channel segments. The California Avenue staging area would be used for construction equipment staging for secondary channel modification, channel construction, and floodplain lowering in the middle and upper (southern) segments. Soil stockpiling would occur at the TKPOA and LWS staging areas, and if necessary, at the Rubicon Trail and Highland Woods staging areas.

For Alternative 3, the Sailing Lagoon and LWS staging areas would be used for mobilization and floodplain lowering activities. The Washington Avenue staging area would be utilized for revegetation/irrigation and winterization activities, recontouring the existing channel, work on the existing secondary channel, and construction of the pilot channel and vertical and lateral grade controls. Stockpiling of excavated materials generated by these activities would occur at the TKPOA, and/or the Rubicon Trail and Highland Woods staging areas. All soil/sediment transport would occur along internal haul roads.

For Alternative 4, the Sailing Lagoon and LWS staging areas would be used for mobilization, channel construction and recontouring, stockpiling, revegetation/irrigation, and winterization activities in the northern portion of the study area. The California Avenue staging area would be utilized for work in the southern portion of the study area, including lowering the floodplain, inset floodplain construction, and work on the existing secondary channel. Stockpiling of soils excavated by these activities that would be needed for backfilling would occur at the LWS, TKPOA, and/or Rubicon Trail staging areas. The volume of excavated materials in excess of the backfill needs would be transported offsite to an out-of-basin storage or reuse site. The general haul route for the offsite sediment transport would likely be from Dover Drive or Washington Avenue to Tahoe Keys Boulevard, then to U.S. 50.

YEAR 2

During Year 2, work would continue on new and modified sections of river channel. Bank protection would be constructed on both sides of the channel, and for Alternatives 1–3, vertical grade controls would be constructed as well. Under Alternative 3, overflow culverts would be constructed under U.S. 50 through the embankment fill.

Under Alternative 4, reserve fill located at the LWS Restoration Area would be excavated and hauled off site, and then the floodplain existing main channel would be recontoured. After recontouring, permanent revegetation and temporary irrigation would be installed in work areas at final grade as soon as possible. Each of these activities would take one to two months to complete.

Throughout the construction season, the revegetation treatments conducted during Year 1 would be irrigated and inspected.

Under Alternatives 1–3, work related to the modification of the Sailing Lagoon would occur during Year 2. The Sailing Lagoon and LWS staging areas would be used for mobilization, equipment and materials storage, and worker parking. The lagoon would be isolated from the Tahoe Keys Marina by installing the bulkhead and levee along the Tahoe Keys Marina channel. The isolated lagoon would then be drained, recontoured, and revegetated for connection to the Upper Truckee River during Year 3. Recontouring of the Sailing Lagoon would entail excavation of sediment that would be hauled offsite to an out-of-basin storage or reuse site. The general haul route for the off-site sediment transport would likely be from Venice Drive to Tahoe Keys Boulevard and then to U.S. 50.The Sailing Lagoon modification activities could take as long as four months to complete. Additionally, these staging areas would be used to stage and store equipment associated with inspection, revegetation, and irrigation of channel areas constructed in Year 1 (Alternatives 1 – 4) and vertical grade control construction (Alternative 1) in the northern portion of the study area.

The California Avenue staging area would be utilized for staging equipment and materials for the bank protection (Alternatives 1–4) and vertical grade control installation (Alternatives 1, 2, and 3) activities in the southern portion of the study area.

Under Alternative 4, the Sailing Lagoon and LWS staging areas would be used to provide access for mobilization, soil stockpiling, parking, and equipment material storage for Year 2 activities in the northern portion of the site. These activities would include inspection and irrigation of previously constructed channels, recontouring of the existing channel, and removal of the LWS reserve fill. The California Avenue staging area would be used for bank protection–related construction activities downstream of U.S. 50.

YEAR 3

Except for mobilization, revegetation, irrigation, and project shutdown during Year 4, project construction would be completed during Year 3. Year 3 would also include continued inspection and irrigation of revegetation treatments installed in Years 1 and 2.

Lagoon and dune restoration would continue during Year 3. Under Alternatives 1–3, the eastern end of the Sailing Lagoon would be recontoured, and the lagoon connected to the river. Under Alternatives 1 and 2, fill would be removed at East Barton beach to restore lagoon and the restored lagoon revegetated; at Barton Beach, dune swales and ridges would be recontoured and revegetated. Under each of these alternatives, the Sailing Lagoon and LWS staging areas would be used to stage equipment/materials for these activities.

Connecting points between the new and old channels would be graded, and under Alternatives 1–3, vertical and lateral grade controls constructed. Water would be pumped into new and recontoured channel segments to pre-wet margins and then flows would be redirected into the new channels. Fill would be placed in the old channel sections to be abandoned. Under Alternatives 1–3, excavation would take place at the LWS Restoration Area and the TKPOA Corporation Yard to provide materials for use in backfilling the existing channel, and these areas would subsequently be recontoured. Permanent revegetation and temporary irrigation would be installed in all work areas at final grade as soon as possible. For Alternatives 1–3, the LWS and Venice Drive staging areas would serve as the primary areas for storage of equipment/materials and parking for these activities.

Under Alternatives 2 and 3, a stormwater treatment area would be constructed along the western edge of the Upper Truckee River, adjacent to Venice Drive, and an additional treatment area would be constructed near Colorado Avenue. The LWS and Venice Drive staging areas would serve these activities.

Public access and recreation infrastructure would be constructed during Year 3. Under Alternative 1, this would include construction of the bridge and boardwalk running west to Cove East Beach; the kiosk, parking area, and boat take-out near Venice Drive; and a trail system and viewpoints at the eastern margin of the meadow. Alternative 2 would include construction of viewpoints and an ADA-accessible fishing platform. The Lily Avenue, Bellevue Avenue, and Highland Woods staging areas would be used to serve construction activities on the east side of the study area; the LWS and East Venice Drive staging areas would serve construction activities on the west side of the study area.

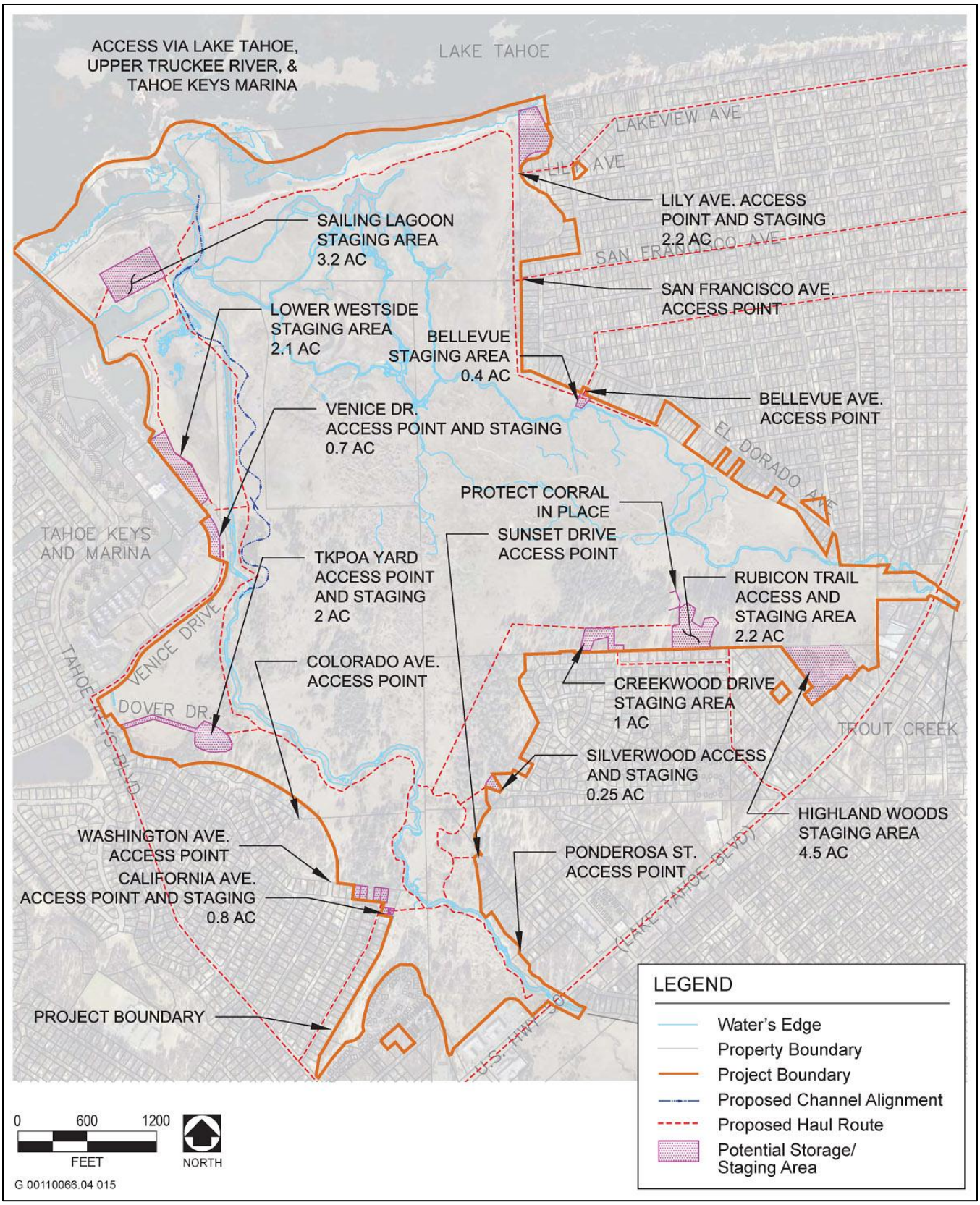
YEAR 4

Under Alternatives 1–4, construction activities in Year 4 would consist of mobilization and maintenance of roadway and staging areas, revegetation and irrigation, winterization, and project shutdown. Although some ground disturbance would be associated with these activities, cut and fill of materials would not be substantial. All work in Year 4 would utilize either the East Venice Drive (west) or Bellevue (east) staging areas.

2.7 ENVIRONMENTAL COMMITMENTS

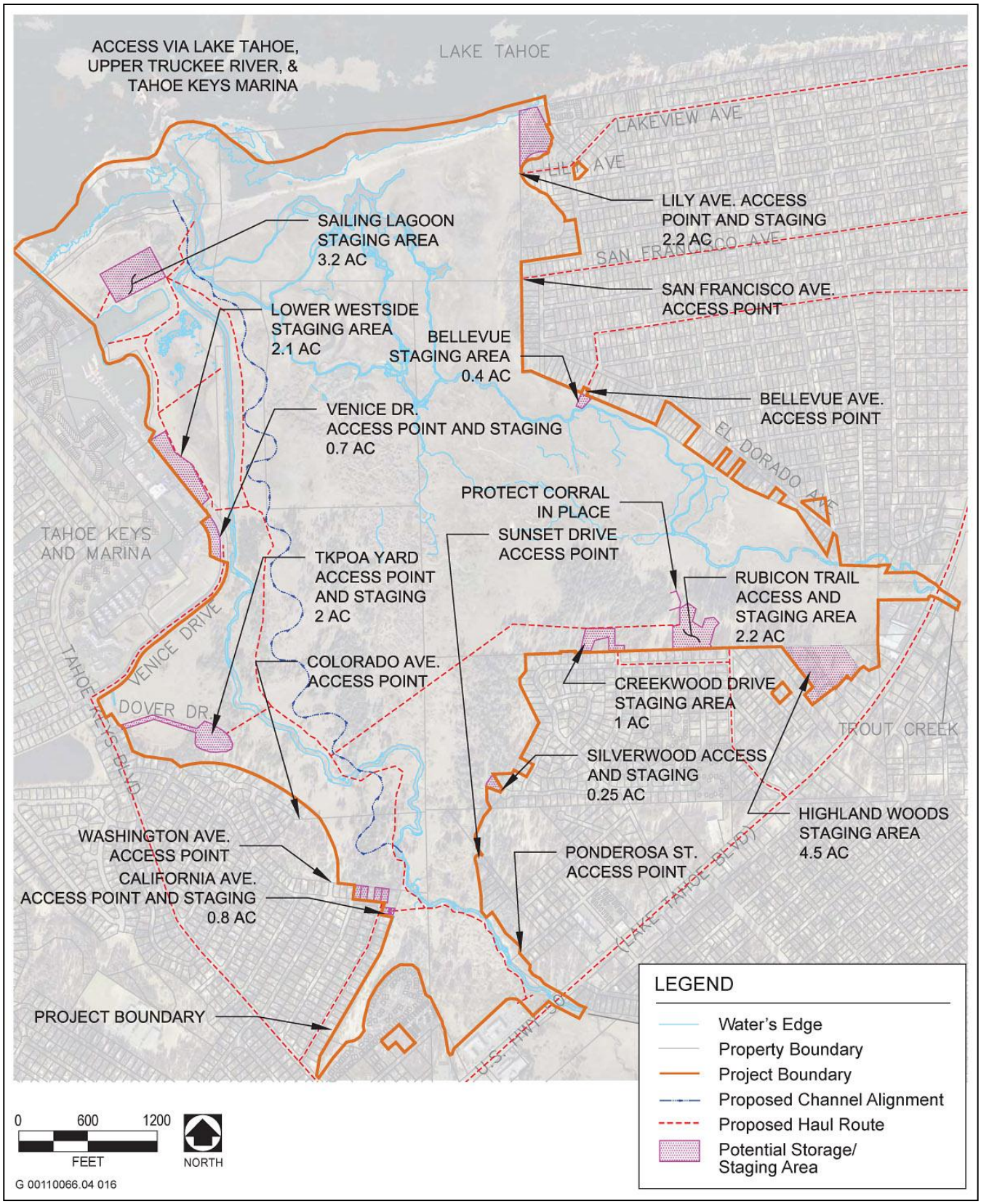
Proposed project alternatives include environmental commitments listed in Table 2-6 to avoid or minimize adverse effects on the environment. The environmental analysis assumes implementation of these commitments prior to determination of environmental impacts. In some instances these environmental commitments were insufficient to fully avoid potential impacts, therefore, mitigation measures are proposed when feasible.

To document fulfillment of these commitments, the Conservancy will prepare an Environmental Commitments Record (ECR). The ECR will contain a summary of required permits and environmental commitments that must be incorporated into the project. This summary will be completed on approval of this environmental document. The ECR also will record when required actions are taken, and changes and additions to environmental commitments or permit conditions made during construction. After project construction, the Conservancy will maintain a record of the completed ECR.



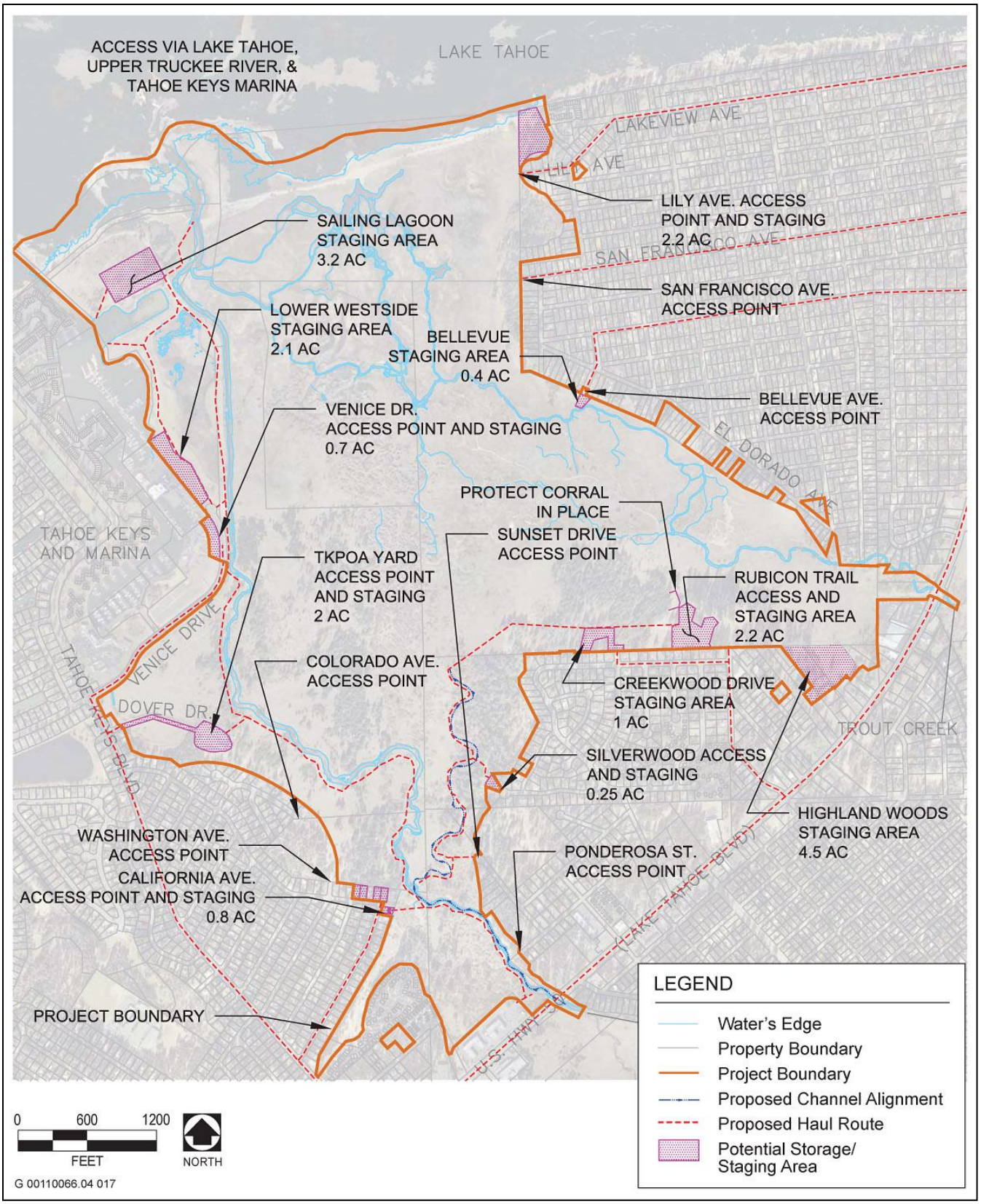
Source: Conservancy and DGS 2013 (aerial image from 2002), adapted by AECOM in 2013

Exhibit 2-5 **Alternative 1—Storage/Staging and Access Plan**



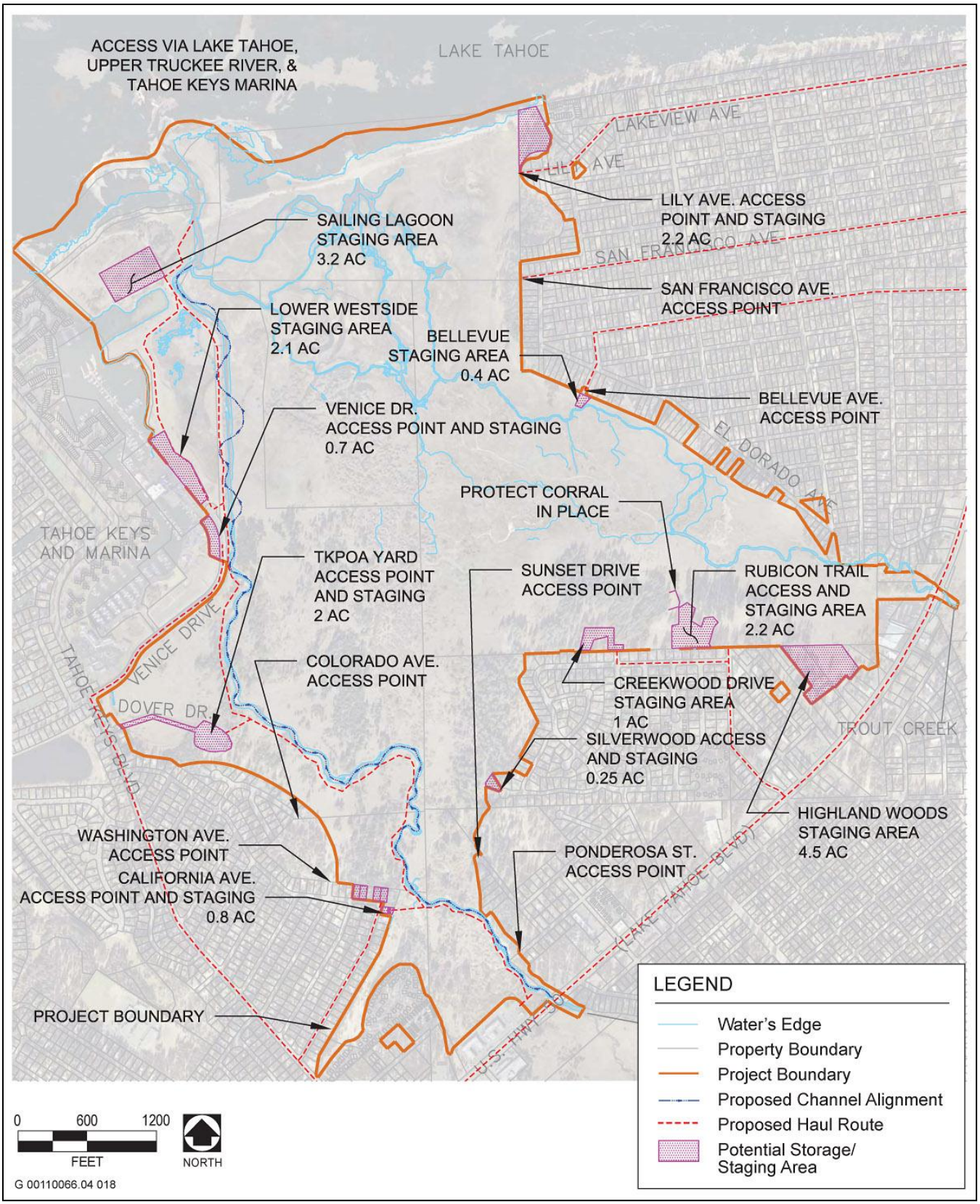
Source: Conservancy and DGS 2013 (aerial image from 2002), adapted by AECOM in 2013

Exhibit 2-6 **Alternative 2—Storage/Staging and Access Plan**



Source: Conservancy and DGS 2013= (aerial image from 2002), adapted by AECOM in 2013

Exhibit 2-7 **Alternative 3—Storage/Staging and Access Plan**



Source: Conservancy and DGS 2013 (aerial image from 2002), adapted by AECOM in 2013

Exhibit 2-8 **Alternative 4—Storage/Staging and Access Plan**

Table 2-5
Construction Schedule for Action Alternatives

Activities/Engineered Element	Duration (Months)			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Year 1				
Mobilization. **Alts. 1–4:** Build haul roads and staging areas. Install BMPs and place signage.	1	1	1	1
Recontour Existing Channel. **Alt. 1:** Recontour the existing secondary channel between RS 17+00 and RS 29+00. Construct the vertical grade controls at RS 17+00 and RS 29+00. **Alt. 3:** Recontour the existing secondary channel (east high-flow branch) between RS 17+00 and RS 28+00 to function as the low-flow channel with top width of approximately 38 feet and average depth of 4 feet.	1	–	1	–
Lowered Floodplain. **Alt. 1:** Excavate the existing terrace between RS 5+25 and RS 11+00. Haul excavated material to the on-site TKPOA Corporation Yard, LWS, or Sailing Lagoon staging areas for stockpiling until it is used for backfill in Year 3. **Alt. 2:** Excavate the existing terrace between RS 5+25 and RS 11+00 and between RS 17+00 and RS 21+00. Haul excavated material to the onsite TKPOA Corporation Yard, LWS, or Sailing Lagoon staging areas (or alternatively to the Rubicon Trail or Highland Woods staging) for stockpiling until it is used for backfill in Year 3. **Alt. 3:** Excavate the existing terrace between RS 0+00 and RS 5+00, RS 5+25 and RS 11+00, and RS 21+00 and RS 29+00. Haul excavated material to the onsite TKPOA Corporation Yard, LWS, or Sailing Lagoon staging areas (or alternatively to the Rubicon Trail or Highland Woods staging) for stockpiling until it is used for backfill in Year 3. **Alt. 4:** Excavate the existing terrace between RS 0+00 and RS 5+00 and between RS 5+25 and RS 11+00. Off-haul excavated material to an approved out-of-basin location.	1	1.5	2	1.5
Inset Floodplain. **Alt. 4:** Excavate the elevation of the inlet and outlet of the existing secondary channel (west high-flow channel) at RS 05+25 and RS 11+00 to an elevation that allows flow into the secondary channel when the total flow exceeds the design flow of the main channel.	–	–	–	0.5
Existing Secondary Channel. **Alts. 1–4:** Excavate the elevation of the inlet and outlet of the existing secondary channel (west high-flow channel) at RS 05+25 and RS 11+00 to an elevation that allows flow into the secondary channel when the total flow exceeds the design flow of the main channel. **Alt. 3:** Same as above, but also recontour the existing secondary channel (east high-flow branch) between RS 28+00 and RS 29+00 to function as part of the lowered floodplain.	0.5	0.5	0.5	0.5
New Channel. **Alt. 1:** Construct a new channel between RS 63+00 and RS 93+00, not including the area at approximately RS 85+00 where the new channel and existing channel intersect. Haul excavated material to the onsite TKPOA Corporation Yard for stockpiling until it is used for backfill in Year 3.	3	–	–	–

Table 2-5
Construction Schedule for Action Alternatives

Activities/Engineered Element	Duration (Months)			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
New Channel and River Mouth Modification. **Alt. 2:** Construct a new channel between RS 20+00 and RS 100+00, not including the areas at approximately RS 38+00 and RS 95+50 where the new channel and existing channel intersect. Haul excavated material to the onsite TKPOA Corporation Yard for stockpiling until it is used for backfill in Year 3.	–	3	–	–
New Channel and Vertical and Lateral Grade Controls. **Alt. 3:** Excavate the new pilot channel off the existing secondary channel near RS 28+00 with a top width of approximately 38 feet and average depth of 4 feet. Haul excavated material to the TKPOA Corporation Yard for stockpiling until it is used for backfill in Year 3. Construct a vertical grade-control structure at RS 17+00 on the new low-flow alignment (pilot channel) to stabilize the elevation of the inlet of the new channel. Construct a lateral control east of RS 28+00 where the new low-flow channel leaves the existing secondary channel.	–	–	2.5	–
Revegetation/Irrigation. **Alts. 1–4:** Conduct permanent revegetation and install temporary irrigation as soon as feasible in all work areas at final grade.	1	1	1	1
Winterization. **Alts. 1–4:** Install BMPs on all disturbed areas, "demobilize" all equipment from the site, remove or stabilize all access roads, and shut down the irrigation system.	0.5	0.5	0.5	0.5
Year 2				
Mobilization. **Alts. 1–4:** Inspect and/or rebuild haul road and staging areas. Reinstall BMPs as needed and restart the irrigation system.	1	1	1	1
New Channel and Lowered Floodplain. **Alt. 1:** Inspect to evaluate the condition of Year 1 grading and revegetation. Initiate irrigation as soon as possible and inspect revegetation monthly.	5	–	–	–
New Channel, River Mouth Modification, and Lowered Floodplain. **Alt. 2:** Inspect to evaluate the condition of Year 1 grading and revegetation. Initiate irrigation as soon as possible and inspect revegetation monthly.	–	5	–	–
New Channel, Recontoured Existing Channel, Existing Secondary Channel, and Lowered Floodplain. **Alt. 3:** Inspect to evaluate the condition of Year 1 grading and revegetation. Initiate irrigation as soon as possible and inspect revegetation monthly.	–	–	5	–
Existing Secondary Channel, Inset Floodplain and Lowered Floodplain. **Alt. 4:** Inspect to evaluate the condition of prior grading and revegetation. Initiate irrigation as soon as possible and inspect revegetation monthly.	–	–	–	5
Bank Protection. **Alts. 1–4:** Construct bank protection between RS 0+00 and RS 13+00 on both sides of the channel.	2	2	2	2

Table 2-5
Construction Schedule for Action Alternatives

Activities/Engineered Element	Duration (Months)			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Overflow Culverts. **Alt. 3:** Construct overflow culverts under U.S. 50 through the embankment fill. Culverts are to be plugged and remain so until lowered floodplain has sufficient revegetation.	–	–	1.5	–
Vertical Grade Controls. **Alt. 1:** Construct vertical grade-control structures at RS 35+00, RS 42+00, RS 50+00, and RS 57+00.	2	–	–	–
Vertical Grade Controls and River Mouth Modification. **Alt. 3:** Construct vertical grade-control structures at about RS 92+00 on Trout Creek to stabilize the existing bed elevation, and at RS 99+00 on the Upper Truckee River to raise existing bed elevation. Install bioengineered revegetation at and around structures.	–	–	2	–
Restored Floodplain. **Alt. 4:** Excavate reserve fill located at the LWS Restoration Area, recontour to match adjoining floodplain elevations, revegetate, and irrigate. Off-haul excavated material to an approved out-of-basin location.	–	–	–	1
Recontoured Existing Channel. **Alt. 4:** Recontour the existing main channel between RS 69+00 and RS 93+00. Off-haul material excavated from the banks and import clean gravel/cobble to build point bars.	–	–	–	3
Bulkhead and Levee. **Alts. 1–3:** Install vertical sheet pile bulkhead extending from approximately 30 feet east of the existing sheet pile along the Tahoe Keys Marina channel. Isolate the Sailing Lagoon, pump/drain, and excavate sediment (including invasive plants and animals if present). Haul sediment to an off-site disposal area. Construct an earthen levee along the east side of the sheet pile bulkhead.	2	2	2	–
Restored Lagoon. **Alts. 1–3:** Recontour the Sailing Lagoon, aside from the area near RS 93+00 where it will be reconnected to the river (in Year 3). Revegetate/irrigate areas at grade.	1	1	1	–
Revegetation/Irrigation. **Alts. 1–4:** Conduct permanent revegetation and install temporary irrigation at final grade as soon as feasible in all work areas.	1	1	1	1
Winterization. **Alts. 1–4:** Install BMPs on all disturbed areas, “demobilize” all equipment from the site, remove or stabilize all access roads, and shut down the irrigation system.	0.5	0.5	0.5	0.5
Year 3				
Mobilization. **Alts. 1–4:** Inspect and/or rebuild haul road and staging areas. Reinstall BMPs as needed, and restart the irrigation system.	1	1	1	1

Table 2-5
Construction Schedule for Action Alternatives

Activities/Engineered Element	Duration (Months)			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
New Channel, Recontoured Existing Channel, and Lowered Floodplain. **Alt. 1:** Inspect to evaluate the condition of prior grading and revegetation. Initiate irrigation as soon as possible and inspect revegetation monthly.	5	–	–	–
New Channel, River Mouth Modification, and Lowered Floodplain. **Alt. 2:** Inspect to evaluate the condition of prior grading and revegetation. Initiate irrigation as soon as possible and inspect revegetation monthly.	–	5	–	–
Recontoured Existing Channel, Existing Secondary Channel, and Lowered Floodplain. **Alt. 3:** Inspect to evaluate the condition of prior grading and revegetation. Initiate irrigation as soon as possible and inspect revegetation monthly.	–	–	5	–
Existing Secondary Channel, Inset Floodplain, Lowered Floodplain, and Recontoured Existing Channel. **Alt. 4:** Inspect to evaluate the condition of prior grading and revegetation. Initiate irrigation as soon as possible and inspect revegetation monthly.	–	–	–	5
Excavation of Reserve Fill at LWS Restoration Area and Fill at TKPOA Corporation Yard. **Alts. 1, 2, and 3:** Excavate reserve fill located at the LWS Restoration Area and fill at the TKPOA Corporation Yard for use in backfilling the existing channel. **Alt. 4:** Excavate reserve fill located at the TKPOA Corporation Yard for use in backfilling the existing channel.	1	1	1	–
Public Access and Recreation Infrastructure Elements. **Alts. 1–4:** Construct all public-access facilities and recreation infrastructure elements.	3	3	3	3
Restored Lagoon. **Alts. 1 and 2:** Excavate fill from East Barton Beach and revegetate/irrigate areas at grade.	0.5	0.5	–	–
River Mouth Modification. **Alt. 1:** Install revegetation/bioengineering treatments at completion of bridge/boardwalk construction.	0.5	–	–	–
Restored Dunes. **Alts. 1 and 2:** Excavate new dune swales, recontour new dune ridges, and revegetate/irrigate areas at grade.	0.5	0.5	–	–
New Channel and Recontoured Existing Channel. **Alt. 1:** Pump water into the new and recontoured channel sections to pre-wet channel margins. Implement diversion(s) to construct the tie-in locations between the new channel and the existing channel as well as the vertical and lateral grade controls.	2	–	–	–
New Channel and River Mouth Modification. **Alt. 2:** Pump water into new channel sections to pre-wet channel margins. Implement diversion(s) to construct the tie-in locations between the new channel and the existing channel as well as the vertical and lateral grade controls.	–	3	–	–

Table 2-5
Construction Schedule for Action Alternatives

Activities/Engineered Element	Duration (Months)			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
New Channel. **Alt. 3:** Pump water into new channel to pre-wet channel margins. Implement diversion to construct the tie-in location between the new channel and the existing channel as well as the vertical and lateral grade controls at RS 17+00.	–	–	2	–
Vertical and Lateral Grade Controls. **Alt. 1:** Construct vertical grade control at RS 93+00, and lateral grade controls at RS 17+00, RS 29+00, and RS 63+00 where the new alignment and existing alignment converge and at RS 85+00 where the new alignment crosses the existing alignment. **Alt. 2:** Construct vertical and lateral grade controls at RS 96+00 and RS 95+50 (respectively) where the new alignment and existing alignment diverge, and at RS 38+00 where the new alignment crosses the existing alignment. **Alt. 3:** Construct the lateral and vertical grade controls at RS 17+00 at the intersection of the new low-flow channel with the backfilled existing channel, and the lateral grade control near RS 95+00 where the existing channel meets the backfilled existing channel.	1	1	1	–
Partial Backfill and Complete Backfill of Old Channel. **Alts. 1, 2, and 3:** Bring areas of new and old channel connections to grade and redirect flows into new channels. Place fill within the old channel sections that are abandoned, revegetate, and irrigate.	1	2	2	–
Restored Lagoon. **Alt. 1:** Recontour the east end of the Sailing Lagoon to reconnect the lagoon to the river, in association with construction of vertical and lateral grade controls at RS 93+00. **Alt. 2:** Recontour the east end of the Sailing Lagoon to reconnect the lagoon to the river, in association with construction of vertical and lateral grade controls and backfilling of the old channel. **Alt. 3:** Recontour the east end of the Sailing Lagoon to reconnect the lagoon to the river, in association with construction of vertical and lateral grade controls and backfilling of the old channel.	0.5	0.5	1	–
Restored Floodplain. **Alts. 1, 2, and 3:** Recontour the former TKPOA Corporation Yard to match adjoining floodplain elevations, revegetate, and irrigate.	1	1	1	–
Stormwater Treatment Basins. **Alts. 2 and 3:** Construct stormwater treatment facilities at RS 45+00 and RS 63+00.		1	1	–
Revegetation/Irrigation. **Alts. 1–4:** Conduct permanent revegetation and install temporary irrigation at final grade as soon as feasible in all work areas.	1	1	1	1
Winterization. **Alts. 1–4:** Install BMPs on all disturbed areas, “demobilize” all equipment from the site, remove or stabilize all access roads, and shut down the irrigation system.	0.5	0.5	0.5	0.5

Table 2-5
Construction Schedule for Action Alternatives

Activities/Engineered Element	Duration (Months)			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Year 4				
Mobilization. **Alts. 1–4:** Inspect and/or rebuild haul road and staging areas as needed for the final year of work. Reinstall BMPs as needed, and start up the irrigation system.	1	1	1	1
Revegetation/Irrigation. **Alts. 1–4:** Inspect to evaluate the condition of all prior grading, revegetation, and BMPs. Initiate irrigation as soon as possible and inspect revegetation monthly. Reinstall BMPs as needed.	5	5	5	5
Winterization and Project Shutdown. **Alts. 1–4:** Remove all construction-related BMPs, and restore all disturbed areas, "demobilize" all construction equipment and related facilities from the site, remove and stabilize all access roads, and shut down the irrigation system. No additional work is planned by the contractor, except for maintenance during the warranty period.	0.5	0.5	0.5	0.5

Notes: BMP = best management practice; RS = River Station; TKPOA = Tahoe Keys Property Owners Association; U.S. 50 = U.S. Highway 50
Source: Data provided by Cardno ENTRIX in 2008

Table 2-6 Environmental Commitments of the Upper Truckee River and Marsh Restoration Project
Environmental Commitment 1: Reduce the Generation of Construction-Related Emissions of ROG, NO_X, and PM_{10}. In accordance with the TRPA Code of Ordinances, the Conservancy will implement the following measures to reduce the emission of ROG, NO_X, and PM_{10} during construction: ▸ The Conservancy will obtain all necessary TRPA permits and approvals and will follow all required TRPA codes and procedures with respect to BMPs (TRPA Code Section 60.4), project grading (TRPA Code Section 33.3), excavation, and construction-related emissions-generating activities (TRPA Code Section 65.1: Air Quality Control). ▸ The Conservancy will obtain all necessary El Dorado County permits and approvals and will follow all required County laws and procedures with respect to BMPs, project grading excavation, and construction-related emissions-generating activities. ▸ Activities disturbing the soil will occur between October 15 and May 1 of each year, unless approval has been granted by TRPA and Lahontan RWQCB. All construction sites will be winterized before October 15 of each construction year in accordance with the provisions of Section 33.3.1.D of the TRPA Code of Ordinances and the National Pollutant Discharge Elimination System (NPDES) permit. ▸ Dust control measures will be required for any grading activity creating substantial quantities of dust. Dust control measures will be approved by TRPA before groundbreaking and will comply with the provisions of Section 33.3.3 of the TRPA Code of Ordinances.
Environmental Commitment 2: Prepare and Implement a Cultural Resources Protection Plan. Before construction begins, a cultural resource protection plan will be prepared and implemented before and during construction. Measures will include, but are not limited to assuring final design placement and orientation of recreation infrastructure will incorporate visual screening or barriers as appropriate to minimize visibility and access which could otherwise lead to damage or destruction of prehistoric site CA-Eld-26; installing barriers or fencing during construction to protect identified sites, including CA-Eld-26; jobsite education on protocol to identify potential uncovered resources and response (stop work) protocol; and presence of a qualified cultural resource specialist to oversee grading activities that are in the vicinity of eligible resources, including initial grading activities within the vicinity of the bluff and CA-Eld-26. Before project-related ground disturbance begins, the Conservancy will train all construction personnel regarding the possibility of uncovering buried cultural resources. The Conservancy will retain a qualified cultural resources specialist to educate personnel as to how to identify prehistoric and historic-era archaeological remains. If unusual amounts of stone, bone, or shell or significant quantities of historic-era artifacts such as glass, ceramic, metal, or building remains are uncovered during construction activities, work in the vicinity of the specific construction site at which the suspected resources have been uncovered will be suspended, and the Conservancy will be contacted immediately. At that time, the Conservancy will retain a qualified professional archaeologist, who will conduct a field investigation of the specific site and recommend measures deemed necessary to protect or recover any cultural resources concluded by the archaeologist to represent significant or potentially significant resources as defined by CEQA, NEPA, and TRPA. These measures may include but will not necessarily be limited to avoidance, archival research, subsurface testing, and excavation of contiguous block units. Conservancy will implement the measures deemed necessary by the archaeologist before construction resumes within the area of the find. The purpose of this oversight will be to ensure that cultural resources potentially uncovered during ground-disturbing activities are identified, evaluated for significance, and treated in accordance with their possible National Register of Historical Places (NRHP) and California Register of Historical Resources (CRHR) status. Potential treatment methods for significant and potentially significant resources may include but will not be limited to taking no action (i.e., resources determined not to be significant), avoiding the resource by changing construction methods or project design, and implementing a program of testing and data recovery, in accordance with all applicable Federal and State requirements.
Environmental Commitment 3: Stop Work Within an Appropriate Radius Around the Discovered Human Remains, Notify the El Dorado County Coroner and the Most Likely Descendants, and Treat Remains in Accordance With State and Federal Law. In accordance with Section 7050.5(b) of the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, the contractor and/or the Conservancy will immediately halt potentially damaging excavation in the area of the burial and notify the El Dorado County Coroner and a professional archaeologist to determine the nature of the remains. The coroner will examine all discoveries of human remains within 48 hours of receiving notice of the discovery. If the coroner determines that the remains are those of a Native American, he or she will contact the Native American Heritage Commission (NAHC) by phone within 24 hours of making that determination (California Health and Safety Code, Section 7050[c]). Following the coroner's findings, the Conservancy, an archaeologist, and the NAHC-designated Most Likely Descendant (MLD) will determine the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments are not disturbed. The responsibilities for

Table 2-6 Environmental Commitments of the Upper Truckee River and Marsh Restoration Project
acting upon notification of a discovery of Native American human remains are identified in California Public Resources Code (PRC) Section 5097.9. Upon the discovery of Native American remains, the Conservancy will ensure that the immediate vicinity (according to generally accepted cultural or archaeological standards and practices) is not damaged or disturbed by further development activity until consultation with the MLD has taken place. The MLD will have 48 hours after being granted access to the site to complete a site inspection and make recommendations. A range of possible treatments for the remains, including nondestructive removal and analysis, preservation in place, relinquishment of the remains and associated items to the descendants, or other culturally appropriate treatment may be discussed. California PRC Section 5097.9 suggests that the concerned parties may extend discussions beyond the initial 48 hours to allow for the discovery of additional remains. The following are site protection measures that the Conservancy will employ: ▸ Record the site with the NAHC or the appropriate Information Center of the California Historical Resources Information System. ▸ Utilize an open-space or conservation zoning designation or easement. ▸ Record a document with El Dorado County. The Conservancy or its authorized representative will rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance if the NAHC is unable to identify a MLD or if the MLD fails to make a recommendation within 48 hours after being granted access to the site. The Conservancy or its authorized representative may also reinter the remains in a location not subject to further disturbance if it rejects the recommendation of the MLD and mediation by the NAHC fails to provide measures acceptable to the Conservancy.
Environmental Commitment 4: Prepare and Implement an Invasive Species Management Plan. In consultation with TRPA and other relevant agencies, the Conservancy will prepare an Invasive Species Management Plan to address existing and potential terrestrial and aquatic invasive species. The plan will specifically address Eurasian watermilfoil as it is known to be present in the study area and is a species of particular concern. The plan will be divided into two sections: one addressing terrestrial species and the other addressing aquatic. The aquatic portion will be consistent with the State of California's Aquatic Species Management Plan (CDFG 2008), and will be completed, reviewed, and approved by the California Department of Fish and Game (CDFG) prior to initiation of construction. The plan will address how the project will address invasive species currently in the project area in addition to how the project will prevent introducing new species. The following will be part of the plan to address both invasive aquatic and terrestrial species: ▸ A qualified biologist with experience in the Tahoe Basin will conduct a preconstruction survey to assess current populations of invasive plants in the project area. Invasive species presence will be documented, and an action plan in the context of the project will be developed to remove them prior to construction and/or prevent their spread due to construction activities. Control measures may include herbicide application, hand removal, or other mechanical control. ▸ All equipment entering the study area from areas infested by invasive plants or areas of unknown infestation status will be cleaned of all attached soil or plant parts before being allowed into the study area All motorized and non-motorized equipment used for in-channel work will be thoroughly cleaned prior to use on the project site and then be cleaned before leaving the site. This includes waders, nets, seines, water quality monitoring equipment, boats, kayaks, life jackets, and construction vehicles. ▸ To reduce the import of seed or other materials potentially containing invasive plants, the project will use on-site sources of seed and materials to the extent practicable. Seed, soil amendment, and erosion control materials that need to be imported to the study area will be certified weed-free or will be obtained from a site documented as uninfested by invasive plants. ▸ With regard to aquatic invasive species, habitat within construction sites with aquatic invasive species will be isolated prior to in-channel work. A qualified biologist(s) with expertise in Tahoe Basin aquatic plant and animal species will be present during construction and will supervise the removal and disposal of non-native invasive species from the project area. All biologists working on this program will be qualified to conduct non-native aquatic species removal/disposal in a manner that avoids and/or minimizes all potential risks to native aquatic species, particularly any special status species potentially encountered. Biologists will be on site when work sites are isolated and/or dewatered, if necessary, in order to capture, handle, and safely remove or dispose of any non-native aquatic invasive species encountered. This program will be closely coordinated with the Aquatic Species Rescue and Relocation Program, described below as Environmental Commitment 7.

Table 2-6 Environmental Commitments of the Upper Truckee River and Marsh Restoration Project
After project construction, the project site will be annually monitored for occurrence of invasive plants for four years. If invasive plants are documented during monitoring, they will be treated and eradicated to prevent further spread.
Environmental Commitment 5: Prepare and Implement Effective Construction Site Management Plans to Minimize Risks of Water Quality Degradation and Impacts to Vegetation. Permits and approvals from several entities (e.g., TRPA, Lahontan RWQCB, U.S. Army Corps of Engineers (USACE), CDFG, U.S. Fish and Wildlife Service (USFWS), and CSLT) will impose conditions and requirements to minimize construction risks of water quality and vegetation degradation. The Conservancy will develop and implement several site management plans as part of various permit and approval requirements, including but not limited to a grading and erosion control plan, a dewatering and channel seasoning plan, a diversion plan, a winterization plan, and a monitoring and construction management plan. The following measures will be implemented by the Conservancy and their contractor within these plans to be developed for specific permits or as independent measures: ► Restrict the area and duration of construction disturbance to the absolute minimum necessary to accomplish work. Protect existing vegetation outside construction area and salvage and re-use riparian vegetation where it needs to be disturbed. ► Design, install, and maintain temporary BMPs to protect disturbed areas and minimize soil erosion, prevent surface runoff interaction with disturbed surfaces, and limit the potential for release of sediment to surface water bodies for storm events up to the 20-year precipitation event. ► Design, install, and maintain internally draining construction area(s) within the study area to prevent discharge of untreated stormwater into surface water bodies. Anticipate runoff from adjacent lands and reroute it around the construction zone. ► Salvage topsoil to be reused on-site during project-related grading. ► Provide winterization that isolates and protects disturbed areas from high streamflow on the Upper Truckee River and Trout Creek (up to the 50-year event). ► Secure a source of transportation and a location for deposition and/or storage of all excavated and imported materials at the project site and minimize use of nonlocal materials and importation of materials from off-site. ► Protect stockpiled and transported materials or debris from wind or water erosion. Store soil and other loose material at least 100 feet from the active channel during the construction season. Designate staging areas and haul routes in existing developed or disturbed areas where feasible, and where not feasible, in the least sensitive natural areas feasible. ► Flag and/or fence boundaries of staging areas, haul routes, and construction sites. ► Restrict the placement of materials or equipment to designated staging areas or construction sites and prohibit the use of vehicles off of roads and haul routes. ► Minimize overwinter storage of materials, vehicles, equipment, or debris within the 100-year floodplain. ► Provide site-specific and reachwide dewatering/diversion plans that indicate the scheduling approach and/or maximum diverted flows to minimize risks from summer thunderstorms, specific diversion/bypass/ dewatering methods and equipment, defined work areas and diversion locations, the types and locations of temporary BMPs for the diversions and reintroduction points, measures and options for treating turbid water before release back to the channel, and stated water quality performance standards. ► Salvage and reuse plant materials to the extent practicable. ► Avoid fertilizer application to revegetated areas. ► Provide flushing flows before activation of new and reconnected river channel sections based on a “channel seasoning” plan that indicates the water source(s); volumes and duration required; phased placement of clean, washed gravels; and the measures and options for treating potentially turbid water. ► Require all contractors to develop Spill Prevention Plans (SPP) and Storm Water Pollution Prevention Plans (SWPPP). These plans will contain BMPs to be implemented to minimize the risk of sedimentation, turbidity, and hazardous material spills. Applicable BMPs may include permanent and temporary erosion control measures, including the use of straw bales, mulch or wattles, silt fences, filter fabric, spill remediation material such as absorbent booms, proper staging of fuel, out of channel equipment maintenance, and ultimately seeding and revegetating. Preventing contaminants from entering the river during construction and operation of the project will protect water quality and the aquatic habitat.

Table 2-6 Environmental Commitments of the Upper Truckee River and Marsh Restoration Project
Maintain the effectiveness of temporary erosion control, stormwater facilities, and flood flow protections throughout the construction area. Monitor the status and effectiveness of temporary erosion control, stormwater facilities, and flood flow protections throughout the construction area, including each of the internally draining zones that could separately discharge to various surface water bodies. Monitor turbidity upstream of the Upper Truckee River and Trout Creek, and where feasible, downstream of the construction zone. Monitoring will be conducted by qualified personnel on a regular basis during summer construction and on an event basis when runoff equals or exceeds the BMP design standards. Document failures and/or threats of BMP failures, and identify remedial measures implementation. Repair BMP failures within 24 hours of documentation.
Environmental Commitment 6: Obtain and Comply with Federal, State, Regional, and Local Permits. The Conservancy and its contractor will obtain and comply with the terms and conditions of all permits required by applicable federal, state, regional, and local statutes and regulations. The anticipated compliance, consultation, and coordination are described in Chapter 5.
Environmental Commitment 7: Prepare and Implement an Aquatic Species Rescue and Relocation Plan. The Conservancy will prepare and implement an Aquatic Species Rescue and Relocation Plan to reduce the direct loss of native fish or desired sport (trout) and native mussels from impacts associated with construction of the project. The objective of the rescue and relocation effort is to reduce harm and avoid potential mortality of important aquatic species, especially sensitive fish species and mussels, which may be present within the project area. The plan will be completed, reviewed, and approved by both CDFG and USFWS (for Lahontan cutthroat trout) prior to initiation of construction. Aquatic habitat within work areas will be isolated (using block nets, silt curtains, or coffer dams) prior to in-channel work. A qualified biologist with expertise in Tahoe Basin aquatic species, including the collection, handling, and relocating of fish and freshwater mussels, habitat relationships, and biological monitoring of Tahoe Basin fish species will supervise the fish and mussel rescue and relocation program for the project. All biologists working on the fish rescue and recovery program will be qualified to conduct fish and mussel collections in a manner that minimizes all potential risks to collected animals, particularly any special status species potentially encountered. Aquatic organisms isolated within the work area(s) will be removed by hand, seine netting, or, if necessary, electrofishing. Partial dewatering of the site will facilitate removal of aquatic species, but dewatering should not expose or strand individuals to be rescued, and water temperature and dissolved oxygen levels should be monitored to maintain levels supporting the most sensitive species. Should western pearlshell mussels be found in the site, the mussels shall be removed prior to fish rescues to minimize injury from foot traffic or electrofishing. Mussels can be located and removed by hand in wadeable streams; snorkeling and hand removal may be needed in deeper water. If electrofishing is necessary, it will be performed by qualified biologists and conducted according to established guidelines provided by CDFG and USFWS. Biologists will be on site when work sites are isolated and/or dewatered, in order to capture, handle, and safely relocate sensitive fish species (i.e. Lahontan cutthroat trout and western pearlshell mussels). Appropriate rescue methods should consider both general (low conductive water) and site-specific conditions (substrate, bed morphology). All captured native fish and mussels will be relocated, as soon as possible, to another Upper Truckee River site that has been pre-approved by CDFG and USFWS and/or USFS biologists, and in which suitable habitat conditions are present. All captured invasive fishes (e.g., bluegill, bass, and catfish) or aquatic invasive plants will be disposed of, consistent with the approved EC 4: Prepare and Implement an Invasive Species Management Plan, described above.
Environmental Commitment 8: Prepare a Final Geotechnical Engineering Report, and Implement All Applicable Recommendations. Before construction begins, the Conservancy will obtain the services of a licensed geotechnical engineer to prepare a final geotechnical engineering report for the project. The final geotechnical engineering report will address and make recommendations on the following as necessary: ▸ structural/seismic design of bridges; ▸ site preparation; ▸ appropriate sources and types of fill; ▸ potential need for soil amendments; ▸ access roads, pavement, and asphalt areas; ▸ shallow groundwater table; and ▸ soil and slope stability.

Table 2-6 Environmental Commitments of the Upper Truckee River and Marsh Restoration Project
In addition to the recommendations for the conditions listed above, the geotechnical investigation will include subsurface testing of soil and groundwater conditions for proposed project elements and will determine appropriate bulkhead and levee and bridge foundation designs that are consistent with City code requirements. All recommendations contained in the final geotechnical engineering report will be implemented by the Conservancy. Special recommendations contained in the geotechnical engineering report will be noted on the grading plans and implemented as appropriate before construction begins. Design and construction of all phases of the project will be in accordance with current City code requirements at the time of construction.
Environmental Commitment 9: Develop and Implement a Construction Management Program. The Conservancy and its contractor will develop a construction management program to avoid or minimize potential impacts to health and safety during project construction, to the extent feasible. The construction management program will inform contractors and subcontractors of work hours, modes and locations of transportation and parking for construction workers, location of overhead and underground utilities, worker health and safety, truck routes, stockpiling and staging procedures, public access routes, the terms and conditions of all project permits and approvals; and the health and safety plan (HASP) information described below. The Conservancy and its contractor will develop and implement a HASP that clearly notifies all workers of the potential to encounter hazardous materials during demolition and construction activities. The HASP will identify proper handling and disposal procedures for contaminants expected to be on-site as well as maps and phone numbers for local hospitals and other emergency contacts. All protocols outlined in the HASP will be complied with throughout project implementation. Any stored hazardous materials present in the study area will be removed and disposed at appropriately permitted locations, as appropriate. The HASP shall describe fire prevention and response methods, including fire precaution, prevention, and suppression methods that are consistent with the policies and standards in South Lake Tahoe. The plan shall include a requirement that all construction equipment must be equipped with spark arrestors. All construction personnel shall be made familiar with the contents of the plan before the start of construction activities. A copy of the plan shall be posted in the trailer used by the on-site construction superintendent. The HASP would also include construction notification procedures for CSLT police, public works, and fire department and schools within one-quarter mile prior to construction activities. As required by Public Resource Code Section 21151.4, the Conservancy shall provide written notification of the project to the Lake Tahoe Unified School District at least 30 days before certification of the EIR/EIS/EIS and shall consult with the school district regarding proper handling and disposal methods associated with substances subject to California Health and Safety Code Section 25532. Notices would also be distributed to neighboring property owners, local agencies, and public works, police, and fire departments, and the Lake Tahoe Unified School District.
Environmental Commitment 10: Establish and Implement a Management Agreement with the El Dorado County Vector Control District. The Conservancy will establish and implement a management agreement with the El Dorado County Vector Control District (EDCVCD) to adequately control mosquito populations in the study area. As a performance criterion for the management agreement, the terms and conditions of the agreement will be designed to ensure that EDCVCD can maintain mosquito abundance at or below pre-project levels. The agreement will include, but not be limited to, the following: ▸ measures that ensure necessary access for monitoring and control measures; ▸ EDCVCD review of project plans and provision of recommendations for management of mosquito populations; and ▸ applicable best management practices from the California Department of Public Health's *Best Management Practices for Mosquito Control on California State Properties* (CDPH 2008), including • procedures for coordinating Conservancy and EDCVCD management activities, and • providing public information for visitors and the community regarding control measures being implemented, the risk of transmission of mosquito-borne disease, and personal protective measures.

Table 2-6 Environmental Commitments of the Upper Truckee River and Marsh Restoration Project
Environmental Commitment 11: Incorporate Effective Permanent Stormwater Best Management Practices. The Conservancy shall ensure that the final design of all recreation features with impervious or partially pervious surfaces will incorporate effective permanent BMPs for the protection of water quality and will conform with all applicable ordinances and standard conditions established by TRPA and Lahontan RWQCB. At a minimum, the stormwater design will: ► minimize the area of disturbance and coverage for all permanent features; ► maximize the use of porous media (e.g., porous pavement, decomposed granite fill) for trail surfaces; ► optimize trail slopes for proper drainage; ► provide for at-the-source infiltration of roof or other cover runoff; and ► provide for collection of runoff from impervious pavements and direct the runoff through oil/water separator(s) and advance treatment prior to discharge to Stream Environment Zones (SEZs).
Environmental Commitment 12: Prepare and Implement Traffic Control Plans. To ensure consistency with City Code 26-16 and state safety orders, rules, and regulations of the Division of Industrial Safety, the Conservancy will prepare and implement traffic control plans for construction activities that may encroach on CSLT and California State road rights-of-way. The traffic control plans will follow California Department of Transportation's (Caltrans) Standard Plans, Standard Special Provisions, and Non-Standard Special Provisions for Temporary Traffic Control Systems and will be signed by a professional engineer. Measures typically used in traffic control plans include advertising of planned lane closures, warning signage, a flag person to direct traffic flows when needed, and methods to ensure continued access by emergency vehicles. During project construction, access to existing land uses will be maintained at all times, with detours used as necessary during road closures. Traffic control plans will be submitted to the CSLT Public Works Department for review and approval before construction of project phases whose implementation may cause encroachment on CSLT or California State road rights-of-way. The Traffic Control Plan will address safety conflicts between construction traffic and of local traffic, pedestrians, and bicyclists. The plan will include advance public advisories, construction-period signage, flag personnel, and other special traffic-control actions as necessary. Specific measures contained in the plan include the following. ► Distribute or mail flyers to residents in the nearby Al Tahoe, Highlands Woods, and Tahoe Keys subdivisions advising about upcoming project traffic prior to the initiation of construction. ► Place advisory signs along construction routes in advance of construction to alert traffic, pedestrian, and bicyclists about the upcoming construction traffic activity. ► Install construction area signage on designated haul routes to inform the public of the presence of trucks. ► Provide flag personnel at when truck activity is heavy (i.e., more than ten trucks per hour). ► Provide information to all truck drivers identifying haul routes, speed limits, location of flaggers, and any other pertinent public safety information. ► Monitor truck and traffic conditions to identify traffic congestion, safety concerns regarding truck, vehicle, and pedestrian and bicycle conflicts and adjust management approach as needed.
Environmental Commitment 13: Prepare and Implement a Public Outreach Plan. The Conservancy will prepare a Public Outreach Plan (POP) to inform the general public and partnering agencies, such as the CSLT, El Dorado County Vector Control, and El Dorado County Animal Control, of construction-related activities within the Project Area. Further, in consultation with the construction contractor, every effort will be made to maintain access to and within the Study Area, including trail access to Lake Tahoe, insofar as the public's health and safety can be assured. There may be periods of time when it is deemed unsafe for the public to be within the study area and/or on trails to the lake during certain construction activities. These periods of restricted access are alternative and construction season dependent. The POP will include strategies to inform the general public and partnering agencies of access restrictions and their anticipated timelines, alternate locations for passive recreation activities, and site access information. Communication of this information may be through signage at access points, messages posted to the Conservancy website, and Public Service Announcements and news articles in the local and regional newspapers, online and in print.

Table 2-6 Environmental Commitments of the Upper Truckee River and Marsh Restoration Project
Environmental Commitment 14: Prepare and Implement a Waterway Traffic Control Plan for Alternatives That Affect the Sailing Lagoon and/or all accessible reaches of the Upper Truckee River within the Upper Truckee River and Marsh Restoration Project Area. The Conservancy will prepare a waterway traffic control plan to ensure safe and efficient vessel navigation during construction at the junction of the Sailing Lagoon and the adjacent channel of the Tahoe Keys Marina and within all accessible reaches of the Upper Truckee River within the project area. The plan will include vessel (motorized and unmotorized) traffic control measures to minimize congestion and navigation hazards to the extent feasible. Construction areas in the waterway will be barricaded or guarded by readily visible barriers, or other effective means to warn boaters of their presence and restrict access. Warning devices and signage will be consistent with the California Uniform State Marking System and effective during non-daylight hours and periods of dense fog. The Conservancy will maintain safe boat access to public launch and docking facilities, businesses, and residences of the Tahoe Keys Marina and will minimize the partial closure of the waterway. Where temporary channel closure is necessary, a temporary channel closure plan shall be developed. The waterway closure plan shall include procedures for notification of the temporary closure to the United States Coast Guard, boating organizations, Tahoe Keys Marina, boat/kayak rental businesses within the area, and all other effective means of notifying boaters.

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3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Organized by environmental resource category, Chapter 3 of this EIR/EIS/EIS describes the affected environment (regulatory and environmental settings) in the study area and analyzes the environmental consequences of the project. Both direct and indirect impacts are evaluated and mitigation measures are provided to reduce or avoid potentially significant impacts associated with implementation of the alternatives. Section 3.18 describes cumulative impacts and mitigation measures for all resource categories. The relationship of project consequences to TRPA environmental carrying capacity thresholds (thresholds) is described in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities."

3.1 APPROACH TO THE ENVIRONMENTAL ANALYSIS

3.1.1 CEQA, NEPA, AND TRPA REQUIREMENTS

The State CEQA Guidelines explain that the environmental analysis for an EIR must evaluate impacts associated with the project and identify mitigation for any potentially significant impacts. All phases of a proposed project, including development and operation, are evaluated in the analysis. Section 15126.2(a) of the State CEQA Guidelines states:

> An EIR shall identify and focus on the significant environmental effects of the proposed project. In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the existing physical conditions in the affected area as they exist at the time the notice of preparation is published, or where no notice of preparation is published, at the time environmental analysis is commenced. Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects. The discussion should include relevant specifics of the area, the resources involved, physical changes, alterations to ecological systems, and changes induced in population distribution, population concentration, and human use of the land (including commercial and residential development), health and safety problems caused by the physical changes, and other aspects of the resource base such as water, historical resources, scenic quality, and public services. The EIR shall also analyze any significant environmental effects the project might cause by bringing development and people into the area affected.

An EIR must also discuss inconsistencies between the proposed project and applicable general plans and regional plans (State CEQA Guidelines, Section 15125[d]).

An EIR must describe any feasible measures that could minimize significant adverse impacts, and the measures are to be fully enforceable through permit conditions, agreements, or other legally binding instruments (State CEQA Guidelines, Section 15126.4[a]). Mitigation measures are not required for effects that are found to be less than significant.

The Council on Environmental Quality's regulations for implementing NEPA specify that a federal agency preparing an EIS must consider the effects of the alternatives on the environment; these include effects on ecological, aesthetic, historical, and cultural resources and economic, social, and health effects. Environmental effects include direct, indirect, and cumulative effects (40 Code of Federal Regulations [CFR] 1508.8). An EIS must also discuss all of the following (40 CFR 1502.16):

- possible conflicts with the objectives of federal, state, regional, and local land use plans, policies, or controls for the area concerned;

- energy requirements and conservation potential;
- urban quality;
- the relationship between short-term uses of the environment and long-term productivity; and
- irreversible or irretrievable commitments of resources.

In addition, an EIS must identify relevant, reasonable mitigation measures that are not already included in the proposed action or alternatives that could avoid, minimize, rectify, reduce, eliminate, or compensate for the project's adverse environmental effects (40 CFR 1502.14).

The TRPA Code of Ordinances states that an EIS shall identify significant environmental impacts of the proposed project, any significant adverse environmental effects that cannot be avoided should the project be implemented, and mitigation measures that must be implemented to assure that regional standards are met (TRPA Code of Ordinances, Section 3.7.2). In assessing the impact of a proposed project on the natural and social environment, the lead agency should evaluate the relationship between local short-term uses of the human environment and the maintenance and enhancement of long-term productivity as well as any significant irreversible and irretrievable commitments of resources that would be involved if the proposed project were implemented. The EIS shall also evaluate growth-inducing impacts of the proposed project.

The TRPA Code of Ordinances also requires findings regarding the effects on environmental carrying capacity thresholds (thresholds). Thresholds are used by TRPA to set environmental goals and standards for the Tahoe Basin. To approve a project, TRPA must find that the project will not cause any threshold to be exceeded (TRPA Code of Ordinances, Section 4.4.1.B). Therefore, a discussion of the effect of each alternative on all thresholds is also included in this EIR/EIS/EIS.

The following discussions present the organization and general assumptions used in the environmental analysis contained in this EIR/EIS/EIS. The reader is referred to the individual technical sections regarding specific assumptions, methodology, and significance criteria used in the analysis.

3.1.2 SECTION CONTENTS

The remainder of Chapter 3 is organized into the following issue areas:

- Section 3.2, "Air Quality and Climate Change"
- Section 3.3, "Archaeological and Historical Resources"
- Section 3.4, "Biological Resources: Vegetation and Wildlife"
- Section 3.5, "Fisheries"
- Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage"
- Section 3.7, "Human Health/Risk of Upset"
- Section 3.8, "Hydrology and Flooding"
- Section 3.9, "Geomorphology and Water Quality"
- Section 3.10, "Land Use"
- Section 3.11, "Noise"
- Section 3.12, "Public Services"
- Section 3.13, "Recreation"
- Section 3.14, "Scenic Resources"
- Section 3.15, "Socioeconomics, Population and Housing, and Environmental Justice"
- Section 3.16, "Transportation, Parking, and Circulation"
- Section 3.17, "Utilities"
- Section 3.18, "Cumulative Impacts"

The content of Sections 3.2 through 3.17 is described below.

CONTENT OF SECTIONS 3.2 THROUGH 3.17

Sections 3.2 through 3.17 follow the same general format with two subsections: "Affected Environment" and "Environmental Consequences."

Affected Environment

"Affected Environment" consists of two subsections, "Regulatory Setting" and "Environmental Setting," which include the following information:

- "Regulatory Setting" identifies the adopted plans, policies, laws, and regulations that are relevant to each topical section. As noted above, the EIR/EIS/EIS needs to address possible conflicts between alternatives and the objectives of formally adopted federal, state, regional, or local land use plans, policies, or controls for the area. Therefore, this subsection summarizes or lists the potentially relevant policies and objectives of the *City of South Lake Tahoe General Plan*, *El Dorado County General Plan*, *Lake Tahoe Airport Comprehensive Land Use Plan*, and *Lake Tahoe Regional Plan*.

  In particular, TRPA's *Regional Plan for the Lake Tahoe Basin* (Regional Plan) includes goals, policies, and ordinances that are relevant to most issue areas. The Regional Plan consists of the following documents: environmental threshold carrying capacities (adopted in 1982 and evaluated every 5 years since 1991), Goals and Policies (September 1986), Regional Transportation Plan—Air Quality Plan (1992), Water Quality Management Plan (1988), Scenic Quality Improvement Program (1989), Plan Area Statements (August 1987 and updated), and Code of Ordinances (adopted November 15, 2011, effective March 1, 2012). The Regional Plan, adopted in 1987, had a 20-year scope. The plan is currently being reviewed and updated through a collaborative effort among TRPA, USFS, the Lahontan RWQCB, and the Nevada Division of Environmental Protection. These agencies are working together to update several important environmental documents for the Tahoe Basin. Until a Regional Plan Update is adopted by the TRPA Governing Board, the 1987 Regional Plan remains in effect.

- "Environmental Setting" provides an overview of the existing physical environmental conditions in the area that could be affected by implementation of the alternatives (i.e., the "affected environment") in accordance with Section 15125 of the State CEQA Guidelines and NEPA regulations (40 CFR 1502.15).

Environmental Consequences and Mitigation Measures

"Environmental Consequences and Mitigation Measures" discusses the impacts of the proposed alternatives (including environmental commitments listed in Table 2-6) on the environment, in accordance with Sections 15125 and 15143 of the State CEQA Guidelines, NEPA regulations (40 CFR 1502.16), and Section 3.7.2.C of TRPA's Code of Ordinances, which requires identification of significant unavoidable impacts, and with Section 3.7.4 of TRPA's Code of Ordinances, which calls for "required findings" in conjunction with the identification of significant unavoidable impacts.

The "Environmental Consequences and Mitigation Measures" section also provides mitigation measures to reduce significant and potentially significant effects of the project alternatives to the extent feasible. (Mitigation measures are not required for impacts identified under the No-Project/No-Action Alternative because no project would be approved; additionally, no permits or authorizations would be required for the No-Project/No-Action Alternative.) The mitigation measures are numbered to correspond with the impact addressed by the mitigation measure.

This section also describes whether mitigation measures would fully reduce each alternative's impacts to less-than-significant levels. It is organized into three subsections:

- Significance Criteria
- Methods and Assumptions
- Impact Analysis and Mitigation Measures

These subsections are described further below.

Significance Criteria

"Significance Criteria" provides the criteria used in this document to define the level at which an impact would be considered significant in accordance with CEQA and NEPA. Significance criteria used in this EIR/EIS/EIS are listed separately for CEQA, NEPA, and TRPA analyses. CEQA criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines, as amended; factual or scientific information and data; professional standards; and regulatory standards of federal, state, and local agencies. For most issue areas, NEPA criteria are based on the CEQA criteria. These criteria also encompass the factors taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects. TRPA Criteria are based on the TRPA Initial Environmental Checklist; factual or scientific information and data; professional standards; and regulatory standards of federal, state, and local agencies. Significance criteria are given an alphanumeric code used to identify the relationship between significance criteria and specific impacts.

Effects on TRPA thresholds are also considered. The alternative's effects on TRPA thresholds are described in Section 4.6, "Consequences for Environmental Threshold Carrying Capacities."

Methods and Assumptions

"Methods and Assumptions" describes the methods, process, procedures, and/or assumptions used to formulate and conduct the impact analysis. All assessments of environmental effects assumed that construction and operation of any alternative would comply with relevant federal, state, regional, and local ordinances and regulations, and applied existing and available information for the study area and vicinity.

An important consideration in evaluating long-term effects of the alternatives is the extent to which the number of visitors to the study area would be altered. Implementing any of the action alternatives would likely increase use of the study area. However, the size of this increase would be proportional to the change in the type and amount of public access and recreation-related infrastructure: Implementing Alternative 2 (minimal recreation infrastructure) would result in only a very slight increase in the number of visitors, and implementing Alternative 1 (maximum recreation infrastructure) would result in the greatest increase. Implementing Alternative 3 or 4 (moderate recreation infrastructure) would result in an intermediate increase. In addition to the type and amount of public access and recreation-related infrastructure, greater connectivity of facilities (both in the study area and to adjacent facilities and access points) would likely increase use of the study area; Alternative 1 would provide connection between the Tahoe Keys Marina area and the Al Tahoe neighborhoods. Factors limiting the potential increase in visitors include the following:

- The recreation and public access elements of the alternatives are related to the existing use of the study area for dispersed recreation, not to new uses. For example, existing trails support casual use by cyclists and pedestrians, but not use by commuter or utilitarian cyclists and pedestrians, or by road cyclists; and the proposed trails also would only support use by casual pedestrians and cyclists. Most of these elements are intended to replace existing, user-created features and/or reduce the impacts of existing dispersed recreation. For example, proposed pedestrian trails and bicycle paths follow the routes of or are intended to replace existing, informal, user-created trails.

- The most popular recreational uses of the study area are walking and running, beach use, wildlife viewing, and fishing. The Tahoe Basin has an abundance of locations where people can engage in these activities; thus, there is not a substantial unmet need for such recreational opportunities.

- Adjacent neighborhoods account for a substantial portion of visitors to the study area, and implementing the project would not alter the number of residents in adjacent neighborhoods.

- The study area can already be accessed from the Upper Truckee River, a number of locations around its perimeter, including from the lake, and trails already connect most portions of the study area.

Nonetheless, several aspects of the proposed public access elements could increase the number of visitors to the study area. For example, several proposed public access elements would change the quality of trail surfaces, which could increase trail use (in a manner analogous to the "maintenance" factor in the Tahoe Bike Trail User Model [LSC Transportation Consultants 2009]). Thus, an increase in use is likely. Recent public use of the study area is described in Section 3.13, "Recreation," and information related to the numbers of visitors is provided in Section 3.16, "Transportation, Parking, and Circulation." Based on this information, and the considerations and factors given above, potential increases in use under the alternatives are anticipated to result in less than 100 additional vehicle trips per day.

Effects Not Discussed Further in the EIR/EIS/EIS

This section lists effects related to specific impact criteria that are not discussed further in the EIR/EIS/EIS. For each type of effect, the reason why the effect is not discussed further is provided (i.e., why no impact or only a negligible effect could occur).

Impact Analysis and Mitigation Measures

"Impact Analysis and Mitigation Measures" discusses potential impacts, determines their significance, and proposes mitigation measures to reduce or avoid potentially significant and significant impacts. Impacts are organized into two categories: (1) project-level impacts, which include both direct and indirect impacts, and (2) cumulative impacts. Direct impacts are those that are caused by the action and occur at the same time and place. Indirect effects are reasonably foreseeable consequences that may occur at a later time or at a distance that is removed from the study area, such as growth-inducing effects and other effects related to changes in land use patterns, population density, or growth rate, and related effects on the physical environment. The duration of direct and indirect impacts falls into the following categories:

- temporary impacts would occur only during construction;

- short-term impacts would begin during construction and last for three to five years; and

- long-term impacts would last longer than five years, and in some cases, a long-term impact could be considered a permanent impact.

A cumulative impact is an impact that would result from the incremental impact of the proposed action (i.e., the alternative under consideration) added to other past, present, and reasonably foreseeable probable future actions. Project-level direct and indirect impacts are analyzed in each resource category section; cumulative impacts are discussed separately in Section 3.18.

The impacts of each alternative are listed numerically and sequentially throughout each section. Impacts are numbered sequentially for Alternatives 1–5 in each section. For example, impacts in Section 3.3 are numbered 3.3-1 (Alt. 1), 3.3-2 (Alt. 1), 3.3-3 (Alt. 1), and so on for Alternative 1, and impacts in Section 3.3 for Alternative 2 are numbered 3.3-1 (Alt. 2), 3.3-2 (Alt. 2), 3.3-3 (Alt. 2), and so on. An alphanumeric code following the impact's title identifies the significance criteria to which it is related. An impact statement precedes the discussion of each impact; this statement provides a summary of the impact and concludes with its level of significance in **bold** font. The discussion that follows the impact statement includes the analysis on which a conclusion is based regarding the level of impact. Impact conclusions are made using the significance criteria described above and include consideration of the "context" of the action and the "intensity" (severity) of its effects in accordance with

NEPA guidance (40 CFR 1508.27). Effects and impacts as used in NEPA regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial. Therefore, it is important to discuss the context and severity of the effect.

The level of impact of the alternatives is determined by comparing estimated effects with baseline conditions. Under CEQA, the environmental setting (as defined above) normally represents the baseline condition against which significance is determined. Under NEPA, the No-Action Alternative (expected future conditions without the project) is the baseline against which the effects of project alternatives are compared; existing conditions are the baseline conditions against which the effects of the No-Action Alternative are compared.

Alternative-specific analyses are conducted to evaluate each potential impact on the existing environment. This assessment also specifies why impacts are found to be less than significant, significant, potentially significant, too speculative for meaningful consideration, or why there is no environmental impact or a beneficial effect. A less-than-significant impact is one that would not result in a substantial adverse change in the physical environment. A significant impact is defined for CEQA purposes as a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project. For NEPA purposes, the significance of effects is based on considerations of both context and intensity (i.e., severity) (40 CFR Section 1508.27), and effects include not only physical conditions but also economic and social conditions (40 CFR Section 1508.8). These effects may be both detrimental and beneficial.

A potentially significant impact is one that, if it were to occur, would be considered a significant impact; however, the occurrence of the impact is uncertain. A potentially significant impact is treated as if it were a significant impact in terms of mitigation. An impact that is too speculative for meaningful consideration is one that has a level of significance that is too uncertain to be reasonably determined. This is an impact for which the degree of significance cannot be determined for specific reasons, such as because aspects of the impact itself are either unpredictable, or the severity of the consequences cannot be known at this time.

Mitigation measures are presented where feasible to avoid, minimize, rectify, reduce, or compensate for significant and potentially significant impacts, in accordance with the State CEQA Guidelines (CCR Section 15126.4), NEPA regulations (40 CFR 1508.20), and the TRPA Code of Ordinances (Section 3.7). Mitigation measures are not proposed when the impact is determined to be less than significant. Each mitigation measure is identified numerically to correspond with the number of the impact being mitigated by the measure, and if more than one mitigation measure is identified for an impact they are identified alphabetically. For example, if Impact 3.3-1 (Alt. 1) were significant and had a single mitigation measure, Impact 3.3-2 (Alt. 1) were less than significant, and Impact 3.3-3 (Alt. 1) were significant and had three mitigation measures, then the mitigation measure for Impact 3.3-1 (Alt. 1) would be Mitigation Measure 3.3-1 (Alt. 1), and the mitigation measures for Impact 3.3-3 would be 3.3-3a (Alt. 1), 3.3-3b (Alt. 1), and 3.3-3c (Alt. 1). Where sufficient feasible mitigation is not available to fully reduce impacts to a less-than-significant level, the impacts are identified as remaining "significant and unavoidable."

Relationship to TRPA Environmental Carrying Capacity Thresholds

TRPA has established thresholds for water quality, air quality, scenic resources, soil conservation, fish habitat, vegetation, wildlife habitat, noise, and recreation. The relationship of the consequences of the alternatives to the TRPA environmental carrying capacity thresholds has been evaluated concurrently with the impact analysis, but is presented in a consolidated discussion in Chapter 4, "Other Required Sections."

CONTENT OF SECTION 3.18, "CUMULATIVE EFFECTS"

Section 3.18, "Cumulative Effects," is organized into the following sections:

- "Definitions of Cumulative Impacts," which defines cumulative effects under CEQA, NEPA, and TRPA;
- "Cumulative Analysis Approach," which provides the geographic extent of the cumulative effects analysis for each resource category, planning context, and methods of the analysis (including significance criteria and a description of related projects considered in the analysis); and
- "Cumulative Impact Analysis," which includes a subsection for each issue area, and within each subsection discusses cumulative impacts, determines their significance, and proposes mitigation measures to avoid (or if avoidance is not feasible, to minimize) potentially cumulatively significant effects.

3.1.3 ISSUES ELIMINATED FROM DETAILED ANALYSIS

The State CEQA Guidelines provide for the identification and elimination from detailed study the issues for which no impacts would be significant or that have been covered by prior environmental review (California PRC, Section 21002.1). The NEPA regulations provide similar provisions (40 CFR 1501.7[a][3]). A brief explanation as to why impacts on each resource are not anticipated, as required by CEQA and NEPA, is provided below.

During initial scoping with the public and governmental agencies, and based on information obtained through literature review, agency correspondence, consultations, and collection of field data, it was determined that the following resources would not experience any potential environmental impacts resulting from any of the alternatives and, accordingly, are not addressed further in this EIR/EIS/EIS:

- agricultural resources, because no agricultural resources are in the study area, including Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or farmland under Williamson Act contracts (effects on forest resources are discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife");
- Indian trust assets, because no Indian trust assets are in the study area;
- mineral resources, because there are no known mineral resources of value or delineated mineral resource recovery sites in the study area;
- school capacity, because no schools are present in the study area, and the alternatives would not affect school capacity by increasing population directly by constructing residences or indirectly by constructing related infrastructure (e.g., roads);
- wastewater treatment facilities, because no wastewater facilities are present in the study area, and the alternatives would not increase population (and thus demand for wastewater facilities) directly by constructing residences or indirectly by constructing related infrastructure (e.g., roads); and
- water supplies, because no water supply facilities are present in the study area, the alternatives would not reduce the availability of water supplies, and the alternatives would not increase population (and thus demand for water supplies) directly by constructing residences or indirectly by constructing related infrastructure (e.g., roads).

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3.2 AIR QUALITY AND CLIMATE CHANGE

This section includes a description of existing air quality conditions in the study area and applicable air quality regulations, and an analysis of potential short-term and long-term air quality impacts that could result from project implementation. Mitigation measures are recommended as necessary to reduce potentially significant adverse air quality impacts. Consistency with TRPA goals and policies is presented in Section 3.10, "Land Use," Table 3.10-1. The project's effects on thresholds are described in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities." See Section 3.18, "Cumulative Impacts," for a discussion of greenhouse gas (GHG) emissions and the potential project effects associated with global climate change.

3.2.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

The study area is located in the eastern portion of El Dorado County, California, within the Lake Tahoe Air Basin (LTAB). Air quality within the El Dorado County portion of the LTAB is regulated by the U.S. Environmental Protection Agency (EPA), California Air Resources Board (ARB), TRPA, and the El Dorado County Air Quality Management District (EDCAQMD). Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although EPA regulations may not be superseded, state and local regulations may be more stringent.

Federal

Federal Clean Air Act

EPA is charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the Federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990. Relevant regulations for criteria and hazardous air pollutants are summarized separately below.

Criteria Air Pollutants

The CAA required EPA to establish national ambient air quality standards (NAAQS). As shown in Table 3.2-1, EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable and fine particulate matter (PM_{10} and $PM_{2.5}$, respectively), and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also required each state to prepare an air quality control plan referred to as a state implementation plan (SIP). The Federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA is responsible for reviewing all state SIPs to determine whether they conform to the mandates of the CAA, and the amendments thereof, and determine whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a Federal implementation plan (FIP) that imposes additional control measures may be prepared for the nonattainment area. If the state fails to submit an approvable SIP or to implement the plan within the mandated time frame, sanctions may be applied to transportation funding and stationary air pollution sources in the air basin. It is important to note, however, that because the study area would not be located in a nonattainment or maintenance area with respect to any of the NAAQS, CAA conformity determination is not required for the project.

Table 3.2-1
Ambient Air Quality Standards

Pollutant	Averaging Time	TRPA Thresholds	California [a,b]	National [c]	
				Primary [b, d]	Secondary [b, e]
Ozone	1-Hour	0.08 ppm	0.09 ppm (180 μg/m^3)	–[e]	Same as Primary Standard
	8-Hour	–	0.07 ppm (137 μg/m^3)	0.08 ppm (157 μg/m^3)	
Carbon Monoxide (CO)	1-Hour	–	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	Same as Primary Standard
	8-Hour	6 ppm	6 ppm [f] (7 mg/m^3)	9 ppm (10 mg/m^3)	
Nitrogen Dioxide (NO_2)[g]	Annual Arithmetic Mean	–	0.030 ppm (56 μg/m^3)	0.053 ppm (100 μg/m^3)	Same as Primary Standard
	1-Hour	–	0.18 ppm (338 μg/m^3)	–	–
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	–	0.030 ppm (80 μg/m^3)	–
	24-Hour	–	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)	–
	3-Hour	–	–	–	0.5 ppm (1,300 μg/m^3)
	1-Hour	–	0.25 ppm (655 μg/m^3)	–	–
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	–	20 μg/m^3	–	Same as Primary Standard
	24-Hour	–	50 μg/m^3	150 μg/m^3	
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	–	12 μg/m^3	15 μg/m^3	Same as Primary Standard
	24-Hour	–	–	35 μg/m^3	
Lead [h]	Calendar Quarter	–	–	1.5 μg/m^3	Same as Primary Standard
	30-Day Average	–	1.5 μg/m^3	–	–

Table 3.2-1
Ambient Air Quality Standards

Pollutant	Averaging Time	TRPA Thresholds	California [a,b]	National [c]	
				Primary [b, d]	Secondary [b, e]
Hydrogen Sulfide	1-Hour	–	0.03 ppm (42 µg/m^3)	No National Standards	
Sulfates	24-Hour	–	25 µg/m^3		
Vinyl Chloride [h]	24-Hour	–	0.01 ppm (26 µg/m^3)		
Visibility-Reducing Particle Matter	8-Hour	*Regional:* Extinction coefficient of 25 Mm^{-1} (157 km, 97 miles) 50 percent of the year, 34 Mm^{-1} (115 km, 71 miles) 90 percent of the year. *Subregional:* 50 Mm^{-1} (48 miles) 50 percent of the year, 125 Mm^{-1} (19 miles) 90 percent of the year.	-		

Notes: µg/m^3 = micrograms per cubic meter; km = kilometers; mg/m^3 = milligrams per cubic meter; Mm^{-1} = per megameter; ppm = parts per million

[a] California standards for ozone, SO_2 (1- and 24-hour), NO_2, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] Concentration expressed first in units in which it was issued. Equivalent units given in parentheses are based on a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[c] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. Environmental Protection Agency for further clarification and current federal policies.

[d] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[e] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] Applicable in the Lake Tahoe Air Basin.

[g] On February 19, 2008, the Office of Administrative Law approved a new NO_2 ambient air quality standard, which lowers the one-hour standard to 0.19 ppm and establishes a new annual standard of 0.030 ppm. These changes became effective March 20, 2008.

[h] ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Sources: TRPA 2007a, ARB 2008a

Hazardous Air Pollutants

Federal air quality regulations also focus on hazardous air pollutants (HAP), or in California State parlance, toxic air contaminants (TAC). In general, for those HAPs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. (By contrast, acceptable levels of exposure can be determined and the ambient standards have been established for criteria air pollutants [Table 3.2-1].) Instead, EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum available control technology (MACT) or best available control technology for toxics (BACT) to limit emissions. These regulations, in conjunction with additional rules set forth by EDCAQMD, establish the regulatory framework for TACs.

EPA has programs for identifying and regulating HAPs. Title III of the CAAA directed EPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP for major sources of HAPs may differ from those for area sources. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (TPY) of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources. The CAAA specified that emissions standards must be promulgated in two phases. In the first phase (1992–2000), EPA developed technology-based emissions standards designed to produce the maximum achievable reduction of emissions. These standards are generally referred to as requiring MACT. The standards may be different for area sources, based on generally available control technology. In the second phase (2001–2008), EPA is required to promulgate health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards. These emission standards are being implemented in a tiered approach that breaks the second phase into four subgroups. The first two went into effect in November 2008 and the remaining two went into effect in 2009.

The CAAA also required EPA to issue vehicle or fuel standards containing reasonable requirements to control toxic emissions of, a minimum, benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics (benzene, formaldehyde, and 1,3-butadiene). In addition, Section 219 required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State

California Clean Air Act

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards (CAAQS) (Table 3.2-1). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the criteria air pollutants mentioned above. In most cases, the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health-effects studies considered during the standard-setting process and the interpretation of those studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources, and authorizes districts to regulate indirect sources.

Among ARB's other responsibilities are overseeing local air districts' compliance with federal and California laws, approving local air quality plans, submitting SIPs to EPA, monitoring air quality, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels. California has 15 nonattainment areas for the national ozone standard and two nonattainment areas for the $PM_{2.5}$ standard. California's SIP must show how each area will attain the

federal standards. To do this, the SIP will identify the amount by which pollutant emissions must be reduced in each area to meet the standard and the emissions controls needed to attain that reduction.

ARB and local air pollution control districts are developing plans to meet new NAAQS for ozone and $PM_{2.5}$. The draft strategy for California's 2007 SIP was released in April 2007, and the adopted version was transmitted to EPA in November 2007 (ARB 2008b).

Toxic Air Contaminants

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807, Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588, Chapter 1252, Statutes of 1987). AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB can designate a substance as a TAC. To date, ARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. Most recently, diesel particulate matter (diesel PM) was added to ARB's list of TACs.

Once a TAC is identified, ARB then adopts an airborne toxics control measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which no toxic effect will occur, the control measure must reduce exposure below that threshold. If no safe threshold exists, the measure must incorporate BACT to minimize emissions.

The Hot Spots Act requires facilities emitting toxic substances above a specified level to prepare an inventory of toxic emissions, prepare a risk assessment if emissions are substantial, notify the public of significant risk levels, and prepare and implement risk reduction measures.

ARB has adopted diesel-exhaust control measures and more stringent emissions standards for on-road mobile sources of emissions (e.g., transit buses) and off-road diesel equipment (e.g., tractors, generators). In February 2000, ARB adopted a new public-transit bus fleet rule and emissions standards for new urban buses. These new rules and standards included more stringent emissions standards for some new urban bus engines, beginning with the 2002 model year; zero-emission-bus demonstration and purchase requirements for transit agencies; and reporting requirements, under which transit agencies must demonstrate compliance with the public-transit bus fleet rule. Recent milestones included the low-sulfur diesel fuel requirement and tighter emissions standards for heavy-duty diesel trucks (effective in 2007 and subsequent model years) and off-road diesel equipment (2011) nationwide. Over time, replacing older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) in California have been reduced significantly over the last decade; such emissions will be reduced further through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated-gasoline regulations) and control technologies. With implementation of ARB's risk reduction plan, it is expected that diesel PM concentrations will be reduced by 75 percent in 2010 and 85 percent in 2020 from the estimated year-2000 level. Adopted regulations are also expected to continue to reduce emissions of formaldehyde from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

Tahoe Regional Planning Agency

Goals and Policies

The Goals and Policies of the 1987 Regional Plan (TRPA 2006) establish an overall framework for development and environmental conservation in the Lake Tahoe region. These goals and policies are designed to achieve and maintain adopted environmental threshold carrying capacities (thresholds) and are implemented through the TRPA Code of Ordinances. Chapter II (Land Use Element) of the Goals and Policies document consists of seven subelements, one of which is the Air Quality subelement (TRPA 2006). However, the Air Quality subelement does not contain any specific goals or policies.

TRPA has jurisdiction within the LTAB portion of El Dorado County in regard to air quality. Therefore, the Air Quality subelement focuses on achieving the NAAQS and CAAQS as well as special TRPA-adopted regional and subregional visibility standards, and on reducing the deposition of nitrate from oxides of nitrogen (NO_X) emitted by vehicles. TRPA's Code of Ordinances and Regional Transportation Plan contain specific measures designed to monitor and achieve the air quality objectives of the Regional Plan. EDCAQMD's rules and regulations (discussed below) also govern in the Lake Tahoe area.

Code of Ordinances

TRPA adopted Section 65.1 (Air Quality Control) and Section 65.2 (Traffic and Air Quality Mitigation Program) of the TRPA Code of Ordinances (TRPA 2011). The applicable provisions of these chapters are described below.

Section 65.1—Air Quality Control

The provisions of Section 65.1 apply to direct sources of air pollution in the Lake Tahoe region, including certain motor vehicles registered in the region, combustion heaters installed in the region, open burning and stationary sources of air pollution, and idling combustion engines:

- Section 65.1.3, "Vehicle Inspection and Maintenance Program," states that to avoid duplication of effort in implementing an inspection/maintenance program for certain vehicles registered in the CO nonattainment area, TRPA shall work with the affected state agencies to plan for applying state inspection/maintenance programs to the Lake Tahoe region.
- Section 65.1.4, "Combustion Appliances," establishes emissions standards for wood heaters, as well as natural gas– or propane-fired water heaters and central furnaces.
- Section 65.1.6.A "Environmental Assessment," states that any new stationary source of air pollution that produces emissions for the peak 24-hour period beyond any of the limits in Table 65.1.6-1, reproduced as Table 3.2-2 below, shall be considered to have a significant adverse environmental impact. New stationary sources that have a significant adverse environmental impact shall be prohibited.

Table 3.2-2
TRPA Emission Limits for Peak 24-Hour Period

Pollutant	Kilograms	Pounds
Nitrogen oxides	3.0	6.6
Particulate matter less than 10 microns	2.0	4.4
Volatile organic compounds (reactive organic gases)	8.0	17.6
Sulfur dioxide	3.0	6.6
Carbon monoxide	10.0	22.0

Note: TRPA = Tahoe Regional Planning Agency
Source: TRPA 2011

Section 65.2—Traffic and Air Quality Mitigation Program

The purpose of Section 65.2 of the TRPA Code of Ordinances is to establish fees and other procedures to offset impacts from indirect sources of air pollution. As part of the project application for any additional development that would result in an increase of more than 200 daily vehicle trips, a technically adequate analysis of potential traffic and air quality impacts must be prepared (Section 65.2.4.B). To offset regional and cumulative impacts,

project proponents must contribute to the air quality mitigation fund, or they may provide mitigation measures that cost at least as much as the required contribution to the air quality mitigation fund (Section 65.2.4.C). Such regional and cumulative mitigation measures may include transportation systems management measures such as bicycle facilities and pedestrian facilities.

Regional Transportation Plan—Air Quality (Goals and Policies, Action Element)

The purpose of the *Regional Transportation Plan—Air Quality Plan* (RTP-AQP) is to attain and maintain the thresholds established by TRPA in 1982, and all applicable federal, state, and local standards established for transportation and air quality. The RTP-AQP contains specific measures designed to monitor and achieve the air quality objectives of its Regional Plan and to attain and maintain the TRPA thresholds (TRPA 1982).

TRPA thresholds address CO, ozone, regional and subregional visibility, and nitrate deposition. There are numerical standards for each of these parameters, in addition to management standards that are intended to assist in attaining the thresholds. The management standards include reducing wood smoke, maintaining NO_X levels, reducing traffic volumes on U.S. 50, and reducing vehicle miles of travel. These thresholds and associated management standards are described in more detail in the following section. In addition, the Tahoe Regional Planning Compact states that the Regional Plan shall provide for attaining and maintaining federal, state, or local air quality standards, whichever are strictest, in the respective portions of the region for which the standards are applicable.

El Dorado County Air Quality Management District

Overview

EDCAQMD attains and maintains air quality conditions in El Dorado County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of EDCAQMD includes preparing plans for the attainment of ambient air quality standards, adopting and enforcing rules and regulations concerning sources of air pollution, and issuing permits for stationary sources of air pollution. EDCAQMD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the CAA, CAAA, and CCAA. Air quality plans applicable used to evaluate project impacts are discussed below.

The 1994 *Sacramento Regional Clean Air Plan* was developed cooperatively with all the air quality management districts (AQMD) and air pollution control districts (APCD) in the Sacramento Region (EDCAQMD, Feather River AQMD, Placer County APCD, Sacramento Metropolitan AQMD, and Yolo-Solano AQMD). The plan was adopted in 1994 in compliance with the Federal 1990 CAAA. At that time, the region could not show that it would meet the federal 1-hour ozone standard by 1999. In exchange for moving the deadline to 2005, the region accepted a designation of “severe nonattainment” for the federal 1-hour ozone standard, with additional emissions requirements imposed on stationary sources. Updates to the plan were adopted in 1999 and 2002. However, on June 15, 2005, the federal 1-hour ozone standard was revoked and subsequent air quality plans were focused toward the federal 8-hour ozone standard. A new clean-air plan draft developed for the 8-hour ozone standard was released in September 2008. However, in September 2011, EPA promulgated its revised and more stringent ozone standard of 0.075 parts per million (ppm) that triggered new area designations released in July 2012. The Sacramento Region (El Dorado, Placer, Sacramento, Solano, Sutter, and Yolo counties) was designated as a Severe 15 nonattainment area for the new 8-hour ozone standard (EPA 2012). The region has three years after the final EPA designation (i.e., July 2012) to prepare a new attainment plan. At the time of this writing, the new federal 8-hour ozone plan is being developed for the more stringent federal 8-hour ozone standard.

All projects are subject to adopted EDCAQMD rules and regulations in effect at the time of this analysis applicable to the project include the following:

- **Rule 202—Visible Emissions.** A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is as dark or darker in shade as that designated as number 1 on the Ringelmann Chart, as published by the U.S. Bureau of Mines.

Rule 223-1—Fugitive Dust—Construction.

A. PURPOSE: The purpose of this rule is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (manmade) fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions.

B. APPLICABILITY: The provisions of this rule are applicable to specified outdoor fugitive dust sources. The definitions, exemptions, requirements, administrative requirements, recordkeeping requirements, and test methods set forth in this rule are applicable to Rules 223, 223-1 and 223-2 of the Rules and Regulations of the El Dorado County Air Quality Management District.

As discussed above, TRPA has jurisdiction over air quality considerations in the LTAB portion of El Dorado County, although EDCAQMD's rules and regulations are also applicable within TRPA's jurisdiction (EDCAQMD 2002).

Toxic Air Contaminants

At the local level, APCDs or AQMDs may adopt and enforce ARB control measures. Under EDCAQMD Regulation V, all sources with the potential to emit TACs are required to obtain permits from the district. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new-source review standards and ATCMs. EDCAQMD limits emissions and public exposure to TACs through several programs. EDCAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

Sources that require a permit are analyzed by EDCAQMD (e.g., through a health risk assessment) based on their potential to emit toxics. If it is determined that the source would emit TACs in excess of EDCAQMD's threshold of significance for TACs, as identified below, sources must implement the best available control technology for TACs (T-BACT) to reduce emissions. If a source cannot reduce the risk below the threshold of significance even after T-BACT has been implemented, EDCAQMD will deny the permit. This helps to prevent new problems and reduces emissions from existing older sources by requiring them to apply new technology when retrofitting with respect to TACs. It is important to note that EDAQMD's air quality permitting process applies to stationary sources; properties that are exposed to elevated levels of TACs from nonstationary type sources and the nonstationary type sources themselves (e.g., on-road vehicles) are not subject to air quality permits. Further, for reasons of feasibility and practicality, mobile sources (e.g., cars and trucks) are not required to implement T-BACT, even if they have the potential to expose adjacent properties to elevated levels of TACs. Rather, emissions controls on such sources (e.g., vehicles) are subject to regulations implemented on the federal and state levels.

Odors

EDCAQMD has determined some common types of facilities that have been known to produce odors: wastewater treatment facilities, chemical manufacturing plants, painting/coating operations, feed lots/dairies, composting facilities, landfills, and transfer stations. Because offensive odors rarely cause any physical harm, and federal and state air quality regulations do not contain any requirements for their control, EDCAQMD has no rules or standards related to odor emissions other than its nuisance rule:

- **Rule 205—Nuisance.** A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable

number of persons, or to the public, or which endanger the comfort, repose, health or safety of any such persons, or the public, or which cause to have a natural tendency to cause injury or damage to business or property. The provisions of Rule 205 do not apply to odors emanating from agriculture operations necessary for the growing of crops or raising of fowl or animals.

Any actions related to odors are based on citizen complaints to local governments and EDCAQMD.

ENVIRONMENTAL SETTING

The study area is located in the southern portion of the LTAB. The LTAB comprises portions of El Dorado and Placer Counties on the California side, and Washoe County, Douglas County, and the Carson City Rural District on the Nevada side.

The ambient concentrations of air pollutant emissions are determined by the amount of pollutants emitted and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and the presence of sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as climate, meteorology, and topography, in addition to the level of emissions by existing air pollutant sources. These factors are discussed separately below.

Climate, Meteorology, and Topography

Lake Tahoe lies in a depression between the crests of the Sierra Nevada and Carson ranges on the California-Nevada border at a surface elevation of approximately 6,260 feet above sea level. The LTAB is defined by the 7,000-foot contour, which is continuous around the lake, except near Tahoe City. The mountains surrounding the lake are approximately 8,000–9,000 feet in height on average, with some reaching 10,000 feet.

The water temperature of Lake Tahoe remains constant at 600 feet below the surface. This constant temperature is approximately 39 degrees Fahrenheit (ºF). This characteristic, in combination with the topographic location of the lake, defines one of the LTAB's most important atmospheric regimes: In the absence of strong synoptic weather systems (large scale system, 620 miles or more), the LTAB develops shallow subsidence and radiation inversions throughout the year (air temperature variations unique to the basin relative to surrounding areas). In addition, rapid radiation cooling at night regularly generates gentle nocturnal, down slope winds that blow from the mountain ridges down to the shore, then fan across the lake (Cahill and Cliff 2000).

Pollutants from local sources are trapped by frequent atmospheric inversions in the LTAB, greatly limiting the volume of air into which the pollutants are mixed (e.g., diluted), which results in accumulation and elevated concentrations. Further, each night the down slope winds transport local pollutants from nearby developed areas out over the lake, increasing the opportunity for pollutants to deposit. This meteorological regime, characterized by weak or calm winds and a strong inversion, is the most common pattern at all times of the year (Cahill and Cliff 2000).

A second important meteorological regime is the transport of pollutants from the Sacramento Valley and San Francisco Bay Area, because winds from these areas move upslope in the Sierra Nevada, and the lake is located directly east of the Sierra Nevada crest. This pattern develops when the western slopes of the Sierra Nevada are heated, causing the air to rise in a chimney effect and move upslope to the Sierra crest and over into the LTAB. The strength of this pattern depends on the amount of heating, and thus is strongest in summer, beginning in April and essentially ceasing in late October (Cahill and Cliff 2000).

Other regimes in the LTAB are defined by strong synoptic weather patterns that overcome the dominant terrain-defined meteorology regimes discussed above. The most important is the winter storm regime, which is responsible for precipitation in the form of snow or rain (Cahill and Cliff 2000).

Each of the meteorological regimes has the potential to influence pollution concentrations in the LTAB. Concentrations of pollutants typically increase when local inversions are present, trapping emissions, and when conditions allow pollution to be transported from the western slopes of the Sierra Nevada, the Sacramento Valley, and San Francisco Bay. Recent studies have even shown spring and fall contributions to local pollution levels from Asia. Periods of lesser concentrations of pollutants are associated with winter storms and high winds. Winter storms dilute the local and upwind pollution with strong vertical mixing and the incorporation of clean North Pacific air (Cahill and Cliff 2000).

Local meteorological conditions representative of the study area are recorded at the South Lake Tahoe Airport Station. The annual normal precipitation is approximately 15 inches, and occurs primarily from November through March. January temperatures average approximately 26ºF and August temperatures average approximately 63ºF (WRCC 2008a). The annual predominant wind direction and mean speed is from the south at 6 miles per hour (mph) (WRCC 2008b).

Criteria Air Pollutants

Concentrations of ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead are used as indicators of ambient air quality conditions. These are the most prevalent air pollutants known to be deleterious to human health and for which acceptable concentrations have been determined; thus, they are commonly referred to as "criteria air pollutants."

A brief description of each criteria air pollutant—source types, health effects, and future trends—follows. A description of the most current emissions inventory, attainment area designations, and monitoring data for the study area is provided below.

Ozone

Ozone is a photochemical oxidant, a substance whose oxygen combines chemically with another substance in the presence of sunlight, and the primary component of smog. Ozone is not directly emitted into the air, but is formed through complex chemical reactions between precursor emissions of reactive organic gases (ROG) and NO_X in the presence of sunlight. ROG are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that results from the combustion of fuels. A highly reactive molecule, ozone readily combines with many different components of the atmosphere. Consequently, high levels of ozone tend to exist only while high ROG and NO_X levels are present to sustain the ozone formation process. Once the precursors have been depleted, ozone levels rapidly decline. Because these reactions occur on a regional scale, ozone is a regional pollutant.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time of ozone formation, peak ozone concentrations often occur far downwind of the precursor emissions. In general, ozone concentrations over or near urban and rural areas result from an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (Godish 2004:169, 170).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 ppm to 0.40 ppm for one to two hours has been found to significantly alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes (the amount of air inhaled and exhaled), and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to the above adverse health effects, evidence exists relating ozone

exposure to an increase in permeability of respiratory epithelia; such increased permeability leads to an increased response of the respiratory system to challenges, and a decrease in the immune system's ability to defend against infection (Godish 2004:169, 170).

Ozone emissions have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. Peak levels have not declined as much as the number of days that standards are exceeded has declined. From 1990 to 2006, the maximum peak eight-hour indicator decreased by six percent. The number of state eight-hour exceedance days declined by 75 percent. Most of this progress occurred after 1999. However, there were no exceedance days in 2003, 2004, and 2005 and two in 2006; these were among the lowest rates in the 17-year period (ARB 2008c). Data from 2006 showing the trend in three-year averages of eight-hour ozone data indicate that the LTAB continues to be in attainment for the national and state ozone standards (ARB 2008c).

Carbon Monoxide

CO is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources. In fact, 77 percent of the nationwide CO emissions are from mobile sources. The other 23 percent consists of CO emissions from wood-burning stoves, incinerators, and industrial sources.

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (EPA 2008a).

The highest concentrations are generally associated with cold, stagnant weather conditions that occur during the winter. In contrast to problems caused by ozone, which tends to be a regional pollutant, CO problems tend to be localized. CO levels are in attainment for Federal and State designations. CO is in nonattainment for TRPA designations.

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal-combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (EPA 2008b). The combined emissions of NO and NO_2 are referred to as NO_X and reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with ozone, the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms during or shortly after exposure, including coughing, difficulty with breathing, vomiting, headache, and eye irritation. After approximately four to twelve hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has occasionally been linked with prolonged respiratory impairment, with such symptoms as chronic bronchitis and decreased lung functions (EPA 2008b). NO_2 levels are in attainment for federal and state designations. TRPA does not have an NO_2 designation.

Sulfur Dioxide

SO_2 is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is

a respiratory irritant; constriction of the bronchioles occurs with inhalation of SO_2 at 5 ppm or more. On contact with the moist, mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis (EPA 2008d). SO_2 levels are in attainment for federal and state designations. TRPA does not have a SO_2 designation.

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and particulate matter formed in the atmosphere by condensation and/or transformation of SO_2 and ROG (EPA 2008c). Fine particulate matter ($PM_{2.5}$) is a subgroup of PM_{10}, consisting of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less (ARB 2008c:1-20).

The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons, and other toxic substances adsorbed onto fine particulate matter (referred to as the "piggybacking effect"), or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (EPA 2008c). $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and may contain substances that are particularly harmful to human health.

Direct emissions of PM_{10} remained relatively unchanged between 1975 and 2005 and are projected to remain unchanged through 2020. PM_{10} emissions in the LTAB are dominated by emissions from areawide sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, waste burning, and residential fuel combustion. The state annual average concentrations remained relatively constant from 1999 through 2005, with a slight drop in 2006. The differences in trends are the result of differences in national and State and monitoring methods. $PM_{2.5}$ emissions in the LTAB are dominated by emissions from the same areawide sources as PM_{10} (ARB 2008c:1-20).

Lead

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, as discussed in detail below, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Thirty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (EPA 2008e).

As a result of EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (95 percent between 1980 and 1999), and levels of lead in the air decreased by 94 percent between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13 percent of lead emissions. A national health and nutrition examination survey reported a 78 percent decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (EPA 2008e).

The decrease in lead emissions and ambient lead concentrations over the past 25 years is California's most dramatic success story with regard to air quality management. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent ARB regulations have virtually eliminated all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (EPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, ARB identified lead as a TAC. Lead levels are in attainment for federal and state designations. TRPA does not have a lead designation.

Monitoring Station Data and Attainment Area Designations

Concentrations of criteria air pollutants are measured at several monitoring stations in the LTAB. The South Lake Tahoe–Sandy Way and South Lake Tahoe–1901 Airport Road stations are the closest monitoring stations to the study area with recent data for ozone, CO, NO_2, PM_{10}, and $PM_{2.5}$. In general, the ambient air quality measurements from these monitoring stations are representative of the air quality in the vicinity of the study area. Table 3.2-3 summarizes the air quality data from these stations for the 3 most recent years for which data are available (2006–2008).

Table 3.2-3
Summary of Annual Air Quality Data (2005–2007)

South Lake Tahoe–Sandy Way and South Lake Tahoe–1901 Airport Road Air Quality Monitoring Stations [a]			
	2006	**2007**	**2008**
Ozone [b]			
Maximum concentration (1-hour/8-hour, ppm)	0.086/0.075	0.090/0.073	0.091/0.077
Number of days State standard exceeded (1-hour/8-hour)	0/2	0/5	0/5
Number of days national standard exceeded (1-hour/8-hour)	0/0	0/0	0/1
Respirable Particulate Matter (PM_{10})[c]			
Maximum Concentration ($\mu g/m^3$) (California)	66.6	55.6	96.7
Number of days State standard exceeded (measured/calculated[d])	3/3	2/–	–/–
Number of days national standard exceeded (measured/calculated[d])	–/–	–/–	–/–

Notes: $\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million; – = data not available

[a] Carbon monoxide, nitrogen dioxide, sulfur dioxide, and fine particulate matter data not available for the Lake Tahoe Air Basin.

[b] Data from the South Lake Tahoe–1901 Airport Road Station.

[c] Data from the South Lake Tahoe–Sandy Way Station.

[d] Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

Sources: ARB 2008d, ARB 2010

EPA, ARB, and TRPA use this type of monitoring data to designate areas according to attainment status for criteria air pollutants established by the agencies. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are nonattainment, attainment, and unclassified. Unclassified is used in areas that cannot be classified on the basis of available information as meeting or not meeting the standards. The most current national, state, and TRPA attainment designations for the El Dorado County portion of the LTAB are shown in Table 3.2-4 for each criteria

air pollutant. Table 3.2-4 also contains the TRPA threshold attainment designations from the 2006 Thresholds Evaluation Report (TRPA 2007a).

Table 3.2-4
Attainment Status Designations for the El Dorado County Portion of the Lake Tahoe Air Basin

Pollutant	National Designation	State Designation	TRPA Designation
Ozone—1-hour	–	Unclassified	Nonattainment
Ozone—8-hour	Attainment/Unclassified	–	–
PM_{10}	Attainment/Unclassified	Nonattainment	Nonattainment
$PM_{2.5}$	Attainment/Unclassified	Attainment	–
CO	Attainment/Unclassified	Attainment	Nonattainment
NO_2	Attainment/Unclassified	Attainment	–
SO_2	Attainment	Attainment	–
Lead (Particulate)	Attainment/Unclassified	Attainment	–
Hydrogen Sulfide	–	Unclassified	–
Sulfates	–	Attainment	–
Visibility-Reducing Particulates	–	Unclassified	Attainment
Traffic Volume	–	–	Attainment
Wood Smoke	–	–	Unknown*
Vehicle Miles of Travel	–	–	Nonattainment
Atmospheric Deposition—TRPA Interim Target	–	–	Unknown*
Atmospheric Deposition—TRPA Standard	–	–	Unknown*

Notes: CO = carbon monoxide; NO_2 = nitrogen dioxide; $PM_{2.5}$ = fine particulate matter; PM_{10} = respirable particulate matter; SO_2 = sulfur dioxide; TRPA = Tahoe Regional Planning Agency

* The status of these standards is unknown because the technology necessary to determine base year values does not exist, and the original standards and indicators were not well defined.

Sources: ARB 2008e, EPA 2008f, TRPA 2007a

Emissions Inventory for Criteria Air Pollutants

Table 3.2-5 summarizes emissions of criteria air pollutants within the LTAB portion of El Dorado County for various source categories. According to El Dorado County's LTAB emissions inventory, mobile sources are the largest contributor to the estimated annual average air pollutant levels of ROG, CO, NO_X, and oxides of sulfur (SO_X), accounting for approximately 63, 68, 90, and 100 percent, respectively, of the total emissions. Areawide sources account for approximately 92 and 90 percent of the County's PM_{10} and $PM_{2.5}$ emissions, respectively.

Toxic Air Contaminants

Concentrations of TACs are also used as indicators of ambient air quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

Table 3.2-5 Summary of 2008 Estimated Emissions Inventory for Criteria Air Pollutants and Precursors (El Dorado County—Lake Tahoe Air Basin)						
Source Type/Category	Estimated Annual Average Emissions (Tons per Day)					
	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Stationary Sources						
Fuel Combustion	0.0	0.0	0.1	0.0	0.0	0.0
Cleaning and Surface Coating	0.1	–	–	–	–	–
Petroleum Production and Marketing	0.0	–	–	–	–	–
Industrial Processes	–	0.0	0.0	0.0	0.0	0.0
Subtotal (Stationary Sources)	0.2	0.0	0.1	0.0	0.0	0.0
Areawide Sources						
Solvent Evaporation	0.7	–	–	–	–	–
Miscellaneous Processes	0.8	10.4	0.2	0.0	3.7	1.8
Subtotal (Areawide Sources)	1.5	10.4	0.2	0.0	3.7	1.8
Mobile Sources						
On-Road Motor Vehicles	1.0	10.0	1.4	0.0	0.1	0.0
Other Mobile Sources	1.6	10.8	1.9	0.0	0.2	0.2
Subtotal (Mobile Sources)	2.5	20.8	3.3	0.1	0.3	0.2
Total for El Dorado County in Lake Tahoe	**4.2**	**31.2**	**3.5**	**0.1**	**4.0**	**2.0**

Notes:
CO = carbon monoxide; NO_X = oxides of nitrogen; SO_X = oxides of sulfur; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; ROG = reactive organic gases
Source: ARB 2009

Diesel Particulate Matter

According to the *California Almanac of Emissions and Air Quality* (ARB 2008c), most of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines (diesel PM). Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal-combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, ARB has made preliminary concentration estimates based on a PM exposure method. This method uses the ARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene pose the greatest existing ambient risk in California of the TACs for which data are available.

Diesel PM poses the greatest health risk among these ten TACs mentioned. Based on receptor modeling techniques, ARB estimated California's statewide average diesel PM health risk in 2000 to be 540 excess cancer cases per million people. Since 1990, the state's health risk from diesel PM has been reduced by 40 percent. Overall, levels of most TACs, except for para-dichlorobenzene and formaldehyde, have gone down since 1990 (ARB 2008c).

Existing sources of TACs in the project vicinity include mobile-source emissions from surrounding highways (e.g., U.S. 50) and from minor stationary sources such as the South Lake Tahoe Airport. There are no major existing stationary sources of TACs near the study area (ARB 2008f, 2008g).

Naturally Occurring Asbestos

Asbestos is the common name for a group of naturally occurring fibrous silicate minerals that can separate into thin but strong and durable fibers. Naturally occurring asbestos, which was identified as a TAC by ARB in 1986, is located in many parts of California and is commonly associated with serpentine.

According to a report by the California Department of Conservation, Division of Mines and Geology, *A General Location Guide to Ultramafic Rocks in California—Areas More Likely to Contain Naturally Occurring Asbestos* (Churchill and Hill 2000:2), the study area is not located in an area that is likely to contain naturally occurring asbestos.

Odors

Odors are typically regarded as an annoyance rather than a health hazard. However, a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and is quite subjective. Some individuals can smell very minute quantities of specific substances; others may not have the same sensitivity, but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person may be perfectly acceptable to another (e.g., some odors at fast-food restaurants). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the odor is quite difficult to detect or recognize. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Notable odor sources in the vicinity (i.e., within two miles) of the study area are the South Tahoe Refuse Recycling Center and the refuse center's transfer station, both located approximately one mile south of the study area, on Ruth Avenue. There are no other major odor sources (e.g., wastewater treatment facilities, landfills, or food processing facilities) in the vicinity of the study area.

3.2.2 GREENHOUSE GAS EMISSIONS

REGULATORY BACKGROUND

Federal

Supreme Court Ruling on California Clean Air Act Waiver

EPA is the federal agency responsible for implementing the CAA. The U.S. Supreme Court ruled on April 2, 2007, that CO_2 is an air pollutant as defined under the CAA and that EPA has the authority to regulate emissions of GHGs. However, there are no federal regulations or policies regarding GHG emissions applicable to the project or alternatives under consideration. See AB 1493 (discussed in the "State" section below under "Summary of Laws and Executive Orders") for further information on the CCAA Waiver.

Energy and Independence Security Act of 2007 and Corporate Average Fuel Economy Standards

The Energy and Independence Security Act of 2007 (EISA) amended the Energy Policy and Conservation Act (EPCA) to further reduce fuel consumption and expand production of renewable fuels. The EISA's most important amendment includes a statutory mandate for the National Highway Traffic Safety Administration (NHTSA) to set corporate-average fuel economy (CAFE) standards for each model year (MY) of passenger cars at the maximum feasible level. This statutory mandate also eliminates the old default CAFE standard of 27.5 miles per gallon. The EISA requires that CAFE standards for MYs 2011–2020 be set sufficiently high to achieve the goal of an industrywide average CAFE standard of 35 miles per gallon for passenger cars and light-duty trucks.

In accordance with President Obama's request, the rulemaking for this goal has been divided into two parts. The first part, which was published in the *Federal Register* in March 2009, included CAFE standards for MY 2011 to meet the statutory deadline (March 30, 2009). The second part of the rulemaking, which applies to MY 2012 and subsequent years, consists of the maximum CAFE standards feasible under the limits of the EPCA and EISA.

U.S. Environmental Protection Agency Regulations

In response to the mounting issue of climate change, EPA has taken the following actions to regulate, monitor, and potentially reduce GHG emissions.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons (MT) or more of CO_2 per year. These publicly available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost-effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial GHG emitters, along with vehicle and engine manufacturers, will report at the corporate level. An estimated 85% of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.

National Program to Cut Greenhouse Gas Emissions and Improve Fuel Economy for Cars and Trucks

On September 15, 2009, EPA and the U.S. Department of Transportation's NHTSA proposed a new national program that would reduce GHG emissions and improve fuel economy for all new cars and trucks sold in the United States. EPA proposed the first-ever national GHG emissions standards under the CAA, and NHTSA

proposed CAFE standards under the EPCA. This proposed national program would allow automobile manufacturers to build a single light-duty national fleet that would satisfy all requirements under both federal programs and the standards of California and other states.

Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases

On December 7, 2009, EPA adopted its *Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act* (Endangerment Finding). The Endangerment Finding is based on Section 202(a) of the CAA, which states that the EPA Administrator should regulate and develop standards for "emission[s] of air pollution from any class of classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare."

The rule addresses Section 202(a) in two distinct findings. The first addresses whether atmospheric concentrations of the six key GHGs (CO_2, methane [CH_4], nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) threaten the health and welfare of current and future generations. The second finding addresses whether the combined emissions of GHGs from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs, and thus to the threat of climate change.

The EPA Administrator found that atmospheric concentrations of GHGs endanger public health and welfare within the meaning of CAA Section 202(a). The EPA Administrator also found that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare.

Council on Environmental Quality Draft NEPA Guidelines

Because of uneven treatment of climate change under NEPA, the International Center for Technology Assessment, Natural Resources Defense Council, and Sierra Club filed a petition with the Council on Environmental Quality (CEQ) in March 2008, requesting that climate change analyses be included in all federal environmental review documents. In response to the petition and Executive Order 13514, CEQ issued new draft guidance on when and how to include GHG emissions and climate change impacts in environmental review documents under NEPA. CEQ's guidance (issued on February 18, 2010) suggests that federal agencies should consider opportunities to reduce GHG emissions caused by their proposed actions, adapt the actions to climate change impacts throughout the NEPA process, and address these issues in their agency NEPA procedures.

In the context of addressing climate change in environmental documentation, the two main considerations are:

- the GHG emissions effects of a proposed action and alternative actions, and
- the impacts of climate change on a proposed action or alternatives. CEQ notes that "significant" national policy decisions with "substantial" GHG impacts require analysis of their GHG effects—that is, if a proposed action would cause "substantial" annual direct emissions, or if a Federal agency action implicates energy conservation, reduced energy use, or GHG emissions and/or promotes renewable-energy technologies that are cleaner and more efficient.

In these circumstances, information on GHG emissions (qualitative or quantitative) that is useful and relevant to the decision should be used when deciding among alternatives. CEQ suggests that if a proposed action would cause direct annual emissions of ≥25,000 MT carbon dioxide equivalent (CO_2e), a quantitative and qualitative assessment may be meaningful to decision makers and the public. If annual direct emissions would be less than 25,000 MT CO_2e, CEQ encourages federal agencies to consider whether the action's long-term emissions should receive similar analyses.

State

Because every nation emits GHGs and thus makes an incremental cumulative contribution to global climate change, cooperation on a global scale will be required to reduce the rate of GHG emissions to a level that can help to slow or stop the human-caused increase in average global temperatures and associated changes in climatic conditions. Several statewide initiatives relevant to land use planning are discussed below; however, this does not represent a complete list of climate change–related legislation in California.

Summary of Laws and Executive Orders

Various statewide initiatives to reduce the State's contribution to GHG emissions have raised awareness that, even though the various contributors to and consequences of global climate change are not yet fully understood, global climate change is under way, and real potential exists for severe adverse environmental, social, and economic effects in the long term. Such initiatives include the following:

- **Assembly Bill 1493—**In 2002, then-Governor Gray Davis signed AB 1493 (Stats. 2002, Ch. 200) (amending Health and Safety Code, Section 42823 and adding Health and Safety Code, Section 43018.5). AB 1493 required that ARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state."

- **Executive Order S-3-05—**Executive Order S-3-05, which was signed by Governor Arnold Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

- **Assembly Bill 32, California Climate Solutions Act of 2006—**In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006 (Stats. 2006, Ch. 488, enacting Health and Safety Code, Sections 38500–38599.) AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. It requires California to reduce its GHG emissions to 1990 levels by 2020, and reduce gas emissions to 80 percent below 1990 levels by 2050.

- **California Senate Bill 97—**Senate Bill (SB) 97, signed August 2007 by Governor Arnold Schwarzenegger, acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA (Stats. 2007, Ch. 185 (enacting Pub. Resources Code, Sections 21083.05 and 21097.) This bill directs the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the Natural Resources Agency guidelines for feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, by July 1, 2009. The Natural Resources Agency was required to certify and adopt those guidelines by January 1, 2010. The California Natural Resources Agency adopted those guidelines on December 30, 2009, and the guidelines became effective March 18, 2010. The significance criteria developed as part of SB 97 are used in this analysis to evaluate GHG emissions.

- **Executive Order S-13-08—**EO S-13-08, issued November 14, 2008, directs the California Natural Resources Agency, California Department of Water Resources, OPR, California Energy Commission, State Water Resources Control Board, California Department of Parks and Recreation, and California's coastal management agencies to participate in a number of planning and research activities to advance California's ability to adapt to the impacts of climate change. The order specifically directs agencies to work with the National Academy of Sciences to initiate the first California Sea Level Rise Assessment and to review and update the assessment every two years after completion; directs the Resource Agency to immediately assess

the vulnerability of the California transportation system to sea level rise; and directs CAT to develop a California Climate Change Adaptation Strategy.

Climate Change Scoping Plan

On December 11, 2008, pursuant to AB 32, CARB adopted the Climate Change Scoping Plan (CCSP). This plan outlines how emissions reductions will be achieved from significant sources of GHGs via regulations, market mechanisms, and other actions. Six key elements, outlined in the scoping plan, are identified to achieve emissions reduction targets:

- expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- achieving a statewide renewable energy mix of 33 percent;
- developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
- adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation.

The CCSP also included recommended 39 measures that were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately impact low-income and minority communities. These measures also put the state on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80 percent below 1990 levels. The measures in the approved CCSP will be in place by 2012.

Governor's Office of Planning and Research Technical Advisory

In June 2008, OPR released a Technical Advisory providing preliminary guidance to local agencies about how to evaluate and mitigate effects of GHG emissions by projects, as required by CEQA. OPR requested that the ARB recommend the method for setting significance thresholds for GHG emissions; thus, in October ARB released a preliminary draft proposal (Guidance). Although in draft form, the Guidance does provide some assistance in evaluating whether projects would impede the State's mandatory requirements under AB 32 to reduce statewide GHG emissions.

It describes three classes of common projects: industrial, commercial, and residential.

The Guidance recommends that one performance based threshold and one numerical threshold be obtained for each project.

The Guidance states that some small residential and commercial projects, emitting 1,600 MT of CO_2e would not impede the State from achieving emission reduction objectives, and could be deemed categorically exempt from CEQA. However, the Guidance has an unspecified numerical threshold for commercial and residential projects. Projects emitting more than 1,600 MT of CO_2e per year could or could not meet minimum performance standards. The minimum performance standards would include complying with stringent standards for green building rating

systems and codes, energy efficiency, water conservation, outdoor potable water use, construction, waste recycling, and residential transportation.

For industrial projects, the guidance states that projects emitting a significance threshold less than 7,000 MT CO_2e per year for operational emissions (excludes transportation) may be considered as having a less-than-significant impact. This threshold is estimated to cover approximately 90% of GHG emissions from new industrial projects statewide.

OPR CEQA Guidelines for GHG Emissions

The significance thresholds are not established in OPR's Preliminary Draft CEQA Guideline Amendments for GHG Emissions. To determine the significance impacts from project emissions, OPR indicates that lead agencies should make a good-faith effort, based on available information, to calculate or estimate the GHG emissions associated with a project. Lead agencies determine which, if any, model or methodology to quantify greenhouse gas emissions should be selected, and whether qualitative analysis or performance based standards should be relied upon.

California Climate Change Adaptation Strategy

In cooperation and partnership with multiple state agencies, the 2009 California Climate Adaptation Strategy summarizes the best known science on climate change impacts in seven specific sectors (public health, biodiversity and habitat, ocean and coastal resources, water management, agriculture; forestry, and transportation and energy infrastructure) and provides recommendations on how to manage against those threats.

Addressing Climate Change at the Project Level: California Attorney General's Office

In January 2010, the California Attorney General's Office released a document to assist local agencies with addressing climate change and sustainability at the individual project level under CEQA. The document provides examples of various measures that may reduce project-level impacts related to climate change. As appropriate, the measures can be included as design features of a project, required as changes to the project, or imposed as mitigation (whether undertaken directly by the project proponent or funded by mitigation fees).

CLIMATE CHANGE ENVIRONMENTAL SETTING

Existing climate conditions and GHG emissions sources in California and the LTAB comprise the environmental setting of climate change.

Global Climate Trends and Associated Impacts

The rate of increase in global average surface temperature over the last hundred years has not been consistent; the last three decades have warmed at a much faster rate—on average 0.32°F per decade. Eleven of the 12 years from 1995 to 2006 rank among the 12 warmest years in the instrumental record of global average surface temperature (going back to 1850) (IPCC 2007:4).

During the same period over which this increased global temperature has occurred, many other changes have occurred in other natural systems. Among numerous other observed conditions, sea levels have risen on average1.8 mm/yr; precipitation patterns throughout the world have shifted, with some areas becoming wetter and other drier; tropical cyclone activity in the North Atlantic has increased; and peak runoff timing of many glacial and snow fed rivers has shifted earlier. Though it is difficult to prove a definitive cause and effect relationship between global warming and other observed changes to natural systems, there is high confidence in the scientific community that these changes are a direct result of increased global temperatures (IPCC 2007:3). This basic conclusion has been endorsed by more than 45 scientific societies and academies of science, including all of the

national academies of science of the major industrialized countries. Since 2007, no scientific body of national or international standing has maintained a dissenting opinion.

Greenhouse Gas Emissions Sources and Inventory

CO_2e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential (GWP) of a GHG, depends on the lifetime, or persistence, of a gas molecule in the atmosphere. For example, as described in Appendix C, "Calculation References," of the General Reporting Protocol of the California Climate Action Registry (CCAR) (CCAR 2009:Appendix C), 1 ton of CH_4 has the same contribution to the greenhouse effect as approximately 23 tons of CO_2. Therefore, CH_4 is a much more potent GHG than CO_2. Expressing emissions in CO_2e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

Emissions of CO_2 are byproducts of fossil-fuel combustion. CH_4, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) largely associated with agricultural practices and landfills. CO_2 sinks, or reservoirs, include vegetation and the ocean, which respectively absorb CO_2 through photosynthesis and dissolution, two of the most common processes of CO_2 sequestration.

California

California is the 12th to 16th largest emitter of CO_2 in the world (CEC 2006:1). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (CEC 2006:1). California produced 484 million gross MT of CO_2 equivalent in 2004. Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2004, accounting for 41 percent of total GHG emissions in the State (CEC 2006:1). This sector was followed by the electric power sector (including both in-state and out-of-state sources) (22 percent) and the industrial sector (21 percent) (CEC 2006:1).

3.2.3 Environmental Consequences and Mitigation Measures

Significance Criteria

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; the TRPA Initial Environmental Checklist; and regulatory standards of federal and state agencies as well as EDCAQMD. These criteria also encompass the factors taken into account under NEPA to determine the significance of an action in terms of the context and intensity of its effects.

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to air quality if it would:

- conflict with or obstruct implementation of the applicable air quality plan (CEQA 1);
- violate any air quality standard or contribute substantially to an existing or projected air quality violation (Table 3.2-1) (CEQA 2);
- result in a cumulatively considerable net increase of any criteria air pollutant for which the project region is in nonattainment under any applicable national or state ambient air quality standards (including releasing emissions that exceed quantitative thresholds for ozone precursors) (CEQA 3);
- expose sensitive receptors to substantial pollutant concentrations (including TACs/HAPs) (CEQA 4); or

- create objectionable odors affecting a substantial number or people (CEQA 5).

Cumulatively considerable effects, including those related to CEQA 3, are discussed in Section 3.18, "Cumulative Effects."

As stated in Appendix G, the significance criteria established by the applicable AQMD or APCD may be relied upon to make the above determinations. Thus, as identified by EDCAQMD, an alternative was determined to result in a significant impact related to air quality if:

- short-term construction-related or long-term operation-related (regional) emissions of ROG or NO_X were to exceed mass emissions of 82 pounds per day (lb/day) (EDCAQMD 2002) or other criteria air pollutants (i.e., CO, PM_{10}, $PM_{2.5}$, SO_2, NO_2, sulfates, lead, or hydrogen sulfide) would exceed a national or state ambient air quality standard(s) (CEQA 6).

Under CEQA an alternative was determined to result in a significant effect related to greenhouse gases if it would:

- generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment (CEQA 7); or

- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases (CEQA 8).

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative was determined to have a significant impact related to air quality if it would result in:

- substantial air pollutant emissions (TRPA 1);

- deterioration of ambient (existing) air quality (TRPA 2);

- the creation of objectionable odors (TRPA3);

- alteration of air movement, moisture or temperature, or any change in climate, either locally or regionally (TRPA 4); or

- increased use of diesel fuel (TRPA 5).

METHODS AND ASSUMPTIONS

Almost all increased pollutant emissions that would be associated with the improvements within the study area would be generated by construction-related activities. The number of visitors to the study area is not expected to change substantially, with Alternative 1 (maximum recreation) resulting in the greatest increase, Alternative 2 the smallest, and Alternatives 3 and 4 in between. Construction emissions are described as short term in duration.

These emissions, especially emissions of criteria air pollutants (i.e., PM_{10}) and ozone precursors (e.g., ROG and NO_X), have the potential to represent a significant air quality impact.

Fugitive dust emissions are associated primarily with site preparation and excavation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and vehicle miles traveled (VMT) on-site and off-site. Emissions of ROG and NO_X are associated primarily with gas and diesel equipment and asphalt paving.

The method of analysis for short-term construction, long-term operational (regional), local mobile-source, and TAC emissions is consistent with the recommendations of EDCAQMD and TRPA.

Greenhouse Gases

The EDAQMD has not adopted significance criteria for analyzing GHG emissions generated by development, or a methodology for analyzing impacts related to GHG emissions or global climate change. By enactment of AB 32 and SB 97, the State of California has identified GHG reduction goals and determined that the effect of GHG emissions on global climate change is an adverse environmental impact issue. While the emissions of one single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change.

To meet AB 32 goals, California would need to generate less GHG emissions than current levels. It is recognized, however, that for most projects there is no simple metric available to determine if a single project would substantially increase or decrease overall GHG emission levels.

Although the text of AB 32 applies to stationary sources of GHG emissions, this mandate demonstrates California's commitment to reducing the rate of GHG emissions and the State's associated contribution to climate change, without intent to limit population or economic growth within the State. Thus, to achieve the goals of AB 32, which are tied to GHG emission rates of specific benchmark years (e.g., 1990), California would have to achieve a lower rate of emissions per unit of population than it has now. Further, in order to accommodate future population and economic growth, the state would have to achieve an even lower rate of emissions per unit than was achieved in 1990. (The goal to achieve 1990 quantities of GHG emissions by 2020 means that this will need to be accomplished with 30 years of population and economic growth beyond 1990 in place.) Thus, future planning efforts that would not encourage reductions in GHG emissions would conflict with the policy decisions contained in the spirit of AB 32, thus impeding California's ability to comply with the mandate.

The State of California has established GHG reduction targets and has determined that GHG emissions as they relate to global climate change are a source of adverse environmental impacts in California that should be addressed under CEQA. Although AB 32 did not amend CEQA, it identifies the myriad of environmental problems in California caused by global warming (Health and Safety Code, Section 38501[a]). SB 97, however, did amend CEQA by directing OPR to prepare revisions to the State CEQA Guidelines addressing the mitigation of GHGs or their consequences. As an interim step toward development of required guidelines, in June of 2008, OPR published a technical advisory, entitled "CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review." OPR recommends that the lead agencies under CEQA make a good-faith effort, based on available information, to estimate the quantity of GHG emissions that would be generated by a proposed project, including the emissions associated with vehicular traffic, energy consumption, water usage, and construction activities, to determine whether the impacts have the potential to result in a project or cumulative impact and to mitigate the impacts where feasible (OPR 2008).

In that document, OPR acknowledged that "perhaps the most difficult part of the climate change analysis will be the determination of significance," and noted that "OPR has asked ARB technical staff to recommend a method for setting criteria which will encourage consistency and uniformity in the CEQA analysis of GHG emissions throughout the state." ARB has not yet completed this task at the time of writing.

The EDAQMD has not adopted a methodology for evaluating GHG emissions. In the case of the proposed project, CO_2 emissions associated with project construction and operation were modeled using URBEMIS 2007 version 9.2.4; a model widely-used in regional air quality analysis.

It is important to note that all CO_2 emissions from project operation may not necessarily be considered "new" emissions, given that a project itself does not create "new" emitters (people) of GHGs, at least not in the traditional sense. In other words, the operational GHG emissions for this project are not necessarily all new GHG emissions; to a large degree, restoration projects accommodate existing populations. In this sense, restoration projects can be seen as repairing previous environments, and are not in themselves creators of economic and population growth. Emissions of GHGs are, however, influenced by the location and design of projects, to the extent that they can influence travel to and from the projects, and to the degree that project construction contributes to GHG levels.

The methodology used in this document to analyze the project's potential effect on global warming includes a calculation of GHG emissions. The purpose of calculating the project's GHG emissions is for informational and comparison purposes, as there is no adopted quantifiable threshold applicable to either the project level or cumulative level of impact.

Please also refer to Section 3.18, "Cumulative Impacts," of this EIR/EIS/EIS for discussion of greenhouse gas emissions and the project's contribution to the cumulative impact on climate change.

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Air Movement, Moisture (TRPA 4)—The alternatives would have only negligible effects on air movement, moisture or temperature, or on climate, either locally or regionally. None of the alternatives include buildings, other structures or include activities that could cause such effects. (The effects on greenhouse gas emissions, however, are discussed further.)

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.2-1 (Alt. 1) **Short-Term Emissions of Criteria Air Pollutants and Precursors during Construction. (CEQA 1, 2, 6; TRPA 1, 2)** *Construction-related emissions of criteria air pollutants and precursors under Alternative 1 could contribute substantially to an existing or projected air quality violation and expose sensitive receptors to substantial pollutant concentrations, especially considering the nonattainment status of the LTAB with respect to TRPA standards. However, as described in Environmental Commitment 1, the Conservancy will apply several measures to reduce the generation of construction-related emissions of ROG, NO_X, and PM_{10}. Therefore, this impact would be* ***less than significant****.*

Construction emissions are described as short term in duration and have the potential to represent a significant impact with respect to air quality. Fugitive PM_{10} dust emissions are associated primarily with site preparation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and VMT by construction vehicles on- and off-site. Emissions of the ozone precursors ROG and NO_X emissions are associated primarily with exhaust from gas- and diesel-powered equipment and the application of architectural coatings.

Under Alternative 1, the study area restoration and building phases of construction would temporarily generate emissions of criteria air pollutants (e.g., PM_{10}) and precursors (e.g., ROG and NO_X) from excavation, grading, and clearing; use of off-road equipment; import and export of materials; paving; and exhaust from workers' commute vehicles.

Short-term construction-related emissions of ROG, NO_X, and PM_{10} under Alternative 1 were modeled using the ARB-approved URBEMIS 2007 (Version 9.2.4) computer program and EMFAC 2007 emission factors as recommended by EDCAQMD and TRPA. URBEMIS is designed to model construction emissions for land use development projects and allows for the input of project-specific information. Input parameters were based on default model settings and information provided in Chapter 2, "Project Alternatives." Project construction is anticipated to be carried out in four phases. Modeling conducted for this analysis forecasted a construction start date of Summer 2015. Modeling assumed an annual construction period of May 1–October 15 (120 work days) and used the corresponding emission factors. The final construction phase would occur in 2018. Construction emissions would cease following completion of the final construction phase. The modeled maximum daily construction-related emissions are summarized in Table 3.2-6 and described in more detail below and in Appendix F.

Based on the modeling conducted, in the worst-case scenario, construction of Alternative 1 would result in maximum unmitigated daily emissions of approximately 8.5 lb/day of ROG, 60.4 lb/day of NO_X, and 96.9 lb/day of PM_{10} (Table 3.2-6). (These quantities would be less than those for Alternative 4, and similar to those for Alternatives 2 and 3 [except that for Alternative 2 PM_{10} emissions would be greater than for Alternatives 1 and 3].) The daily unmitigated, construction-related emissions for Alternative 1 would not exceed EDCAQMD's short-term significance criterion of 82 lb/day for ROG and NO_X. EDCAQMD considers projects that generate daily ROG and NO_X emissions below the significance criteria to not adversely impact the region's commitment and plan to attain the federal ozone standard.

With implementation of Environmental Commitment (EC) 1, "Reduce the Generation of Construction-Related Emissions of ROG, NO_X, and PM_{10}," described in Table 2-6, construction-related emissions of PM_{10} under Alternative 1 would not violate or contribute substantially to an existing or projected air quality violation. The EDCAQMD considers projects that implement sufficient mitigation measures (or environmental commitments) that would prevent visible PM_{10} dust beyond the project property lines to generate less than significant PM_{10} emissions. Therefore, with the inclusion of EC 1, construction-related PM_{10} would be considered less than significant. As described in Significance Criteria, projects that would not generate emissions of other criteria air pollutants that exceed a national or state ambient air quality standard (see Table 3.2-1) would be considered less than significant. Therefore, implementation of EC 1 would ensure that emissions of the other major construction-related pollutants (e.g., PM_{10}) would not exceed an applicable ambient air quality standard. Furthermore, as determined by SMAQMD, implementing EC 1 (i.e., SMAQMD Enhanced Fugitive PM Dust Control Practices) would reduce construction-related fugitive PM_{10} dust emissions by a minimum of approximately 75 percent and would prevent the fugitive PM_{10} dust from dispersing beyond the property boundary (SMAQMD 2009:Chapter 3). Implementation of this environmental commitment would also reduce exhaust emissions of NO_X, and PM_{10} from diesel equipment by 20 and 45 percent, respectively (SMAQMD 2009:Chapter 3).

This impact would be **less than significant**.

IMPACT 3.2-2 (Alt. 1) **Long-Term Operational (Regional) Emissions of Criteria Air Pollutants and Precursors**. **(CEQA 1, 2; TRPA 1, 2)** *Long-term operational emissions would not exceed TRPA's significance criteria for stationary sources or the EDCAQMD-recommended significance criterion for mass emissions of NO_X. Therefore, implementation of Alternative 1 would not violate an air quality standard, contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, or conflict with or obstruct implementation of the applicable air quality plan. This impact would be* ***less than significant****.*

Regional emissions of ROG, NO_X, PM_{10}, CO, and SO_X from stationary, area, and mobile sources associated with project implementation were estimated using the URBEMIS 2007 (Version 9.4.2) computer program, which is designed to model emissions for land use development projects (including recreation land uses). URBEMIS allows project location specifics and trip generation rates to be selected. The program accounts for stationary- and area-source emissions from the use of natural gas, wood stoves, fireplaces, landscape maintenance equipment, and

Table 3.2-6
Summary of Daily Construction-Related Emissions, as Modeled for the Worst-Case Scenario [1]

Source	Alternative 1 Project-Generated Emissions (pounds per day)			Alternative 2 Project-Generated Emissions (pounds per day)			Alternative 3 Project-Generated Emissions (pounds per day)			Alternative 4 [2] Project-Generated Emissions (pounds per day)			Alternative 5 Project-Generated Emissions (pounds per day)		
	ROG	NO_X	PM_{10}	ROG	NO_X	PM_{10}	ROG	NO_X	PM_{10}	ROG	NO_X	PM_{10}	ROG	NO_X	PM_{10}
Phase 1 (May 2015–October 2015)															
Fugitive Dust	–	–	85.3	–	–	146.1	–	–	95.1	–	–	382.3	–	–	0.0
Off-Road Diesel	4.4	32.5	1.8	4.4	32.5	1.8	4.4	32.5	1.8	4.4	32.5	1.8	0.0	0.0	0.0
On-Road Diesel	0.1	0.6	0.00	0.2	2.9	0.1	0.1	0.8	0.0	0.3	4.0	0.2	0.0	0.0	0.0
Worker Trips	0.1	0.2	0.0	0.1	0.2	0.0	0.1	0.2	0.0	0.1	0.2	0.0	0.0	0.0	0.0
Maximum Daily Total, Unmitigated	*4.6*	*33.3*	*87.1*	*4.7*	*35.6*	*148.0*	*4.6*	*33.5*	*96.9*	*4.8*	*36.6*	*384.2*	*0.0*	*0.0*	*0.0*
Phase 2 (May 2016–October 2016)															
Fugitive Dust	–	–	85.3	–	–	146.1	–	–	95.1	–	–	382.3	–	–	0.0
Off-Road Diesel	4.2	29.7	1.6	4.2	29.7	1.6	4.2	29.7	1.6	4.2	29.7	1.6	0.0	0.0	0.0
On-Road Diesel	0.0	0.6	0.0	0.2	2.5	0.1	0.1	0.7	0.0	0.3	3.4	0.2	0.0	0.0	0.0
Worker Trips	0.1	0.2	0.0	0.1	0.2	0.0	0.1	0.2	0.0	0.1	0.2	0.0	0.0	0.0	0.0
Maximum Daily Total, Unmitigated	*4.3*	*30.4*	*86.9*	*4.5*	*32.3*	*147.8*	*4.3*	*30.6*	*96.7*	*4.5*	*33.3*	*384.0*	*0.0*	*0.0*	*0.0*
Phase 3 (May 2017–October 2017)															
Fugitive Dust	–	–	93.8	–	–	146.0	–	–	96.9	–	–	383.7	–	–	0.0
Off-Road Diesel	3.9	27.0	1.4	3.9	27.0	1.4	3.9	27.0	1.4	3.9	27.0	1.4	0.0	0.0	0.0
On-Road Diesel	0.1	1.5	0.1	0.2	2.5	0.1	0.1	0.9	0.0	0.3	3.1	0.2	0.0	0.0	0.0
Worker Trips	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	*0.0*	*0.0*	*0.0*
Building Construction:[3]															
Off-Road Diesel	2.9	23.7	1.0	2.9	23.7	1.0	2.9	23.7	1.0	2.9	23.7	1.0	0.0	0.0	0.0
Worker Trips	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Asphalt Paving:[4]															
Off-Gas	0.1	0.0	0.0	-	-	-	0.1	0.00	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Off-Road Diesel	1.2	7.8	0.6	-	-	-	1.2	7.8	0.6	1.2	7.8	0.6	0.0	0.0	0.0
On-Road Diesel	0.0	0.1	0.0	-	-	-	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Worker Trips	0.1	0.1	0.0	-	-	-	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Maximum Daily Total, Unmitigated	*8.5*	*60.4*	*96.9*	*7.2*	*53.4*	*148.5*	*8.5*	*59.8*	*99.9*	*8.7*	*62.0*	*386.9*	*0.0*	*0.0*	*0.0*
Phase 4 (May 2018–October 2018)															
Fugitive Dust	–	–	85.3	–	–	146.1	–	–	95.1	–	–	382.3	–	–	0.0
Off-Road Diesel	3.7	24.5	1.3	3.7	24.5	1.3	3.7	24.5	1.3	3.7	24.5	1.3	0.0	0.0	0.0
On-Road Diesel	0.0	0.1	0.0	0.1	0.5	0.0	0.0	0.2	0.0	0.2	2.7	0.1	0.0	0.0	0.0
Worker Trips	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Maximum Daily Total, Unmitigated	*3.8*	*24.8*	*86.6*	*3.8*	*25.1*	*147.4*	*3.8*	*24.8*	*96.4*	*4.0*	*27.3*	*383.7*	*0.0*	*0.0*	*0.0*

Notes: NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; ROG = reactive organic gases
Values may not appear to add exactly due to rounding.
See Appendix F for modeling results.

[1] On-site emissions from mobile equipment used for site grading were based on default emission factors and time durations of URBEMIS2007, Version 9.2.4. Construction activities that involve soil disturbance must occur between May 1 and October 15 to comply with Section 33.3.1.A of the Tahoe Regional Planning Agency (TRPA) Code of Ordinances unless special approval has been granted by TRPA. Emissions were modeled starting in the years indicated above.

[2] Original modeling was performed by AECOM in 2008 using conservative assumptions (i.e., all construction occurring in year 2011). Revised modeling was performed in 2012 in order to more accurately reflect the actual planned years of construction.

[3] All building and public access construction would occur for 3 months during Phase 3 of construction.

[4] Emissions from paving of asphalt are based on default emission factors and time duration of URBEMIS 2007 to pave a total of 0.5 acre.

Source: Modeling performed by EDAW (now AECOM) in 2008

consumer products, as well as mobile-source emissions associated with vehicle trips. Regional emissions from stationary, area (e.g., landscaping equipment), and mobile sources were estimated based on proposed land use types and sizes identified in Chapter 2, "Project Alternatives," the net increase in trip generation from the project's transportation analysis described in Section 3.16, "Transportation, Parking, and Circulation" (e.g., fewer than 100 daily vehicle trips), and the default model setting for 2014 conditions. None of the alternatives are expected to generate more than additional 10 to 20 additional trips per day. Original modeling was performed by AECOM in 2008 using default model settings, and trip generation rates and trip lengths obtained from the transportation analysis. While the original modeling used an operational year earlier than the currently anticipated construction year of 2015, it continues to represent a conservative estimate of operational emissions. Trips are not anticipated to increase over those estimates included in the original modeling, and emission factors for motor vehicles are anticipated to decrease in future years (e.g., 2030) due to rules and regulations adopted by EPA, ARB and TRPA. Therefore, operational emissions occurring after the modeled year of 2014 would result in lower emissions than those presented in Table 3.2-7.

Table 3.2-7
Summary of Modeled Long-Term Operational Emissions under Alternatives 1, 2, 3, or 4

Source Type	Project-Generated Emissions (pounds per day)				
	ROG	NO_X	PM_{10}	CO	SO_X
Summer					
Area sources [1]	0.13	0.02	0.00	1.60	0.00
Mobile sources	1.06	1.33	0.07	10.17	0.01
Total	*1.19*	*1.35*	*0.07*	*11.77*	*0.01*
Winter					
Area sources [1]	0.00	0.00	0.00	0.00	0.00
Mobile sources	1.31	1.90	0.07	14.75	0.01
Total	*1.31*	*1.90*	*0.07*	*14.75*	*0.01*
Thresholds					
Total emissions [2]	*82.00*	*82.00*	–	–	–

Notes: CO = carbon monoxide; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; ROG = reactive organic gases; SO_X = oxides of sulfur
See Appendix F for modeling results.
[1] Area-source emissions include emissions from landscaping and were estimated based on default model settings.
[2] The total emissions threshold applies to the sum of area and mobile sources for EDCAQMD NO_X only.
Source: Modeling performed by EDAW (now AECOM) in 2008

The modeled maximum daily operational emissions under Alternative 1 are summarized in Table 3.2-7 and described in more detail below and in Appendix F. Estimates are conservative, and actual emissions could be less over time as a result of fluctuations in activity and maintenance.

Based on the modeling conducted, worst-case project operations under Alternative 1 would result in maximum unmitigated daily emissions of approximately 1.31 lb/day of ROG, 1.90 lb/day of NO_X, 0.07 lb/day of PM_{10}, 14.75 lb/day of CO, and 0.01 lb/day of SO_X, none of which would exceed the applicable EDCAQMD threshold (Table 3.2-7). These thresholds are based on SIP requirements to reduce emissions from heavy-duty vehicles and land use projects. Because project implementation would not exceed these thresholds, Alternative 1 would not conflict with air quality planning efforts. In addition, because the project's operational emissions of NO_X would

not exceed the EDCAQMD NO_X threshold, Alternative 1 would not affect TRPA's attainment designation for atmospheric deposition.

Long-term operational emissions under Alternative 1 would not violate an air quality standard, contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, or conflict with or obstruct implementation of the applicable air quality plan. This impact would be **less than significant**.

IMPACT 3.2-3 (Alt. 1) **Long-Term Operational (Local) Emissions of Carbon Monoxide by Mobile Sources. (CEQA 1, 2; TRPA 1, 2)** *Long-term local emissions of CO from mobile sources related to project operation under Alternative 1 would not violate an air quality standard (i.e., the eight-hour TRPA standard of 6 ppm), contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. This impact would be* ***less than significant****.*

CO concentration is a direct function of motor vehicle activity (e.g., idling time and traffic flow conditions), particularly during peak commute hours, and meteorological conditions. Under specific meteorological conditions, CO concentrations may reach unhealthy levels with respect to local sensitive land uses such as residential areas, schools, and hospitals. As a result, the analysis of CO emissions is at a local level.

The *Transportation Project-Level Carbon Monoxide Protocol* (Garza, Graney, and Sperling 1997) states that signalized intersections that operate at an unacceptable level of service (LOS) represent a potential for a CO violation, also known as a "hot spot," and thus undergo a quantitative screening-level analysis. The Goals and Policies in the TRPA Regional Plan indicate that up to four hours of LOS E conditions are acceptable at a signalized intersection (TRPA 1987:III-6). No TRPA standard exists for the operation of unsignalized intersections. Thus, an analysis of CO concentrations is typically recommended for receptors located near signalized intersections that are projected to operate at LOS E (for more than four hours per day) or LOS F.

According to the transportation analysis, operation of Alternative 1 would not reduce the LOS at any signalized intersections to an unacceptable level (LOS E or F) during any time of the day or substantially worsen LOS at any signalized intersections (see Section 3.16, "Transportation, Parking, and Circulation," for additional detail). Thus, long-term local emissions of CO from mobile sources during project operation under Alternative 1 would not violate an air quality standard (i.e., the eight-hour TRPA standard of 6 ppm), contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. As a result, this impact would be **less than significant**.

IMPACT 3.2-4 (Alt. 1) **Exposure of Sensitive Receptors to Odors. (CEQA 5, TRPA 3)** *Neither construction nor operation of Alternative 1 would create objectionable odors affecting a substantial number of people. This impact would be* ***less than significant****.*

Implementation of Alternative 1 would not result in any major sources of odor, and the project's proposed land use type is not one of the types commonly known to generate odors (e.g., landfill, coffee roaster, wastewater treatment plant). Emissions of diesel exhaust from the use of on-site construction equipment would be intermittent and short term, and the exhaust would dissipate rapidly from the source. Thus, neither construction nor operation of Alternative 1 would create objectionable odors affecting a substantial number of people. As a result, this impact would be **less than significant**.

IMPACT 3.2-5 (Alt. 1) **Exposure of Sensitive Receptors to Emissions of Hazardous Air Pollutants. (CEQA 4)** *Neither construction nor operation of Alternative 1 would expose sensitive receptors to substantial emissions of HAPs (TACs). As a result, this impact would be* ***less than significant****.*

Construction of Alternative 1 would result in the short-term emission of diesel exhaust by on-site heavy-duty equipment. In January 2001, EPA promulgated a final rule to reduce emissions standards for heavy-duty diesel engines beginning with the 2007 model year. These emissions standards represent emissions reductions of 90 percent for NO_X, 72 percent for nonmethane hydrocarbons, and 90 percent for PM relative to the emissions standards for the 2004 model year.

The dose of a substance in the environment to which receptors are exposed—a function of the substance's concentration and the duration of exposure—is the primary factor used to determine the health risks associated with HAPs (known in state parlance as TACs). Dose is positively correlated with time; that is, a longer exposure period would result in a higher exposure level. Thus, the estimated risks are higher if a fixed exposure occurs over a longer period of time. According to California's Office of Environmental Health Hazard Assessment, health risk assessments, which determine the exposure of sensitive receptors to HAP emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period and duration of activities associated with the project (Salinas, pers. comm., 2004). Because off-road heavy-duty diesel equipment would be used only temporarily, and because of the highly dispersive properties of diesel PM (Zhu et al. 2002) and future reductions in exhaust emissions, construction under Alternative 1 would not expose sensitive receptors to substantial emissions of HAPs.

No major stationary sources of HAP emissions would be constructed or operated with long-term operation of Alternative 1, nor would this alternative result in the generation of HAP emissions from on-site mobile sources (e.g., diesel truck traffic). In addition, no major sources of HAPs exist in the vicinity of the study area. Nonetheless, all stationary sources with the potential to emit HAPs are required to obtain permits from TRPA. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, specifically Section 65.1 (Air Quality Control) of the TRPA Code of Ordinances. Given that compliance with applicable standards is required for the development and operation of facilities that may emit HAPs, emissions in the study area are expected to remain within established standards. Thus, neither construction nor operation of Alternative 1 would expose sensitive receptors to substantial emissions of HAPs. As a result, this impact would be **less than significant**.

IMPACT 3.2-6 (Alt. 1)	**Short-Term or Long-Term Operational (Regional) Emissions of GHGs. (CEQA 7, CEQA 8)** *Implementation of the project would not result in the generation of substantial short-term construction or long-term operation-related emissions of GHGs. When considered in conjunction with other projects throughout the region, the proposed project's emissions would not affect GHG reduction planning efforts. Therefore, GHG emissions from the proposed project would be* ***less than significant****.*

Construction-related GHG emissions were estimated for each alternative using URBEMIS 2007, Version 9.2.4. Operation-related emissions, including direct (e.g., maintenance) and indirect (e.g., vehicle trips) emissions were also calculated using URBEMIS 2007.

Construction-Generated Greenhouse Gas Emissions

Activities associated with construction of Alternative 1would occur during a period of approximately 4 years. During this time, construction-related GHG emissions would be associated with engine exhaust from heavy-duty construction equipment, material transport trucks, and worker commute trips. Although any increase in GHG emissions would add to the quantity of emissions that contribute to global climate change, emissions associated with construction of the project would occur over a limited period. Following full completion of the project, all construction emissions would cease. Despite the intensity and duration of construction activities, and the lack of available mitigation measures to abate GHG emissions from heavy-duty construction equipment and on-road hauling emissions, the incremental contribution to climate change by the project's construction emissions would be short term and minimal.

To establish additional context in which to consider the magnitude of project-generated construction-related GHG emissions, it may be noted that facilities (i.e., stationary, continuous sources of GHG emissions) in California that generate greater than 25,000 MT of CO_2 per year are mandated to report their GHG emissions to the ARB pursuant to AB 32. As shown in Table 3.2-8, estimated GHG emissions associated with construction of the project would be a maximum of 449 MT of CO_2 per year under the conditions for the highest emitting alternative (Year 3 of Alternative 4).

Table 3.2-8
Summary of Modeled Construction-Generated Emissions of Greenhouse Gases under the Conditions for the Highest Emitting Alternative (Alternative 4) [1]

Source	Total Mass CO_2 Emissions (metric tons)[1]
Construction Emissions [2]	
Year 1	297
Year 2	296
Year 3	449
Year 4	297
Total Construction Emissions (Years 1–4)	1,338

Notes: CO_2 = carbon dioxide.
Values may not appear to add exactly due to rounding.
[1] The values presented do not include the full life-cycle of GHG emissions that occur over the production/transport of materials used during construction of the project, solid waste that occurs over the life of the project, and the end-of-life of the materials and processes that indirectly result from the project. Estimation of the GHG emissions associated with these processes would be speculative, would require analysis beyond the current state of the art in impact assessment, and may lead to a false or misleading level of precision in reporting of project-related GHG emissions.
[2] Construction emissions were modeled with the URBEMIS 2007 computer model. The URBEMIS 2007 model does not account for CO_2 emissions associated with the production of concrete or other building materials used in project construction. It also does not estimate emissions for GHGs other than CO_2, such as CH_4 and N_2O, because the emission levels of these other GHGs are expected to be nominal in comparison to the estimated CO_2 levels despite their higher global warming potential.
See Appendix F, "Air Quality Modeling Results," for detailed model input, assumptions, and threshold calculations.
Source: Modeling conducted by EDAW (now AECOM) in 2012.

The project would generate substantially less emissions than the ARB reporting level of 25,000 MT of CO_2 per year and the cap-and-trade level of 10,000 MT of CO_2 per year set by AB 32. This information is presented for informational purposes only, and it is not the intention of the Conservancy to adopt 25,000 or 10,000 MT of CO_2 per year as a numeric threshold. Rather, the intention is to put project-generated GHG emissions in the appropriate context to evaluate whether the project's contribution to the global impact of climate change is considered substantial. Because construction-related emissions under all alternatives would be short term, minimal, and finite in nature (i.e., would not be continuing) and would not approach emissions levels of concern to agencies that have established emission reporting levels, the project's construction-related GHG emissions would not be substantial and would not conflict with state and local planning efforts. This impact would be **less than significant**.

Operation-Related GHG Emissions

Operation-related GHG emissions would be generated by area and mobile sources during the life of the project. Area-source GHG emissions would be associated with maintenance largely related to maintaining public access infrastructure, waste disposal, and other miscellaneous activities. Existing maintenance programs would continue as they do today under Alternative 5. The largest increase in emissions would occur under Alternative 1, which

would entail the most public access facilities in the study area. No alternative would involve municipal water use, and therefore, the proposed project would not generate off-site GHG emissions associated with water conveyance, treatment, and consumption. Quantification of sequestration of carbon by vegetation is not feasible without an accurate inventory of vegetation types and sequestration rates. Nonetheless, it was assumed that carbon sequestration would remain similar to existing conditions because the site would remain in natural vegetation, and although some changes in vegetation type would likely reduce sequestration rates in small areas (e.g., where Jeffrey pine forest would be replaced with other vegetation), other changes in vegetation type in large areas would likely increase carbon sequestration rates (e.g., conversion of montane meadow to willow-scrub). Mobile-source GHG emissions would be generated by the slight increase in project-related vehicle trips associated with the improvements to public access infrastructure in the study area attracting some additional visitors. Table 3.2-9 presents the operation-related GHG emissions associated with Alternative 1, the highest emitting alternative. Estimates of mobile-source GHG emissions are based on the traffic analysis prepared for the project, which estimates less than 100 additional trips per day under Alternative 1, compared to existing conditions, which are associated with an increase in recreational users.

Table 3.2-9
Summary of Modeled Operation-Related Emissions of Greenhouse Gases under the Conditions for the Highest Emitting Alternative (Alternative 1) [1]

Source	Annual Mass CO_2 Emissions (metric tons/year)
Operation-Related Emissions of Alternative 1 (Year 5)	
Area Sources [1]	0.2
Mobile Sources [1,2]	111.1
Electricity Consumption [3]	0
Municipal Water Use [4]	0
Total Operation-Related Emissions	**111.3**

[1] Direct operation-related emissions (i.e., area and mobile sources) were modeled using the URBEMIS 2007 computer model, based on trip generation rates obtained from the traffic analysis, as well as the other assumptions and input parameters used to estimate criteria air pollutant emissions. Mobile source emissions assume nine trips per day above existing conditions. Year 2018 is the earliest year when completion of the project would likely occur. URBEMIS does not estimate emissions for GHGs other than CO_2, such as CH_4 and NO_2, because the emission levels of these other GHGs are expected to be nominal in comparison to the estimated CO_2 levels despite their higher global warming potential.

[2] Estimation of mobile-source emissions is based on the traffic study, which assumes four additional employees per day (nine additional trips).

[3] No additional substantial electricity consumption is expected under all alternatives.

[4] No additional substantial water consumption is expected under all alternatives.

See Appendix F, "Air Quality Modeling Results," for detailed model input, assumptions, and threshold calculations.

Source: Modeling conducted by EDAW (now AECOM) in 2008

For context (as with construction emissions), projects that generate more than 25,000 MT of CO_2 per year are mandated to report GHG emissions to ARB pursuant to AB 32. As shown in Table 3.2-9 the estimated increase in GHG emissions associated with operation of Alternative 2 would be approximately 12 MT of CO_2 per year. Again, the proposed project would generate substantially fewer emissions than the above-referenced threshold levels of 25,000 and 10,000 MT of CO_2 per year. Because operation-related emissions would not approach the recommended thresholds of ARB and legislation that have established screening levels, the project's GHG emissions would not be substantial and would not conflict with state and local planning efforts. This impact would be **less than significant**.

As described in Impact 3.2-1 (Alt. 1), construction emissions of fugitive PM_{10} dust, ROG, and NO_X have the potential to represent a significant short-term impact with respect to air quality. Under Alternative 2, the study area restoration and recreation phases of construction would temporarily generate emissions of criteria air pollutants (e.g., PM_{10}) and precursors (e.g., ROG and NO_X) from excavation, grading, and clearing; use of off-road equipment; import and export of materials; paving; and exhaust from workers' commute vehicles.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.2-1 (Alt. 2) **Short-Term Emissions of Criteria Air Pollutants and Precursors during Construction. (CEQA 1, 2, 6; TRPA 1, 2)** *Construction-related emissions of criteria air pollutants and precursors under Alternative 2 could contribute substantially to an existing or projected air quality violation and expose sensitive receptors to substantial pollutant concentrations, especially considering the nonattainment status of the LTAB with respect to TRPA standards. However, as described in Environmental Commitment 1, the Conservancy would apply several measures to reduce the generation of construction-related emissions of ROG, NO_X, and PM_{10}. Therefore, this impact would be* ***less than significant****.*

Short-term construction-related emissions of ROG, NO_X, and PM_{10} under Alternative 2 were modeled using the ARB-approved URBEMIS 2007 (Version 9.2.4) computer program and EMFAC 2007 emission factors as recommended by EDCAQMD and TRPA. URBEMIS is designed to model construction emissions for land use development projects and allows for the input of project-specific information. Input parameters were based on default model settings and information provided in Chapter 2, "Project Alternatives." Project construction is anticipated to be carried out in four phases. The first phase is anticipated to begin in May 2015, with final project completion in October 2018. Modeling assumed an annual construction period of May 1–October 15 (120 work days) starting in 2015. The modeled maximum daily construction-related emissions are summarized in Table 3.2-6 and described in more detail below and in Appendix F.

Based on the modeling conducted, in the worst-case scenario, construction of Alternative 2 would result in maximum unmitigated daily emissions of approximately 7.2 lb/day of ROG, 53.4 lb/day of NO_X, and 148.5 lb/day of PM_{10} (Table 3.2-6). (These quantities of ROG and NO_X would be similar to those for Alternative 1; this quantity of PM_{10} emissions would be greater than the quantity for Alternative 1.) Daily unmitigated, construction-related emissions for Alternative 2 would not exceed EDCAQMD's short-term significance criterion of 82 lb/day for ROG and NO_X.

With implementation of EC 1, described in Table 2-6, construction-related emissions of PM_{10} under Alternative 1 would not violate or contribute substantially to an existing or projected air quality violation. This impact would be **less than significant**.

IMPACT 3.2-2 (Alt. 2) **Long-Term Operational (Regional) Emissions of Criteria Air Pollutants and Precursors. (CEQA 1, 2; TRPA 1, 2)** *Long-term operational emissions would not exceed TRPA's significance criteria for stationary sources or the recommended significance criterion for mass emissions of NO_X. Therefore, implementation of Alternative 2 would not violate an air quality standard, contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, or conflict with or obstruct implementation of the applicable air quality plan. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.2-2 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.2-3 (Alt. 2) **Long-Term Operational (Local) Emissions of Carbon Monoxide by Mobile Sources. (CEQA 1, 2; TRPA 1, 2)** *Long-term local emissions of CO from mobile sources related to project operations under Alternative 2 would not violate an air quality standard (i.e., the eight-hour TRPA standard of 6 ppm), contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.2-3 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.2-4 (Alt. 2) **Exposure of Sensitive Receptors to Odors. (CEQA 5, TRPA 3)** *Neither construction nor operation of Alternative 2 would create objectionable odors affecting a substantial number of people. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.2-4 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.2-5 (Alt. 2) **Exposure of Sensitive Receptors to Emissions of Hazardous Air Pollutants. (CEQA 4)** *Neither construction nor operation of Alternative 2 would result in the exposure of sensitive receptors to substantial emissions of HAPs (TACs). As a result, this impact would be* ***less than significant****.*

This impact would be the same as Impact 3.2-5 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.2-6 (Alt. 2) **Short-Term or Long-Term Operational (Regional) Emissions of GHGs. (CEQA 7, CEQA 8)** *Implementation of the project would not result in the generation of substantial short-term construction or long-term operation-related emissions of GHGs. When considered in conjunction with other projects throughout the region, the proposed project's emissions would not affect GHG reduction planning efforts. Therefore, GHG emissions from the proposed project would be* ***less than significant****.*

This impact would be the same as Impact 3.2-6 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.2-1 (Alt. 3) **Short-Term Emissions of Criteria Air Pollutants and Precursors during Construction. (CEQA 1, 2, 6; TRPA 1, 2)** *Construction-related emissions of criteria air pollutants and precursors under Alternative 3 could contribute substantially to an existing or projected air quality violation and expose sensitive receptors to substantial pollutant concentrations, especially considering the nonattainment status of the LTAB with respect to TRPA standards. However, as described in Environmental Commitment 1, the Conservancy would apply several measures to reduce the generation of construction-related emissions of ROG,* NO_X*, and* PM_{10}*. Therefore, this impact would be* ***less than significant****.*

As described in Impact 3.2-1 (Alt. 1), construction emissions of fugitive PM_{10} dust, ROG, and NO_X have the potential to represent a significant short-term impact with respect to air quality. Under Alternative 3, the initial site preparation and building phases of construction would temporarily generate emissions of criteria air pollutants (e.g., PM_{10}) and precursors (e.g., ROG and NO_X) from excavation, grading, and clearing; use of off-road equipment; import and export of materials; paving; application of architectural coatings; and exhaust from workers' commute vehicles.

Short-term construction-related emissions of ROG, NO_X, and PM_{10} under Alternative 3 were modeled using the ARB-approved URBEMIS 2007 (Version 9.2.4) computer program and EMFAC 2007 emission factors as recommended by EDCAQMD and TRPA. URBEMIS is designed to model construction emissions for land use development projects and allows for the input of project-specific information. Input parameters were based on default model settings and information provided in Chapter 2, "Project Alternatives." Project construction is anticipated to be carried out in four phases. The first phase is anticipated to begin in May 2015, with final project completion in October 2018. Modeling assumed an annual construction period of May 1–October 15 (120 work days) starting in 2015. The modeled maximum daily construction-related emissions are summarized in Table 3.2-6 and described in more detail below and in Appendix F.

Based on the modeling conducted, in the worst-case scenario, construction of Alternative 3 would result in maximum unmitigated daily emissions of approximately 8.5 lb/day of ROG, 59.8 lb/day of NO_X, and 99.9 lb/day of PM_{10} (Table 3.2-6). (These quantities would be comparable to those for Alternatives 1 and 2, except that emissions of PM_{10} would be greater under Alternative 2 than under Alternatives 1 and 3.) Daily unmitigated, construction-related emissions for Alternative 3 would not exceed EDCAQMD's short-term significance criterion of 82 lb/day for ROG and NO_X. With implementation of EC 1, described in Table 2-6, construction-related emissions of PM_{10} under Alternative 3 would not violate or contribute substantially to an existing or projected air quality violation. This impact would be **less than significant**.

IMPACT 3.2-2 (Alt. 3) **Long-Term Operational (Regional) Emissions of Criteria Air Pollutants and Precursors. (CEQA 1, 2; TRPA 1, 2)** *Long-term operational emissions would not exceed TRPA's significance criteria for stationary sources or the recommended significance criterion for mass emissions of NO_X. Therefore, implementation of Alternative 3 would not violate an air quality standard, contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, or conflict with or obstruct implementation of the applicable air quality plan. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.2-2 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.2-3 (Alt. 3) **Long-Term Operational (Local) Emissions of Carbon Monoxide by Mobile Sources. (CEQA 1, 2; TRPA 1, 2)** *Long-term local emissions of CO from mobile sources related to project operation under Alternative 3 would not violate an air quality standard (i.e., the eight-hour TRPA standard of 6 ppm), contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.2-3 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.2-4 (Alt. 3) **Exposure of Sensitive Receptors to Odors. (CEQA 5, TRPA 3)** *Neither construction nor operation of Alternative 3 would create objectionable odors affecting a substantial number of people. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.2-4 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.2-5 (Alt. 3) **Exposure of Sensitive Receptors to Emissions of Hazardous Air Pollutants. (CEQA 4)** *Neither construction nor operation of Alternative 3 would result in the exposure of sensitive receptors to substantial emissions of HAPs (TACs). As a result, this impact would be* ***less than significant****.*

This impact would be the same as Impact 3.2-5 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.2-6 (Alt. 3)	**Short-Term or Long-Term Operational (Regional) Emissions of GHGs. (CEQA 7, CEQA 8)** *Implementation of the project would not result in the generation of substantial short-term construction or long-term operation-related emissions of GHGs. When considered in conjunction with other projects throughout the region, the proposed project's emissions would not affect GHG reduction planning efforts. Therefore, GHG emissions from the proposed project would be* ***less than significant****.*

This impact would be the same as Impact 3.2-6 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.2-1 (Alt. 4)	**Short-Term Emissions of Criteria Air Pollutants and Precursors during Construction. (CEQA 1, 2, 6; TRPA 1, 2)** *Construction-related emissions of criteria air pollutants and precursors under Alternative 4 could contribute substantially to an existing or projected air quality violation and expose sensitive receptors to substantial pollutant concentrations, especially considering the nonattainment status of the LTAB with respect to TRPA standards. As described in Environmental Commitment 1, the Conservancy would apply several measures to reduce the generation of construction-related emissions of ROG, NO_X, and PM_{10}. Therefore, this impact would be* ***less than significant.***

As described in Impact 3.2-1 (Alt. 1), construction emissions of fugitive PM_{10} dust, ROG, and NO_X have the potential to represent a significant short-term impact with respect to air quality. Under Alternative 4, the initial site preparation and building phases of construction would temporarily generate emissions of criteria air pollutants (e.g., PM_{10}) and precursors (e.g., ROG and NO_X) from excavation, grading, and clearing; use of off-road equipment; import and export of materials; paving; application of architectural coatings; and exhaust from workers' commute vehicles.

Alternative 4 involves the cut of 104,844 cubic yards more material than the next highest alternative (Alternative 2) to reduce the grade of the corridor along the river channel to create a new floodplain. The removal of extra material to reduce the elevation of a broad corridor along the river would result in addition construction equipment moving the materials on the project site. Consequently, the level of construction emissions is substantially greater for Alternative 4 than other alternatives. Therefore, as described above, actual projected construction years were used to model Alternative 4's construction emissions in order to avoid grossly overestimating emissions.

Short-term construction-related emissions of ROG, NO_X, and PM_{10} under Alternative 4 were modeled using the ARB-approved URBEMIS 2007 (Version 9.2.4) computer program and EMFAC 2007 emission factors as recommended by TRPA. URBEMIS is designed to model construction emissions for land use development projects and allows for the input of project-specific information. Input parameters were based on default model settings and information provided in Chapter 2, "Project Alternatives." Project construction is anticipated to be carried out in four phases. The first phase is anticipated to begin in May 2015, with final project completion in October 2018. Modeling assumed an annual construction period of May 1–October 15 (120 work days) starting in 2015 and used the corresponding emission factors. The modeled maximum daily construction-related emissions are summarized in Table 3.2-6 and described in more detail below and in Appendix F.

Based on the modeling conducted, construction of Alternative 4 would result in maximum unmitigated daily emissions of approximately 8.7 lb/day of ROG, 62.0 lb/day of NO_X, and 386.9 lb/day of PM_{10} (Table 3.2-6). Daily unmitigated, construction-related emissions for Alternative 4 would not exceed EDCAQMD's short-term significance threshold of 82 lb/day for ROG or NO_X. With implementation of EC 1, described in Table 2-6, construction-related emissions from Impact 3.2-1 (Alt. 4) would reduce fugitive PM_{10} dust emissions by a minimum of approximately 75 percent and prevent dispersion of fugitive PM_{10} dust beyond the property boundary. This impact would be **less than significant**.

IMPACT 3.2-2 (Alt. 4) **Long-Term Operational Emissions of Criteria Air Pollutants and Precursors**. **(CEQA 1, 2; TRPA 1, 2)** *Long-term operational emissions would not exceed TRPA's significance criteria for stationary sources or the recommended significance criterion for mass emissions of NO_X. Therefore, implementation of Alternative 4 would not violate an air quality standard, contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, or conflict with or obstruct implementation of the applicable air quality plan. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.2-2 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.2-3 (Alt. 4) **Long-Term Operational (Local) Emissions of Carbon Monoxide by Mobile Sources. (CEQA 1, 2; TRPA 1, 2)** *Long-term local emissions of CO from mobile sources related to project operation under Alternative 4 would not violate an air quality standard (i.e., the eight-hour TRPA standard of 6 ppm), contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.2-3 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.2-4 (Alt. 4) **Exposure of Sensitive Receptors to Odors. (CEQA 5, TRPA 3)** *Neither construction nor operation of Alternative 4 would create objectionable odors affecting a substantial number of people. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.2-4 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.2-5 (Alt. 4) **Exposure of Sensitive Receptors to Emissions of Hazardous Air Pollutants. (CEQA 4)** *Neither construction nor operation of Alternative 4 would result in the exposure of sensitive receptors to substantial emissions of HAPs (TACs). As a result, this impact would be* ***less than significant****.*

This impact would be the same as Impact 3.2-5 (Alt. 1). For the same reasons as described Alternative 1, this impact would be **less than significant**.

IMPACT 3.2-6 (Alt. 4) **Short-Term or Long-Term Operational (Regional) Emissions of GHGs. (CEQA 7, CEQA 8)** *Implementation of the project would not result in the generation of substantial short-term construction or long-term operation-related emissions of GHGs. When considered in conjunction with other projects throughout the region, the proposed project's emissions would not affect GHG reduction planning efforts. Therefore, GHG emissions from the proposed project would be* ***less than significant****.*

This impact would be the same as Impact 3.2-6 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **less than significant**.

Alternative 5—No-Project/No-Action

IMPACT 3.2-1 (Alt. 5) **Short-Term Emissions of Criteria Air Pollutants and Precursors during Construction. (CEQA 1, 2, 6; TRPA 1, 2)** *Because no construction activities would occur, no short-term construction-related emissions would occur.* ***No impact*** *would occur.*

Alternative 5 would not result in any construction activities in the study area. The study area would remain in its current undeveloped state. As a result, no short-term construction-related emissions of criteria air pollutants (e.g., PM_{10}) or precursors (e.g., ROG and NO_X) would occur. Therefore, **no impact** would occur.

IMPACT 3.2-2 (Alt. 5) **Long-Term Operational (Regional) Emissions of Criteria Air Pollutants and Precursors**. **(CEQA 1, 2; TRPA 1, 2)** *No new long-term operational emissions sources would result from Alternative 5 and use of the study area would remain comparable to existing use. Vehicle emissions from recreation activity would remain at existing levels.* ***No impact*** *would occur.*

As the No-Project/No-Action Alternative, Alternative 5 does not include any new stationary, area, or mobile sources of emissions associated with project operation. No land use changes would occur in the study area, which would remain in its current undeveloped state, and use of the area would remain comparable to existing use. As a result, emissions from the vehicles of recreation-related visitors to the study area would be unchanged from existing emissions levels. **No impact** would occur.

IMPACT 3.2-3 (Alt. 5) **Long-Term Operational (Local) Emissions of Carbon Monoxide by Mobile Sources. (CEQA 1, 2; TRPA 1, 2)** *No long-term change would occur to traffic levels from activities in the study area; thus Alternative 5 would not increase CO levels on nearby local roadways.* ***No impact*** *would occur.*

As the No-Project/No-Action Alternative, Alternative 5 would not result in a long-term change in traffic caused by activities in the study area. As a result, this alternative would not result in changes to the LOS at signalized intersections in the project vicinity, nor would it result in increased long-term local emissions of CO from mobile sources. **No impact** would occur.

IMPACT 3.2-4 (Alt. 5) **Exposure of Sensitive Receptors to Odors. (CEQA 5, TRPA 3)** *Because project construction and operation would not occur, no long-term sources of odor would be caused by activities in the study area, and odors at nearby sensitive receptors would not increase under Alternative 5.* ***No impact*** *would occur.*

Because the project would not be constructed and would not operate under Alternative 5, this alternative would not result in any long-term sources of odors, and existing odors at nearby sensitive receptors would not increase. **No impact** would occur.

IMPACT 3.2-5 (Alt. 5) **Exposure of Sensitive Receptors to Emissions of Hazardous Air Pollutants. (CEQA 4)** *Under Alternative 5 no short-term or long-term emissions of HAPs (TACs) would occur. As a result,* ***no impact*** *would occur.*

Alternative 5 would not result in any construction activities in the study area. The study area would remain in its current undeveloped state. As a result, no short-term or long-term emissions of HAPs (known in State parlance as TACs) would occur. Therefore, **no impact** would occur.

IMPACT 3.2-6 (Alt. 5) **Short-Term or Long-Term Operational (Regional) Emissions of GHGs. (CEQA 7, CEQA 8)** *Under Alternative 5 no short-term or long-term emissions of GHGs would occur. As a result,* ***no impact*** *would occur.*

Alternative 5 would not result in any construction or operational activities in the study area. The study area would remain in its current undeveloped state. As a result, no short-term or long-term emissions of GHGs would occur. Therefore, **no impact** would occur.

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3.3 ARCHAEOLOGICAL AND HISTORICAL RESOURCES

This section analyzes the effects of the project on archaeological and historical resources located within or adjacent to the study area. This analysis does all of the following:

- describes the criteria for determining the significance of cultural resources, including standards provided in NEPA, Section 106 of the National Historic Preservation Act (referred to in this section as "Section 106"), CEQA, and the TRPA Code of Ordinances;
- provides an inventory of known archaeological and historical resources on the study area;
- summarizes previous archaeological investigations; and
- evaluates the potential impacts of the project on known and unknown significant archaeological and/or historical resources and identifies feasible mitigation measures that would reduce those impacts to less-than-significant levels.

For the purposes of this analysis, cultural resources include historic, prehistoric, and archaeological resources. Cumulative cultural resource impacts are addressed in Section 3.16, "Cumulative Impacts." Consistency with TRPA goals and policies is presented in Section 3.10, "Land Use," Table 3.10-1.

3.3.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

NEPA Guidelines

In accordance with NEPA, an agency must consider:

- unique characteristics of the geographic area, such as proximity to historic or cultural resources (40 Code of Federal Regulations [CFR] 1508), and
- the degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP) (40 CFR 1508.27[b][8]).

The following federal law related to archeological and historical resources is relevant to the project alternatives and is described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- Section 106 of the National Historic Preservation Act.

Regulations relevant to the proposed alternatives are described in detail in Chapter 5, "Compliance, Consultation, and Coordination."

State

CEQA offers directives regarding project-related impacts on historical resources and unique archaeological resources located within California. It states generally that if implementing a project would result in significant environmental impacts, public agencies should consider whether feasible mitigation measures or feasible alternatives can substantially lessen or avoid such impacts. This general mandate applies equally to significant environmental effects related to certain cultural resources.

Only significant cultural resources ("historical resources" and "unique archaeological resources") need to be addressed. The State CEQA Guidelines define a "historical resource" as, among other things, "[a] resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources" (CRHR) (State CEQA Guidelines, Section 15064.5[a][1]; see also Public Resources Code Sections 5024.1 and 21084.1.) A historical resource may be eligible for inclusion in the CRHR, as determined by the State Historical Resources Commission or the lead agency, if the resource:

- is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- is associated with the lives of persons important in our past;
- embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- has yielded, or may be likely to yield, information important in prehistory or history.

In addition, a resource is presumed to constitute a "historical resource" if it is included in a "local register of historical resources" unless "the preponderance of evidence demonstrates that it is not historically or culturally significant" (State CEQA Guidelines, Section 15064.5[a][2]).

CEQA (California Public Resources Code Section 21083.2) and the State CEQA Guidelines (Section 15064.5) also require consideration of unique archaeological sites. As stated in Section 21083.2 of the Public Resources Code, a "unique archaeological resource" is defined as "an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

(1) "Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information."

(2) "Has a special and particular quality such as being the oldest of its type or the best available example of its type."

(3) "Is directly associated with a scientifically recognized important prehistoric or historic event or person."

If an archaeological site does not meet any of the criteria for inclusion in the CRHR but does meet the definition of a unique archaeological resource as outlined in Public Resources Code Section 21083.2 of CEQA, it is entitled to special protection or attention under CEQA. Treatment options under Section 21083.2 include activities that preserve such resources in place in an undisturbed state. Other acceptable methods of mitigation include excavation and curation or study in place without excavation and curation (if the study finds that the artifacts would not meet one or more of the criteria for defining a "unique archaeological resource").

Section 15064.5(e) of the State CEQA Guidelines requires that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the Native American Heritage Commission (NAHC) must be contacted within 24 hours. At that time, in accordance with Section 15064.5(d), the lead agency must consult with the appropriate Native Americans as identified by the NAHC; under certain circumstances, the lead agency is to develop an agreement with the Native Americans for the treatment and disposition of the remains.

Tahoe Regional Planning Agency

Goals and Policies

The Goals and Policies document of the 1987 Regional Plan establishes an overall framework for development and environmental conservation in the Lake Tahoe region. Chapter IV (Conservation Element) of the Goals and Policies document considers ten subelements selected to cover the full range of Lake Tahoe's natural and historical resources. The sole goal (Goal #1) in the Cultural Subelement of this chapter calls for sites of historical, cultural, and architectural significance within the region to be identified and preserved. There are two policies under Goal #1: Policy 1 requires TRPA to establish a list of significant historical, cultural, and architectural sites and special-review criteria to protect such sites; and Policy 2 stipulates that these sites be given special incentives and exemptions to promote the preservation and restoration of such structures and sites.

Code of Ordinances

In compliance with federal and state laws, TRPA has adopted guidelines to determine cultural resources significance and impacts in the Tahoe Basin. Chapter 67 of the TRPA Code of Ordinances states that "sites, objects, structures, districts or other resources of historical, cultural, archaeological, paleontological, or architectural significance locally, regionally, state-wide, or nationally" shall meet at least one of the following criteria:

- resources that are associated with historically significant events and sites, such as an important community function in the past or a memorable happening in the past, or that contain qualities reminiscent of an early stage of development in the region (Section 67.6.1);
- resources associated with the lives of persons significant in history, including regional history, including buildings or structures associated with a locally, regionally, or nationally known person; notable examples or best surviving works of a pioneer architect, designer, or master builder; or structures associated with the life or work of significant persons (Section 67.6.2);
- resources that embody the distinctive characteristics of a type, period, or method of construction; that possess high artistic values; or that represent a significant or distinguishable entity but whose components may lack individual distinction (Section 67.6.3);
- archaeological or paleontological resources protected or eligible for protection under state or federal guidelines (Section 67.6.4); or
- prehistoric archaeological or paleontological resources that may contribute to the basic understanding of early cultural or biological development in the region (Section 67.6.5).

Section 67.3 of the TRPA Code of Ordinances requires the protection of sites, objects, structures, or other resources designated as historic resources or for which designation is pending. Such resources may not be demolished, disturbed, removed, or significantly altered unless TRPA has approved a resource protection plan to protect the historic resources. Section 67.3.3 requires that the resource protection plan be prepared by a qualified professional and states that the plan may provide for surface or subsurface recovery of data and artifacts and recordation of structural and other data. Section 67.3.4 requires that resources be protected during construction; grading, operation of equipment, or other soil disturbance is prohibited in areas where a designated historic resource is present or could be damaged, except in accordance with a TRPA-approved resource protection plan (TRPA 2011).

Section 33.3.7 of the TRPA Code of Ordinances addresses the discovery of historic resources during grading activities. This section requires project-related grading to cease and project proponents to notify TRPA if construction contractors encounter resources that appear to be 50 years old or older. TRPA would suspend

grading and consult with appropriate federal, state, or local entities to determine the significance of the resource, if any. The property owner is required to protect the materials during the investigation period (TRPA 2011).

ENVIRONMENTAL SETTING

Natural Setting

Recognizing that the study area has been disturbed by human activity for much of its history, it is unlikely that the floral and faunal communities seen today are representative of those that were present before extensive Euro-American settlement of the area. The introduction of exotic plant and animal species, the alteration of watercourse channels, and general habitat degradation that have occurred since Euro-American settlement have produced a landscape and biotic community likely quite different from its earlier state. Many native species still exist in the area, including some used by the native Washoe people; however, the diversity of plant and animal life in the marsh and surrounding area has changed, and in some regards has become more limited.

Prehistoric Archaeological Setting

The prehistory of the northern Sierra Nevada has been studied by numerous researchers, among them Ataman (1999), Heizer and Elsasser (1953), Elsasser (1960, 1978), Elston (1971, 1982, 1986), Elston et al. (1977, 1994, 1995), Miller and Elston (1979), Ingbar (1994), Moratto (1984), Pendleton et al. (1982), Kuffner (1987), Peterson (1984), Zeier and Elston (1986), Delacorte (1997), McGuire (1997), and Moore and Burke (1992). The cultural chronology of the region, based on the synthesis provided by Elston et al. (1994:11), is summarized in Table 3.3-1.

Table 3.3-1
Cultural Phases in the Central and Northern Sierra Nevada

Phase/Adaptive Strategy	Time Markers	Age (Years BP)	Climate
Late Kings Beach/ Late Archaic	Desert Series Projectile Points, chert cores, utilized flakes and other small chert tools, and possibly shallow saucer-shaped house pits	700–150	Neoglacial; wet and cool but with little summer precipitation
Early Kings Beach/ Late Archaic	Rosegate Series points; chert cores; utilized flakes and other small chert tools; hullers; M1a sequin beads; possibly small, shallow saucer-shaped house pits	1300–700	Neoglacial; dry, trees growing in former bogs, extended periods when Lake Tahoe may not have overflowed
Late Martis/Middle Archaic	Corner-notched and eared points of the Martis and Elko Series and large basalt bifaces	3000–1300	Neoglacial; wet but not necessarily cooler, increased summer rain
Early Martis/Middle Archaic	Contracting stem points of the Martis and Elko Series, Steamboat points, and large basalt bifaces	5000–3000	Beginning of Medithermal; Neoglacial; wet, but not necessarily cooler, increased summer precipitation; Lake Tahoe begins to overflow
Spooner/Early Archaic	No time markers defined	8000–4000	Altithermal; generally hot and dry; Lake Tahoe does not overflow for long periods
Tahoe Reach/ Pre-Archaic	Great Basin Stemmed Series points	>10,000–8000	Anathermal; warming trend, climate similar to the present

Source: Compiled by AECOM in 2012

Scant archaeological evidence of early occupation has been discovered thus far in the Sierra Nevada; however, east of the Sierra Nevada crest, in the western Great Basin, the Tahoe Reach Phase is seen by Elston et al. (1994) as an expression of early occupation. Dating from approximately 10,000 to 8000 years before present (BP), archaeological sites associated with this period are marked by the presence of Great Basin stemmed points with ground margins, bifaces, choppers, and crescent-shaped tools. The subsequent Spooner Phase of the Early Archaic (8000–4000 BP), originally proposed by Elston (1971), currently lacks diagnostic artifacts and remains generally undefined pending the results of future archaeological research.

Throughout the ensuing Archaic period, populations increased, the resource base broadened, and food gathering and tools used for processing plant materials became more complex, with new items and technologies added to existing ones. Flaked stone tools became simpler and smaller, with less stylistic variation, and during the Late Archaic, the bow and arrow replaced the atlatl and dart (Elston 1982:187; 1986). The intensified use of resources and the complexity of expanded tool kits are representative of the transition to the Late Archaic archaeological period. Much of this transition is thought to have been in response to population pressures, possibly spurred by a hot, dry climatic regime occurring between 1000 and 2000 years BP (Elston 1986).

Elston (1982:189) proposed a basic Archaic settlement pattern for the Great Basin with two variations: a dispersed and a restricted pattern. The former was the typical pattern in the more arid regions of the western Great Basin (central Nevada), where small residential groups frequently selected different winter habitations and base camp sites from year to year to take advantage of a relatively unpredictable and scarce resource base. The restricted pattern prevailed throughout the northern Sierra Nevada front (the area adjacent to and east of the crest) between 4000 and 2000 years BP At that time, greater effective moisture provided a resource base that was relatively more reliable and abundant in relation to population density. In the Middle Archaic, residential groups regularly occupied sites with access to a suite of subsistence resources. Thus, high-return resources could be procured more efficiently and at lower cost, with few residential moves (Elston 1982:196; Zeier and Elston 1986).

Moore and Burke (1992:21) define four artifact classes that characterize Middle Archaic period sites: large corner-notched and contracting-stem points, large bifaces used as scrapers rather than for cutting, flake tools made on large interior flakes (flakes not exhibiting cortical surfaces) with steep edge angles similar to those of the bifaces, and expedient gravers and perforators. Reduction of lithic materials was generalized and inefficient, producing a large amount of waste rock (Moore and Burke 1992:21–24). Elston (1986:141) proposed that Middle Archaic winter sites were located in optimal ecological locales. In the Truckee Meadows, it appears from the density of diagnostic artifacts that land use intensified during this period. However, there is no evidence for long-term occupation; base camps appear to have been visited frequently for limited periods.

During the Late Martis Phase of the Middle Archaic (3000–1300 BP), the archaeological assemblages associated with the disparate Great Basin and California cultural areas were distinct. These differences may reflect a cultural and physical barrier that persists throughout the Martis Phases of the Middle Archaic (Ataman 1999:10–11) and may have continued into later times, as suggested by research conducted by Deis (1999), who presents evidence for a discontinuity in the presence of Great Basin projectile point types along the western slopes of the Sierra Nevada during the Middle/Late Archaic transition. Abrupt technological, settlement, and subsistence changes are seen throughout the Tahoe Basin at the beginning of the Late Archaic, and these changes may be associated with the emergence of the ethnographic Washoe (Zeier and Elston 1986). Small projectile points, indicating a switch from atlatl and dart to bow and arrow technology, are evident throughout the region. The corresponding Early Kings Beach Phase (1300–700 BP) is characterized by the appearance of hullers and bedrock mortars, apparently associated with a northern population expansion and subsequent exploitation of pinyon pines. Fish and small game also become a major part of the diet. This phase is marked by a switch to a toolstone-efficient technology centered on the primary use of locally available cherts and sinter. In addition to the major shift to small Rosegate arrow points, other diagnostic traits include the use of large and small triangular bifaces made exclusively of chert, well-thinned bifaces with large width-to-thickness ratios. Gravers are absent during this period; retouched flakes are rare; and perforators, if present, tend to be made of recycled small corner-notched points.

Elston (1982:199) postulated a more dispersed settlement pattern with less regular occupation of optimal sites in the Late Archaic (Kings Beach Phase). He linked this shift to a changing subsistence pattern with progressively greater intensity of exploitation of diverse resources and ecozones. Zeier and Elston (1986:377–379) found that people continued to occupy the old sites but also began to occupy new sites in less optimal locations. Resources were being depleted faster at the old sites, necessitating more frequent moves, or demographic packing filled in the spaces between optimal locations. At the new sites, low-ranked resources were used intensively at higher cost. These new site locations may reflect exploitation of pinyon, which reached its northernmost expansion between 1200 and 710 BP (Raven 1990:78).

On the eastern Sierra Nevada front, the Late Kings Beach Phase of the Late Archaic (700–150 BP) is marked by flaked stone assemblages dominated by local cherts, with rare use of basalt and sinter (Elston et al. 1994:18). Although Elston et al. (1994) ascribe the beginning of this period with the appearance of small side-notched point types that replace the early corner-notched types, Moore and Burke (1992:23) propose that the corner-notched varieties persist until circa 500 BP, which is consistent with evidence presented by Clay (1996). Elston et al. (1994:18) state that the evidence is not compelling. Moore and Burke (1992:37) suggest that the dietary breadth decreases during this phase, and there appears to be a decrease in sites at upper elevations, with increased occupation at lower elevations, particularly along terraces of the Truckee River.

Ethnographic Setting

Although recent historic-era accounts of traditional Native American territories do not always reflect prehistoric patterns of native land use and occupation, the Tahoe Basin is unusual in that ethnographic, linguistic, and archaeological evidence supports a presence of the Washoe and their ancestors in the region for at least several thousand years. The following outline of Washoe culture and presence in the area is drawn from the recent work of Lindström (2004), unless otherwise noted.

The study area is located in the center of Washoe territory, which was used primarily by the Southern Washoe or *Hung a lel ti* (d'Azevedo 1956, 1984; Downs 1966; Nevers 1976; Stewart 1938). The rich environment of the Tahoe Basin afforded the Washoe a degree of isolation and independence from neighboring peoples and may account for their long tenure in the area (d'Azevedo 1984:466, 471). The Washoe are part of an ancient Hokan-speaking residual population that was subsequently surrounded by Numic-speaking peoples, such as the Northern Paiute (Jacobsen 1966).

The ethnographic record suggests that during the warmer months, small groups traveled through high mountain valleys collecting edible and medicinal roots, seeds, and marsh plants. In the higher elevations, men hunted large game (mountain sheep, deer) and trapped smaller mammals. Suitable tool stone (such as basalt) was quarried at various locales along the north side of Lake Tahoe. The lake and its tributaries were an important fishery. The Upper Truckee River and Trout Creek accommodated numerous established fishing areas where multiple family groups converged to harvest Lahontan cutthroat trout and whitefish from late spring through fall (Lindström and Rucks 2002, 2003). Archaeological evidence of these ancient Washoe subsistence activities, including temporary small hunting camps containing flakes of stone and broken tools, is found along the mountain flanks. In the high valleys, more permanent base camps have been found along lakes, streams, and springs and are represented by stone flakes, tools, grinding implements, and house depressions.

By the 1850s, Euro-Americans permanently occupied the Washoe territory and had changed traditional lifeways. Mining, lumbering, grazing, commercial fishing, tourism, and the growth of settlements disrupted traditional Native American relationships to the land. As hunting and gathering activities were increasingly restricted over time, the Washoe were often forced to become dependent on the Euro-American settlers. Because access to lands in the Tahoe Basin and throughout the Sierra Nevada was limited, Washoe families would return to the lake in the summers, where they negotiated work and camping privileges with various establishments, creating a postcontact settlement pattern where conditions were congenial. They were employed as domestic laborers around the resorts

and settlements and as basket weavers, commercial fishermen, and guides for backcountry sportsmen (Scott 1973:20).

Unlike Native Americans in many other regions of California, even into the 20th century, the Washoe were not completely displaced from their traditional lands. In 1917, the Washoe Tribe began reacquiring a small part of their traditional lands (Nevers 1976:90–91). The Washoe remain a tribe recognized by the U.S. government and have maintained an established land base. Its 1,200 tribal members are governed by a tribal council that consists of members of the Carson, Dresslerville, Woodfords, and Reno-Sparks Indian colonies, as well as members from nonreservation areas. The contemporary Washoe have developed a comprehensive land use plan (Washoe Tribal Council 1994) that identifies the goals of reestablishing a presence in the Tahoe region and revitalizing Washoe heritage and cultural knowledge, including the harvest and care of traditional plant resources and the protection of traditional properties in the cultural landscape (Rucks 1996:3).

Washoe Place Names

Lake Tahoe was both the spiritual and physical center of the Washoe world. The Washoe lived along its shores, referring to the lake as *Da ow a ga*, which means "edge of lake." The Washoe word *Da ow*, mispronounced by Euro-Americans as "Tahoe," gave rise to the lake's modern name. Freed (1966) and d'Azevedo (1956) reported the locations of several Washoe encampments in the Tahoe Basin. It is important to note that the names of these places are geographic references to camping destinations for multiple family groups and not necessarily the name of a single camp.

According to d'Azevedo (1956:19), the Washoe referred to the "delta" of the Upper Truckee River and Trout Creek as *mesuk malam*, which means "a swamp that is now a meadow." Trout Creek (*ma't'osawhu wa't'a*) and the Upper Truckee River (*imgi' wa't'a, t'sigolhu wa't'a*), drainages that form the Upper Truckee River delta, were also known as *mes a*, a term also applied to the entire Lake Valley (d'Azevedo 1956:85), perhaps indicating the traditional importance of the delta. Two of the most important fisheries and productive wetlands in the subsistence regimes of the Southern Washoe and their Carson Valley neighbors are located in the study area. The Upper Truckee River and Trout Creek have been identified as being among the most productive and desirable Washoe fisheries at Lake Tahoe of the 11 fisheries ranked in testimony gathered for the Washoe Lands Claim Case (Wright n.d.).

Freed (1966) lists two ethnographic camp sites associated with these fisheries:

- *ImgiwO'tha* (cutthroat trout + water course) was the name given to a fishing camp "east of the Upper Truckee River and about one and a half miles from [south] of the lake."

- *mathOcahuwO'tha* (whitefish + water course) was the name given to "an important fall camp on Trout Creek" that was noted as a particularly attractive destination in the late fall when families gathered on their way out of the basin en route to the Pine Nut Mountains or west into the Sierra Nevada foothills for acorns. This camp was also noted because families could spread out, camping near their fish blinds, which they could not do at other fisheries. Families drove whitefish into the shallows, scooped them from the water, and dried and processed them for winter stores. Late berries, another important winter staple, were also gathered at this location.

In his interviews with the Washoe, d'Azevedo (1956:19–20) was given the same names (recorded in varying orthography) as designations for the water course (Trout Creek) itself, although he was told that *mathOcahuwO'tha* was a recent name for Trout Creek, known formerly as *t'sigóhu w'át'a* (kidney [shaped] + water course), according to Roma James (the father of Washoe Elder Steven James, mentioned below) and George Snooks. d'Azevedo was also given this name for a tributary of Trout Creek located upstream "near Sierra House" (along Pioneer Trail). In addition, according to d'Azevedo, *Meshuk málam* (medicine + confluence) was the name for the delta or wetland where the Upper Truckee River and Trout Creek converge into a wetland (the Upper Truckee Marsh) before entering the lake.

Nevers (1976:6) gives the same names (with varying orthography) and locations of camps for the same areas as those given by Freed (1966), stating that the Carson Valley and Southern Washoe used the camps at Trout Creek, "catching plentiful whitefish" and that "at *Imigi Watah*, the Washoe caught cutthroat trout which were big enough to pull a man into the water." In addition, Scott (1957:187) presents pictures of two Washoe women, dating from October 19, 1901, and taken northeast of the Upper Truckee River, with a portion of the marsh in the background. The caption identifies the women as being "near their summer campground."

These camp locales have been confirmed in more recent ethnographic and oral history research. Steven James relates that his younger brother, Ivan, was born in the camp their family occupied close to Trout Creek, east of and adjacent to U.S. 50 (d'Azevedo 1956:18). James remembers that the area upstream was important "for many families" and believes that families would have had particular places along this river that they returned to each year. His family's camp (where Ivan was born) was near the present-day highway and located in a stand of lodgepole pine, "all cut down now." He recalls that the fishing was good along the river, up past Sierra House all the way to Star Lake. He also notes that there was an old trail, a shortcut that provided access to Lake Tahoe from Woodfords and passed by the Sierra House site. This trail was described to d'Azevedo (1956:18) as traversing up Willow Creek canyon to Sierra House, via Fountain Place, or *góbiba'* (and perhaps over Armstrong Pass).

The marsh not only was an important fishing location but provided other significant resources. For example, Washoe Elder Florine Conway recalls that there was a particular "gray willow" that grew from the trunks of downed shrubs growing in Trout Creek downstream of U.S. 50. The willows produced desirable long wands sought by weavers of large, ornate baskets (three rod *degiku*) (d'Azevedo 1956:18).

Knox Johnson (Johnson, pers. comm. with Susan Lindström, 2004), a descendant of a pioneer family that grazed cattle along Trout Creek, recalls that the Washoe harvested cutthroat trout in spring, with special emphasis on whitefish in Trout Creek in fall. He also remembers that Washoe Indians camped along Trout Creek near the U.S. 50 bridge as late as the 1950s while they worked summer jobs at the south end of the lake. Johnson further notes that the ten-acre parcel of land in the Highland Woods subdivision, north of U.S. 50 and off Sunset Drive, was a large Washoe Indian camp.

The area that Johnson refers to is likely part of archaeological site CA-ELD-26/H, a large Native American camp that extends along the bluff overlooking the Upper Truckee River/Trout Creek marsh, north of Springwood Drive and containing the former Mosher (Barton) cattle corrals and the Barton family ranch house at "Meadowedge." It is possible that a substantial portion of the surrounding Highland Woods and Sierra Tract subdivisions encompasses this large Native American encampment. Both residential subdivisions were likely constructed where the Washoe fishing camp (known as *Imigi Watah*) was located, as described in detail by Freed (1966), d'Azevedo (1956), and Nevers (1976). The developments are also located adjacent to Trout Creek, an important fall camp that remained a resource and camping area for several families well after contact until increased development and subdivision after World War II ended these arrangements.

Historic-Era Setting

Historic-era activities in the Tahoe Basin and specifically in and in the vicinity of the study area can be discussed in terms of several general trends or themes that have most influenced the current patterns of land use and development: transportation, cattle ranching and agriculture, timber harvesting, and the advent of resort and residential communities. Unless otherwise noted, the information presented below is drawn from the work of Lindström (2004).

Transportation

The opening of the Comstock silver mining boom in Nevada, beginning in mid-1859, prompted a surge in heavy wagon and freight traffic through the Tahoe Basin and the development of roadways and routes that allowed increased and quicker travel though the region. Lindström and Hall (1998) and Scott (1957, 1973) have described these various routes in detail. Those most relevant to the study area are discussed below.

Johnson Pass Road

Johnson Pass Road was one of the earliest road components in the Bonanza Road System between Placerville and the mines of the Comstock Lode. The Bonanza Road System was also known as the Johnson Cut-off, the Lake Road, the Placerville/Lake Tahoe Road, the Lake Bigler Toll Road, the Lake House Road, the Lincoln Highway, and, ultimately, U.S. 50 (Scott 1973:59, 64, 451; TRPA 1971:8). The Bonanza Road (more commonly referred to as the "Old Placerville Road") traversed the Johnson Cut-off over Echo Summit, down to Lake Valley, and then to Mormon Station (Genoa). Laid out in 1852 (probably as a narrow trail), it was passable for wagons sometime before 1854 (Hoover, Rensch, and Rensch 1966:76). The Lake House Road "dogleg" of the Johnson Pass Road branched northward through the present-day Sierra Tract and Highland Woods subdivisions.

The present-day Pioneer Trail, previously referred to as the "back road," was often preferred by freighting teams because it was less sandy than the Lake House Road (Scott 1957:380). Knox Johnson notes that the "Old" Lake House Road was really two roads that joined into a single route through the present-day Sierra Tract subdivision. One road branched from Pioneer Trail near the present fire station, and the other road left Pioneer Trail along Trout Creek, about two miles northeast of Meyers. The two roads merged into one due south of the Sierra Tract subdivision and passed through the subdivision near Carson Street, exiting to cross U.S. 50 at its intersection with O'Malley Drive at the present-day 7-Eleven convenience store.

The "Old" Lake House Road continued north of U.S. 50 through the current Highland Woods subdivision, exiting off Rubicon Trail. From there, the road crossed the marsh on an elevated causeway and entered the Al Tahoe subdivision along Argonaut Avenue. At Lily Street, the road turned east and followed Lakeview Avenue to El Dorado Beach, where it again joined the modern route of U.S. 50. This lakeshore "dogleg" is shown as a major route through Lake Valley on maps dating between 1861 and 1949. The modern route of U.S. 50, which bisects the Sierra Tract subdivision, did not assume prominence in the Lake Valley transportation system until 1949.

Portions of present-day U.S. 50 and Pioneer Trail were also part of the first designated coast-to-coast motor route referred to as the Lincoln Highway. The highway, consisting of a route patched together from preexisting roads and newly built "seedling miles" intended to spur economic growth, started in Times Square, New York City, and ended in Jack London Square in Oakland, California. At the time, the federal government was not involved with the designation and construction of the route. The people primarily responsible for establishing the Lincoln Highway Association in 1913 and conducting all its activities were Henry Joy, president of the Packard Motor Car Company, and Carl Fisher, owner of the Indianapolis Motor Speedway. Mr. Joy and Mr. Fisher, along with other automobile manufacturers and industrialists of the day, had a vested interest in the growth and improvement of roadways in the United States. A better and more extensive road network would lead to increased sales.

In 1921, the federal government passed the Federal Highway Act, which provided $75 million of matching funds to the states for highway construction. However, the act required each state to identify seven percent of its total mileage as "primary"; only these roads would be eligible for federal funds. The Lincoln Highway, already an established and maintained route, was ready for designation as a primary road worthy of federal funding. By the late 1920s, the Lincoln Highway in California was no longer a private enterprise and had been fully absorbed into the federal highway system.

Lake House

Lake Bigler House (referred to as "Lake House") was constructed by Seneca Dean, William W. Lapham, and Robert Garwood Dean on 320 acres they acquired in 1859. It was constructed on a dogleg of Johnson Pass Road that formerly fronted Lake Tahoe one-half mile northeast of the location where the Upper Truckee River empties into the lake. Lake House, Tahoe's first lakeshore hotel (Hoover et al. 1966:84), was erected near what are now Lakeview and Lily Avenues. It was known variously as Lake Bigler House, Lake House, Van Wagener's Hotel, and Dean and Martin's Station, until Thomas B. Rowland established the name Rowland's Lake House and

Station. Discovery of the Comstock Lode in 1859 and attendant construction of a series of toll roads through Tahoe's Lake Valley into the Carson Valley brought throngs of travelers past these doors.

Cattle Ranching and Agriculture

Ranching and farming endeavors that raised beef and dairy cattle and hay and grain in the meadows within and in the vicinity of the marsh were established beginning in the 1860s. Several pioneer ranching and dairy families in the Tahoe region, including the Barton and Johnson families, had land holdings on or near the lower reaches of the Upper Truckee River and Trout Creek drainages adjacent to the study area. In some cases, family ownership dates back to homesteads acquired in the 1860s; for most, however, lands were purchased as cut-over timber holdings in the early 1900s.

Barton Ranch

Barton Ranch was situated in the first meadow north of Yank's Station (Meyers). Homesteaded by cattleman Hiram Barton, who came to California in the 1850s, it served as his Lake Valley "home ranch" during the summer season. Although it supplied feed for the freighting teams and dairy products to the traveler, the holding was not strictly considered a way station in the 1860s. It also served as a lodging house when other establishments on the lakeshore leg of the Johnson Cut-off were filled to capacity. The bottomlands south of the Upper Truckee River's outlet passed through the ranch and milk house, which later would be known as "Meadowedge." The ranch house was located east of the study area and beyond Rubicon Trail. Barton was the father of two girls and seven boys. One of his sons, William D. Barton, was still active in the cattle business in 1955, with his headquarters in the Tahoe Valley (Scott 1957:379).

The ranching industry was seasonal, and Lake Valley (located just south of the study area) was typically used as summer range for livestock. Prior conversations with Barton relatives and friends, such as the Moshers, and the oral history recollections of Alva Barton provide general insights into the migratory dairy and beef enterprise ranching system practiced at Lake Tahoe (see Lindström and Rucks [2002] for additional details). Alva Barton pointed out that although the meadows were located in the mountains, they still needed to be irrigated during the dry season. They were irrigated using a network of water impounding and diverting dams and wing walls, water gates, and miscellaneous earthen water works. Some of these features have been recorded by Lindström (1995, 1996) and Lindström and Rucks (2002, 2003) along the Upper Truckee River within the study area and by Lindström and Hall (1998) along Trout Creek. To enhance pasture production, stock was periodically moved. More recently, the Moshers' grazing practices were modified by local regulations until grazing on the property was finally discontinued.

Johnson Ranch

Johnson family members were pioneers in the Lake Valley area and introduced irrigation practices to neighboring ranchers. Chris Johnson owned considerable land holdings in the vicinity of the study area. Although most of the Johnsons' holdings were centered around Bijou Meadows, the Johnsons also irrigated Trout Creek Meadows. In the early 1900s, in search of additional pastureland, Chris Johnson purchased acreage along the middle reach of Trout Creek in the eastern portion of the present-day Sierra Tract. To purchase the land, he paid $13,000 to the Jacques estate, a firm from Los Angeles that had been involved in developing the Al Tahoe subdivision.

According to Knox Johnson, grandson of Chris Johnson, the family stored water behind two dams on Trout Creek (Lindström, pers. comm., 1996, cited in Lindström and Hall 1998). The upper dam was located at the site of a present-day South Lake Tahoe Public Utility District facility and the lower dam was opposite Knox Johnson's former residence in the Sierra Tract at 1057 Blue Lake Road. Levees were built along both sides of Trout Creek to back up water and flood the meadow, and the family ice house was once located at the present-day muffler shop at 2774 Lake Tahoe Boulevard.

Timber Harvesting

A general history of Comstock-era logging in the Tahoe Basin, with additional information on lumbering in the Lake Valley area, is offered by Lindström and Hall (1998), Myrick (1992), and Scott (1957, 1973).

Several major lumber companies formerly operated in the Tahoe Basin. Each developed an impressive network of sawmills, railroads, tramways, flumes, and rafting operations that was designed to cut and move most of the lumber over the crest of the Carson Range and down to the Comstock mines. The Carson & Tahoe Lumber & Fluming Company (CTLFC) emerged as the chief operator, with holdings in the east-central, south, and southwestern portions of the Tahoe Basin. The company was formed by Bliss and Yerington in 1873, with headquarters at Glenbrook, Nevada.

One of the CTLFC's lumbering operations was centered near present-day Bijou at Taylor's Landing. In 1889, two years after the CTLFC installed its Lake Valley Railroad, it drove double rows of pilings to hold back the sand at the influx of the Upper Truckee River. Pilings were also driven at strategic points along the river, serving as "bumpers" to ease the passage of logs (site CA-ELD-739-H) (Lindström 2004). Logs were floated downstream at high water, and the timber was banked at the outlet. The "go-devil" barge became a familiar sight in the shallow water at the mouth of the river, where it was used to retrieve sunken logs. After the sunken logs were winched to the surface, they were moved to the Glenbrook Mill (Scott 1957:209).

During the 1890s, the CTLFC obtained timber rights to more than 6,000 acres along the south shore of the lake, acquiring rights on Barton family holdings, among others. As the timber business prospered, thousands of men found work as lumberjacks, log rollers, and cordwood splitters. Ranchers and dairymen who provisioned the lumber operations also benefited. Although the larger suppliers of hay and grain were Carson Valley ranchers, supplementary amounts of feed were provided by ranchers and dairymen, such as the Bartons (Lindström and Hall 1998:22).

By the mid-1890s, the South Lake Tahoe area had been stripped of its marketable timber, and large-scale logging in this region ceased.

Resort and Residential Community Development

With the demise of logging, title to land sections in and surrounding the study area could be obtained by paying the back taxes for the property or, at the most, $1.50 an acre. This incentive led to an era of resort and summer-home development that came to characterize much of South Lake Tahoe (Scott 1957:219). Lindström and Hall (1998) have summarized these events that occurred in the vicinity of the study area.

As the Tahoe Basin attracted more tourists, diverse resorts appeared along the shores of the lake. Growing numbers of eastern visitors joined the members of San Francisco's elite and the wealthy mining and business interests of the Comstock Lode at the lake's best hotels. People of more modest means vacationed in rustic hotels and cottages or camped at resort facilities such as Lakeside. The movement toward year-round use of the Tahoe Basin brought building and development to Tahoe's shores, with the need to house employees in addition to the vacationers. Lake Tahoe's south shore was heavily involved with this growth.

By 1908, Chris Johnson owned land along Trout Creek, including a triangular piece of property in the current Sierra Tract subdivision located adjacent to and south of the study area. During the late 1940s, the Johnsons subdivided their parcel, which was bounded on the north by U.S. 50, on the west by O'Malley Drive, and on the east by Trout Creek Marsh, calling it "Johnson Acres No. 2." As part of "Johnson Acres No. 1," they also subdivided property near "the big Indian camp" at Bijou into one-acre lots that sold for $1,100–1,600 each. In 1951 Knox Johnson built his "cabin" at 1057 Blue Lake Road. At this time, there was only one street in the subdivision. Development on the remaining property west of O'Malley Drive, known then as the Tahoe Sierra Subdivision No. 1, No. 3, and No. 4 (and currently known as the Sierra Tract Subdivision), began circa 1945–1946.

The Highland Woods subdivision is located at the southern extent of the Upper Truckee River Marsh, adjacent to and immediately north of U.S. 50. Before it was developed, the land was under the jurisdiction of the U.S. Forest Service (USFS). The earliest part of this subdivision was developed in 1959 as the "Country Crossroads Village." The ten-acre lot located off Sunset Drive, at the western end of the subdivision, was once a sawmill site that was operated during the 1940s by Gus Winkleman, a former supervisor for El Dorado County.

Previous Cultural Resources Investigations

Twenty-seven known cultural resources investigations have been conducted within one-quarter mile of the project area. Of these, nine are in or adjacent to the study area (Table 3.3-2). Many of these investigations have been conducted in relation to erosion control and wetland restoration projects proposed for locations within the study area or on adjacent parcels. Not all of these investigations included intensive field surveys, archival research, oral histories, and consultation with the Washoe Tribe of Nevada and California. An appendix prepared for this EIR/EIS/EIS contains information on the nature and location of cultural resources. In accordance with Section 9 of the Archaeological Resources Protection Act of 1979 (16 United States Code [USC] 470hh) and Section 304 of the National Historic Preservation Act of 1966 (16 USC 470w-3), this information is privileged and is intended for limited distribution only. Thus, that appendix is referred to in this section of the EIR/EIS/EIS as "Confidential Appendix."

Table 3.3-2
Previous Cultural Resources Investigations Conducted in and Adjacent to the Study Area

NCIC Number	Title	Author	Date
None	*Sierra Tract Erosion Control Project—Addendum Cultural Resources Inventory*	Brian Ludwig—EDAW (now AECOM)	2007
None	*Heritage Resource Inventory—Sierra Tract Erosion Control Project*	Susan Lindström	2004
None	*Phase I Addendum—Archaeological Field Inventory Upper Truckee River Wetlands Restoration Project, 400 Acres, South Lake Tahoe California, El Dorado County*	Susan Lindström	1996
8616	*Upper Truckee River Reclamation Project Heritage Resource Study*	Susan Lindström and Penny Rucks	2002
6786	*Archaeological Survey Report—AT&T Wireless Services, Site ID #959002021A—Lake Valley 2435 East Venice Drive, South Lake Tahoe, El Dorado County, California*	Ric Windmiller	2002
2861	*Phase I Literature Review and Preliminary Assessment of Known and Potential Heritage Resources—Upper Truckee River and Wetland Restoration Project*	Susan Lindström	1995
2856	*First Addendum—Historic Property Survey Report for Three Bridges within the Lake Tahoe Basin on State Route 50: El Dorado County, California*	PAR Environmental Services	1991
2869	*An Archeological Reconnaissance of the Lake Tahoe Community College–El Dorado County, California*	Daniel G. Foster—California Department of Forestry and Fire Protection	1982
2850	*An Archaeological Survey of the South Lake Tahoe Bike Trail Project, El Dorado County, California*	David Chavez	1981

Source: Compiled by EDAW (now AECOM) in 2007 and 2012 based on information from the North Central Information Center at California State University, Sacramento

Studies noted in Table 3.3-2 identified ten prehistoric and historic-era cultural resources in the study area. One of these has been recommended eligible for listing in the NRHP and the CRHR, seven are considered not eligible, and two are unevaluated resources (Table 3.3-3).

Table 3.3-3
Cultural Resources Previously Documented in the Study Area

Resource Number	Association	Site Type	Location		NRHP/CRHR Recommendation
			USGS Quadrangle	Section	
CA-ELD-26/H	Prehistoric/ historic	Habitation—lithic scatter—historic refuse	South Lake Tahoe	4	Prehistoric component eligible; historic component not eligible
CA-ELD-721H	Historic	Old Placerville Road	South Lake Tahoe	4, 31	Not eligible
CA-ELD-739H (Locus 1)	Historic	CTLFC pilings	South Lake Tahoe	4	Unevaluated, submerged
CA-ELD-739H	Historic	CTLFC pilings	Emerald Bay	31	Unevaluated, submerged
CA-ELD-2223H	Historic	"Old" Lake House Road	South Lake Tahoe	4	Not eligible
CA-ELD-2235H	Historic/ prehistoric	Dunlap Dam Complex—lithic scatter	South Lake Tahoe	4	Not eligible
CA-ELD-2238H	Historic	Sparse refuse scatter	South Lake Tahoe	31	Not eligible
CA-ELD-2239H	Historic	Fence lines	South Lake Tahoe	4, 31	Not eligible
CA-ELD-2240H	Historic	Roadway	South Lake Tahoe	4	Not eligible
UTR-IF-1	Prehistoric	Isolated chert flake	Emerald Bay	31	Not eligible

Notes: CRHR = California Register of Historical Resources; CTLFC = Carson & Tahoe Lumber & Fluming Company; NRHP = National Register of Historic Places; USGS = U.S. Geological Survey.
Sources: Search by EDAW (now AECOM) at the North Central Information Center in 2007 and 2012

These previously identified resources reflect the prehistoric and ethnographic occupation of the area by Native American peoples and the predominant themes of historic-era activity that occurred throughout much of the Tahoe Basin. The prehistoric resources, particularly the site of CA-ELD-26/H, represent the intensive use of the lakeshore and the adjacent Upper Truckee River Marsh by the Washoe for fishing, the acquisition of other numerous lake and marsh resources, and general habitation. Subsurface testing in 2012 by AECOM archaeologists at CA-ELD-26/H has identified buried prehistoric cultural deposits that appear relatively substantial and intact, suggesting that the site has good physical integrity. In addition, the location of CA-ELD-26/H appears to be consistent with the Washoe fishing camp *Imgiw O'tha*, and ethnographic accounts indicate that the site was used into the 1940s and 1950s. Ethnographic and locational information demonstrates that CA-ELD-26/H was especially important to the Washoe as a village, meeting place, and/or ceremonial site or important in some other capacity and is therefore recommended eligible under NRHP Criterion a and CRHR Criterion 1. The site does not appear to be directly associated with a significant person or persons (NRHP Criterion b, CRHR Criterion 2), nor is it distinctive or the work of a master (NRHP Criterion c, CRHR Criterion 3). Although a portion of the site has been affected by development, the portion in the project area appears to possess good to excellent integrity, indicating that the site retains important scientific information. Therefore, the prehistoric component of CA-ELD-26/H is recommended eligible for listing in the NRHP and CRHR under Criterion d and 4 (data potential), respectively.

Locus C of CA-ELD-26/H appears to be the remains of a short-term flaking event. Because of a lack of data potential, including sufficient quantities of obsidian that may be used for relative dating, and subsurface deposits, Locus C does not appear to contribute to the NRHP eligibility of CA-ELD-26/H under Criteria a and 1.

Because the historic refuse associated with CA-ELD-26/H cannot be associated with a particular activity, event, or theme, these remains are not eligible for inclusion in the NRHP or CRHR.

The single isolated prehistoric artifact (site UTR-IF-1) does not retain any significant data and thus is not eligible for listing in the NRHP and CRHR.

The activities of the early lumber industry are visible in the study area, including the pilings and structural remains in the channel of the Upper Truckee River and on the shore of Lake Tahoe (CA-ELD-739H and CA-ELD-739H Locus 1). These items have been attributed to the CTLFC and appear to be portions of the system used to transport sawed logs from the timber stands to the company's mills for processing. The bumper pilings, situated at a sharp bend in the river channel, were documented by Lindström in 1996 but only the top portions that were not submerged could be observed by AECOM archaeologists from a distance in 2007. The level of the river may have been higher at the time of the 2007 survey than it was in 1996. It is also possible that a collapse of the riverbank, which consists primarily of soft sediments, has obscured this site. The pilings on the shore of the lake at the mouth of the Upper Truckee River were documented by Herschel Davis of the USFS, Lake Tahoe Basin Management Unit, in 1990.

When the pilings on the shore of the lake were first recorded, the lake level was considerably lower at that time than it was in 2007 (California Department of Parks and Recreation Archaeological Site Record—CA-ELD-739H [Confidential Appendix]) when the EDAW (now AECOM) archaeologists conducted their investigations. As a result, only the very top portions of several of the pilings could be seen in 2007, and these were located approximately 100 feet from the present-day shoreline. Due to lack of accessibility no evaluations of the eligibility of either portion of CA-ELD-739H were made at the time of their recording.

Documented sections of the Old Placerville Road (CA-ELD-721H), the "Old" Lake House Road (CA-ELD-2223H), and a portion of an unnamed unpaved roadway (CA-ELD-2240H) all demonstrate the degree to which the area has been influenced by early transportation systems. Although the Upper Truckee River Marsh may not have necessarily been a destination on these roads, the gentle nature of the topography within and in the vicinity of the marsh made it a perfect location for the surveying and constructing early roads. The immediate surroundings of some of these roads have changed little since the roads were originally laid out during the Comstock mining era, but they are little more than wide footpaths now and represent only small portions of the original system. Consequently, none of them have been recommended eligible for listing on the NRHP and CRHR.

The Dunlap dam (CA-ELD-2235/H) is associated with a common historic-era development theme in the Tahoe Basin and is not directly associated with particularly important events in relation to these developments (NRHP Criterion a, CRHR Criterion 1). Although the dam and associated ditches may be associated with specific notable area individuals (Barton and Johnson families) (NRHP Criterion b, CRHR Criterion 2), the features no longer retain the integrity that sufficiently expresses their use and period of significance. They are also commonly encountered features, do not exhibit distinctive characteristics or high artistic values, and are not known to be the works of a recognized master (NRHP Criterion c, CRHR Criterion 3). Lastly, the data potential of these irrigation features (NRHP Criterion d, CRHR Criterion 4) has been fully realized through their documentation; no further important scientific data are likely to be present. Regarding the prehistoric component, the seven obsidian flakes appear to reflect a one-time event associated with tool production/retooling, and lack further data that would contribute to regional research issues. Therefore, the prehistoric component does not appear to be eligible for inclusion in the NRHP or CRHR under Criterion d or 4. Consequently, CA-ELD-2235/H is recommended not eligible for NRHP or CRHR listing.

Cultural resources such as a sparse scatter of 19th- and 20th-century debris (CA-ELD-2238H) and the fence lines (CA-ELD-2239H) are related to ranching, grazing, and general historic-era use of the marsh and the lakeshore. However, these are common historic-era development themes in the Tahoe Basin, and neither of these resources is directly associated with particularly important events in relation to these developments (NRHP Criterion a, CRHR Criterion 1). Although features may be associated with specific notable area individuals (Barton and Johnson families) (NRHP Criterion b, CRHR Criterion 2), they no longer retain the integrity that sufficiently expresses their period of significance. They are also commonly encountered features, do not exhibit distinctive characteristics or high artistic values, and are not known to be the works of a recognized master (NRHP Criterion c, CRHR Criterion 3). Lastly, their data potential (NRHP Criterion d, CRHR Criterion 4) has been fully realized through their documentation; no further important scientific data are likely to be present. Consequently, CA-ELD-2238H and CA-ELD-2239H are recommended not eligible for NRHP or CRHR listing.

2007 AND 2012 SURVEY RESULTS OF DOCUMENTED CULTURAL RESOURCES

In October and November 2007, EDAW (now AECOM) archaeologists conducted an intensive survey of portions of the study area that had not been covered under previous surveys or were subjected to only reconnaissance-level inventories (Exhibit 3.3-1). As a result of the EDAW (now AECOM) 2007 survey, six previously undocumented historic-era resources were recorded (Table 3.3-4). An additional inventory was conducted by AECOM archaeologists in June 2012. No additional previously undocumented cultural resources were recorded during this effort. However, new data were added to the descriptions of sites CA-ELD-26/H and CA-ELD-2235/H (Confidential Appendix).

Table 3.3-4
Cultural Resources Newly Documented in the Study Area

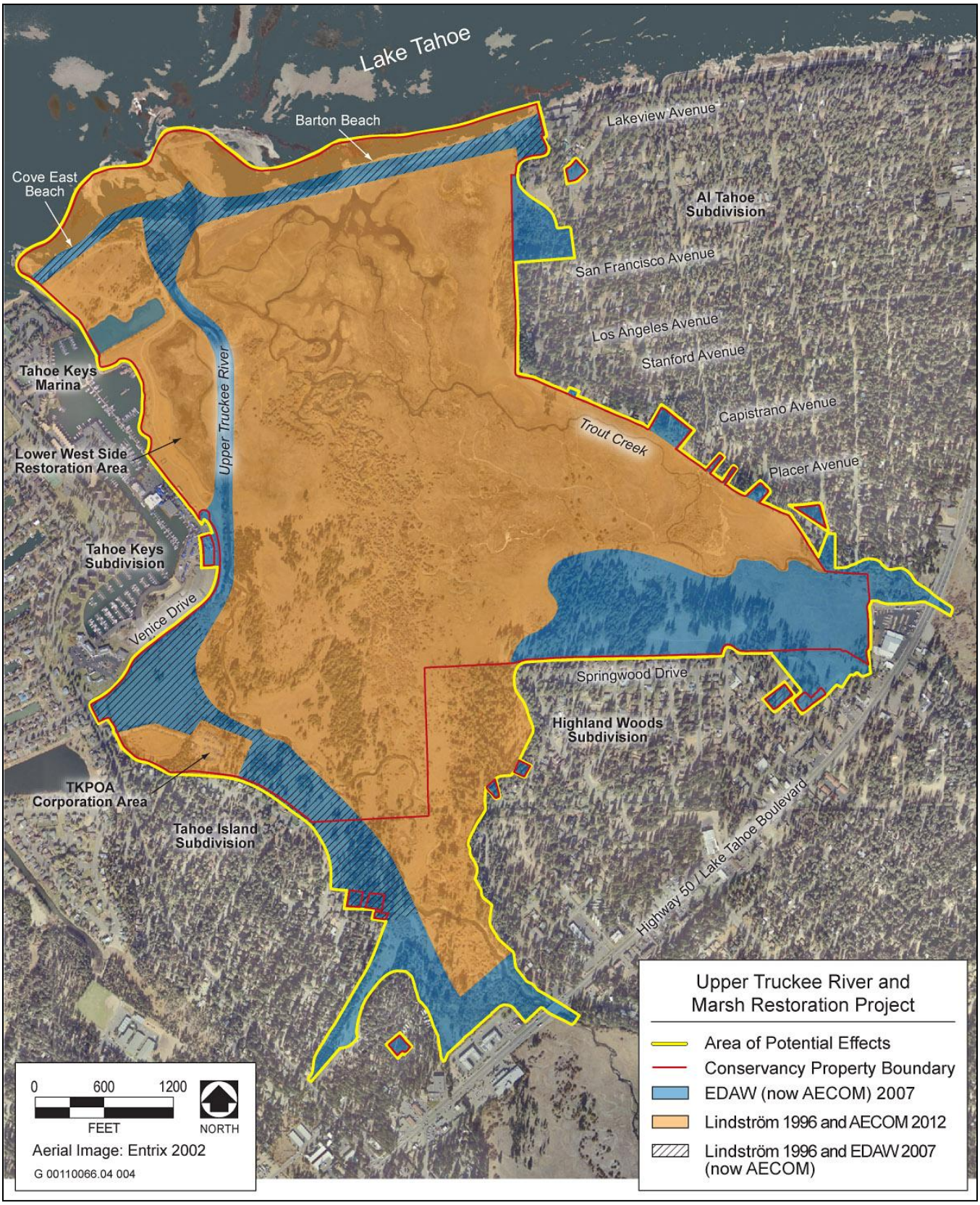
Temporary Resource Number	Association	Site Type	Location		NRHP/CRHR Recommendation
			USGS Quadrangle	Section	
UTRM-1	Historic	Mosher cattle corral	South Lake Tahoe	4	Not eligible
UTRM-2	Historic	Wagon	South Lake Tahoe	4	Not eligible
UTRM-3	Historic	Logging cable and debris	South Lake Tahoe	4	Not eligible
UTRM-4	Historic	Logging cable	South Lake Tahoe	4	Not eligible
UTRM-5	Historic	Boulder pile	South Lake Tahoe	4	Not eligible
UTRM-6	Prehistoric	Isolated obsidian biface	South Lake Tahoe	3	Not eligible

Notes: USGS Quadrangle = U.S. Geological Survey topographic quadrangle map; NRHP = National Register of Historic Places; CRHR = California Register of Historical Resources
Source: Data provided by EDAW (now AECOM) in 2007

Of the six newly recorded sites and features, two appeared related to cattle ranching that occurred in the study area from the middle decades of the 19th century until recent years. Most consisted of isolated features or artifacts, although a "site," a cattle corral and nearby structural remains, was also documented (Confidential Appendix).

UTRM-1

This site consists of a livestock corral identified by Susan Lindström as having been associated with the operations of the Mosher family, who were relatives of the Bartons. Other possible structural remains, including 20th-century poured-concrete footings, were noted adjacent to the corral. The corral features several hinged gates, a truck or wagon ramp for loading or unloading livestock for transportation, and interior fences dividing the main corral into several sections. In general, the entire structure remains in good condition. It appears to have been



Source: Data provided by EDAW (now AECOM) in 2008

Exhibit 3.3-1 **Cultural Resources Survey Map**

altered or repaired in recent years, as evidenced by the placement of several plywood segments or patches that exhibit minimally weathered surfaces. Some segments of the corral fencing, both exterior walls and interior dividers, have partially collapsed in place but have not been dismantled to any great extent. The corral appears to show several stages of construction using expedient materials over a long period. Railroad ties (some even retaining the tie plates and spikes), sawed logs, heavy tree branches or trunks, milled dimensional lumber, and plywood have all been incorporated into the corral. Iron hardware ranges from machine-produced and commercially available hinges, spikes, and wire nails to latches and square-cut nails that may date to as early as the later years of the 19th century. However, given the expedient and opportunistic nature of much of the corral, it is not possible to determine whether the hardware was installed strictly for corral use or whether it was simply attached to reused posts, boards, and other elements of the structure.

Other possible structural remains were noted adjacent to and within approximately 100 feet west of the corral. These remains consist of what may be a recently capped drilled well, two poured concrete blocks or footings, and a general scatter of mid-20th- to late 20th-century refuse. This area is wooded, and the footings and debris appear to be randomly scattered among the trees, all of which appear to be at least 40–50 years old. On the South Lake Tahoe U.S. Geological Survey topographic quadrangle map (photorevised in 1992), two possible buildings are shown in this general location. No other structural remains are present in the area of the corral, and it is assumed that one of the depicted buildings or structures is the Mosher corral.

Although the corral is associated with a notable Tahoe-area ranching family, it has clearly been altered numerous times since its original date of construction. Given the consistent incorporation of reused and expedient materials into the corral, it would be difficult to date specific portions of the structure based on materials and construction methods. In addition, although the corral was built according to functional needs unique to the ranching business, it was not the work of a master (per NRHP and CRHR criteria), nor does it appear to be a particularly early example or a unique structure. Consequently, because of a lack of integrity and significant historical association, this resource is recommended not eligible for listing in the NRHP and CRHR.

UTRM-2

This isolated resource consists of the remains of a farm or ranch wagon possibly dating to as early as the late 19th century. All that remains is the frame, portions of the bed, the front end, side braces, and a portion of the tongue. Although heavily weathered, the wood and iron parts remain in good condition and reflect an early period of construction with the subsequent addition of later hardware. A mix of machine-produced, commercially cast, and hand-forged hardware demonstrates that the wagon was probably used over a long period of time, from a time when hinges, straps, spikes, and brackets were entirely or partially forged by a blacksmith to when such elements were almost exclusively produced in a commercial factory setting.

It is not possible to determine exactly who used this wagon and for what specific purposes. Given its robust construction, it does not appear to have been intended primarily as a vehicle for transporting people. More likely, it was intended to haul material, such as the equipment, supplies, and feed necessary for the daily operation of a ranching enterprise. Given the present location of the wagon, it likely was owned and used by the Barton or Mosher operations.

The wagon is an interesting artifact from a time when ranching was one of the predominant commercial activities in the South Lake Tahoe region, and it may be associated with notable area families; however, it cannot be linked with any specific important historical event or person(s). In addition, much of the original structure of the wagon including the wheels and tires, axles, superstructure, seat, and tongue, are missing. Although what remains is in fairly good condition, much of its structural integrity has been compromised. Consequently, this isolated artifact is recommended not eligible for NRHP/CRHR listing.

UTRM-3 and UTRM-4

These two isolated artifacts consist of 1-inch steel logging cables, or "chokers," most likely used during commercial logging operations within and near the study area. The location of UTRM-3 also includes a sparse scatter of probably related debris, such as the remains of a rubber (not steel-belted) truck tire, and a section of galvanized steel box beam that may have served as a truck bumper. None of these isolated items appears to date to before the 1950s or 1960s. They may be related to expedient lumbering and/or hazardous tree removal that may have been conducted in relation to the construction of nearby houses. Because of their recent vintage and lack of historical association, neither of these artifacts is recommended eligible for NRHP or CRHR listing.

UTRM-5

Situated on the west bank of the Upper Truckee River, this feature consists of a boulder pile partially buried in the bank and extending partially into the river channel. The water-worn boulders incorporated into this pile range from approximately 12 inches to more than 18 inches in diameter and appear to have been purposefully deposited at this location. No other similar deposits were noted along the river channel, and such boulders do not appear to occur naturally within the study area. No other structures, buildings, or other signs of construction are present in the area. Although these boulders are clearly not a natural feature, it is not known why they were placed in this spot. They may represent a localized attempt at riverbank stabilization or the beginnings of a dam or channel diversion project intended to store or reroute water in relation to cattle ranching. Regardless, this feature does not appear to be associated with any significant event, and it clearly does not represent the work of a master or a unique structure. Consequently, it is recommended not eligible for listing in the NRHP and CRHR.

UTRM-6

This isolated artifact consists of a small midsection of an obsidian projectile point. It is not possible to determine a specific projectile point style, although the thin blade and the approximate angle of the edges suggest that it may be an arrow point characteristic of the later prehistoric or early ethnographic periods. Because this artifact is isolated, is not associated with any significant event, and cannot provide further scientific data, it is recommended not eligible for NRHP and CRHR listing.

Paleontological Setting

The study area is located within Holocene-age (11,000 years BP and younger) alluvial fill and Holocene flood plain deposits (Saucedo 2005). To be considered a fossil, an object must be more than 11,000 years old. Therefore, no fossils exist within the study area.

3.3.2 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; the TRPA Initial Environmental Checklist; factual or scientific information and data; and regulatory standards of federal, state, and local agencies. These criteria also encompass the factors taken into account under NEPA to determine the significance of an action in terms of the context and intensity of its effects. The CEQA, NEPA, and TRPA criteria are listed below.

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to archaeological and historical resources if it would:

- cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the State CEQA Guidelines (CEQA 1);
- cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the State CEQA Guidelines (CEQA 2); or
- disturb any human remains, including those interred outside of formal cemeteries (CEQA 3).

Section 15064.5 generally defines historical resources as (1) a resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR; (2) a resource included in a local register of historical resources or identified as significant in a historical resource survey; and (3) any other object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant, provided that the lead agency's determination is supported by substantial evidence. A substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the historical resource would be materially impaired.

A cultural resource may be eligible for listing in the CRHR if it:

- is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- is associated with the lives of persons important in our past;
- embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of an important creative individual or possesses high artistic values; or
- has yielded, or may be likely to yield, information important in prehistory or history.

Section 15064.5 generally defines a significant archaeological site as one that is a historical resource or one that meets the definition of a unique archaeological resource in Section 21083.2 of the California Public Resources Code.

NEPA Criteria

Under the National Historic Preservation Act and the regulations in 36 CFR Part 800, the criteria for assessing adverse effects on cultural resources is guided by the specific legal context of the site's significance as set out in Section 106 of the National Historic Preservation Act (16 USC 470), as amended. A property may be listed in the NRHP if it meets criteria for evaluation defined in 36 CFR 60.4:

> The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) that are associated with the lives of persons significant in our past; or
>
> (c) that embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess a artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) that have yielded, or may be likely to yield, information important in prehistory or history.

Most prehistoric archaeological sites are evaluated with regard to Criterion (d) of the NRHP, which refers to site data potential. Such sites typically lack historical documentation that might otherwise adequately describe their important characteristics. Archaeological methods and techniques are applied to gain an understanding of the types of information that may be recovered from deposits at the site. Data sought are those recognized to be applicable to scientific research questions or to other cultural values. For example, shellfish remains from an archaeological deposit can provide information about the nature of prehistoric peoples' diet, foraging range, exploited environments, environmental conditions, and seasons during which various shellfish species were taken. These are data of importance to scientific research that can lead to the reconstruction of prehistoric lifeways. Some archaeological sites may be of traditional or spiritual significance to contemporary Native Americans or other groups, particularly those sites that are known to contain human burials.

Site integrity is also a consideration for the NRHP eligibility of an archaeological locale. The aspects of prehistoric resources for which integrity is generally assessed are location, setting design, workmanship, feeling, and association. These may be compromised to some extent by cultural and postdepositional factors (e.g., highway construction, erosion, bioturbation), yet the resource may still retain its integrity for satisfying Criterion (d) if the important information residing in the site survives. Conversely, archaeological materials such as shells may not be present in sufficient quantity or may not have adequate preservation for accurate identification. Thus, their potential as data to address important research questions is significantly reduced. Assessment of these qualities is particularly important for archaeological properties where the spatial relationships of artifacts and features are necessary to determine the patterns of past human behavior.

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative would result in a significant impact on archeological or historical resources if it would:

- result in an alteration of or adverse physical or aesthetic effect to a significant archaeological or historical site, structure, object, or building (TRPA 1);
- have the potential to cause a physical change that would affect unique ethnic cultural values (TRPA 2); or
- restrict historic or prehistoric religious or sacred uses within the potential impact area (TRPA 3).

The TRPA Initial Environmental Checklist also includes criteria that identify the potential for significant impacts if a project is located on a property with known cultural, historical, and/or archaeological resources, or associated with any historically significant events and/or sites or persons. In this EIR/EIS/EIS, these criteria were considered to be included in the other TRPA criteria listed above.

METHODS AND ASSUMPTIONS

Impacts on archaeological and historical resources that would result from the project were identified by considering how implementation of the project alternatives would affect the integrity of cultural resources and human remains identified within or immediately adjacent to the study area. Evaluation of potential impacts on archaeological and historical resources was based on a review of archaeological reports, historic maps, and other documents relevant to the study area, and consultation with the Native American community. This evaluation also included an intensive field inventory with limited testing of portions of the study area not previously subjected to archaeological surveys.

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Restrict religious or sacred uses within the potential impact area (TRPA 3)—The proposed alternatives would not physically restrict religious or sacred uses in the study area, nor would the alternatives change future management of the study area. Consequently, there would be no impacts to religious or sacred uses.

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.3-1 (Alt. 1) **Damage to or Destruction of Documented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *One potentially significant cultural resource (CA-ELD-26/H) has been identified within the study area and could be adversely affected during construction. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in areas that could have the potential to find significant resources in the vicinity of CA-ELD-26/H. Additionally, project construction personnel would be trained on the possibility of encountering potentially significant resources; if such resources were encountered, proper measures would be taken to protect them. Furthermore, final design of the bike path will completely avoid the CA-ELD-26/H site and the adjacent areas. Therefore, this impact would be* ***less than significant****.*

A total of 16 prehistoric and historic-era sites, features, and artifacts have been identified within the study area. Of these, only one prehistoric site, CA-ELD-26/H, is recommended as significant under CEQA, NEPA, and TRPA criteria. Site CA-ELD-26/H is recommended as eligible for listing in the NRHP and CRHR because of its importance to the Washoe people as a fishing camp and for its data potential; future research could provide information important to researching issues related to prehistoric and ethnographic Washoe occupation of the Tahoe Basin. Under Alternative 1, several proposed bike paths and viewpoints, as well as staging areas and haul roads, have the potential to affect portions of the landform in the vicinity of the Highland Woods subdivision, where materials associated with site CA-ELD-26/H have been documented. As evidenced by archaeological and ethnographic information, the edge of this landform (a low bluff situated above the marsh) would have been an important habitation and activity locale for the Washoe during prehistoric periods and into the historic era. Proposed staging areas and haul roads in the vicinity of the Rubicon Trail access points (to the study area) have the potential to uncover in-situ artifacts and features directly related to site CA-ELD-26/H.

As described in Environmental Commitment (EC) 2, "Prepare and Implement a Cultural Resources Protection Plan" (Table 2-6), the Conservancy would install construction barriers around site CA-ELD-26/H, educate construction workers about site protection requirements, and ensure that a qualified cultural resource specialist would oversee initial grading activities within the vicinity of the bluff. The purpose of monitoring would be to ensure that cultural resources potentially uncovered during ground-disturbing activities are identified, evaluated for significance, and treated in accordance with their possible NRHP and CRHR status. Furthermore, because the proposed bike path loop on the bluff cannot be redesigned around the CA-Eld-26/H site, the facility will be removed from the final design. To avoid further disturbance of this area, no user-created trails would be removed from the area. The bike path, on the far end of the bluff, crossing Trout Creek to the Al Tahoe neighborhood would remain in the proposed project. The Conservancy, through the cultural resources protection plan, would ensure that a cultural resource specialist would oversee initial grading to make certain that any cultural resource discovered are identified, evaluated for significance, and treated in accordance with their possible NRHP and CRHR status.

Potential treatment methods for significant and potentially significant resources may include but would not be limited to taking no action (i.e., resources determined not to be significant), avoiding the resource by changing construction methods or project design, and implementing a program of testing and data recovery, in accordance with all applicable federal and state requirements. With implementation of EC 2, this impact would be **less than significant**.

IMPACT 3.3-2 (Alt. 1) **Damage to or Destruction of Undocumented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *Although the study area has been surveyed for cultural resources, significant buried archaeological materials may be present that could be adversely affected by project grading and excavation. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in known resource areas and training of project construction personnel on the possibility of encountering significant resources; if such resources were encountered, proper measures would be taken to protect them. This impact would be* ***less than significant****.*

The potential exists for previously unidentified prehistoric and historic-era archaeological sites, features, and artifacts within the study area to be uncovered prior to or during construction-related ground-disturbing activities. Although the study area has been intensively surveyed for surface and near-surface traces of early Native American and historic-era activities and remains, if such traces are present below ground but obscured, they would not have been documented with the surface inventories performed within the study area. Because such resources could be uncovered during project implementation (e.g., construction of new river channels, recreational facilities, and paths) and could be determined to represent significant cultural resources in accordance with CEQA, NEPA, and TRPA criteria.

As described in EC 2 (Table 2-6), the Conservancy would prepare and implement a cultural resources protection plan. The plan would include training project construction personnel on the possibility of encountering significant resources; if such resources were encountered, proper measures would be taken to protect those resources until further determination could be made. The Conservancy would retain a qualified cultural resources specialist to educate personnel on how to identify prehistoric and historic-era archaeological remains. If unusual amounts of stone, bone, or shell or significant quantities of historic-era artifacts such as glass, ceramic, metal, or building remains were to be uncovered during construction activities, work in the vicinity of the specific construction site at which the suspected resources were uncovered would be suspended, and the Conservancy would be contacted immediately. The education of construction personnel on the character of potential cultural resources discoveries increases the likelihood that if potentially significant sites, features, or artifacts were to be encountered, they would be identified early in construction activities. As described by Impact 3.3-1 (Alt. 1), the Conservancy would also hire a qualified cultural resource specialist to oversee initial grading and construction activities in the vicinity of CA-ELD-26/H, where proposed grading has the potential to uncover in-situ artifacts and features directly related to site CA-ELD-26/H or other general prehistoric and ethnographic occupations of the bluff. Oversight, training, and early discovery would result in their documentation and preservation, and impacts on them would be reduced or avoided. Consequently, this impact would be **less than significant**.

IMPACT 3.3-3 (Alt. 1) **Damage to or Destruction of Previously Undocumented Human Remains during Construction. (CEQA 3)** *Project-related construction activities could uncover or otherwise disturb previously undiscovered prehistoric or historic-era human remains. However, as described in Environmental Commitment 3, the Conservancy and its contractor would stop work and inform the El Dorado County Coroner of the discovery of human remains if uncovered during project construction. This impact would be* ***less than significant****.*

Although no human remains have been listed or recorded within or in the immediate vicinity of the study area, previously undiscovered human remains could be uncovered by project construction activities. However, as described in EC 3, "Stop Work Within an Appropriate Radius Around the Discovered Human Remains, Notify the El Dorado County Coroner and the Most Likely Descendants, and Treat Remains in Accordance With State and Federal Law" (Table 2-6), the Conservancy would inform the El Dorado County Coroner of the discovery of human remains if uncovered during project construction. If Native American remains were to be discovered, they would be protected until consultation with the MLD has taken place and recommendations made. Adherence to Section 7050.5(b) of the Health and Safety Code and Section 5097.9 would result in treatment and disposition of human remains in accordance with state law and/or the wishes of the MLD in the case of the discovery of Native American human remains. Consequently, this impact would be **less than significant**.

IMPACT 3.3-4 (Alt. 1) **Damage to or Destruction of Documented Potentially Significant Cultural Resources Resulting from Public Access Features. (CEQA 1, 2; TRPA 1, 2)** *The proposed bicycle path loop would be located close to CA-ELD-26/H. However, due to the fact the bike path loop could not be redesigned to avoid the CA-ELD-26/H site the path will be removed from the final design. The bike path from the Rubicon trail access point to the Al Tahoe neighborhood would remain due to the fact it is not in the vicinity of the CA-ELD-26/H site. However, with the implementation of Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include assurances that final design placement and orientation of recreation facilities would incorporate features to minimize visibility and access that could otherwise lead to damage or destruction of prehistoric site CA-ELD-26/H. This impact would be* ***less than significant****.*

Implementation of Alternative 1 would eliminate user-created trails at and near prehistoric site CA-ELD-26/H and UTRM-1. The removal of these trails would reduce existing adverse effects on the integrity of these sites. The long-term use of the bike path proposed in the immediate vicinity of site CA-ELD-26/H has the potential to draw attention to the location and character of these potentially significant sites, and to facilitate looters or casual souvenir hunters removing surface artifacts or engaging in illicit subsurface excavation. Such activities could affect the integrity of this site over time, dramatically reducing the data potential, and physical integrity and setting of CA-ELD-26/H. Such losses of data potential and integrity could cause this resource to be determined no longer eligible for listing on the NRHP/CRHR. Because of these potential effects and the fact the bike path loop cannot be redesigned, this facility will be removed from the final design. The bike path that is proposed to connect the Rubicon Trail access point to the Al Tahoe neighborhood will remain in the project because it is not in the vicinity of site CA-ELD-26/H. Furthermore, as described in EC 2 (Table 2-6), the Conservancy would prepare a cultural resources protection plan that would include assurances that final design placement and orientation of recreation facilities would incorporate features to minimize visibility and access that could otherwise lead to damage or destruction of prehistoric site CA-ELD-26/H. Therefore, this impact would be **less than significant**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.3-1 (Alt. 2) **Damage to or Destruction of Documented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *One potentially significant cultural resource (CA-ELD-26/H) has been identified within the study area and could be adversely affected during construction. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in staging areas that are in the vicinity of significant resources. Furthermore, staging proposed on the bluff will completely avoid the CA-ELD-26/H site. Therefore, this impact would be* ***less than significant****.*

A total of 16 prehistoric and historic-era sites, features, and artifacts have been identified within the study area. Of these, only one prehistoric site, CA-ELD-26/H, is recommended as significant under CEQA, NEPA, and TRPA criteria. Site CA-ELD-26/H is recommended as eligible for listing in the NRHP and CRHR because of its importance to the Washoe people as a fishing camp and for its data potential; future research could provide information important to researching issues related to prehistoric and ethnographic Washoe occupation of the Tahoe Basin. Under Alternative 2, no permanent features are proposed in the vicinity of CA-ELD-26/H; however, staging areas and haul roads have the potential to affect portions of the landform in the vicinity of the Highland Woods subdivision, where materials associated with site CA-ELD-26/H have been documented. As evidenced by archaeological and ethnographic information, the edge of this landform (a low bluff situated above the marsh) would have been an important habitation and activity locale for the Washoe during prehistoric periods and into the historic era. Proposed staging areas and haul roads in the vicinity of the Rubicon Trail access points (to the study area) have the potential to uncover in-situ artifacts and features directly related to site CA-ELD-26/H.

As described in EC 2, "Prepare and Implement a Cultural Resources Protection Plan" (Table 2-6), the Conservancy would install construction barriers around site CA-ELD-26/H, educate construction workers about site protection requirements, and ensure that a qualified cultural resource specialist would oversee initial grading

activities within the vicinity of the bluff. The purpose of this monitoring would be to ensure that cultural resources potentially uncovered during ground-disturbing activities are identified, evaluated for significance, and treated in accordance with their possible NRHP and CRHR status. Potential treatment methods for significant and potentially significant resources may include but would not be limited to taking no action (i.e., resources determined not to be significant), avoiding the resource by changing construction methods or project design, and implementing a program of testing and data recovery, in accordance with all applicable federal and state requirements. With implementation of EC 2, this impact would be **less than significant**.

IMPACT 3.3-2 (Alt. 2) **Damage to or Destruction of Undocumented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *Although the study area has been surveyed for cultural resources, significant buried archaeological materials may be present that could be adversely affected by project grading and excavation. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in known resource areas and training of project construction personnel on the possibility of encountering significant resources; if such resources were encountered, proper measures would be taken to protect them. This impact would be* ***less than significant.***

This impact would be the same as Impact 3.3-2 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.3-3 (Alt. 2) **Damage to or Destruction of Previously Undocumented Human Remains during Construction. (CEQA 3)** *Project-related construction activities could uncover or otherwise disturb previously undiscovered prehistoric or historic-era human remains. However, as described in Environmental Commitment 3, the Conservancy and its contractor would stop work and inform the El Dorado County Coroner of the discovery of human remains if uncovered during project construction. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.3-3 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.3-4 (Alt. 2) **Damage to or Destruction of Documented Potentially Significant Cultural Resources Resulting from Public Access Features. (CEQA 1, 2; TRPA 1, 2)** *Alternative 2 does not include public access features that could draw attention to the location and character of significant cultural resources, or that could facilitate access to areas where significant cultural resources have been documented. This impact would be* ***less than significant****.*

An increase in public attention or access, with accompanying increased risks for looting or artifact collecting, would constitute a potentially significant impact. Because Alternative 2 does not include operating paths or viewpoints in the immediate vicinity of significant cultural resources, there would not be an increase in public attention or access to significant cultural resources documented within the study area. Consequently, Alternative 2 does not pose a long-term threat to the integrity of sites, features, or artifacts recommended as eligible for listing in the NRHP and CRHR. This impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.3-1 (Alt. 3) **Damage to or Destruction of Documented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *One potentially significant cultural resource (site CA-ELD-26/H) has been identified within the study area and could be adversely affected by construction and/or implementation of Alternative 3. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in areas that could have the potential to find significant resources. Additionally, project construction personnel would be trained on the possibility of encountering potentially significant resources; if such resources were encountered, proper measures would be taken to protect them. Furthermore, final design of the bike path/pedestrian trail will completely avoid the bluff area and CA-ELD-26/H. Therefore, this impact would be* ***less than significant****.*

Alternative 3 proposes the construction of a bike path within the boundaries of and in the vicinity of site CA-ELD-26/H. Alternative 3 also proposes to construct access haul roads and staging areas immediately adjacent to the CA-ELD-26/H site. Construction of the proposed recreational facilities, access/haul roads, and staging areas has the potential to affect portions of site CA-ELD-26/H (recommended eligible for listing in the NRHP and CRHR) and/or artifacts and features possibly associated with this site that have not yet been documented on the landform located above the marsh. As described in EC 2 (Table 2-6), the Conservancy would prepare and implement a cultural resources protection plan. As part of the plan, construction barriers would be installed around site CA-ELD-26/H, construction workers would be educated about site protection requirements, and a qualified cultural resource specialist would oversee initial grading activities in the vicinity of the bluff. Furthermore, because the proposed bike path/pedestrian trail loop on the bluff cannot be redesigned around the CA-Eld-26/H site, the facility will be removed from the final design.

Potential treatment methods for significant and potentially significant resources may include but would not be limited to taking no action (i.e., resources determined not to be significant), avoiding the resource by changing construction methods or project design, and implementing a program of testing and data recovery, in accordance with all applicable federal and state requirements. With implementation of EC 2, this impact would be **less than significant**.

IMPACT 3.3-2 (Alt. 3) **Damage to or Destruction of Undocumented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *Although the study area has been surveyed for cultural resources, significant buried archaeological materials may be present that could be adversely affected by project grading and excavation. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in known resource areas and training of project construction personnel on the possibility of encountering significant resources; if such resources were encountered, proper measures would be taken to protect them. This impact would be* ***less than significant.***

This impact would be the same as Impact 3.3-2 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.3-3 (Alt. 3) **Damage to or Destruction of Previously Undocumented Human Remains during Construction. (CEQA 3)** *Project-related construction activities could uncover or otherwise disturb previously undiscovered prehistoric or historic-era human remains. However, as described in Environmental Commitment 3, the Conservancy and its contractor would stop work and inform the El Dorado County Coroner of the discovery of human remains if uncovered during project construction. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.3-3 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.3-4 (Alt. 3) **Damage to or Destruction of Documented Potentially Significant Cultural Resources Resulting from Public Access Features. (CEQA 1, 2; TRPA 1, 2)** *Increased public access over time has the potential to lead to damage or destruction of site CA-ELD-26/H. The proposed bicycle path/pedestrian trail loop would be located in and adjacent to CA-ELD-26/H. Because this facility cannot be redesigned to avoid the CA-ELD-26/H site, it will be removed from the final design. This impact would be* ***less than significant****.*

This impact would be similar to Impact 3.3-4 (Alt. 1) except for the fact there would be no bike path connecting the Rubicon Trial access point to the Al Tahoe neighborhood and therefore would not need special design features to reduce potential impacts to the CA-ELD-26/H site. Therefore, this impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.3-1 (Alt. 4) ***Damage to or Destruction of Documented Potentially Significant Cultural Resources during Construction.*** **(CEQA 1, 2; TRPA 1, 2)** *One potentially significant cultural resource (site CA-ELD-26/H) has been identified within the study area and could be adversely affected by project implementation. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in areas that could have the potential to find significant resources. Additionally, project construction personnel would be trained on the possibility of encountering potentially significant resources; if such resources were encountered, proper measures would be taken to protect them. Furthermore, final design of the bike path will completely avoid the bluff area and CA-ELD-26/H. This impact would be* ***less than significant****.*

Alternative 4 proposes the construction of a bike path either on or within the immediate vicinity of site CA-ELD-26/H. Ground-disturbing activities associated with the construction of this path have the potential to physically disturb or destroy site CA-ELD-26/H. Alternative 4 would also include several staging areas; two would be placed north of the Sunset Drive Access Point and one on the Conservancy parcel south of U.S. 50. Construction of the proposed bike path and staging areas has the potential to affect portions of the landform in the vicinity of the Highland Woods subdivision, where materials associated with site CA-ELD-26/H have been documented. As evidenced by archaeological and ethnographic information, the edge of this landform (a bluff situated above the marsh) would have been an important habitation and activity locale for the Washoe during prehistoric periods and into the historic era. Ground-disturbing activities associated with the construction of the bike path and staging areas has the potential to uncover significant archaeological materials associated with site CA-ELD-26/H.

However, as described in EC 2 (Table 2-6), the Conservancy would prepare and implement a cultural resources protection plan. As part of the plan, construction barriers would be installed around site CA-ELD-26/H, construction workers would be educated about site protection requirements, and a qualified cultural resource specialist would oversee initial grading activities in the vicinity of the bluff. Furthermore, because the proposed bike path on the bluff cannot be redesigned around the CA-Eld-26/H site, the facility will be removed from the final design.

Potential treatment methods for significant and potentially significant resources may include but would not be limited to taking no action (i.e., resources determined not to be significant), avoiding the resource by changing construction methods or project design, and implementing a program of testing and data recovery, in accordance with all applicable Federal and State requirements. With implementation of EC 2, this impact would be **less than significant.**

IMPACT 3.3-2 (Alt. 4) **Damage to or Destruction of Undocumented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *Although the study area has been surveyed for cultural resources, significant buried archaeological materials may be present that could be affected by project grading and excavation. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include training project construction personnel to the possibility that significant resources could be encountered, and if encountered, proper measures would be taken to protect those resources. This impact would be* ***less than significant.***

This impact would be the same as Impact 3.3-2 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.3-3 (Alt. 4) **Damage to or Destruction of Previously Undocumented Human Remains during Construction. (CEQA 3)** *Project-related construction activities could uncover or otherwise disturb previously undiscovered prehistoric or historic-era human remains. However, as described in Environmental Commitment 3, the Conservancy and its contractor would stop work and inform the El Dorado County Coroner of the discovery of human remains if uncovered during project construction. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.3-3 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.3-4 (Alt. 4) **Damage to or Destruction of Documented Potentially Significant Cultural Resources Resulting from Increased Public Access. (CEQA 1, 2; TRPA 1, 2))** *Increased public access over time has the potential to lead to damage or destruction of site CA-ELD-26/H. The proposed bicycle path loop would be located in and adjacent to CA-ELD-26/H. Because this facility cannot be redesigned to avoid the CA-ELD-26/H site, it will be removed from the final design. This impact would be* ***less than significant****.*

This effect would be the same as Impact 3.3-4 (Alt. 3). For the same reasons as described above, this effect would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.3-1 (Alt. 5) **Damage to or Destruction of Documented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *One potentially significant cultural resource has been identified within the study area. However, because no construction activities are foreseeable under this alternative, these resources would not be affected.* ***No impact*** *would occur.*

One potentially significant cultural resource (site CA-ELD-26/H) has been identified within the study area. However, because no construction activities are foreseeable within the study area, this documented potentially significant cultural resource would not be affected by construction activities. **No impact** would occur.

IMPACT 3.3-2 (Alt. 5) **Damage to or Destruction of Undocumented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *Significant buried archaeological materials may be present in the study area. However, no construction activities are foreseeable under this alternative. Therefore,* ***no impact*** *would occur.*

Although the study area has been surveyed for cultural resources, significant buried archaeological materials may be present and could be adversely affected by project grading and excavation. However, under Alternative 5 no construction activities are foreseeable in the study area. Therefore, **no impact** would occur.

IMPACT 3.3-3 (Alt. 5) **Damage to or Destruction of Previously Undocumented Human Remains during Construction. (CEQA 3)** *No construction activities would occur. Thus, human remains would not be disturbed.* ***No impact*** *would occur.*

No construction activities would occur in the study area under Alternative 5. Thus, previously undiscovered prehistoric or historic-era human remains would not be uncovered or otherwise disturbed by construction activities. **No impact** would occur.

IMPACT 3.3-4 (Alt. 5) **Damage to or Destruction of Documented Potentially Significant Cultural Resources Resulting from Increased Public Access. (CEQA 1, 2; TRPA 1, 2)** *Continued public access has the potential to lead to damage or destruction of site CA-ELD-26/H over time. However, under this alternative, no additional recreation infrastructure is proposed in the vicinity of CA-ELD-26/H and thus, a substantial adverse effect on these potentially significant cultural resources would be similar to existing conditions. Thus, this impact would be* ***less than significant****.*

Looting and souvenir collecting can be inadvertently encouraged by public access and can severely affect the integrity of a site or feature that has been recommended eligible for listing in the NRHP and CRHR. Public access along existing user-created trails in the vicinity of CA-ELD-26/H has the potential to lead to damage or destruction of site CA-ELD-26/H over time. However, under this alternative, no additional recreation infrastructure is proposed in the vicinity of CA-ELD-26/H. Therefore, substantial adverse effects on these cultural resources caused by looting and souvenir-collecting related to the project would be similar to existing conditions. This impact would be **less than significant**.

3.4 BIOLOGICAL RESOURCES: VEGETATION AND WILDLIFE

This section describes the vegetation and wildlife (terrestrial biological) resources that are known or have the potential to occur in the study area and the project vicinity. These resources include common vegetation, wildlife, and sensitive habitats; and special-status plant and animal species. Aquatic resources are discussed in Section 3.5, "Fisheries." Cumulative vegetation and wildlife impacts are addressed in Section 3.16, "Cumulative Impacts." Consistency with TRPA goals and policies is presented in Section 3.10, "Land Use," Table 3.10-1. The project's effects on thresholds are described in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities."

3.4.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

The following federal laws related to vegetation and wildlife are relevant to the proposed alternatives and are described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- Federal Endangered Species Act (ESA)
- Migratory Bird Treaty Act (MTBA)
- Section 404 of the Clean Water Act (CWA)

State

The following state laws related to vegetation and wildlife are relevant to the proposed alternatives and are described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- California Endangered Species Act (CESA)
- California Fish and Game Code Section 1602—Streambed Alterations
- California Fish and Game Code Sections 3503–3503.5—Protection of Bird Nests and Raptors
- Section 401 Water Quality Certification/Porter-Cologne Water Quality Control Act

Tahoe Regional Planning Agency

Goals and Policies

The Conservation Element (Chapter IV) of the TRPA Goals and Policies establishes goals for the preservation, development, utilization, and management of natural resources within the Tahoe Basin (TRPA 2006). These policies and goals are designed to achieve and maintain adopted environmental threshold carrying capacities and are implemented through the TRPA Code of Ordinances.

The Conservation Element includes ten subelements that address the range of Lake Tahoe's natural and historical resources. The Vegetation, Wildlife, and Stream Environment Zone subelements are discussed in this section, and the goals related to each of these subelements are identified below.

Chapter IV of the Goals and Policies identifies the following five goals for vegetation:

- Provide for a wide mix and increased diversity of plant communities.

- Provide for maintenance and restoration of such unique ecosystems as wetlands, meadows, and other riparian vegetation.

- Conserve threatened, endangered, and sensitive plant species and uncommon plant communities.
- Provide for and increase the amount of late seral/old-growth stands.
- Retain appropriate stocking levels and distribution of snags and coarse woody debris in the region's forests to provide habitat for organisms that depend on such features and to perpetuate natural ecological processes.

The two goals identified for wildlife are as follows:

- Maintain suitable habitats for all indigenous species of wildlife without preference to game or nongame species through maintenance of habitat diversity.
- Preserve, enhance, and where feasible, expand habitats essential for threatened, endangered, rare, or sensitive species found in the Basin.

The Stream Environment Zone (SEZ) subelement contains an additional goal:

- Provide for the long-term preservation and restoration of SEZs.

In addition to these broader goals identified within the Conservation Element, special attainment goals have been developed to further focus management efforts and provide a measure of progress. These attainment goals are defined by the TRPA Thresholds. The Conservation Element specifically identifies several attainment goals or thresholds for certain vegetation and wildlife resources. TRPA thresholds are discussed in the "TRPA Environmental Threshold Carrying Capacities" section below.

Code of Ordinances

The applicable provisions of the TRPA Code of Ordinances regarding vegetation and wildlife are summarized below.

Protection and Management of Vegetation

The Code of Ordinances requires the protection and maintenance of all native vegetation types. Section 61.3, "Vegetation Protection and Management," provides for the protection of SEZ vegetation, other common vegetation, uncommon vegetation, and sensitive plants (TRPA 2011). TRPA defines an SEZ as an area that owes its biological and physical characteristics to the presence of surface water or groundwater. The term SEZ includes perennial, intermittent, or ephemeral streams; meadows and marshes; and other areas with near-surface water influence within the Tahoe Basin. No project or activity may be implemented within the boundaries of an SEZ except as otherwise permitted for habitat improvement, dispersed recreation, vegetation management, or as provided in Chapter 30 of the Code of Ordinances.

Protection of Sensitive and Uncommon Plants

Section 61.3.6, "Sensitive and Uncommon Plant Protection and Fire Hazard Reduction," of the TRPA Code of Ordinances establishes standards for preserving and managing sensitive plants and uncommon plant communities. Projects and activities that are likely to harm, destroy, or otherwise jeopardize sensitive plants or their habitat must fully mitigate their significant adverse effects. Measures to protect sensitive plants and their habitat include:

- fencing to enclose individual populations or habitat;
- restricting access or intensity of use;
- modifying project design as necessary to avoid adverse impacts;
- dedicating open space to include entire areas of suitable habitat; or
- restoring disturbed habitat.

Tree Removal

TRPA regulates the management of forest resources in the Tahoe Basin to achieve and maintain the environmental thresholds for species and structural diversity, to promote the long-term health of the resources, and to create and maintain suitable habitats for diverse wildlife species. Provisions for tree removal are provided in Section 61.1 of the Code of Ordinances. Chapter 36 and Sections 33.6, 61.3.6, and 61.4 also include provisions for tree protection during project design and implementation. Tree removal requires the review and approval of TRPA (TRPA 2011).

Project proponents must obtain a tree permit from TRPA for all cutting of trees greater than 14 inches in diameter at breast height (dbh). (At its November 2007 meeting, the TRPA Governing Board approved an increase in the tree-diameter threshold for a permit from 6 inches to 14 inches; the revised ordinance that reflects this change is currently in effect [Thayer, pers. comm., 2008].) However, trees of any size marked as a fire hazard by a fire protection district or fire department that operates under a memorandum of understanding with TRPA can be removed without a separate tree permit.

Trees greater than 30 inches dbh must be retained, except under circumstances specified in the Code of Ordinances. As stated in Section 61.1.4.B of the TRPA Code of Ordinances:

> Within non-SEZ urban areas, individual trees larger than 30 inches dbh that are healthy and structurally sound shall be retained as desirable specimen trees having aesthetic and wildlife value, unless no reasonable alternative exists to retain the tree, including reduction of parking areas or modification of the original design.

In addition, trees and vegetation not scheduled to be removed must be protected during construction in accordance with Section 33.6 of the TRPA Code of Ordinances.

If a project would result in substantial tree removal (as defined by TRPA Code Section 61.1.8), a tree removal or harvest plan must be prepared by a qualified forester for approval by TRPA. The required elements of this plan are described in Section 61.1.5.C of the Code of Ordinances.

The Code of Ordinances (Chapter 62) also provides quantitative requirements for snag and coarse woody debris retention and protection by forest type in terms of size, density, and decay class.

Wildlife

TRPA sets standards for preserving and managing wildlife habitats, with special emphasis on protecting or increasing habitats of special significance, such as deciduous trees, wetlands, meadows, and riparian areas (TRPA Code of Ordinances, Chapter 62). Specific habitats that are protected include riparian areas, wetlands, and SEZs; wildlife movement and migration corridors; important habitat for any species of concern; critical habitat necessary for the survival of any species; nesting habitat for raptors and waterfowl; fawning habitat for deer; and snags and coarse woody debris. In addition, TRPA special-interest species, which are locally important because of rarity or other public interest, and species listed under the ESA or CESA are protected from habitat disturbance by conflicting land uses.

Section 62.3.2 of the TRPA Code of Ordinances includes the following requirements for protection of wildlife movement and migration corridors:

- SEZs adjoining creeks and major drainages link islands of habitat and shall be managed, in part, for use by wildlife as movement corridors. Structures, such as bridges, proposed within these movement corridors shall be designed to not impede the movement of wildlife.

- Projects and activities in the vicinity of deer migration areas shall be required to mitigate or avoid significant adverse impacts. The location of deer migration areas shall be verified by the appropriate state wildlife or fish and game agencies.

The Code of Ordinances also contains several provisions regarding "critical habitat." TRPA defines critical habitat as any element of the overall habitat for any species of concern that, if diminished, could reduce the existing population or impair the stability or viability of the population. This applies also to habitat for special-interest species native to the Tahoe Basin whose breeding populations have been extirpated, but could return or be reintroduced. Section 62.2.3 of the TRPA Code of Ordinances includes the following critical-habitat provisions:

- No project or activity shall cause, or threaten to cause, the loss of any habitat component considered critical to the survival of a particular wildlife species.
- No project or activity shall threaten, damage, or destroy nesting habitat of raptors and waterfowl or fawning habitat of deer.
- Wetlands shall be preserved and managed for their ecological significance, including their value as nursery habitat to fishes, nesting and resting sites for waterfowl, and as a source of stream recharge, except as permitted pursuant to Chapter 30 of the Code of Ordinances.
- Projects or activities within wetlands may include the creation of artificial nesting sites for waterfowl.

ENVIRONMENTAL SETTING

To evaluate and describe the presence and quality of common and sensitive biological resources in the study area, and to identify potential effects of project implementation on those resources, EDAW (now AECOM) biologists conducted reconnaissance surveys of the site and reviewed the following existing data sources for the Conservancy:

- *Processes and Functions of the Upper Truckee Marsh* (Conservancy and DGS 2003);
- *Upper Truckee River and Wetland Restoration Project: Final Concept Plan Report* (Conservancy and DGS 2006a);
- California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB 2010);
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS 2010);
- *List of Endangered and Threatened Species that Occur or May be Affected by Projects in the South Lake Tahoe (522B) USGS 7.5 Minute Quad* (USFWS 2010);
- *Wildlife Inventory and Monitoring in the Lake Tahoe Basin, California: Pre-Restoration* (Borgmann and Morrison 2004);
- *Riparian Biological Diversity in the Lake Tahoe Basin* (Manley and Schlesinger 2001);
- *Lake Tahoe Watershed Assessment* (Murphy and Knopp 2000); and
- other technical sources referenced in this section.

Several focused and reconnaissance-level surveys for wildlife resources have been conducted by ecologists (e.g., Borgmann and Morrison 2004), since restoration planning was initiated in the mid-1990s.

In support of the project, AECOM botanists conducted a survey for special-status plants in the study area on July 25–27, 2007, following CDFG's *Guidelines for Assessing the Effects of Proposed Development on Rare, Threatened, and Endangered Plants and Plant Communities* (CDFG 2000) and the U.S. Fish and Wildlife Service's (USFWS's) *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants* (USFWS 1996). This is considered a "protocol-level" survey (i.e., a survey following specific protocols as determined by appropriate resource agencies). A letter report discussing the findings of this survey is included as an appendix to this document (Appendix G). In conjunction with the special-status plant survey, reconnaissance surveys for vegetation were also conducted by AECOM botanists Mark Bibbo and Richard Dwerlkotte on July 25–27, 2007.

Overview

The study area is approximately 592 acres, excluding the lake area and approximately 40 acres of upland adjacent to the marsh proper. The study area is bordered on the east, south, and west by residential or commercial development; Lake Tahoe borders the study area on the north.

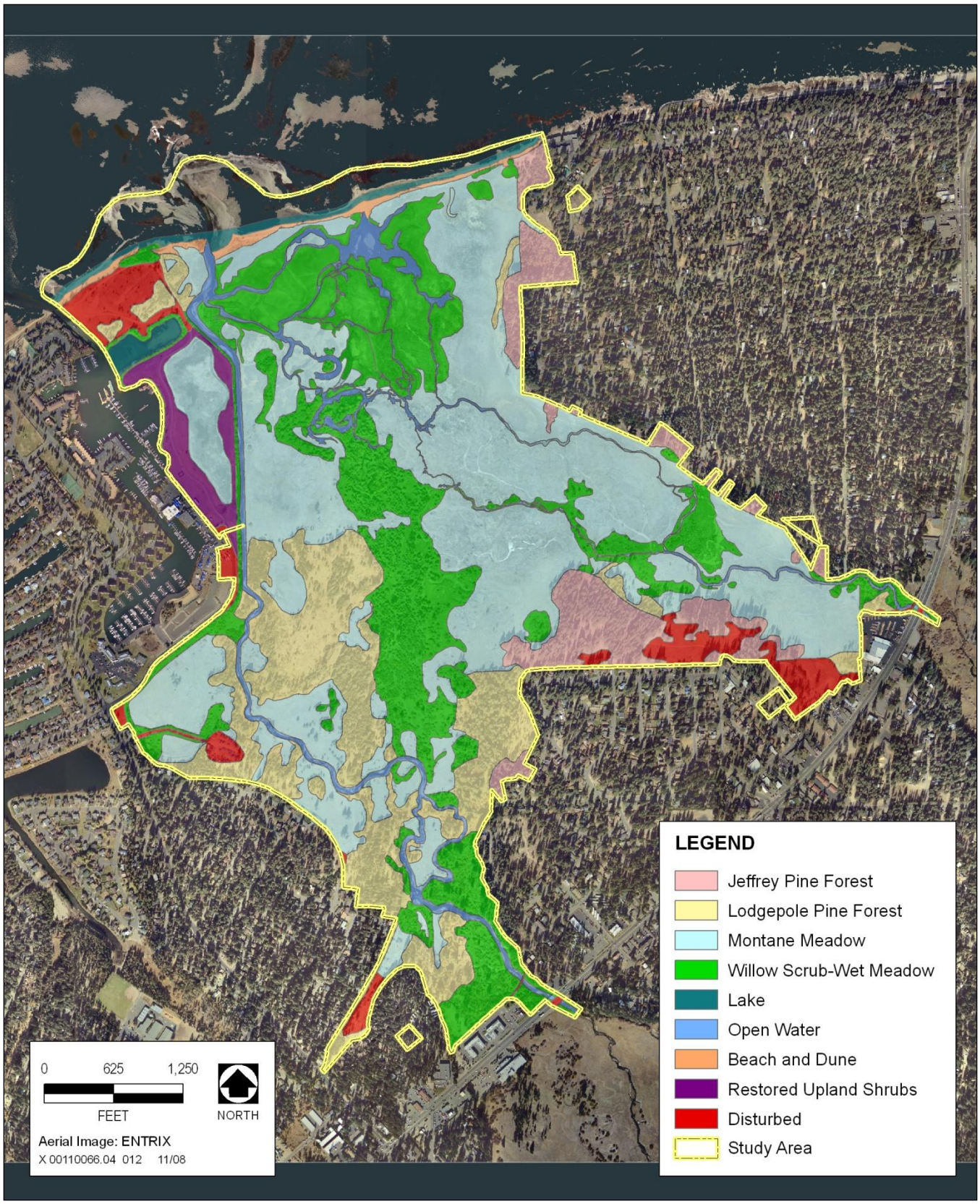
The study area contains the largest remaining wetland in the Tahoe Basin and is a significant conservation area on the south shore of Lake Tahoe. A substantial portion of the study area is cited by Murphy and Knopp (2000) as one of five Ecologically Sensitive Area marshes in the basin because of its size, uniqueness, and potential to support high levels of biodiversity. Wetlands and riparian areas such as those found in the study area provide important habitat for wildlife. The soil and vegetation complexes of riparian and wetland systems produce structurally heterogeneous vegetation and aquatic ecosystems, frequently resulting in diverse biological communities. Many of the wildlife species found in the Tahoe Basin are dependent on aquatic or riparian communities or use riparian environments for some aspect of their life history (Manley and Schlesinger 2001). Most of the study area is designated as a TRPA threshold site (Upper Truckee Marsh threshold site) for waterfowl and wintering bald eagles and uncommon plant communities. Therefore, a nondegradation standard applies to this site, which means that no disturbance is permitted on the site that would reduce habitat quality for these species.

Recreation in the study area is of particular concern because of its potential effects on wildlife (Conservancy 2001). Existing patterns of recreation are described in Section 3.13, "Recreation." Recreational activities reported in the study area include hiking, jogging, mountain biking, cross-country skiing, snowshoeing, dog-walking, hot-air ballooning, tube or raft floating, boating, canoeing, kayaking, fishing, and beach access (Conservancy 2001). Unauthorized recreation activities are known to occur in the study area, including camping and unleashed dog walking. Unauthorized recreational activities in the marsh are an existing source of wildlife disturbance. Unauthorized recreation has also resulted in a user-created network of trails and other disturbed areas throughout the study area. (These trails are described in Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage," and in Section 3.13, "Recreation.")

The following sections describe the vegetation types and the primary wildlife habitat functions provided in the study area.

Vegetation

The study area is characterized by a continuum of plant communities, ranging from predominantly forested areas at the highest elevations to wet meadow and riparian areas along the Upper Truckee River and Trout Creek, to lagoon and sandy barrier beach along the shores of Lake Tahoe. Vegetation types in the study area have been previously described and mapped in technical reports prepared for the project. Vegetation was most recently mapped and described in detail in *Processes and Functions of the Upper Truckee Marsh* (Conservancy and DGS 2003). The vegetation map created for that report was updated in the field during the special-status plant survey conducted by AECOM botanists in July 2007 (Appendix G). Updates and changes to the location and extent of vegetation communities on the study area were recorded with a Global Positioning System (GPS) in the field, digitized for entry into a geographic information system (GIS), and used to create an updated vegetation map that



Source: Data provided by EDAW (now AECOM) in 2008

Exhibit 3.4-1 **Location and Extent of Plant Communities on the Study Area**

accurately reflects current conditions (Exhibit 3.4-1). Plant community names shown on the maps and described below are a combination of names used in previous reports describing vegetation (Conservancy and DGS 2003; WBS 1995, 1999) and other Californian and Sierran vegetation classifications (Elliott-Fisk et al. 1997; Holland 1986; Sawyer and Keeler-Wolf 1995; Fites-Kaufman 2007).

Jeffrey Pine Forest

This upland plant community occurs around the edges of the study area at the highest elevations. These upland locations are relatively well drained, and growing conditions are drier than elsewhere in the study area. The canopy of the Jeffrey pine community is dominated by Jeffrey pine (*Pinus jeffreyi*), but white fir (*Abies concolor*) also occurs. In California, Jeffrey pine is found as a dominant species in a wide range of physical conditions and from elevations as low as 500 feet to as high as 9,500 feet (Sawyer and Keeler-Wolf 1995). In the Sierra Nevada, communities dominated by Jeffery pine typically occur at about 6,000–8,000 feet in elevation (Holland 1986). The composition of understory species on the west slope of the Sierra Nevada differs from that on the east slope, and stands in the study area show east-slope affinities. Common species in the study area in the shrub layer include wax currant (*Ribes cereum*), tobacco brush (*Ceanothus velutinus*), bitterbrush (*Purshia tridentata*), rubber rabbitbrush (*Chrysothamnus nauseosus*), greenleaf manzanita (*Arctostaphylos patula*), and wood rose (*Rosa woodsii*). The herbaceous understory is typically dominated by nonnative grasses, including Kentucky bluegrass (*Poa pratensis*), domestic timothy (*Phleum pratense*), and creeping bent grass (*Agrostis stolonifera*), but can also include native sedges (*Carex* spp.) and rushes (*Juncus* spp.) in moister, lower elevation areas within the uplands.

Lodgepole Pine Forest

Lodgepole pine occurs on lower, more mesic (i.e., wet) sites than Jeffrey pine, especially in areas that are transitional to montane meadow. The largest stands of lodgepole pine in the study area occur on the southern half of the property. This plant community is characterized by open canopies of lodgepole pine (*Pinus contorta* var. *murrayana*) with an understory that may include willow and herbaceous species. Willow species present include Lemmon's willow (*Salix lemmonii*), shining willow (*S. lucida* ssp. *lasiandra*), and Geyer's willow (*S. geyeriana*). Dominant herbs include Kentucky bluegrass, woolly sedge (*Carex lanuginosa*), Baltic rush (*Juncus balticus*), aster (*Aster occidentalis*), yarrow (*Achillea millefolium*), and checker mallow (*Sidalcea oregana*). Relatively open-canopied stands can have well-developed understories with an abundance of wildflowers such as ranger's buttons (*Sphenosciadium capitellatum*), lupine (*Lupinus polyphyllus*), hedge nettle (*Stachys ajugoides*), scarlet gilia (*Ipomopsis aggregata*), western buttercup (*Ranunculus occidentalis*), cinquefoil (*Potentilla* spp.), and Indian paintbrush (*Castilleja miniata*).

Montane Meadow

Montane meadow is an herbaceous plant–dominated community that encompasses a range of moisture and soil conditions that result in differences between dominant plant species. The location of these varying clusters of species is dynamic, based on changing lake and groundwater levels, and no attempt has been made to map meadow subtypes. Areas mapped as montane meadow also include the recently restored and still developing vegetation of the wetland portion of the Lower West Side (LWS) Restoration Project area. Montane meadows are scattered within forests throughout the Sierra Nevada at low-lying landscape positions (Holland 1986). Plants in this community are "hydrophytes," meaning they are specially adapted to tolerating and persisting in saturated soil conditions. The hydrophytic vegetation of montane meadows is maintained by high groundwater levels, typically supported by streams that flow through the meadow. Soils are usually fine-textured and are typically saturated for most of the growing season. Plant cover is generally high.

A suite of sedges, rushes, and grasses dominates in various locations within the montane meadow in the study area. Important species include Baltic rush, Nevada rush (*Juncus nevadensis*), straight-leaved rush (*J. orthophyllus*), field sedge (*Carex praegracilis*), beaked sedge (*Carex utriculata*), water sedge (*C. aquatilis*), common spikerush (*Eleocharis macrostachya*), tufted hairgrass (*Deschampsia cespitosa*), domestic timothy, and

Kentucky bluegrass. Characteristic forbs include aster, arnica, cinquefoil, and Douglas' knotweed (*Polygonum douglasii*). Some areas support large stands of a single species, typically domestic timothy, spikerush, field sedge, or Baltic rush. Baltic rush appears particularly adaptable, persisting in relatively dry areas, such as the fringes of the meadow, and in areas subject to periodic sustained flooding, such as behind the barrier beaches (Barton and East Barton Beaches).

Willow Scrub–Wet Meadow

In the study area, willow scrub–wet meadow occurs primarily in association with stream channels and as scattered patches within the floodplain of streams. Individual willows may be found outside of riparian flood zones, but areas dominated by willows are always closely associated with the floodplain. The large area of willow scrub–wet meadow in the center of the study area appears to be associated with old, abandoned stream channels. The canopy of willow scrub can be dense to open and is dominated by Lemmon's willow, Geyer's willow, and shining willow. Dense stands of willow scrub typically lack an understory. In more open stands, the understory is dominated by montane meadow herbaceous species such as sedges, creeping bent grass, domestic timothy, and slender wheatgrass (*Elymus trachycaulus* var. *trachycaulus*). The following forbs are also common: cinquefoil, aster, arnica (*Arnica chamissonis* var. *foliosa*), and slender willow-herb (*Epilobium ciliatum* var. *ciliatum*).

Lagoon and Open Water

Periodically, additional open-water habitat is created by high lake levels, high groundwater levels, and the pooling of surface water behind the barrier beaches. The presence and size of an extensive lagoon currently depends largely on the lake level, although this was not necessarily the case in the past. The lagoon was largely absent in 1995 surveys but extensive in 1998 because of a higher lake level (Conservancy and DGS 2003). A small portion of the study area was reported as flooded in 1995, but the location was not mapped. A small area of lagoon was also present in summer 2002, after two dry winters resulted in a lower lake level. The lagoon area present in 2002 was formed by pooling of Trout Creek behind the barrier beaches. By 2007, after 5 years of higher lake levels, the lagoon was extensive. The lagoon is characterized by aquatic and emergent plant species including yellow pond-lily (*Nuphar luteum* ssp. *polysepalum*), yellow water buttercup (*Ranunculus flabellaris*), white water buttercup (*R. aquatilis* var. *capillaceus*), pondweed species (*Potamogeton* spp.), common waterweed (*Elodea canadensis*), common bladderwort (*Utricularia vulgaris*), water smartweed (*Polygonum amphibium* var. *stipulaceum*), Baltic rush, and beaked sedge.

In addition to the natural lagoons that exist in the study area, a human-made lagoon feature exists in the northwestern portion of the study area. This lagoon is part of the Tahoe Keys Marina and is commonly referred to as the "Sailing Lagoon." Unlike the natural lagoons associated with Barton and East Barton Beaches, which are affected by lake level, groundwater level, and condition of the barrier beaches, the Sailing Lagoon is connected to a marina that is actively dredged to provide a clear channel for motorized boats to access Lake Tahoe. The Sailing Lagoon is a highly disturbed area and provides limited biological values. Stabilization features (e.g., riprap) border much of the lagoon. The vegetation characteristics of the Sailing Lagoon differ significantly from those in natural lagoon habitat. Aquatic vegetation is dominated primarily by the nonnative Eurasian watermilfoil, *Myriophyllum spicatum*, and willow species grow along the edge, between the Sailing Lagoon's open water and the adjacent upland habitat.

Beach and Dune

A series of plant communities occur along the sandy barrier beach and dune ridge that separates other plant communities on the study area from the open water of Lake Tahoe. "Beach" is defined here as the area of sandy substrate subject to wave action and exposed between high and low lake levels. Above the elevation of the current maximum lake level is a ridge of sand, largely stabilized by vegetation. In keeping with terminology frequently used for barrier beach complexes, this area is referred to as "dune." Barbour and Major (1988: 223–262), describing California oceanic beaches, define dunes as the "sandy, open habitat which extends from the foredune

(or the furthest inland reach of storm waves) to typically inland vegetation on stabilized substrate." This pattern is analogous to what is observed in the study area, where the lakeside vegetation is highly dynamic, but the lagoon-side vegetation consists largely of montane meadow species.

The beach and dune system is dynamic, as it is continually reshaped by erosion from wave action and affected by wind, storm events, and lake level. The highest dune areas are less frequently disturbed and more densely vegetated. The dune ridge is typically covered by a dense sod of water sedge and Nebraska sedge (*Carex nebrascensis*), with some creeping wildrye (*Leymus triticoides*), meadow barley (*Hordeum brachyantherum*), and silverleaf phacelia (*Phacelia hastata*). In contrast, the beach is more dynamic because it is more frequently disturbed by wave action. The sandy beach area is continually subject to erosion and deposition. Plants establish as the lake level retreats. This establishment often occurs at the elevational edge of a recent lake boundary, creating progressive lines of vegetation.

The dynamic lakeside beach in the study area supports occurrences of the rare Lake Tahoe endemic, Tahoe yellow cress (TYC) (*Rorippa subumbellata*). Tahoe yellow cress may be found growing alone or in association with species such as silverleaf phacelia, cinquefoil, cudweed (*Gnaphalium palustre*), bur-marigold (*Bidens laevis*), curly dock (*Rumex crispus*), monkeyflower (*Mimulus primuloides*), lupine, field mint (*Mentha arvensis*), and beautiful spikerush (*Eleocharis acicularis* var. *bella*). The distribution of this rare plant is highly dynamic because available habitat varies with lake level. Available habitat increases during dry periods as additional sand is exposed and decreases during wetter periods (Conservancy and DGS 2006).

Restored Upland Shrubs

This vegetation type occurs only in the upland areas surrounding the restored montane meadow at the LWS Restoration Area, in the northwestern portion of the study area. Shrubs typical of the understory of the study area's Jeffrey pine community were planted here in fall 2002. (Jeffrey pine itself was not planted).

Disturbed Areas

At several locations within the study area, vegetation has been removed or has been otherwise affected by human activities, such as placement of fill. In addition to the disturbed areas shown in Exhibit 3.4-1, there is a user-created network of trails and small disturbed areas throughout most vegetation types that has resulted from unauthorized recreational activities. (These trails are described in Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage," and in Section 3.13, "Recreation.")

The species composition of these disturbed areas varies. In most areas, herbaceous species dominate. Percent cover varies widely depending on the level of disturbance. Among the species present are herbs such as yarrow, slender willow-herb, aster, beardtongue (*Penstemon speciosus*), and dwarf lupine (*Lupinus lepidus* var. *ramosus*), and grasses such as Kentucky bluegrass.

In the Cove East Beach area, west of the Upper Truckee River and north of the LWS Restoration Area, extensive deposition of fill material and other human modifications of the substrate and vegetation have occurred. A portion of this area is dominated by rubber rabbitbrush (*Chrysothamnus nauseosus*). Areas dominated by rubber rabbitbrush are typically maintained by disturbance such as fire, grazing, or soil tilling (Holland 1986). Herbaceous species that occur in areas dominated by rubber rabbitbrush include mountain tarweed (*Madia glomerata*), ground smoke (*Gayophytum diffusum* var. *parviflorum*), and cheatgrass (*Bromus tectorum*). Cheatgrass is considered a widespread, aggressive invasive weed species by the California Invasive Plant Council (Cal-IPC) (2006), with a "High" overall rating (species that have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure). In addition, infestations of perennial pepperweed (*Lepidium latifolium*), another Cal-IPC species with a rating of "High," are present near Trout Creek in the southern portion of the study area.

Wildlife Habitat Functions

Wetlands and riparian areas often support diverse wildlife communities. Many of the wildlife species found in the Tahoe Basin depend on aquatic or riparian communities or use riparian environments for some aspect of their life history (Manley and Schlesinger 2001). As the largest remaining wetland adjacent to Lake Tahoe, much of the study area contains important habitat for wildlife. The mix of terrestrial and aquatic habitats that exist in the study area support a variety of common wildlife species. The site is also known or is likely to support some special-status wildlife species (see "Sensitive Biological Resources" below).

Appendix H, "Wildlife Species and Associated Terrestrial and Aquatic Habitats at the Upper Truckee Marsh," provides a list of approximately 200 amphibian, reptile, bird, and mammal species that have been observed or are likely to occur in the study area. This list was compiled from the following sources:

- survey data from the study area from 1999–2004 (TRPA 2002b, Borgmann and Morrison 2004),
- Conservancy survey data from the study area from 2002 (Conservancy 2002), and
- previous ecological studies within the study area (Conservancy 1997).

A general list of species occurrences in the Tahoe Basin was also reviewed (Murphy and Knopp 2000).

The wildlife species typically associated with each terrestrial or aquatic habitat are briefly described below. The vegetation communities form a continuum of habitats (Exhibit 3.4-1) along hydrologic, elevation, and land use gradients. Annual variability in environmental conditions influences the abundance and distribution of the communities. Many wildlife species use several of the communities. In addition, the proximity of one community to another may be essential for some species (e.g., willow flycatchers [*Empidonax traillii*] are associated with willow scrub with areas of open water or saturated soils nearby). The following sections describe the conditions and functions of these habitats.

Jeffrey Pine Forest

The Jeffrey pine community supports a variety of birds, including woodpeckers, nuthatches, and kinglets. The trees provide perching habitat for many other species of birds, including bald eagles (*Haliaeetus leucocephalus*) and great horned owls (*Bubo virginianus*). This community also supports small mammals such as vagrant shrew (*Sorex vagrans*), yellow-pine chipmunk (*Tamias amoenus*), Douglas squirrel (*Tamiasciurus douglasii*), and golden-mantled ground squirrel (*Spermophilus lateralis*).

Lodgepole Pine Forest

The lodgepole pine community provides perch sites for raptors that may use the meadow for foraging, such as red-tailed hawk (*Buteo jamaicensis*) and American kestrel (*Falco sparverius*). Kestrels may also nest in cavities in these trees. Other cavity-nesting species such as tree swallows (*Tachycineta bicolor*), white-breasted nuthatches (*Sitta carolinensis*), and red-breasted sapsuckers (*Sphyrpicus ruber*) may nest in this community. Some of the species found in the Jeffrey pine or willow scrub–wet meadow communities may use the lodgepole pines as well, but in general, species in this community include ones that prefer more open areas than a Jeffrey pine community, and drier conditions than found in a willow scrub–wet meadow community.

Willow Scrub–Wet Meadow

The willow scrub–wet meadow community provides cover and forage for many species of songbirds. The willow scrub–wet meadow community in the study area is also part of a TRPA threshold site for wintering bald eagle and waterfowl. In general, this community can provide foraging and nesting habitat for flycatchers, warblers, and sparrows. Riparian-associated species documented in willow scrub–wet meadow communities in the study area during the breeding season include Wilson's warbler (*Wilsonia pusilla*), song sparrow (*Melospiza melodia*), and orange-crowned warbler (*Vermivora celata*). Yellow warbler (*Dendroica petechia*), a CDFG species of special

concern, also nests in willow scrub vegetation in the study area (Borgmann and Morrison 2004). Other species, such as mountain chickadee (*Poecile gambeli*), ruby-crowned kinglet (*Regulus calendula*), and yellow-rumped warbler (*Dendroica coronata*), use the willow scrub–wet meadow community as foraging habitat. The willows provide especially important foraging habitat during migration, when birds require stopover habitats to rest and forage.

Other avian species restricted to riparian or scrub habitats, including willow flycatcher and MacGillivray's warbler (*Oporornis tolmiei*), have the potential to breed in this community in the study area. MacGillivray's warbler and willow flycatcher are expected to nest in dense willow thickets, and they are known to nest elsewhere in the Tahoe Basin, but they have not been detected in the study area during recent breeding-season surveys (TRPA 2002a, Conservancy 2002, Borgmann and Morrison 2004).

The structure of willows is an important component of nesting habitat for many birds. A possible explanation for why these species are not breeding in the study area may be that the structure of the willows is unsuitable. Grazing occurred in the study area in the past and has prevented the growth of young willows. The willow thickets in the study area consist of very dense and mature trees. There is very little evidence of recruitment in past years, resulting in even-aged stands. The monotypic structure and age may affect the suitability of the willows to support these breeding songbirds. The nesting habitat of willow flycatcher is described in detail in the "Sensitive Biological Resources" section to illustrate specific structural habitat requirements.

Several bat species have been detected on the site, and they likely forage in the willow scrub–wet meadow communities. These species include hoary bat (*Lasiurus cinereus*), long-eared myotis (*Myotis evotis*), little brown bat (*M. lucifigus*), and Mexican free-tailed bat (*Tadarida brasiliensis*) (Borgmann and Morrison 2004). Amphibian and reptile species that are known to occur in the study area, and that are likely to use willow scrub–wet meadow communities, include Pacific tree frog (*Hyla regilla*) and western terrestrial garter snake (*Thamnophis elegans*).

Montane Meadow

The montane meadow community is contained within a TRPA threshold site for nesting waterfowl, which include species such as mallard (*Anas platyrhynchos*), cinnamon teal (*Anas cyanoptera*), and gadwall (*Anas strepera*). The meadow is also part of a threshold site designated for wintering bald eagle.

The montane meadow in the study area provides habitat for many species of ground-nesting birds, supports populations of small mammals, and provides foraging opportunities for raptors. Different species use different aspects of the meadow as habitat. Water level is the primary factor that modifies habitats within the meadow; some species prefer drier areas, others require moister conditions. For example, under drier conditions, the meadow provides ideal nesting habitat for savannah sparrows (*Passerculus sandwichensis*) and western meadowlarks (*Sturnella neglecta*), which nest near or on the ground. Small-mammal populations may increase under moderately dry conditions, as long as seed production can support them. During wet years or under conditions that promote water retention in the study area, the lagoon increases in size, and nesting sites for savannah sparrows and meadowlarks may be limited to only the upland edges of the meadow. Suitable areas for dry burrows may also limit populations of small mammals. Decreased populations of small mammals may result in fewer foraging opportunities for raptors. However, the wetter conditions may favor red-winged blackbirds (*Agelaius phoeniceus*), which prefer to nest in wet or moist areas where emergent vegetation is present. Species such as Pacific treefrogs and long-toed salamanders (*Ambystoma macrodactylum*) may breed successfully only when conditions are wet enough for a sufficient length of time to maintain ponded areas for eggs to develop and metamorphose.

Several mammal species that use montane meadow habitat have been documented on the site: montane vole (*Microtus montanus*), vagrant shrew, deer mouse (*Peromyscus maniculatus*), California ground squirrel (*Spermophilus beecheyi*), coyote (*Canis latrans*), and black bear (*Ursus americanus*) (Borgmann and Morrison 2004). In Borgmann and Morrison's 2004 study, montane vole was the most commonly detected small mammal

in the study area. Other small mammal species likely to occur in montane meadow habitat in the study area include harvest mouse (*Reithrodontomys megalotis*) and western jumping mouse (*Zapus princes*). Small-mammal populations provide foraging opportunities for raptors, such as northern harrier (*Circus cyaneus*) and American kestrel.

Beach and Dune

The beach provides migration foraging habitat for shorebirds, such as western sandpiper (*C. mauri*), long-billed dowitcher (*Limnodromus scolopaceus*), and willet (*Catoptophorus semipalmatus*). Shorebirds are more commonly observed in the study area in the fall during their southerly migration (Orr and Moffitt 1971). The beach and dune provide resting and nesting habitat for many species that use adjacent aquatic habitats for foraging: gulls, terns, geese, and ducks. Species that may nest on the beach or in sparse vegetation within the dune include Forster's tern (*Sterna forsteri*), Wilson's phalarope (*Phalaropus tricolor*), killdeer (*Charadrius vociferus*), and spotted sandpiper (*Actitis macularia*).

Stream

In shallow-water areas at the stream edges, wading birds, such as great blue heron (*Ardea herodias*) and snowy egret (*Egretta thula*), and shorebirds, such as spotted sandpiper, may be present. In areas where the river floods its banks and creates fish-free ponds, suitable habitat for long-toed salamander is created. American beavers (*Castor canadensis*) are active in the streams, and muskrats (*Ondatra zibethicus*) have been observed within the study area in the past. American beaver is not native to the Tahoe Basin (Schlesinger and Romsos 2000) and is a serious management concern.

Borgmann and Morrison (2004) documented the occurrence of bullfrog (*Rana catesbeiana*) in the study area. In the western United States, bullfrog is a nonnative species and a serious management concern. Where it occurs, this species preys on and reduces the population viability of native amphibians, snakes, rodents, and other species.

Lagoon

The lagoon creates habitat for waterfowl and other aquatic wildlife. Waterfowl and shorebirds are strongly associated with lagoon habitats. Dabbling ducks, such as American widgeon (*Anas americana*), northern pintail (*Anas acuta*), northern shoveler (*Anas clypeata*), cinnamon teal, gadwall, and mallard typically skim food from the surface or tip forward to submerge their heads and necks. Most species of dabbling ducks forage in areas of 6–10 inches of water or less. Diving ducks and other aquatic birds that actively dive to feed on submergent vegetation or to pursue prey, such as ring-necked duck (*Aythya collaris*), common merganser (*Mergus merganser*), pied-billed grebe (*Podilymbus podiceps*), and Forster's tern, may require depths of 3–10 feet (Grassland Water District 2001, cited in Conservancy and DGS 2003). Around the fringes of the lagoon where tules (*Typha* sp.) and cattails (*Scirpus* sp.) grow, yellow-headed blackbirds (*Xanthocephalus xanthocephalus*) may nest. American beavers and muskrats may also be present in lagoon areas. Black terns (*Chlidonias niger*) historically have nested in this area, but have not been reported in recent years (Shuford 1998).

The lagoon and adjacent terrestrial and aquatic habitats form a continuum of habitats in the study area, and as the amount of one habitat increases the amount of another may decrease. If more water is retained in the marsh, a larger lagoon will form and more nesting and foraging habitat may be available for grebes, ducks, geese, terns, and yellow-headed blackbirds. As a consequence of a larger lagoon, however, there will be less meadow or willow scrub–wet meadow area to support species associated with those communities.

Lake

The lake zone provides habitat for fish-eating birds such as grebes, mergansers, double-crested cormorants (*Palacrocorax auritas*), terns, ospreys (*Pandion haliaetus*), and bald eagles. Other species that forage over open water, such as swallows, may also be present. Geese and other waterbirds may roost on the lake as well.

Sensitive Biological Resources

In this analysis, sensitive biological resources include those that receive special protection through the TRPA Code of Ordinances, ESA, CWA, U.S. Forest Service (USFS) Manual, or local plans, policies, and regulations; or that are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. These resources are addressed in the sections below.

Special-Status Species

Special-status species are plants and animals that are legally protected or otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. In this document, special-status species are defined as:

- species listed or proposed for listing as threatened, rare, or endangered under the ESA or CESA;
- species considered as candidates for listing under the ESA or CESA;
- wildlife species identified by CDFG as species of special concern;
- animals fully protected under California Fish and Game Code;
- species designated as sensitive, special interest, or threshold species by TRPA;
- species designated as sensitive by the USFS Regional Forester in Region 5; or
- plants on CNPS List 1B (plants that are rare, threatened, or endangered in California and elsewhere) or List 2 (plants that are rare, threatened, or endangered in California but more common elsewhere) (CNPS 2010).

Federal "species of concern" are no longer designated or recognized by USFWS; therefore, species previously designated as such are not addressed in this section.

Special-Status Plants

A preliminary list of special-status plant species with potential to occur in the study area was developed based on a review of the following:

- the CNPS Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2010);
- a list of special-status species known to occur within the South Lake Tahoe and eight surrounding U.S. Geological Survey (USGS) 7.5-minute quadrangles obtained from the CNDDB (2010);
- a list of species in the USFS Lake Tahoe Basin Management Unit designated as sensitive species (USFS 2005);
- a list of taxa designated by TRPA as sensitive or threshold species (TRPA 2002b); and
- a list of federally endangered, threatened, or candidate species that may be affected by projects in the Tahoe Basin (USFWS 2010).
- The initial data review preliminarily identified 44 special-status plant, lichen, and fungi species that could occur in the region. Table 3.4-1 contains information on all special-status plant species previously recorded in the southern Tahoe Basin. Based on review of existing documentation and discussion with local botanists with extensive experience with the site, 24 of these special-status plant species have the potential or are known to occur in the study area.

Table 3.4-1
Special-Status Plant Species Known From or With Potential to Occur in the Upper Truckee River and Wetlands Restoration Project Study Area

Scientific and Common Name	Listing Status[1]			Habitat and Flowering Period	Potential for Occurrence
	Federal	State	Local/CNPS		
Arabis rectissima var. *simulans* Washoe tall rockcress	I			Dry, sandy granitic or andesitic soils on gentle slopes within open mature Jeffery pine dominated forests, often on recovering lightly disturbed soils; 6,033 to 7,349 ft. Blooming period: May–July	**Not expected to occur**. Suitable habitat on the site is highly disturbed.
Arabis rigidissima var. *demota* Galena Creek rockcress	S		TRPA/1B	Fir- pine-quaking aspen associations, meadow edges, usually on north-facing slopes and rocky outcrops; 7,021–10,019 ft. Blooms August	**Not expected to occur.** Suitable habitat on the site is highly disturbed. No occurrences known from south shore of Lake Tahoe.
Arabis tiehmii Tiehm's rock cress	S		1B	Granitic alpine boulder and rock fields; 9,744 to 11,778 ft. Blooming period: July–August	**Not expected to occur.** Elevations of known occurrences exceed elevations of study area, and no boulder or rock fields in study area.
Botrychium ascendens Upswept moonwort	S		2	Grows in mesic lower montane coniferous forest; 4,921 to 7,496 ft. Blooming period: July–August	**Could occur**. Suitable mesic habitat occurs in the study area.
Botrychium crenulatum Scalloped moonwort	S		2	Freshwater marshes and swamps, meadows and seeps, bogs and fens, and lower montane coniferous forest; 4,921 to 10,761 ft. Blooming period: June–September	**Could occur**. Suitable mesic habitat occurs in the study area.
Botrychium lineare Slender moonwort	S		1B	Often disturbed upper montane coniferous forest; 8,530 ft. Blooming period: unknown	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and no upper montane forest in study area.
Botrychium lunaria Common moonwort	S		2	Upper montane coniferous forest, subalpine coniferous forest, and meadows and seeps; 7,480 to 11,154 ft. Blooming period: August	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and study area does not include upper montane or subalpine coniferous forest.
Botrychium minganense Mingan moonwort	S		2	Lower and mesic upper montane coniferous forest and bogs and fens; 4,921 to 6,742 ft. Blooming period: July–September	**Could occur**. Suitable mesic habitat occurs in the study area.

Table 3.4-1
Special-Status Plant Species Known From or With Potential to Occur in the Upper Truckee River and Wetlands Restoration Project Study Area

Scientific and Common Name	Listing Status[1]			Habitat and Flowering Period	Potential for Occurrence
	Federal	State	Local/CNPS		
Botrychium montanum Western goblin	S		2	Lower and mesic upper montane coniferous forest; 4,921 to 6,988 ft. Blooming period: July–September	**Could occur**. Suitable mesic habitat occurs in the study area.
Carex limosa Shore sedge			2	Grows in upper and lower montane coniferous forest, meadows and seeps, and bogs and fens; 3,937 to 8,858 ft. Blooming period: June–August	**Could occur**. Suitable mesic habitat occurs in the study area.
Carex mariposana Mariposa sedge (name changed from *C. paucifructus*)			TRPA	Red fir and subalpine coniferous forest, montane meadows; 3,960 to 10,560 ft. Blooming period: unknown	**Not expected to occur.** Known occurrences in the Tahoe Basin are at higher elevations than the study area.
Chaenactis douglasii var. *alpine* Alpine dusty maidens			2	Granitic alpine boulder and rock fields; 9,842 to 11,154 ft. Blooming period: July–September	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and no boulder or rock fields in the study area.
Cryptantha crymophila Subalpine cryptantha			1B	Volcanic and rocky subalpine coniferous forest; 8,530 to 10,498 ft. Blooming period: July–August	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and no subalpine coniferous forest in the study area.
Draba asterophora var. *asterophora* Tahoe draba	S		TRPA/1B	Grows in subalpine coniferous forest and alpine boulder and rock fields; 8,250 to 11,499 ft. Blooming period: July–August /September	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and no subalpine conifer forest, or boulder or rock fields, in study area.
Draba asterophora var. *macrocarpa* Cup Lake draba	S		TRPA/1B	Grows in rocky subalpine coniferous forest; 8,202 to 9,235 ft. Blooming period: July–August	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and no subalpine conifer forest in the study area.
Epilobium howellii Subalpine fireweed	S		1B	Mesic subalpine coniferous forest and meadows and seeps; 6,561 to 8,858 ft. Blooming period: July–August	**Could occur**. Suitable mesic habitat occurs on the study area.
Epilobium oreganum Oregon fireweed			1B	Mesic upper and lower montane coniferous forest and bogs and fens; 1,640 to 7,349 ft. Blooming period: June–September	**Could occur**. Suitable mesic habitat occurs on the study area.

Table 3.4-1
Special-Status Plant Species Known From or With Potential to Occur in the Upper Truckee River and Wetlands Restoration Project Study Area

Scientific and Common Name	Listing Status[1]			Habitat and Flowering Period	Potential for Occurrence
	Federal	State	Local/CNPS		
Epilobium palustre Marsh willowherb			2	Meadows and seeps and bogs and fens; 7,217 ft. Blooming period: July–August	**Could occur**. Suitable mesic habitat occurs on the study area.
Erigeron miser Starved daisy	S		1B	Rocky upper montane coniferous forest; 6,036 to 8,595 ft. Blooming period: June–October	**Not expected to occur**. Suitable habitat in the study area is highly disturbed and typically found at higher elevations in the Tahoe Basin
Eriogonum umbellatum var. *torreyanum* Donner Pass buckwheat	S		1B	Volcanic, rocky upper montane coniferous forest and meadows and seeps; 6,085 to 8,595 ft. Blooming period: July–September	**Not expected to occur**. Minimal suitable habitat in the study area.
Glyceria grandis American mannagrass			2	Bogs and fens, meadows and seeps, and streambanks and lake margins of marshes and swamps; 49 to 6,496 ft. Blooming period: June–August	**Known to occur.** Observed at Upper Truckee Marsh (EDAW and ENTRIX 2003) and during the 2007 rare plant survey.
Hulsea brevifolia Short-leaved hulsea	S		1B	Granitic or volcanic, gravelly or sandy upper montane coniferous forest and lower montane coniferous forest; 4,921 to 10,498 ft. Blooming period: May–August	**Not expected to occur**. Suitable habitat in the study area is highly disturbed.
Lewisia kelloggii ssp. *hutchisonii* Hutchison's lewisia	S		3	Openings and slate in upper montane coniferous forest; 4,799 to 7,004 ft. Blooming period: June–August	**Not expected to occur**. Suitable habitat in the study area is highly disturbed.
Lewisia kelloggii ssp. *kelloggii* Kellogg's lewisia	S			Sandy or gravelly, usually granitic or volcanic substrates; 4,265 to 7,874 ft. Blooming period: May–July	**Not expected to occur**. Suitable habitat in the study area is highly disturbed.
Lewisia longipetala Long-petaled lewisia	S		TRPA/1B	Grows in granitic subalpine coniferous forest and alpine boulder and rock fields; 8,202 to 9,596 ft. Blooming period: July–August	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and no subalpine forest, or boulder or rock fields in the study area.
Polystichum lonchitis Holly fern			3	Grows in granitic or carbonate upper montane coniferous forest and subalpine coniferous forest; 5,905 to 8,530 ft. Blooming period: June–September	**Could occur**. Suitable mesic habitat occurs on the study area.

Table 3.4-1
Special-Status Plant Species Known From or With Potential to Occur in the Upper Truckee River and Wetlands Restoration Project Study Area

Scientific and Common Name	Listing Status[1]			Habitat and Flowering Period	Potential for Occurrence
	Federal	State	Local/CNPS		
Rorippa subumbellata Tahoe yellow cress	C/S	E	TRPA/1B	Grows in decomposed granitic beaches of meadows and seeps and in lower montane coniferous forests; 6,217 to 6,233 ft. Blooming period: May–September	**Known to occur**. Suitable habitat present. Observed at the Upper Truckee Marsh (EDAW 2003) Barton Beach and Cove East populations are monitored annually when lake level is above 6,226 feet, and every other year when lake level is below 6,226 feet.
Schoenoplectus subterminalis Water bulrush			2	Grows in montane lake margins of marshes and swamps and in bogs and fens; 2,460 to 7,381 ft. Blooming period: July–August	**Could occur**. Suitable mesic habitat occurs in the study area.
Scutellaria galericulata Marsh skullcap			2	Lower montane coniferous forest, meadows and seeps, and marshes and swamps; 0 to 6,889 ft. Blooming period: June–September	**Could occur**. Suitable mesic habitat occurs in the study area.
Stuckenia filiformis Slender-leaved pondweed			2	Grows in assorted shallow freshwater marshes and swamps; 984 to 7,053 ft. Blooming period: May–July	**Could occur**. Suitable mesic habitat occurs in the study area.
Utricularia ochroleuca Cream-flowered bladderwort			2	Lake margins of marshes and swamps and mesic meadows and seeps; 4,708 to 4,724 ft. Blooming period: June–July	**Could occur**. Suitable mesic habitat occurs in the study area.
Moss					
Bruchia bolanderi Bolander's candle moss	S		2	Damp soil in upper montane coniferous forest, meadows and seeps, and lower montane coniferous forest; 5,577 to 9,186 ft.	**Could occur**. Suitable mesic habitat occurs in the study area.
Helodium blandowii Blandow's bog moss	S		2	Meadows and seeps and damp soil in subalpine coniferous forests; 6,108 to 8,858 ft.	**Could occur**. Suitable mesic habitat occurs in the study area.
Meesia longiseta Long-stalked hump-moss	I			Usually in fens, but sometimes along freshwater streams at high elevations.	**Could occur**. Suitable mesic habitat occurs in the study area.
Meesia triquetra Three-ranked hump-moss	S		4	Grows in mesic and soil upper montane coniferous forest, subalpine coniferous forest, meadows and seeps, and bogs and fens; 4,265 to 9,688 ft.	**Could occur**. Suitable mesic habitat occurs in the study area.
Meesia uliginosa Broad-nerved hump-moss	S		2	Grows in damp soil of upper montane coniferous forest, subalpine coniferous forest, meadows and seeps, and bogs and fens; 4,265 to 9,199 ft.	**Could occur**. Suitable mesic habitat occurs in the study area.

Table 3.4-1
Special-Status Plant Species Known From or With Potential to Occur in the Upper Truckee River and Wetlands Restoration Project Study Area

Scientific and Common Name	Listing Status[1]			Habitat and Flowering Period	Potential for Occurrence
	Federal	State	Local/CNPS		
Myurella julacea Myurella moss	I		2	Alpine boulder and rock fields and damp rock and soil of subalpine coniferous forest; 8,858 to 9,842 ft.	**Not expected to occur**. Known occurrences are at higher elevations than the study area, and no subalpine forest, or boulder or rock fields in the study area.
Orthotrichum praemorsum Orthotrichum moss	I			Shaded, moist habitats of Eastern Sierra Nevada rock outcrops; up to 8,202 ft.	**Not expected to occur**. Known occurrences at higher elevations than the study area, and no extensive rock outcrops in study area.
Orthotrichum shevockii Shevock's moss	I		1B	Lower montane coniferous forest, pinyon and juniper woodland, subalpine coniferous forest, and granitic and rock of upper montane coniferous forest; 6,889 to 7,874 ft.	**Not expected to occur**. Known occurrences are at higher elevations than the study area.
Orthotrichum spjuttii Spjut's bristlemoss	I		1B	Lower montane coniferous forest, pinyon and juniper woodland, subalpine coniferous forest, and granitic and rock of upper montane coniferous forest; 6,889 to 7,874 ft.	**Not expected to occur**. Typically found at higher elevations than the study area.
Pohlia tundrae Tundrae pohlia moss	I		2	Gravelly, damp soil of alpine boulder and rock fields; 8,858 to 9,842 ft.	**Could occur**. Precise microhabitat required are unknown (Gross pers. comm.) Suitable habitat unlikely.
Sphagnum spp. Sphagnum mosses	I			Usually in fens and bogs; sometimes very wet, nonacidic habitats that remain saturated.	**Could occur**. Suitable mesic habitat occurs in the study area.
Lichen					
Veined water lichen *Peltigera hydrothyria*	S			Lower to mid-montane elevations in small, fresh water, perennial streams with little fluctuation in water level and scouring.	**Could occur**. Suitable perennial stream habitat present on the study area.
Fungi					
Branched collybia *Dendrocollybia racemosa*	S			Older mixed coniferous forest.	**Could occur**. Suitable habitat present in the study area.

Table 3.4-1
Special-Status Plant Species Known From or With Potential to Occur in the Upper Truckee River and Wetlands Restoration Project Study Area

Scientific and Common Name	Listing Status[1]			Habitat and Flowering Period	Potential for Occurrence
	Federal	State	Local/CNPS		

[1]Legal Status Definitions

Federal

U.S. Fish and Wildlife Service (USFWS):

T Federal Threatened
E Federal Endangered
C Candidate

Lake Tahoe Basin Management Unit:

S Sensitive Species
I Species of Interest

State

California Department of Fish and Game (DFG):

R Rare
T Threatened
E Endangered

Local/California Native Plant Society (CNPS)

CNPS Listing Categories:

1B Plants rare, threatened, or endangered in California and elsewhere
2 Plants rare, threatened, or endangered in California but more common elsewhere
3 Plants for which more information is needed – a review list
4 Plants of limited distribution – a watch list

During the special-status plant survey of the study area, one special-status plant species, American mannagrass (*Glyceria grandis*), a CNPS List 2 species, was encountered that had not been previously reported from the study area (Table 3.4-1). The known populations of TYC at Cove East and Barton Beaches were visited during this survey. The locations of these populations of special-status species are shown in Exhibit 3.4-2 and are discussed in more detail below.

American Mannagrass

American mannagrass is a rhizomatous grass (i.e., a grass with some below-ground stems) that is on CNPS List 2 (plants that are rare, threatened, or endangered in California but more common elsewhere) (CNPS 2010). The species is much more common outside of California; it is found from Alaska to Newfoundland in the north (including all of the northwestern, midwestern, mid-Atlantic, and northeastern states), in the mountains of Arizona and New Mexico in the southwest, and north of North Carolina and Tennessee in the southeastern United States. In California it is known from Fresno, Humboldt, Mendocino, Mono, Placer, and Tuolumne Counties. There are no previously documented occurrences of American mannagrass in El Dorado County.

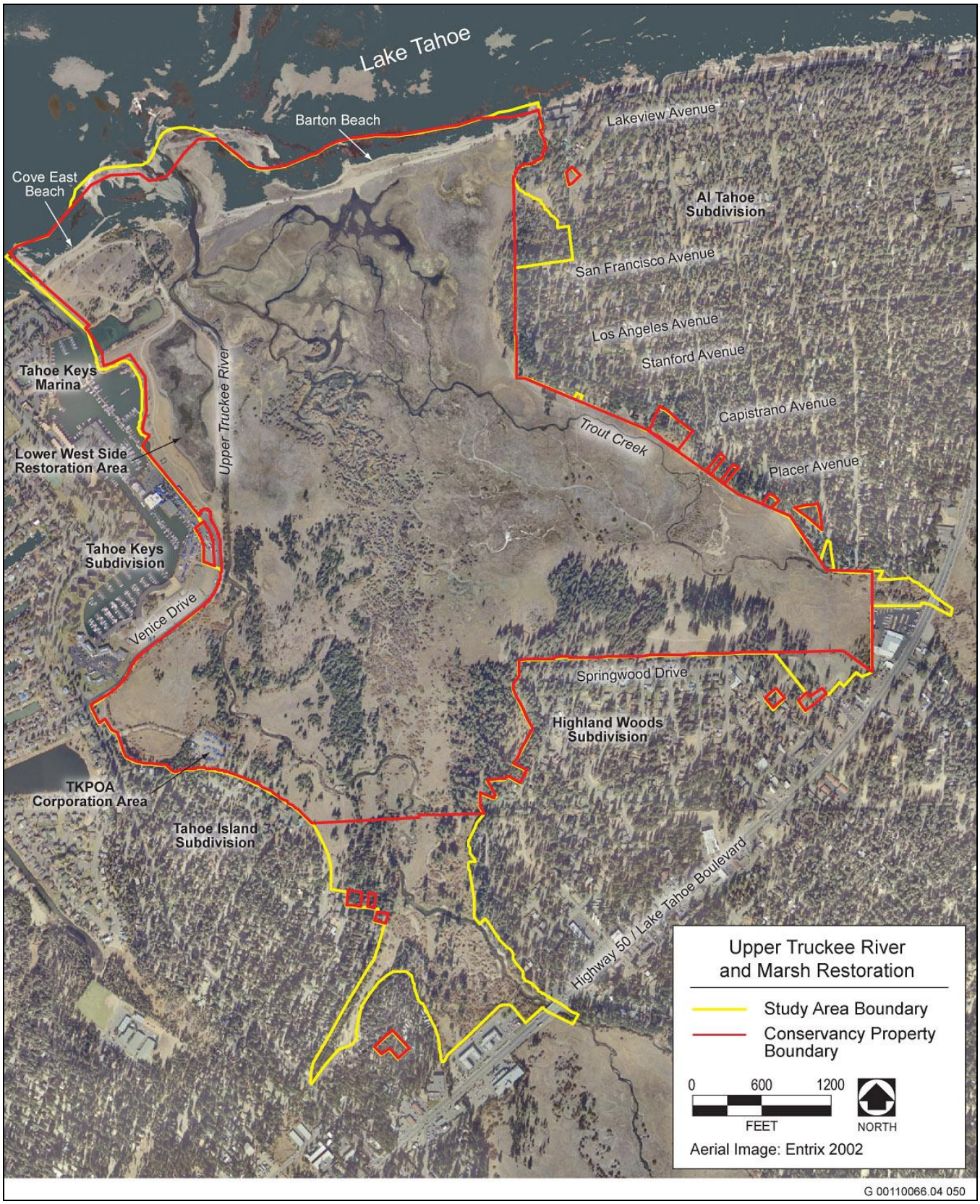
American mannagrass grows in riparian habitats, on streambanks, at lake margins, in meadows, and in bogs and fens. It grows to a height of three feet tall and has a 7- to 15-inch-long, egg-shaped inflorescence (i.e., arrangement of flowers) bearing small spikelets (i.e., small groups of inconspicuous flowers). The grass flowers between June and August. It is similar in overall appearance to fowl mannagrass (*Glyceria elata*), which is much more common throughout the Sierra Nevada. It can also be confused with pale fake mannagrass (*Torreyochloa pallida*). Photographs of American mannagrass can be found in Appendix G.

During AECOM's special-status plant survey of the study area (July 25–27, 2007), American mannagrass was found in one location growing on a low mud bench within one of the active channels of Trout Creek just above the surface water. Associated species on the mud bench were pale fake mannagrass (*Torreyochloa pallida*), beaked sedge, Baltic rush, fringed willow herb (*Epilobium ciliatum*), and wild mint (*Mentha arvense*). Approximately 35 flowering stems were observed in a ten-square-foot area. Nearby mannagrass species, thought to be fowl mannagrass, had a very different appearance characterized by much greener lemmas and inflorescence, a slightly smaller inflorescence, and smaller, more rounded glumes.

Tahoe Yellow Cress

Tahoe yellow cress is a perennial herb with yellow flowers that is endemic to the sandy beaches of Lake Tahoe. Part of the mustard family, TYC is a candidate for listing by USFWS, listed as endangered by the State of California, and a TRPA threshold special-status species. It emerges above ground from perennial underground roots between March and June and flowers between June and October. The sandy beach margin of Lake Tahoe is the only known location of the species.

Tahoe yellow cress is thought to be very sensitive to disturbance by human activity (e.g., walking, running, dog-walking) (Pavlik, Murphy, and TYCTAC 2002:11 and 78; Conservancy and DGS 2006:15). It is also very sensitive to lake level, with more occurrences present during low lake levels when more beach-zone habitat is available for colonization (Pavlik, Murphy, and TYCTAG 2002; Stanton and Pavlik 2006). In response to low numbers of TYC occurrences in the mid-1990s, a multiagency technical advisory group (TAG) was formed by TRPA to develop and implement a conservation strategy for the species. The conservation strategy was written in 2002 (Pavlik, Murphy, and TYCTAC 2002), and a memorandum of understanding and conservation agreement was signed by 13 state and local agencies and organizations to implement the strategy. Several studies have been initiated since 2001, including TYC seed collection and trial outplantings.



Source: Adapted by EDAW (now AECOM) in 2013

Exhibit 1-2 **Study Area Map**

In 2005, members of the TAG transitioned to being members of an adaptive management working group (AMWG), and the TAG is now a subcommittee of the AMWG. Part of implementing the conservation strategy is ensuring that entities that manage properties with TYC occurrences have submitted a management plan or information sheet to the AMWG (Stanton and Pavlik 2006). As a condition of TRPA approval for the Lower West Side Wetland Restoration Project on Conservancy land, a TYC management plan was drafted for the populations of TYC occurring on Cove East Beach (west of the Upper Truckee River mouth) and on Barton and East Barton Beaches (east of the Upper Truckee River mouth) (Conservancy and DGS 2006). For monitoring purposes, these populations have been separated into two segments. The segment of the population located on Cove East Beach has been called Upper Truckee West, and the remaining part of the population on Barton and East Barton Beaches has been called Upper Truckee East. The Upper Truckee West and Upper Truckee East populations are two of the 26 TRPA threshold population sites for TYC. The Upper Truckee East site is thought to support approximately three-quarters of the total TYC population. The Conservancy maintains an exclosure that protects much of the Upper Truckee East population from human activity.

The goals of the Conservancy's TYC management plan are to:

- manage the collective Upper Truckee West and Upper Truckee East TYC population on Cove East, Barton, and East Barton Beaches within its natural range of variation so that it is stable or growing and not decreasing in size as a result of effects from human use and/or Conservancy land management decisions;
- base management decisions on the best scientific information available;
- incorporate adaptive management strategies into the plan so that the Conservancy is both proactive in researching TYC biology, possible effects on the population, and the best education and outreach approaches, and reactive in terms of incorporating that research into new management policies; and
- provide a consistent management framework over time.

Special-Status Wildlife

A preliminary list of special-status wildlife species known or with potential to occur in the study area was developed based on a review of:

- USFWS's Federal Endangered and Threatened Species that Occur or May be Affected by Projects in the South Lake Tahoe (522B) USGS 7.5 Minute Quad (USFWS 2010);
- CDFG's Special Animals report (CDFG 2009), which is a list of federally listed and state-listed taxa, CDFG species of special concern, and other special-status animals;
- a list of special-status species known to occur within the South Lake Tahoe and eight surrounding USGS 7.5-minute quadrangles obtained from the CNDDB (2007);
- a list of species designated as sensitive by the USFS Regional Forester in Region 5 (USFS 2005); and
- a list of taxa designated by TRPA as special-interest or threshold species (TRPA 2007).

The initial data review preliminarily identified 27 special-status wildlife species that could occur in or near the study area. Twelve of the species evaluated are not expected or have a low potential to occur in the study area, and 15 have a moderate to high likelihood to occur in the study area and vicinity. This determination was based primarily on three factors: the types, extent, and quality of habitats in the study area; the proximity of the study area to known extant occurrences of the species; and the regional distribution and abundance of the species.

Table 3.4-2 summarizes the potential for occurrence of each special-status wildlife species evaluated during this analysis. Species with a moderate to high potential to occur in the study area, or that are known to occur, are described below.

Bald Eagle

TRPA considers most of the study area a population threshold site for wintering bald eagles (as shown in Exhibit 3.4-3). The bald eagle is listed as endangered under the CESA, designated as a sensitive species by USFS, and designated as a special-interest species by TRPA; it is also fully protected under the California Fish and Game Code. Effective August 8, 2007, the bald eagle was removed from the federal ESA by USFWS because of the species' population recovery throughout most of its range.

Bald eagles require large bodies of water or free-flowing streams with abundant fish and adjacent snags or other perches for hunting. They generally nest in undisturbed coniferous forests, usually within a mile of a lake or reservoir. Bald eagle habitat typically consists of several components—most significantly, close proximity to large bodies of water and wetlands associated with lakes, mature coniferous stands with presence of dominant trees, and adequate protection from human disturbance.

Bald eagles are known to nest in a few areas within the Tahoe Basin, including Emerald Bay and Marlette Lake (USFS 2000). They are not expected to nest in the study area. In 1991, a study was conducted by Humboldt State University to evaluate the Tahoe Basin for the support of nesting and wintering bald eagles. The study identified ten areas on the California side of Lake Tahoe that could provide the necessary nesting structure for bald eagles. Nine of the ten areas were determined to be unsuitable for nesting bald eagles.

The only site determined to be suitable was Emerald Bay, which has supported a nesting pair since 1997 (USFS 2000). Resident eagles and young produced in the Tahoe Basin, as well as migrants from other areas, are known to use portions of the study area during the winter. During surveys conducted from 1998 to 2002, the population of wintering bald eagles ranged between seven and 13 adults and zero to four juveniles (Sanchez, pers. comm., 2004). Bald eagles are frequently observed during the summer foraging over the study area (Robinson, pers. comm., 2003). Because only one pair is currently known to nest in the South Lake Tahoe area (USFS 2000), it is assumed that the eagles observed are from the nesting territory at Emerald Bay, or are migrant visitors. They use the conifers on the periphery of the study area for perching and roosting and the meadow, lagoon, and lake for foraging. The shorezone is a critical habitat feature for bald eagles at Lake Tahoe (USFS 2000).

Bald eagles tend to favor lodgepole and Jeffrey pines as perching trees, but will also use aspen or willows. Preferred perches typically are bordered by open areas, have stout horizontal branches, are tall and of large diameter, are close to water and feeding areas, and provide a good view of the surrounding area. Trees used by wintering bald eagles in the Tahoe Basin usually have open branches and either dead standing, dead topped, or some dead lateral branches in a live crown. The trees favored for perches ranged from approximately 80 feet to 100 feet tall and were at least 40 feet taller than the understory of the surrounding stand (Laves and Romsos 2000).

Several known perch sites exist in the study area (as shown in Exhibit 3.4-3). These perch sites are regulated by TRPA and are not to be disturbed. The proximity of these perches to foraging areas makes them particularly valuable to eagles. Although TRPA establishes a buffer zone of 0.5 mile to protect bald eagle nests, the 2001 and 2006 TRPA threshold evaluation reports have not defined a recommended buffer around perch sites (TRPA 2002b, 2007). However, the threshold evaluations state that perching trees and nesting sites shall not be physically disturbed; nor shall the habitat within the disturbance (buffer) zone around nest sites be manipulated in any manner, unless needed to enhance habitat quality. Laves and Romsos (2000) recommend a buffer of 820 feet around perch sites. Changes in water levels in the study area or changes in the river mouth and beach and dune formation may affect the suitability and condition of the perch trees.

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
Amphibians					
Yosemite toad *Bufo canarus*	FC	SC		Endemic California toad found in wet meadows between 4,000–12,000 feet in the Sierra Nevada from Alpine County south to Fresno County.	**Not expected to occur**. The study area is outside the known range of this species.
Mountain yellow-legged frog *Rana muscosa*	FC, FSS	SC	P	Occurs in upper elevation lakes, ponds, bogs, and slow-moving alpine streams. Most Sierra Nevada populations are found between 6,000 and 12,000 feet elevation. Almost always found within three ft. of water, and associated with montane riparian habitats in lodgepole pine, ponderosa pine, Jeffrey pine, sugar pine, white fir, whitebark pine, and wet meadow vegetation types. Alpine lakes inhabited by mountain yellow-legged frogs generally have grassy or muddy margin habitat, although below treeline sandy and rocky shores may be preferred. Suitable stream habitat can be highly variable, from high gradient streams with plunge pools and waterfalls, to low gradient sections through alpine meadows, but low gradient streams are preferred. Small streams are generally unoccupied and have no potential breeding locations due to the lack of depth for overwintering and refuge (i.e., depths of several feet or more).	**Low potential to occur.** Potentially suitable habitat is present in the study area. However, the distance to known populations, presence of predators (e.g., bullfrogs), and high level of disturbance in the study area cause the potential of occurrence to be low.
Northern leopard frog *Rana pipiens*	FSS	SC		Usually occurs in permanent water with abundant aquatic vegetation. Associated with wet meadows, marshes, slow-moving streams, bogs, ponds, potholes, and reservoirs.	**Not expected to occur.** Potentially suitable habitat is present in the study area. However, there have been no documented occurrences in the region.
Birds					
Bald eagle *Haliaeetus leucocephalus*	FSS	SE, FP	SI	Uses ocean shorelines, lake margins, and river courses for both nesting and wintering. Most nests are within one mile of water in large trees with open branches. Roosts communally in winter.	**Observed in study area (foraging).** Resident eagles and young produced in the Basin, as well as migrants from other areas, are known to perch in the study area during winter months. The breeding pair from Emerald Bay has also been observed foraging over the study

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
					area in the summer. The study area has been identified as a Bald Eagle Threshold Area by the TRPA, and several known perch sites exist in the study area.
Golden eagle *Aquila chrysaetos*		FP	SI	Mountains and foothills throughout California. Nests on cliffs and escarpments or tall trees.	**Not expected to occur**. Suitable habitat not present in the study area.
Osprey *Pandion haliaetus*		SC	SI	Associated strictly with large fish-bearing waters. Nest usually within 0.25 mile of fish-producing water, but may nest up to 1.5 mile from water. In the Tahoe Basin, osprey nests are distributed primarily along the Lake Tahoe shoreline at the northern portion of the east shore and southern portion of the west shore. Other osprey nest sites in the Basin occur along the shorelines of smaller lakes (e.g., Fallen Leaf Lake), and in forest uplands up to 1.5 miles from lakes.	**Observed in study area (Foraging)**. Osprey have been observed in the study area. They are not known to nest in the study area, however good foraging habitat and perch sites are present in the area.
Northern goshawk *Accipiter gentilis*	FSS		SI	In the Sierra Nevada, generally requires mature conifer forests with large trees, snags, downed logs, dense canopy cover, and open understories for nesting; aspen stands are also used for nesting. Foraging habitat includes forests with dense to moderately open overstories, and open understories interspersed with meadows, brush patches, riparian areas, or other natural or artificial openings. Goshawks reuse old nest structures and maintain alternate nest sites.	**Observed in study area (foraging).** Potential foraging habitat is present in the study area. However the lack of suitable nesting habitat and high disturbance levels in the surrounding area (e.g., residential and commercial development) cause the study area to be rarely used and northern goshawk to have a low potential to occur in a given year. A northern goshawk was observed in the study area previously (1994–1996). However, the detection was made in September when individuals tend to be moving from summer areas (Global Environmental 1997). It could have been a young bird produced elsewhere in the Basin or a migrating bird. No northern goshawks have been documented in the study area in recent years (1997–2007).

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
Cooper's hawk *Accipiter cooperii*		SC		Nests in oak woodlands, other mixed evergreen forest, or coniferous forest. Forages in a variety of habitats-from open areas to dense forests.	**Observed in study area**. Potential nesting and foraging habitat exists within upland areas in the study area. The species has been documented foraging in the study area as recently as 2000 but has not been observed nesting (TRPA 2002). The level of disturbance in the study area reduces the potential for this species to use the area for nesting to a low level.
Sharp-shinned hawk *Accipiter striatus*		SC		Nests in coniferous or mixed forests, usually selecting a conifer for the nest tree. Forages in a wide variety of coniferous, mixed, or deciduous woodlands.	**Observed in study area (Foraging).** Potential nesting and foraging habitat exists within the upland areas in the study area. The species has been observed foraging in the study area as recently as 2000 but has not been observed nesting (TRPA 2002). The level of disturbance in the study area reduces the potential for this species to use the study area for nesting to a low level.
Northern harrier *Circus cyaneus*		SC		Found in a variety of open grassland, wetland, and agricultural habitats. Open wetland habitats used for breeding include marshy meadows, wet and lightly grazed pastures, and freshwater and brackish marshes. Breeding habitat also includes dry upland habitats, including grasslands, croplands, drained marshlands, and shrub-steppe in cold deserts. Winters throughout California where suitable habitat occurs. Wintering habitat includes open areas dominated by herbaceous vegetation, including grasslands, pastures, croplands, coastal sand dunes, brackish and freshwater marsh, and estuaries (Grinnel & Miller 1944, Martin 1987, and MacWhirter & Bildstein 1996).	**Observed in study area.** Suitable habitat is present in the study area and the species has been documented using the area for foraging. No harrier nests have been documented in the study area to date, and the level of disturbance has likely resulted in a low potential for nesting to occur in the study area.
Peregrine falcon *Falco peregrines*	FSS	SE, FP	SI	Nests and roosts on protected ledges of high cliffs, usually adjacent to water bodies and wetlands that support abundant avian prey.	**Not expected to occur**. Suitable habitat not present in the study area.

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
Long- eared owl *Asio otus*		SC		Found in a variety of habitat types throughout its range. Nests in woodland, forest, and open (e.g., grassland, shrubsteppe, desert) settings. Occupies wooded and nonwooded areas that support relatively dense vegetation (trees, shrubs) adjacent to or within larger open areas such as grasslands or meadows (i.e., habitat edges) (Bloom 1994, Marks et al. 1994). This species has also been documented breeding in contiguous conifer forest habitat with heavy mistletoe infestation (Bull et al. 1989). Trees and shrubs used for nesting and roosting include oaks, willows, cottonwoods, conifers, and junipers (Marks et al. 1994).	**Moderate potential to occur.** Since a variety of habitat types (e.g., open and forested) are present in the study area, it is likely that suitable habitat exists in the study area for this species. However, the species is known to nest in different habitats throughout its range and preferred nesting habitat for long-eared owls in the Lake Tahoe Basin has not been well documented. However, the species has been documented in the Lake Tahoe Basin during the breeding season as recently as 2005.
California spotted owl *Strix occidentalis occidentalis*	FSS	SC	P	Occurs in several forest vegetation types, including mixed conifer, ponderosa pine, red fir and montane hardwood. Nesting habitat is generally characterized by dense canopy closure (i.e., >70%) with medium to large trees and multistoried stands (i.e., at least two canopy layers). Foraging habitat can include intermediate to late-successional forest with greater than 40% canopy cover.	**Low potential to occur.** Potential foraging habitat is present in the study area. However the lack of suitable nesting habitat and high disturbance levels in the surrounding area (e.g., residential and commercial development) cause the potential for occurrence to remain low.
Great gray owl *Strix nebulosa*	FSS	SE		Found in Central Sierra mature mixed conifer forests near meadows. Scattered along the west slope of the Sierra between 4,500 and 7,500 ft from Plumas County to Yosemite National Park.	**Not expected to occur.** Suitable habitat is present in the study area. However, the area experiences high disturbance levels, especially in the surrounding area [e.g., residential and commercial development]; and the historic or present occurrence of great gray owl in the Tahoe Basin has not been confirmed.
Willow flycatcher *Empidonax traillii*	FSS	SE	P	In the Sierra Nevada, suitable habitat typically consists of montane meadows that support riparian deciduous shrubs (particularly willows) and remain wet through the nesting season (i.e., mid-summer). Important characteristics of suitable meadows include a high water table that results in standing or slow-moving water,	**Moderate potential to occur.** Suitable habitat for willow flycatchers is currently limited in the study area, primarily due to the hydrology present. Willow flycatchers were formerly known to nest by Trout Creek in the study area (Orr and Moffitt 1971), however in recent years very few sightings have been

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
				or saturated soils (e.g., "swampy" conditions), during the breeding season; abundant riparian deciduous shrub cover (particularly willow); and riparian shrub structure with moderate to high foliar density that is uniform from the ground to the shrub canopy. Most breeding occurrences are in meadows larger than 19 acres, but average size of occupied meadows is approximately 80 acres. Although less common in the Sierra Nevada, riparian habitat along streams can also function as suitable habitat for willow flycatcher. However, those areas must support the hydrologic and vegetation characteristics described for suitable meadows (e.g., standing or slow-moving water, abundant and dense riparian vegetation).	documented. Willow flycatchers may use the study area, particularly in years when overbanking occurs in May and/or June, however, protocol level surveys have not been conducted in recent years and no detections have been made via other methods (e.g., point counts). The restoration proposed for the study area will likely improve the suitability of the habitat present as well as expand it. Therefore the potential for willow flycatcher to occur in the study area will likely increase as a result of the restoration.
Yellow warbler *Dendroica petechia*		SC	P	In the Sierra Nevada, yellow warblers typically breed in wet areas with dense riparian vegetation. Breeding habitats primarily include willow patches in montane meadows, and riparian scrub and woodland dominated by willow, cottonwood, aspen, or alder with dense understory cover. Localized breeding has been documented recently in more xeric sites, including chaparral, wild rose (*Rosa* spp.) thickets, and young conifer stands (Sisegel and DeSante 1999, RHJV 2004).	**Observed in study area**. This species has been documented as present and breeding in the study area (Borgmann and Morrison).
Waterfowl species (collectively)			SI	Wetlands and waters such as lakes, creeks, drainages, marshes, and wet meadows.	**Observed in study area.** Several waterfowl species have been documented foraging, resting, and nesting in the study area (Borgmann and Morrison 2004, TRPA 2002a, TRPA 2002, Conservancy 2002, and Global Environmental 1997).

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
Mammals					
Pale Townsend's big-eared bat *Corynorhinus townsendii pallescens*	FSS	SC	SI	Ranges throughout California mostly in mesic habitats. Limited by available roost sites, such as caves, tunnels, mines, and buildings.	**Not expected to occur.** Suitable habitat not present in the study area. No occurrences reported within the Lake Tahoe Basin (Schlesinger and Romsos 2000).
Western red bat *Lasiurus blossevillii*	FSS	SC		Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. There may be an association with intact riparian habitat (particularly willows, cottonwoods, and sycamores).	**High potential to occur.** Suitable habitat is present in the study area and the species has been documented within 4 miles of the study area as recently as 2004 (Borgmann and Morrison).
Hoary bat *Lasiurus cinereus*		SC		Diverse forest habitats with a mixture of forest and small open areas that provide edges. Solitary and primarily roost in foliage of both coniferous and deciduous trees.	**Observed in study area.** Suitable habitat is present and the species has been documented on the study area (Borgmann and Morrison).
California wolverine *Gulo gulo luteus*	FSS	ST, FP	P	Inhabits upper montane and alpine habitats of Sierra Nevada, Cascades, Klamath, and north Coast Ranges. Needs water source and denning sites. Rarely seen. Sensitive to human disturbance.	**Not expected to occur.** Suitable habitat not present in the study area. Very few documented occurrences in the region.
American marten *Martes Americana*	FSS		P	Dense canopy conifer forest with large snags and downed logs. Prefers old growth stands with multiple age classes in vicinity.	**Not expected to occur**. Suitable habitat not present in the study area.
Pacific fisher *Martes pennanti pacifica*	FC, FSS	SC	P	Inhabits stands of pine, Douglas fir, and true fir, in northwestern California and Cascade-Sierra ranges. Fishers are considered extirpated throughout much of the Central and Northern Sierra Nevada (Zielinski et al. 1995).	**Not expected to occur**. No suitable habitat present. Species is considered extirpated from the Lake Tahoe Basin.
Sierra Nevada red fox *Vulpes vulpes necator*	FSS	ST		Inhabits upper montane and alpine habitats of Sierra Nevada, Cascades, Klamath, and north Coast Ranges. Needs water source and denning sites. Rarely seen. Sensitive to human disturbance.	**Not expected to occur.** Presumed extirpated from the Lake Tahoe Basin (Schlesinger and Romsos 2000).

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
Sierra Nevada mountain beaver *Aplodontia rufa californica*		SC	P	Sierra Nevada mountain beavers use riparian habitats with soft, deep soils for burrowing, lush growth of preferred food sources such as willow and alder, and a variety of herbaceous species for bedding material. Vegetation types include wet meadows and willow-alder dominated riparian corridors, typically near water sources. Suitable riparian habitats are typically characterized by dense growth of small deciduous trees and shrubs near permanent water. Mountain beavers are generally solitary except during their short breeding season, and spend a high proportion of their time in extensive underground burrow systems with multiple openings, tunnels, and food caches.	**Not expected to occur.** No suitable habitat present in the study area.
Sierra Nevada snowshoe hare *Lupus americanus tahoensis*		SC		In the Sierra Nevada, found only in boreal zones, typically inhabiting riparian communities with thickets of deciduous trees and shrubs such as willows and alders.	**Low potential to occur.** Suitable habitat is present in the study area and the species has been documented in the region. However, the level of disturbance and the distance of the study area from additional suitable habitat, and it being relatively isolated from other suitable habitat limit the potential of this species to occur in the study area.
Mule deer *Odocoileus hemionus*			SI	Yearlong resident or elevational migrant, prefers a wide distribution of various-aged vegetation for cover, meadow and forest openings, and free water. In the Sierra Nevada, early to mid-successional forests, woodlands, and riparian and brush habitats are preferred due to the greater diversity of shrubby vegetation and woody cover. In addition to forage, vegetative cover is critical for thermoregulation. Suitable habitat includes a mosaic of vegetation including forest or meadow openings, dense woody thickets and brush, edge habitat, and riparian areas. Fawning habitat, used by does during birth and by	**Low potential to occur.** Suitable habitat is present in the study area. However, there is much development, both residential and commercial, that exists between the study area and other areas of suitable habitat, creating a significant gap in contiguous habitat.

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
				newborn fawns is of critical importance for reproductive success. A diversity of thermal cover, hiding cover, succulent forage, and water are needed during fawning. Optimal deer fawning habitat has been described as having moderate to dense shrub cover near forest cover and water, such as riparian zones. A source of surface water (e.g., creek or river) is especially important to mule deer. Typical fawning habitat varies in size, but an area of 5–26 acres is adequate, with optimal fawn-rearing habitat of around 400 acres.	

[1] **Regulatory Status Definitions**

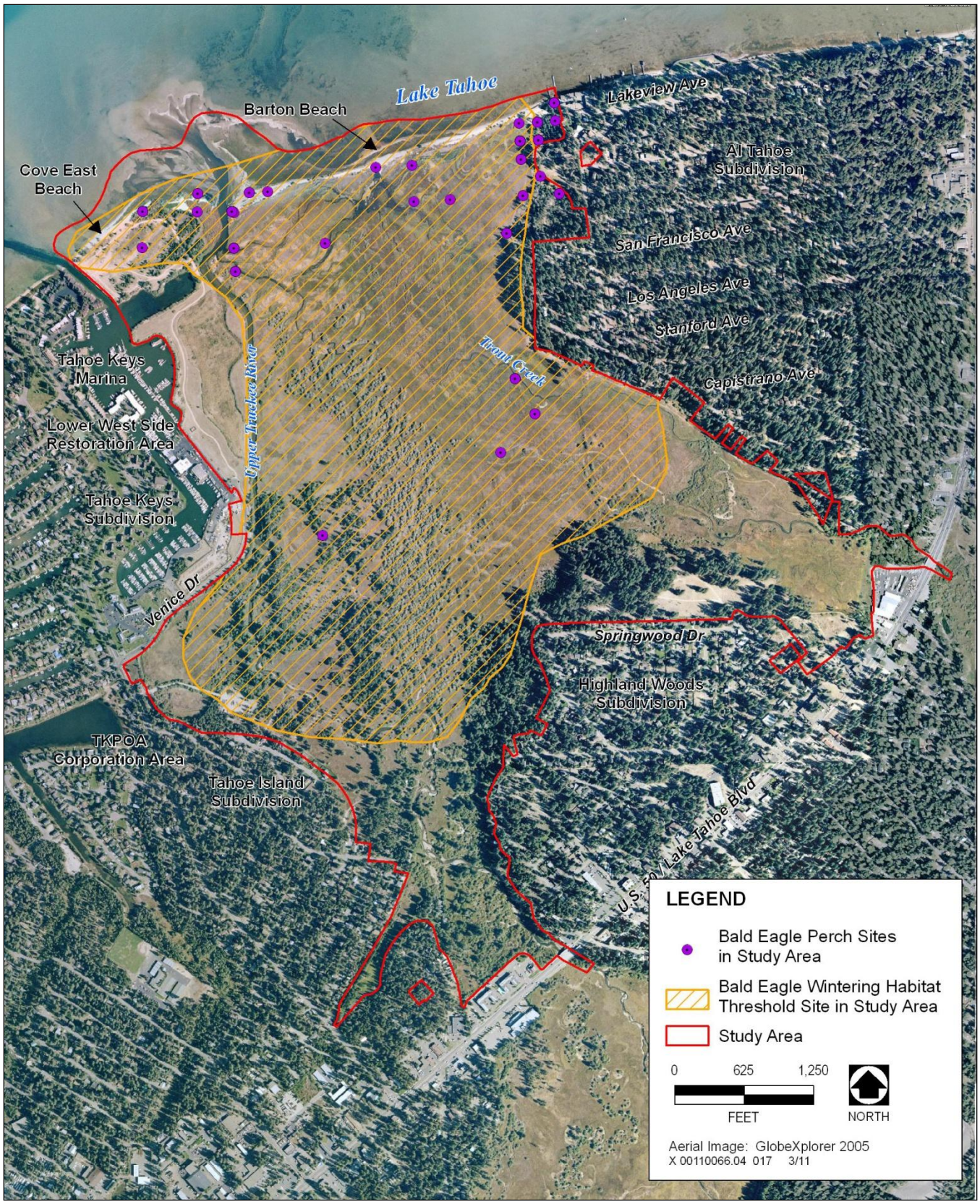
Federal–U.S. Fish and Wildlife Service (USFWS):
FC = Candidate for listing under the federal Endangered Species Act
FSS = USDA Region 5 Sensitive Species (FSM 2672)

TRPA
SI = Special interest/threshold species
P = Proposed by TRPA to be added as a special interest/threshold species (TRPA 2007)

State–California Department of Fish and Game (DFG):
ST = Threatened
SE = Endangered
FP = Fully Protected
SC = Species of Special Concern

[2] **Potential for Occurrence Definitions**

Observed in study area—Species was observed on the site during site visits or was documented on the site by another reputable source.
High potential to occur—All of the species' specific life history requirements can be met by habitat present on the site, and populations are known to occur in the immediate vicinity.
Moderate potential to occur—Some or all of the species life history requirements are provided by habitat on the site; populations may not be known to occur in the immediate vicinity, but are known to occur in the region.
Low potential to occur—Species not likely to occur due to marginal habitat quality or distance from known occurrences.
Not expected to occur—None of the species' life history requirements are provided by habitat on the site and/ or the site is outside of the known distribution for the species. Any occurrence would be very unlikely.



Sources: USFS 2001, TRPA 2006

Exhibit 3.4-3 **Bald Eagle Wintering Habitat Threshold Site and Perch Sites in Study Area**

Recreational activities may adversely affect wintering bald eagles (TRPA 2002a). The disturbance from recreational activities may range in severity from distraction from normal activity to abandonment of wintering areas. In 2002, TRPA considered the threshold and nondegradation standard for wintering bald eagle habitat to be unattained because of documented observations of recreational disturbances (TRPA 2002b). In 2006, the threshold for wintering bald eagle remained unattained (TRPA 2007).

The USFS has prepared a draft bald eagle management plan for the Tahoe Basin (USFS 2000). The plan recommends educating the public regarding the ecology and sensitivity of bald eagles to disturbance, seasonally or temporarily closing areas where eagles may be affected by recreational activities, and prohibiting construction of new trails through areas considered important to eagles.

Osprey

The osprey is designated as a species of concern by CDFG and as a special-interest species by TRPA. Ospreys are associated strictly with large fish-bearing waters and are known to forage in Lake Tahoe and in several other fish-bearing lakes within the basin. In the Tahoe Basin, osprey nests are distributed primarily along the northern portion of the east shore and southern portion of the west shore of Lake Tahoe. Other osprey nests in the basin are located along the shorelines of smaller lakes (e.g., Fallen Leaf Lake), and in forest uplands up to 1.5 miles from water.

Ospreys have been documented flying over the study area. They are not known to nest in the study area, but good foraging and perch sites exist there. Because potential nest trees in the study area are located at the wet meadow/upland edge and this habitat is relatively close to residential development throughout the study area, the quality of nesting habitat for ospreys is considered low. However, the quality of foraging habitat in the study area is relatively high, especially at the mouth of the Upper Truckee River. Ospreys may also use the river for foraging occasionally.

Northern Goshawk, Cooper's Hawk, and Sharp-Shinned Hawk

The northern goshawk (*Accipiter gentilis*), Cooper's hawk (*A. cooperii*), and sharp-shinned hawk (*A. striatus*) are forest raptor species that have been detected in the study area. Each of these species is designated as a species of special concern by CDFG. The northern goshawk is also considered sensitive by USFS Region 5 and is considered a special-interest species by TRPA.

Northern goshawks generally require mature conifer forests with large trees, snags, downed logs, dense canopy cover, and open understories for nesting. Foraging habitat for this species includes forests with dense to moderately open overstories, and open understories interspersed with meadows, brush patches, riparian areas, or other natural or artificial openings. Forest habitat in the study area lacks the characteristics of suitable nesting habitat. A northern goshawk was previously observed in the study area. However, the detection was made in September, when individuals tend to move from summer areas (Conservancy 1997). Therefore, this bird may have been a dispersing juvenile or migrant. Although the goshawk has been observed in the study area, the lack of suitable nesting habitat in the study area and the high level of disturbance in the upland area limit the potential for the northern goshawk to nest there.

Cooper's hawks and sharp-shinned hawks nest and forage in a variety of coniferous and mixed forest habitat types. Cooper's hawks will also forage in more open areas. Suitable foraging habitat exists in the study area in upland areas, as well as in willow scrub–wet meadow. However, the small patches of forested habitat in the study area may not be adequate for nesting. In addition, the level of disturbance, especially in and around the upland area, limits the potential for these two species to use the site for nesting. The Cooper's hawk and sharp-shinned hawk have been detected in the study area as recently as 2000 (TRPA 2002a).

Northern Harrier

The northern harrier is designated as a species of concern by CDFG. It breeds in a variety of open grassland, wetland, and agricultural habitats. Open wetland habitats used for breeding include marshy meadows, wet and lightly grazed pastures, and freshwater and brackish marshes. Breeding habitat also includes dry upland habitats, including grasslands, croplands, drained marshlands, and shrub-steppe in cold deserts. Vegetation height and structure particularly affect the quality of northern harrier habitat, especially because this species is a ground nester.

Northern harriers winter throughout California where suitable habitat occurs, which includes open areas dominated by herbaceous vegetation, including grasslands, pastures, croplands, coastal sand dunes, brackish and freshwater marsh, and estuaries. The species is rarely known to occur in forested areas (Grinnell and Miller 1944, Martin 1987, MacWhirter and Bildstein 1996).

Northern harriers have been observed periodically in the study area. It is not known whether they nest within the study area, but they have been observed foraging over the site in both spring and fall (Conservancy 1997). Northern harriers typically nest in areas that remain undisturbed during the nesting season. The level of recreational activity in the study area throughout the summer months may limit its suitability for nesting.

Long-Eared Owl

The long-eared owl (*Asio otus*) is designated as a species of concern by CDFG. Specific habitat associations of long-eared owl vary over the species' range, and there has been confusion over whether it is a forest or open-country species (Holt 1997). Long-eared owls nest in woodland, forest, and open (e.g., grassland, shrubsteppe, desert) settings. Wooded and nonwooded areas that are occupied by long-eared owls often support relatively dense vegetation (trees, shrubs) adjacent to or within larger open areas such as grasslands or meadows (e.g., habitat edges) (Bloom 1994; Marks, Evans, and Holt 1994; Small 1994). However, this species has also been documented breeding in contiguous conifer forest habitat with heavy mistletoe infestation (Bull, Wright, and Henjum 1989). In California, this species occurs in medium-aged and mature live oak and riparian woodlands. Long-eared owls also breed in oak thickets and conifer forests at higher elevations (Zeiner et al. 1990).

Long-eared owls have been documented in the Tahoe Basin (Smith 2002), but their habitat use has not been well studied. They have been detected during the breeding season, which indicates that they may breed in the area, but their preferred habitat is not known. Long-eared owls have not been documented in the study area, but suitable habitat may exist there in upland forests, willow scrub–wet meadow, or both.

Willow Flycatcher

Three subspecies of willow flycatcher occur in the Sierra Nevada: *Empidonax traillii brewsteri*, *E. t. adastus*, and *E. t. extimus*. The willow flycatcher (all subspecies) is designated as sensitive by the Regional Forester and listed as endangered under the CESA; additionally, *E. t. extimus* (southwestern willow flycatcher) is listed as endangered under the ESA. The willow flycatcher was identified in the notice of intent for the Sierra Nevada Forest Plan Amendment as one of seven aquatic, riparian, and meadow–dependent vertebrate species at risk in the Sierra Nevada bioregion. This species is recognized by USFS Region 5 as the highest priority landbird species in the Sierra Nevada bioregion, and is considered to have the highest likelihood of being extirpated from the Sierra Nevada in the near future.

Willow flycatchers are migratory songbirds that nest in shrubby, wet habitats. In the Sierra Nevada, willow flycatchers tend to prefer willow stands interspersed with open meadow and near standing or running water, often associated with beaver meadows (Sedgwick 2000). Important characteristics of meadows suitable for breeding willow flycatchers are a high water table that results in standing or slow-moving water, or saturated soils (e.g., "swampy" conditions); abundant cover of riparian deciduous shrubs (particularly willow); and riparian shrub structure with moderate to high foliar density that is uniform from the ground to the shrub canopy (Sanders and Flett 1989; Bombay 1999; Green, Bombay, and Morrison 2003). One study in the Sierra Nevada documented that

nests are typically located in willows with about 70 percent foliage cover. Nests are also typically found about 3–4 feet above the ground and within about 7 feet from the edge of the clump (Sanders and Flett 1989).

Riparian habitat along streams can also function as suitable habitat for the willow flycatcher, although this is less common in the Sierra Nevada. Those areas must support the hydrologic and vegetation characteristics described for suitable meadows (e.g., standing or slow-moving water, abundant and dense riparian vegetation). Stream channels that are high-gradient, deeply incised, and lacking a floodplain (e.g., potential for saturated soils or standing water) and are characterized by a sparse or narrow riparian vegetation corridor are not suitable for breeding willow flycatchers.

Although willow flycatchers have nested in meadows less than one acre in size, most nest in much larger meadows. Harris, Sanders, and Flett (1987, 1988) reported that more than 80 percent of occurrences were in meadows larger than about 20 acres. An area of approximately 2.5 acres was estimated as the minimum size required to support a nesting pair of willow flycatchers in the Sierra Nevada (Sanders and Flett 1989). However, another study of 125 meadows in the Sierra Nevada showed that willow flycatchers were found only in meadows ten acres or larger, although meadows as small as 0.6 acre have supported successful breeding flycatchers in the past (Harris, Sanders, and Flett 1987). A recent summary of willow flycatcher occurrence data for the Sierra Nevada indicates that occupied meadows range in size from 1 acre to 716 acres, averaging approximately 80 acres (USFS 2001).

Willow flycatchers were formerly known to nest by Trout Creek in the study area (Orr and Moffitt 1971). This species was not detected in the study area during surveys conducted by Borgmann and Morrison (2004). Protocol surveys for willow flycatcher conducted by AECOM biologists in 2011 located two male willow flycatchers within the study area, but no evidence of nesting (AECOM 2011). Much of the study area may not provide suitable habitat for nesting willow flycatchers (particularly in dry water years) because of its hydrologic conditions and the current willow structure and distribution there (e.g., lack of saturated soils or standing water within willow stands during the breeding season, limited dense willow cover in the floodplain). Some studies have shown that areas consisting of solid, contiguous masses of willows do not support willow flycatchers (Sanders and Flett 1989).

Yellow Warbler

The yellow warbler is designated by CDFG as a species of special concern; in addition, TRPA has proposed adding it as a special-interest species because of its potential to serve as an indicator of riparian health (TRPA 2007). In the Sierra Nevada, yellow warblers typically breed in wet areas with dense riparian vegetation. Primary breeding habitats are willow patches in montane meadows, and riparian scrub and woodland dominated by willow, cottonwood, aspen, or alder with dense understory cover. Localized breeding has been documented recently in more xeric sites, including chaparral, wild rose (*Rosa* spp.) thickets, and young conifer stands (Siegel and DeSante 1999, RHJV 2004).

Willow scrub habitat in the study area provides suitable summer breeding and foraging habitat for yellow warblers. Borgmann and Morrison documented yellow warblers breeding in the study area as recently as 2004; however, they also observed a high level (50 percent or more) of nest parasitism by brown-headed cowbirds (*Molothrus ater*).

Parasitism by brown-headed cowbirds has been identified as a major cause in reductions of yellow warbler populations in the Sierra Nevada. High levels of cowbird parasitism can be the result of increased human habitation and habitat alterations. Brown-headed cowbirds lay their eggs in the nests of other species, which in turn reduces their hosts' breeding productivity. This activity is known as brood parasitism. Brood parasitism reduces productivity in two ways: brown-headed cowbirds typically remove an egg of the host before laying their own egg in the nest, and cowbird nestlings often hatch before and develop more rapidly than the host young. As a consequence, the adult hosts tend to provision more to the larger, more aggressive cowbird nestlings at the expense of their own young. The severity of cowbird parasitism and its effect on populations of yellow warblers

within the study area could not be determined from the Borgmann and Morrison study because of their small sample size (Borgmann and Morrison 2004).

Waterfowl

Waterfowl are strongly associated with lagoon habitats. Because nesting habitat for waterfowl is limited in the Tahoe Basin, waterfowl are considered special-interest species by TRPA. Most of the study area is considered one of 18 TRPA-designated threshold sites for nesting waterfowl (as shown in Exhibit 3.4-4). Surveys conducted by USFS and TRPA indicate that the study area supports high species diversity, with a large number of species and high mean relative abundance (number of individuals) of each species (TRPA 2002a).

Waterfowl species that are likely to nest in the Tahoe Basin include the mallard, northern pintail, northern shoveler, cinnamon teal, American widgeon, gadwall, ring-necked duck, and common merganser. Most of these species nest along shallow-water margins of streams or lakes, in areas of emergent vegetation or other vegetation that provides concealment. Typically nests are in marshes or adjacent meadows and are scrapes on the ground lined with grass (Ehrlich, Dobkin, and Wheye 1988). Most of these ducks are dabblers and feed on vegetation in water approximately 6–10 inches deep. Ring-necked duck and common mergansers feed by diving under water and use aquatic areas approximately 3–10 feet deep.

Cinnamon teal were formerly one of the most common nesters in the study area (Orr and Moffitt 1971); now, however, they are only rarely seen there during the breeding season (TRPA 2002a). Mallards also bred at the marsh in great numbers historically (Orr and Moffitt 1971). They are one of the most common species of waterfowl still found at the marsh, but their numbers have been reduced from historical levels, probably because of reductions in suitable habitat within the Tahoe Basin (TRPA 2002b).

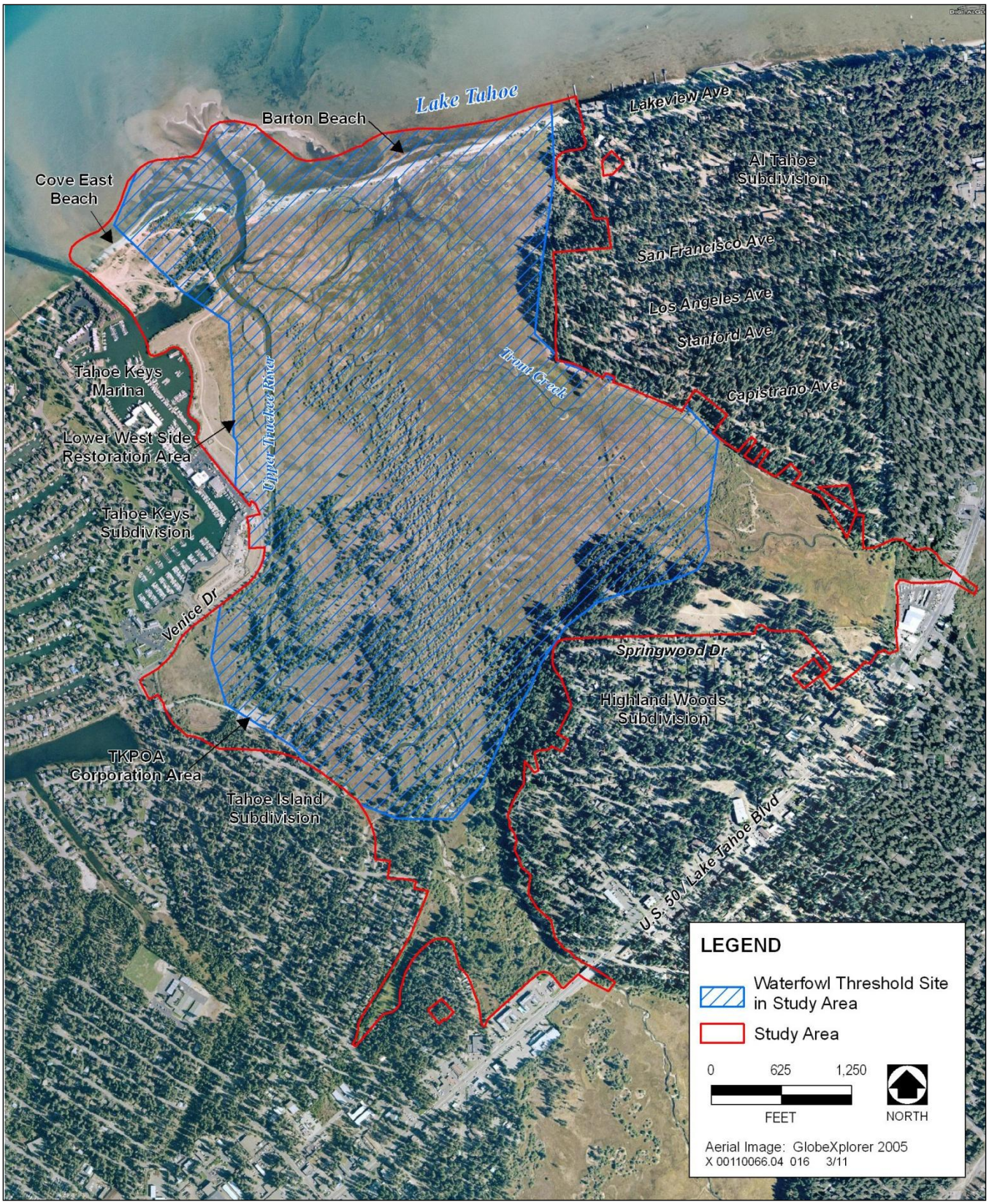
Recreational activities and human access in wetlands may disrupt normal waterfowl behavior (Knight and Cole 1995). Because of increased recreational encroachment into wetland areas, the quality of waterfowl habitats at TRPA-designated threshold sites has been degraded and the threshold standard is not in compliance with the nondegradation standard (TRPA 2002b).

The Canada goose (*Branta canadensis*) has undergone dramatic population growth within the lower 48 states (USFWS 2002). (The Pacific population of the Canada goose is *Branta canadensis moffitti*) Orr and Moffitt (1971) report that only small numbers of Canada geese formerly nested in the study area. However, transplant programs and habitat enhancement programs were undertaken in the past two decades to increase populations of the Canada goose in the West (USFWS 2002). As a result, these populations have risen substantially enough that Canada geese are increasingly coming into conflict with people and human activities. Conflicts between geese and people affect or damage property, human health and safety, agriculture, and natural resources (USFWS 2002). Consequently, Canada geese have become considered by some to be a nuisance species.

The Pacific population of the Canada goose is relatively nonmigratory, with most flocks wintering on or near their nesting areas. They can be found in freshwater marshes and meadows, and, in urban areas, in golf courses and lawns. Nests are usually near water and are made of dry grass, forbs, moss, sticks, and occasionally pine needles or bark. They feed on shoots, roots, seed of grass sedges, grain and berries, and also some insects and crustaceans (Ehrlich, Dobkin, and Wheye 1988).

Hoary Bat

The hoary bat is designated as a species of concern by CDFG. It is associated with a diverse array of forest habitats that also contain open areas, which can provide edge habitat. Hoary bats are solitary and tend to roost in the foliage of both coniferous and deciduous trees. Suitable roosting habitat exists in the study area along the montane meadow/upland edge, and high-quality foraging habitat is present throughout the study area. Hoary bats have been documented in various locations within the Tahoe Basin, including the study area, as recently as 2004 (Borgmann and Morrison 2004).



Source: TRPA 2006

Exhibit 3.4-4 **Waterfowl Threshold Site in Study Area**

Western Red Bat

The western red bat (*Lasiurus blossevilli*) has a broad distribution ranging from Canada (British Columbia) Canada, to Chile. In California, western red bat is designated as a species of concern by CDFG and considered sensitive by USFS Region 5.

Suitable habitat includes edge habitats adjacent to streams or open fields, in orchards, and sometimes urban areas. Roost sites are generally hidden from view in all directions; lack obstruction beneath, allowing the bat to drop downward for flight; lack lower perches that would allow visibility by predators; have dark ground cover to minimize solar reflection; have nearby vegetation to reduce wind and dust; and are generally located on the south or southwest side of a tree. Roost sites may be associated with intact riparian habitat, particularly willow, cottonwoods, and sycamores. Suitable habitat is present in the study area along the upland edge of montane meadow and willow scrub–wet meadow. The species may also forage across the other habitats located in the study area (e.g., wet meadow, lagoon, stream). Western red bats have been detected at Tallac Marsh, less than 4 miles west of the study area (Borgmann and Morrison 2004).

Sierra Nevada Snowshoe Hare

The Sierra Nevada snowshoe hare (*Lepus americanus tahoensis*) is listed as a species of concern by CDFG. In the Sierra Nevada, this species in found only in boreal zones. Suitable habitat includes riparian communities with thickets of willows and alders, and conifer forests with abundant cover composed of shrubs or small trees. In the Tahoe Basin, snowshoe hares can be found in dense brush near the edges of meadows or riparian communities. Montane meadow habitat and the willow scrub–wet meadow habitat in the study area provide suitable habitat for this species. However, the distance of the study area from other suitable habitat and the level of disturbance in the study area may limit the potential of occurrence for this species.

Sensitive Habitats

Sensitive habitats are those that are of special concern to resource agencies or that are afforded specific consideration through the TRPA Goals and Policies and TRPA Code of Ordinances, Section 404 of the CWA, and other applicable regulations. Sensitive natural habitats may be of special concern to these agencies and conservation organizations for a variety of reasons, including their locally or regionally declining status, or because they provide important habitat to common and special-status species. In the study area, the Upper Truckee River and Trout Creek and the associated montane meadow, willow scrub–wet meadow, lodgepole pine, and beach and dune communities are considered sensitive habitats. Some of the areas within these habitats are designated as SEZs. Formal wetland delineations pursuant to U.S. Army Corps of Engineers (USACE) guidelines have not been completed for the study area, but much of the study area is in the floodplain of the Upper Truckee River and Trout Creek. These areas would likely be considered jurisdictional by USACE and the Lahontan Regional Water Quality Control Board under Section 404 of the Federal CWA and the State's Porter-Cologne Act, respectively.

As described previously for the entire study area, sensitive habitats in the study area are affected by existing recreational activities, and unauthorized recreational activities have resulted in a number of trails and other disturbed areas in sensitive habitats. (These trails are described in Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage," and in Section 3.13, "Recreation.")

Other Ecologically Significant or Special-Interest Resources

In addition to special-status species and sensitive habitats, four other resources in the study area are considered ecologically significant or of special interest: the riparian bird community and neotropical migrant landbirds, the raptor community, wildlife movement corridors, and common migratory birds. These resources are discussed below.

Riparian Bird Communities and Neotropical Migrant Landbirds

The quality of riparian habitats and diversity of neotropical migrants in the southern portion of the Tahoe Basin indicate the importance of this area to regional avian conservation and management. Montane meadow and wet-meadow habitats and the forested habitats in the study area provide habitat for numerous neotropical migrant bird species during the breeding season, as well as during spring and fall migration.

Raptor Community

Raptors are considered ecologically significant as a group because they:

- function at a high trophic level, and their populations are typically sensitive to the distribution and local abundance of prey populations;
- represent a wide range of life histories with respect to nesting, foraging, and habitat-use requirements;
- include several species sensitive to habitat disturbance and loss; and
- are generally visible and an important component of a wildlife viewing experience.

The extent and mix of forest and riparian/wet meadow habitats found in the study area provide winter, breeding, and migration habitat for many raptor species known to occur over the larger region.

Wildlife Movement Corridors

Wildlife movement corridors are considered an important ecological resource by various agencies (e.g., USFWS, USFS, TRPA). In addition, wildlife movement and migration corridors are protected under the TRPA Code of Ordinances. Movement corridors may provide favorable locations for wildlife to travel between different habitat areas, such as foraging sites, breeding sites, cover areas, and preferred summer and winter range locations. They may also function as dispersal corridors that allow animals to move between various locations within their range.

As landscapes become increasingly fragmented, the habitat quality and area of organisms that occupy remaining patches of suitable habitat may be reduced, and these organisms may become at risk to processes that affect small or isolated populations (Hilty, Lidicker, and Merenlender 2006:30–48). These processes may include changes in microclimates, limits to daily or seasonal movements, inbreeding depression, and random demographic or environmental catastrophes (e.g., wildfire), and can result in increased mortality or local extinction of populations. Protecting and managing ecological corridors that link core areas of habitat, and that facilitate movement or dispersal of wildlife among habitat patches, has been widely proposed to reduce the adverse effects of habitat fragmentation. By maintaining or increasing connectivity among habitat patches or distinct regions, corridors may play an important role in maintaining population persistence and genetic diversity. Corridors can also facilitate the recolonization of sites where populations have been extirpated or allow for traditional seasonal movements within a population's overall range. Several studies have demonstrated their effectiveness in particular applications (e.g., Beier and Noss 1998). The effectiveness of corridors depends in part on the ecology of individual species and the attributes of the surrounding landscape (Rosenberg, Noon, and Meslow 1997; Hilty, Lidicker, and Merenlender 2006:198–201).

The study area could function as a movement corridor, or as a linkage within a larger movement route, at multiple spatial scales. At a regional scale, because of its large size, geographic position, and habitat quality, the Upper Truckee Marsh provides a "stepping stone" or seasonal habitat for waterfowl and shorebirds migrating along the Pacific Flyway. At a watershed (i.e., across habitats within the Upper Truckee watershed or the Tahoe Basin) or site (i.e., within the study area) scale, wetland and aquatic habitats in the study area likely facilitate movements of waterfowl and shorebirds between the Lake Tahoe shoreline and areas higher in the watershed, as well as local movements within the study area.

Although the study area is one of the most ecologically significant sites in the Tahoe Basin, the extent to which it functions as a movement corridor, particularly at a watershed or regional scale, for other wildlife species is unknown. The study area is surrounded on the west, south, and east by roads, residential development, and commercial activities, and on the north by Lake Tahoe. On its southern boundary, the site is also crossed by U.S. 50. At a watershed scale, these constraints may limit the study area's potential value in facilitating wildlife movements, particularly for medium to large animals (e.g., deer and other mammals). The site could function as a corridor or stepping stone for species whose movements are less sensitive to the presence of human disturbance and roads, such as landbirds. For example, for those species, the study area could provide a habitat linkage between the Lake Tahoe shorezone and areas upstream. Also, because of the study area's large size, riparian habitats there could facilitate local dispersal or movements by some riparian or aquatic species within the study area.

The importance of managing the study area as a potential wildlife corridor may increase in the future if upstream reaches of the Upper Truckee River are restored and habitat functions and values increase there.

Common Migratory Birds

A large number of common bird species are migratory and fall under the jurisdiction of the MBTA. A comprehensive list of MBTA species that could occur in the study area is too lengthy to provide here, but includes such familiar species as mountain chickadee, white-breasted nuthatch, yellow-rumped warbler, and several other warbler species. (Appendix H provides a list of bird species that could occur in the study area.) The nests of all migratory birds are protected under the MBTA, which makes it illegal to destroy any active migratory bird nest (see the discussion of the MBTA under the discussion of federal regulations above). Several migratory bird species have the potential to nest in the study area.

3.4.2 Environmental Consequences and Mitigation Measures

Significance Criteria

For this analysis, the following significance criteria were used to identify and analyze the significance of impacts.

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to vegetation and wildlife resources if it would:

- have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or USFWS (CEQA 1);
- have a substantially adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFG and USFWS (CEQA 2);
- have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means (CEQA 3);
- interfere substantially with the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites (CEQA 4);
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (CEQA 5);

- conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved regional, State, or local habitat conservation plan (CEQA 6);
- conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production (CEQA 7);
- result in the loss of forest land or conversion of forest land to nonforest use (CEQA 8); or
- involve other changes in the existing environment which, due to their location or nature, could result in conversion of forest land to nonforest use (CEQA 9).

These criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines. For criteria CEQA 7 and 8, forest land is defined as in Public Resources Code Section 12220(g): land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis. NEPA requires documentation and discussion of any beneficial effects of a project in addition to its negative impacts. Where appropriate, these beneficial effects are discussed and called out specifically for the purposes of NEPA in the following impact analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative was determined to result in a significant impact related to vegetation and wildlife resources if it would:

- remove native vegetation in excess of the area utilized for the actual development permitted by TRPA's land capability program/Individual Parcel Evaluation System (IPES) (TRPA 1);
- remove riparian vegetation or other vegetation associated with critical wildlife habitat, through either direct removal or indirect lowering of the groundwater table (TRPA 2);
- introduce new vegetation that would require excessive fertilizer or water, or would provide a barrier to the normal replenishment of existing species (TRPA 3);
- cause a substantial change in the diversity or distribution of species, or the number of any species of plants (including trees, shrubs, grass, crops, microflora, and aquatic plants); (this criterion refers to "a substantial change" rather than just "a change" as in the TRPA Initial Environmental Checklist to clarify that this criterion defines a significant impact rather than just an impact) (TRPA 4);
- reduce the numbers of any unique, rare, or endangered species of plants (TRPA 5);
- remove streambank and/or backshore vegetation, including woody vegetation such as willows (TRPA 6);
- remove any native live, dead, or dying trees 30 inches or greater dbh within TRPA's Conservation or Recreation land use classifications (TRPA 7);

- change the natural functioning of an old-growth ecosystem (TRPA 8);
- cause a substantial change in the diversity or distribution of species, or the numbers of any species of animals (birds or land animals including reptiles, insects, mammals, amphibians, or microfauna); (this criterion refers to "a substantial change" rather than just "a change' as in the TRPA Initial Environmental Checklist to clarify that this criterion defines a significant impact rather than just an impact) (TRPA 9);
- reduce the number of any unique, rare, or endangered animal species (TRPA 10);
- introduce new species of animals into an area, or result in a barrier to the migration or movement of animals (TRPA 11); or
- cause the quantity or quality of existing wildlife habitat to deteriorate (TRPA 12).

Although not used as significance criteria, effects on TRPA thresholds were evaluated and these effects are reported in Section 4.6, "Consequences for Environmental Carrying Capacity Thresholds."

METHODS AND ASSUMPTIONS

The analysis of the alternatives' potential effects on vegetation and wildlife resources considers short-term disturbance; long-term conversion to other cover types; changes in river-floodplain connectivity, hydrology, and geomorphic processes; and changes in persistent, intermittent disturbance from recreational activities. Areas potentially affected by short-term disturbance or long-term conversion to other cover types were identified by overlaying GIS layers of proposed project components (including proposed haul routes and staging areas) on layers of vegetation (Exhibit 3.4-1), habitat occupied by special-status plants (Exhibit 3.4-2), and bald eagle perch sites (Exhibit 3.4-3). Acreages of short-term disturbance and long-term conversion of land cover types were generated through these GIS analyses, and are summarized in Tables 3.4-3 and 3.4-4, respectively. Hydraulic modeling results presented in the *Upper Truckee River and Wetland Restoration Project Final Concept Plan Report* (Conservancy and DGS 2006) were used to evaluate effects on river-floodplain connectivity; in particular, the area inundated by 2-year streamflow events was considered a general indicator of the area of active floodplain and river-floodplain connectivity. Evaluation of recreation effects on vegetation and wildlife was based in part on the location of user-created trails (Exhibit 3.6-2) and of existing and proposed facilities; on land steward observations (Rozance 2007); and on a presumed slight (Alternative 2) to small (Alternative 1) increase in recreational use, as described in Section 3.13, "Recreation." Other relevant existing information (which is summarized in Section 3.4.2, "Environmental Setting") and the environmental consequences presented in other sections of this chapter also were considered in determining effects on vegetation and wildlife resources.

In addition to the methods described above, the evaluation of effects on sensitive communities (SEZs, jurisdictional wetlands, and riparian vegetation) was based on several important assumptions. First, the boundaries of SEZs in the study area were considered to roughly correspond to the boundaries of Land Capability District 1b (Exhibit 3.6-2). This district includes almost the entire study area except for some upland forest, restored upland shrub, and developed and disturbed areas near the study area's boundaries. The plant community boundaries (Exhibit 3.4-1) and the SEZ/land capability district boundaries (Exhibit 3.6-2) were used as an interim basis for determining the location of potentially jurisdictional wetlands. A formal wetland delineation would be completed before construction to obtain a USACE permit. Areas mapped as the following vegetation types are presumed to potentially qualify as jurisdictional wetlands (and to include all riparian vegetation in the study area) and thus were considered sensitive communities: lodgepole pine forest, willow scrub-wet meadow, montane meadow, lagoon, and open water. In addition to these vegetation types, beach and dune was also considered a sensitive habitat. Some of the areas in these habitats are designated as SEZs. A formal wetland delineation according to USACE criteria will be conducted after selection of a preferred alternative and the footprint of its constructed elements, to provide impact acreages required for the permitting process.

Table 3.4-3 Acreage of Short-Term Disturbance of Land Cover Types by Alternative				
Cover Type	Alternative			
	1	2	3	4
Developed	2.1	2.1	2.1	0.0
Disturbed	2.1	2.1	0.1	0.0
Restored upland shrub	6.8	6.8	6.8	4.7
Jeffrey pine forest	0.1	0.1	0.0	0.0
Lodgepole pine forest	***1.4***	***3.5***	***1.5***	***2.9***
Montane meadow	***3.4***	***7.3***	***2.0***	***3.6***
Willow scrub-wet meadow	***2.1***	***2.8***	***3.2***	***4.4***
Beach and dune	***0.2***	***0.2***	***0.0***	***0.0***
Open water	***6.3***	***8.3***	***9.2***	***4.3***
Lagoon	***2.4***	***2.4***	***2.4***	***0.0***
Total	26.9 (***15.8***)	35.6 (***24.5***)	27.4 (***18.3***)	19.9 (***15.2***)

Notes: Cover types in ***bold italic*** font are sensitive communities/habitats. The total acreage of these communities are in parenthesis.
No-Project/No-Action Alternative would not involve additional short-term disturbance of land cover and thus is not included in the table.
Acreages are derived from the conceptual design of the alternatives (Appendix C), and may not total exactly because of rounding to one decimal place.
Acreages do not include changes resulting from removal and restoration of the existing network of user-created trails or construction of grade controls, bank protection, or new pedestrian or bicycle trails (except the boardwalks and bridge that are included); acreages also do not include haul routes or staging areas that are outside of footprints of constructed components and not in existing disturbed areas.

Table 3.4-4 Estimated Acreage of Long-Term Conversion of Land Cover Types by Alternative				
Cover Type	Alternative			
	1	2	3	4
Developed	-1.4	-2.0	-2.0	0.0
Disturbed	-2.1	-1.5	0.5	0.0
Restored upland shrub	-6.4	-6.4	-6.4	-4.7
Jeffrey pine forest	-0.1	-0.1	0.0	0.0
Lodgepole pine forest	***-1.1***	***-1.4***	***-0.8***	***-2.9***
Montane meadow	***0.2***	***-0.8***	***1.7***	***-3.6***
Willow scrub-wet meadow	***8.2***	***8.7***	***10.6***	***11.3***
Beach and dune	***2.7***	***2.8***	***0.0***	***0.0***
Open water	***-0.5***	***0.4***	***-3.5***	***0.0***
Lagoon	***0.4***	***0.4***	***0.0***	***0.0***

Notes: Cover types in ***bold italic*** font are sensitive communities/habitats.
No-Project/No-Action Alternative would not involve land cover conversion and thus is not included in the table.
Acreages are for conversions among the cover types and thus total to zero for each alternative.
Acreages are derived from the conceptual design of alternatives (Appendix C).
Acreages do not include changes resulting from removal and restoration of the existing network of user-created trails or construction of grade controls, bank protection, or new pedestrian or bicycle trails (except the boardwalks and bridge that are included); acreages also do not include haul routes or staging areas that are outside of footprints of constructed components and not in existing disturbed areas.
Assumptions: bulkhead area and stormwater treatment basin would remain disturbed; vegetation removed to construct East Barton Lagoon would be equally distributed among Jeffrey pine forest, montane meadow, and beach and dune; the TKPOA Corporation Yard would be restored to montane meadow (for applicable alternatives); land associated with the bulkhead and levee would result in restored upland shrub (90%) and disturbed (10%) cover; and the Alternative 3 river mouth modification would result in montane meadow.

IMPACTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Effects related to several CEQA and TRPA significance criteria would not occur, and thus these effects are not discussed further:

- **Forest Land/Timberland Zoning Conflicts (CEQA 7)**—No conflicts with existing zoning or rezoning of forest land, timberland, or timberland zoned Timberland Production would occur because the study area does not include any of these zoning designations.
- **New Vegetation (TRPA 3)**—No new vegetation would be introduced that required excessive water or fertilizer, or that provided a barrier to replenishment of existing species.
- **Large Tree Removal (TRPA 7)**—No trees greater than 30 inches in diameter would be removed (TRPA 7).
- **Old-Growth Forest (TRPA 8)**—No effects related to old-growth forests would occur because no old-growth forest exists in the study area.

Section 3.4.2, "Environmental Setting," discusses all special-status plant and wildlife species evaluated in this analysis, and Tables 3.4-3 and 3.4-4 summarize the potential for each of these species to occur in the study area. With regard to sensitive species (significance criteria CEQA 1 and TRPA 5), those plant and wildlife species not expected or with a low probability to occur (because of a lack of suitable habitat, recent focused surveys that did not detect the species, or lack of other occurrence records) are not addressed further in this analysis. Implementation of this project is not expected to affect those species.

Potential conflicts with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved regional, State, or local habitat conservation plan (CEQA 6) are evaluated in Section 3.10, "Land Use."

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.4-1 (Alt. 1) **Introduction and Spread of Invasive Plants by Construction Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 1, construction activities could introduce or spread nonnative, invasive plant species. Unwashed construction equipment could carry invasive plant seed or other propagules from infested sites outside of the study area; seed mixes or soil amendments containing invasive plant seed could be used during revegetation; soil containing invasive plant seed could be redistributed in the study area; and multiple sites would be disturbed, providing conditions favorable for invasive plant establishment. However, as described in Environmental Commitment 4, the Conservancy would implement invasive species management practices to avoid introducing invasive species during construction. Therefore, this impact would be* ***less than significant****.*

Nonnative, invasive plant species displace native plant species and can alter the structure, functions, and dynamics of aquatic and terrestrial plant communities. As described in Section 3.4.2, "Environmental Setting," several invasive plant species are already present in the study area that the Conservancy currently manages (e.g., Eurasian watermilfoil and cheatgrass), and other invasive species grow in the Tahoe Basin. (See Section 3.5, "Fisheries," for additional discussion of aquatic invasives.) Nonetheless, construction activities could facilitate the introduction and spread of invasive plants in terrestrial communities of the study area by several mechanisms:

- **Introducing invasive plant propagules (i.e., seeds or plant parts capable of establishing a plant) on unwashed construction equipment entering the study area from infested sites.** Under Alternative 1, multiple trucks and other construction machinery would repeatedly enter the study area for four years (Table 2-4). This equipment might enter the study area following use at sites infested with invasive plants and might be carrying invasive plant propagules (e.g., in mud attached to tread).

- **Introducing invasive plant materials by using seed mixes or soil amendments (e.g., compost) containing invasive plant propagules.** Although soil would not be brought into the study area to construct Alternative 1, seed mixes and soil amendments containing propagules of invasive plants could be used during revegetation.

- **Spreading terrestrial invasive plants already present in the study area by redistributing soil containing invasive plant propagules.** Under Alternative 1, soil would be stockpiled and reapplied or otherwise redistributed on acres of land. For example, as reported in Table 3.4-3, approximately 14 acres of terrestrial natural vegetation would be disturbed for the short term. This redistribution of soil could also spread propagules of invasive plants that are already present in the study area.

- **Facilitating the introduction and spread of invasive plants by creating disturbed sites.** Disturbed sites provide an opportunity for additional species of plants to establish on a site, particularly "weedy" species, which include a number of invasive species. Approximately 23 acres of disturbed sites would be created under Alternative 1, and these sites would provide an opportunity for invasive plants to establish and spread.

Through one or more of these mechanisms, it is possible that one or more invasive plant species could be introduced or spread by construction activities under Alternative 1. However, as described in Environmental Commitment (EC) 4, "Prepare and Implement an Invasive Species Management Plan" (Table 2-6), the Conservancy would implement invasive plant management practices during project construction. The following practices would be included:

- A qualified biologist with experience in the Tahoe Basin will conduct a preconstruction survey to determine whether any populations of invasive plants are present in the project area. If invasive species are documented, they will be removed or their spread otherwise prevented before the start of construction. Control measures may include herbicide application, hand removal, or other mechanical control.

- All equipment entering the study area from areas infested by invasive plants or areas of unknown infestation status will be cleaned of all attached soil or plant parts before being allowed into the study area.

- To reduce the need for importing seed or other materials potentially containing invasive plants, the project will use on-site sources of seed and materials to the extent practicable. Seed, soil amendment, and erosion control materials that need to be imported to the study area will be certified weed free or will be obtained from a site documented as uninfested by invasive plants.

- After project construction, the project site will be annually monitored for infestations of invasive plants for 4 years. If infestations of invasive plants are documented during monitoring, they will be treated and eradicated to prevent further spread.

By reducing or eliminating the primary vectors for introduction of invasive plant seed, and eliminating infestations that establish, implementation of EC 4, described above, would substantially reduce the likelihood of the inadvertent introduction and spread of invasive plants as a result of construction activities. Therefore, this impact would be **less than significant**.

IMPACT 3.4-2 (Alt. 1) **Introduction and Spread of Invasive Plants by Recreational Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 1, it is expected there would be an increase in the number of visitors to the study area, and these visitors could contribute to the introduction and spread of invasive plants by dispersing these plants and disturbing habitat. However, there would also be a reduction in habitat disturbance because existing user-created trails would be removed from the core habitat area and habitat protection measures (e.g., signs and railings) would be incorporated into recreation infrastructure to reduce habitat disturbance by visitors. However, Alternative 1 would increase access to other areas by the construction of boardwalks, bridges, and bike trails, which would increase visitor access at the north end of the study area. Because visitor access and associated recreational activities would be redistributed through implementation of Alternative 1, it is expected that the contribution of such activities to the spread of invasive weeds would remain similar to the existing contribution. This impact would be* ***less than significant.***

Recreational users can disperse invasive plants from infested sites into the study area and can disturb vegetation, which facilitates establishment of invasive plants. Currently, visitors and their pets use an extensive network of user-created trails in most habitats of the study area, including the core habitat area. Visitors also enter habitats from along the Upper Truckee River and the shoreline of Lake Tahoe. In all these areas, visitors disperse invasive plants and disturb vegetation (which facilitates the establishment of invasive plants). Implementing Alternative 1 would remove these user-created trails from the core habitat area, which would reduce the disturbance of vegetation and potential dispersal of invasive plants in those areas. However, Alternative 1 would increase recreational access to the mouth of the Upper Truckee River and the shoreline of Lake Tahoe within the study area because of the construction of boardwalks, bridges, and bike trails. These facilities would be designed to also provide some habitat protection (e.g., signage and designated facilities designed to discourage use of sensitive areas). Therefore, although implementing Alternative 1 would likely result in a small increase in visitors to a small portion of the study area (adjacent to boardwalks, bridges, and bike trails), there would be a decrease in access through a large portion of the study area (resulting from removal of user-created trails). Habitat protection features incorporated into the new recreation facilities would reduce disturbance in those areas, and the introduction and spread of invasive species would be reduced where trails and access are removed from the core habitat. Because visitor access and associated recreational activities would be redistributed through implementation of Alternative 1, it is expected that the contribution of such activities to the spread of invasive weeds would remain similar to the existing contribution. This impact would be **less than significant**.

IMPACT 3.4-3 (Alt. 1) **Damage to or Mortality of Special-Status Plants Resulting from Construction Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 1, construction activities would not occur in occupied American mannagrass habitat. However, construction of the bridge and boardwalk would occur in and close to Tahoe yellow cress habitat that could be occupied. Thus, construction of these facilities could damage or kill Tahoe yellow cress plants. This impact would be* ***potentially significant****.*

Two special-status plant species were documented in the study area by the protocol-level plant survey: American mannagrass and TYC. Alternative 1 would not involve construction activities in the area along Trout Creek occupied by American mannagrass. Thus, American mannagrass would not be affected by Alternative 1. However, a bridge and boardwalk would be constructed along the study area's Lake Tahoe shoreline under this alternative, and construction would also occur along the shoreline where the mouth of the Upper Truckee River would be modified. Footings for the bridge would be placed in beach and dune habitat where TYC is known to occur, and portions of the boardwalk would be located near beach and dune habitat where TYC is known to occur or could potentially be present. Similarly, river mouth modifications also would require construction activities and associated disturbance of beach and dune habitat. Therefore, construction of this bridge and boardwalk, and river mouth modification, could damage or kill TYC plants. This impact would be **potentially significant**.

Mitigation Measure 3.4-3 (Alt. 1): Conduct Protocol-Level Preconstruction Surveys and Avoid or Mitigate Impacts on Tahoe Yellow Cress Plants.

To avoid or mitigate potential adverse effects on Tahoe yellow cress (TYC) plants (stems) resulting from construction activities, the following actions will be implemented:

(A) A qualified botanical monitor familiar with the vegetation of the Tahoe Basin and identification of TYC will conduct a focused preconstruction survey for TYC in all beach habitat where construction-related ground disturbance could occur during that year. Surveys will be conducted between June 15 and September 30, when TYC is clearly identifiable, and will follow CDFG's *Protocols for Surveying and Evaluating Impacts to Special Status Plant Populations and Natural Communities* (CDFG 2009). Surveys will be completed for each year that construction activities could occur in beach habitat.

If no TYC stems are found during the survey, the results of the survey will be documented in a letter report to the Conservancy and TYC Adaptive Management Working Group (AMWG) that will become part of the project environmental record, and no further actions will be required.

(B) If TYC stems are documented during the survey in areas potentially disturbed by construction activities, they will be clearly identified in the field, and if feasible, protected from impacts associated with construction activities. Protective measures will include flagging and fencing of known stem locations and avoidance. If feasible, no construction-related activities will be allowed in areas fenced for avoidance, and construction personnel will be briefed about the presence of the stems and the need to avoid effects on the stems. If all TYC stems are avoided, no further actions will be required.

(C) If avoidance of all TYC plants is not feasible, the Conservancy, in coordination with the TYC AMWG, will delineate and fence a mitigation area within the study area, excavate and translocate potentially affected stems, plant additional nursery-grown TYC plants, and monitor and adaptively manage the mitigation area, as described below. The mitigation area will extend from the inland edge of suitable habitat to the location on the edge of Lake Tahoe under the lowest possible lake elevation. If deemed necessary during monitoring, the Conservancy will either relocate or enlarge the mitigation area to achieve mitigation goals.

All potentially affected stems will be excavated and translocated to the mitigation area. Translocation will follow, as closely as possible, protocols that have been shown to be effective and described by Stanton and Pavlik (2009), and all translocated stems will be marked and/or mapped to facilitate monitoring. Translocation will be limited to no more than 10 percent of the suitable habitat within the project area. If project activities would impact more than 10 percent of the suitable habitat, then design or construction techniques will be adjusted to ensure no more than 10 percent of the suitable habitat would be affected by translocation.

Additional outplanting of container-grown nursery TYC plants to the mitigation area will also occur. Outplanting will occur at a rate of two plants for every one transplanted stem, for a total mitigation rate of 3:1, for combined translocated stems and outplanted container-grown plants. Outplanting of container-grown plants will follow, as closely as possible, protocols that have been shown to be effective as described by Stanton and Pavlik (2009), and all outplanted plants will be marked and/or mapped to facilitate monitoring.

Tahoe yellow cress stem translocation and outplanting of container-grown plants will be followed by active monitoring and adaptive management for the remainder of the growing season in which translocation and outplanting occurs, and the following two growing seasons. Monitoring and adaptive management will include the following actions:

(1) For the remainder of the growing season in which stem translocation and outplanting or container-grown plants occurs, a qualified botanical monitor familiar with the identification of TYC shall inspect each translocated or outplanted stem at least once per month and record phenology (i.e., life cycle stage) and

condition. The Conservancy will consult with the AMWG concerning appropriate measures if significant mortality or vandalism is observed. Additional outplanting will depend on the timing of the observed mortality and the level of the lake.

(2) For the two growing seasons following the season in which stem translocation and container-grown plant outplanting occurred, success of mitigation efforts will be evaluated based on the ratio of TYC stems occurring within the mitigation area. Immediately following translocation and outplanting activities, a qualified botanical monitor shall conduct a complete inventory of TYC stems in the mitigation area.

During each of the two growing seasons following the season in which translocation and outplanting occurs, a qualified botanical monitor shall conduct a complete inventory of the number of TYC stems present in the mitigation area. Surveys will be conducted when TYC is clearly identifiable. If the ratio of stems in the mitigation area is less than the ratio recorded immediately following translocation and outplanting activities, then the Conservancy will conduct additional outplanting of container-grown TYC plants to achieve at least the same ratio of TYC stems in the mitigation area. If deemed necessary based on monitoring results, the Conservancy will either relocate or enlarge the mitigation area to achieve mitigation goals.

The TYC AMWG and CDFG are continuing to develop a standardized monitoring protocol for TYC. Therefore, in an effort to be consistent with the developed protocol, before project implementation, the Conservancy will coordinate with the TYC AMWG and CDFG to finalize the monitoring protocol for evaluating mitigation efforts.

Significance after Mitigation: With implementation of the measures described above, TYC plants that are present in areas of potential ground disturbance would be identified before construction, and impacts on those plants would be avoided if feasible. If avoidance is not feasible, affected TYC plants would be mitigated at a rate of 3:1, and active monitoring and adaptive management would ensure the success of mitigation actions. Therefore, with implementation of Mitigation Measure 3.4-3 (Alt. 1), Impact 3.4-3 (Alt. 1) would be **less than significant**.

IMPACT 3.4-4 (Alt. 1) **Altered Extent of Special-Status Plant Habitat. (CEQA 1, TRPA 5)** *Under Alternative 1, lagoon restoration could increase the extent of habitat that may be physically suitable for American mannagrass. Also, the increased extent and inundation of willow scrub-wet meadow under this alternative could increase the extent of habitat suitable for American mannagrass. However, both of these effects are uncertain and may not alter the extent of suitable habitat. Under Alternative 1, beach and dune restoration could increase the extent of habitat physically suitable for Tahoe yellow cress. The boardwalk would be located near the back beach-marsh transition, but as described in Chapter 2, in the final design it would be sited in the marsh outside of Tahoe yellow cress habitat. Potential changes in sediment supply would not be sufficient to substantially reduce areas physically suitable for Tahoe yellow cress. In summary, the effect on the extent of habitat for American mannagrass would be no effect to beneficial, and for Tahoe yellow cress, the effect would be less than significant. Therefore, this impact would be* ***less than significant****.*

There are two special-status plant species documented in the study area: American mannagrass and TYC. The effect of implementing Alternative 1 could be an increase in the extent of habitat that may be physically suitable for American mannagrass, but could be a reduction in the extent of habitat that may be physically suitable for TYC. It would provide additional habitat potentially suitable for American mannagrass by restoring the lagoon behind East Barton Beach (Table 3.4-4). Also, the extent of habitat suitable for American mannagrass could be increased by the additional acreage of willow scrub-wet meadow and more frequent overbanking of river flow into the marsh that would result from the river restoration included in Alternative 1. However, the specific microhabitat requirements of American mannagrass (e.g., mud benches along Trout Creek) are not known and thus river restoration may not increase the extent of this species.

Implementing Alternative 1 also would increase the acreage of beach and dune (Table 3.4-4) by restoring beach and dune at Cove East Beach, which could provide additional habitat suitable for TYC. However, most beach and dune that would be restored is up to several hundred feet from the immediate shoreline and may not include the moist microsites that provide habitat for TYC. In contrast, the boardwalk proposed under Alternative 1 would be located adjacent to the beach, and thus, could cause the loss of some occupied habitat. As described in Chapter 2, during final design, the alternative would avoid TYC habitat by locating the bridge and boardwalk in marsh not back beach habitat. The river restoration included in Alternative 1 would not alter the function of the beach but could affect the extent of beach habitat by altering the sediment supply from the Upper Truckee River to beaches in the study area. This potential effect would not be substantial and is evaluated in Section 3.9, "Geomorphology and Water Quality."

Although recreational use of potential habitat for TYC habitat would be increased because of boardwalk, bridge, and bike trail construction, disturbance associated with this recreational use would not alter conditions sufficiently to make habitat no longer physically suitable for TYC. However, increased recreational use would increase damage and death of TYC plants from trampling, which is addressed separately by Impact 3.4-5.

The effect of Alternative 1 on the function and extent of habitat for American mannagrass would be no effect to beneficial and on the function and extent of habitat for TYC would be less than significant. Thus, this impact would be **less than significant**.

IMPACT 3.4-5 (Alt. 1) **Damage to or Mortality of Special-Status Plants Resulting from Recreational Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 1, damage to or mortality of special-status plants resulting from recreational activities would increase. Under existing conditions, habitat occupied by American mannagrass is in a location that is not substantially disturbed by recreational activities, and implementing Alternative 1 would maintain this condition. Under Alternative 1, the existing Tahoe yellow cress management plan (including the Barton Beach exclosure and adaptive management) would continue to be implemented. However, Alternative 1 would construct a boardwalk in close proximity to habitat occupied by Tahoe yellow cress and increase recreational use of potential and occupied habitat, and thus, would likely increase trampling of Tahoe yellow cress plants. Therefore, this impact would be* ***significant****.*

Implementing Alternative 1 could change recreational activity in habitat suitable for the two special-status plant species documented in the study area: American mannagrass and TYC.

American mannagrass grows along Trout Creek in an area that is not disturbed by recreational activities under existing conditions and that is not likely to be disturbed in the future. Under Alternative 1, this area would be included in the core habitat in which recreational use would be reduced; therefore, there would be no substantial effect on American mannagrass.

Tahoe yellow cress grows in beach and dune habitat along the study area's Lake Tahoe shoreline at Cove East Beach and Barton Beach. Under existing conditions, this shoreline is used for recreation, and some TYC plants are damaged or killed by visitors. For the study area, the Conservancy has implemented a TYC management plan (Conservancy 2008) that incorporates applicable actions of the regional, multi-agency, conservation strategy for TYC (*Conservation Strategy for Tahoe yellow Cress [*Rorippa subumbellata*]* [Pavlik, Murphy, and TYCTAG 2002]). These actions include establishing and maintaining an exclosure to protect most occupied habitat at Barton Beach and monitoring and adaptive management.

Recreational use of Cove East Beach would not be substantially altered by implementation of Alternative 1. However, recreational use of Barton Beach would increase because Alternative 1 involves constructing a bridge over the Upper Truckee River and a boardwalk trail just inland from Barton Beach that would increase access. Railings, other design features of the boardwalk, and signage would discourage disturbance of beach and dune habitat. and an exclosure would continue to protect most TYC plants from damage or mortality. However, because the boardwalk would be constructed close to the existing populations and an increase in visitors is

expected. A subsequent increase in trampling of plants and other disturbance to TYC populations is also expected, despite signage, protective measures, and continued implementation of the TYC management plan.

This impact would be **significant**.

All feasible measures to avoid, minimize, or mitigate this impact have already been incorporated into the design of Alternative 1 and the existing TYC management plan. However, these measures would not be sufficient to fully mitigate the effects of increased trampling of TYC resulting from increased access to Barton Beach. For this reason, this impact would be **significant and unavoidable**.

IMPACT 3.4-6 (Alt. 1) **Short-Term Disturbance of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Construction Activities. (CEQA 2, 3; TRPA 1, 2, 4, 6)** *Implementing Alternative 1 would disturb sensitive communities. This disturbance would be short term. As described in Environmental Commitments 5 and 6, the Conservancy would minimize the risk to water quality and vegetation and comply with the terms and conditions of required permits to reduce this disturbance. Nonetheless, approximately 16 acres of sensitive communities would be disturbed. This impact would be* ***significant****.*

In the study area, as described above in "Methods and Assumptions," part or all of areas mapped as open water, lagoon, willow scrub-wet meadow, montane meadow, or lodgepole pine forest potentially qualify as jurisdictional wetlands or are considered riparian vegetation or an SEZ. Thus, these areas are all considered sensitive communities. Beach and dune is also a sensitive community.

Constructing the restoration, habitat protection, public access, and recreation components of Alternative 1 would disturb approximately 16 acres of these sensitive communities (Table 3.4-3). Short-term disturbance of sensitive communities can adversely affect ecosystem functions and the services that are products of these functions, including sediment retention and the provision of habitat for common and sensitive plant and wildlife species.

With implementation of EC 5, "Prepare and Implement Effective Construction Site Management Plans to Minimize Risks of Water Quality Degradation and Impacts to Vegetation," and EC 6, "Obtain and Comply with Federal, State, Regional, and Local Permits," described in Table 2-6 in Chapter 2, this impact would be reduced, but the short-term disturbance of sensitive communities would not be eliminated because such disturbance is integral to the river, floodplain, and other restoration elements of Alternative 1. This impact would be **significant**.

Beyond what is already proposed as environmental commitments as part of the project, no feasible mitigation is available to address this impact. Therefore, this impact would be **significant and unavoidable**.

IMPACT 3.4-7 (Alt. 1) **Enhancement and Creation of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZs) Resulting from River and Floodplain Restoration. (NEPA)** *Implementing Alternative 1 would convert some disturbed, developed, and restored upland shrub to sensitive communities. The combined increase in extent of sensitive communities would be approximately 10 acres. In addition, sensitive communities would be enhanced by increasing overbank flooding. Because the extent of sensitive communities would be increased and the existing sensitive communities would be enhanced, this effect would be* ***beneficial****.*

In the study area, sensitive communities include jurisdictional wetlands, riparian vegetation, and SEZ. These communities correspond to the open water, lagoon, willow scrub-wet meadow, montane meadow, lodgepole pine forest, and beach and dune cover types mapped for the study area (Exhibit 3.4-1). Alternative 1 would involve converting some disturbed, developed, and restored upland shrub to sensitive communities (Table 3.4-4). The combined increase in extent of sensitive communities would be approximately 10 acres, with willow scrub-wet meadow increasing in acreage more than other sensitive communities and lodgepole pine forest decreasing more than other sensitive communities. Because there is a broad overlap in the ecological functions and services provided by these sensitive communities, the effects of a decrease in the acreage of one community are largely

offset by increases in other sensitive communities. For example, many wildlife and plant species use more than one of these sensitive communities as habitat (Appendices G and H). SEZ preservation and restoration is an important component of the condition of Lake Tahoe, because SEZs remove some nutrients and sediment from runoff. SEZs also include sensitive communities that provide many other benefits, but they currently only compose only five percent of the land area within the Tahoe Basin (State Parks et al. 2011). Implementing Alternative 1 would increase and enhance SEZs within the study area. Additional long-term beneficial effects are discussed for Impacts 3.4-4 and 3.4-8, and in Section 3.9, "Geomorphology and Water Quality." Because river and floodplain restoration under Alternative 1 would increase the combined extent of sensitive communities and enhance the functions and services provided by them, this long-term effect would be **beneficial**.

IMPACT 3.4-8 (Alt. 1) **Disruption of Wildlife Habitat Use and Loss of Wildlife Resulting from Construction Activities. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 1, construction activities could cause short-term disruption of wildlife use of the study area, cause the loss of wildlife, or both. Wintering bald eagle use of the study area does not occur during the construction season and thus would not be disrupted. However, construction of the restoration elements and recreation infrastructure of Alternative 1 could result in the harm or loss of individuals or nests or result in substantial disruptions to nesting attempts or other activities by three special-status bird species (yellow warbler, willow flycatcher, and long-eared owl) and would substantially affect nesting or other activities by one special-status guild (waterfowl). It also could result in abandonment or removal of active roost sites for, or harm or loss of, hoary bat or western red bat. A number of common wildlife species also would likely have their use of the study area disrupted. This impact would be* ***significant****.*

Under Alternative 1, construction activities could cause short-term disruption of wildlife use of portions of the study area, cause the loss of wildlife, or both. Construction activities would affect both common and special-status wildlife species by the same mechanisms: (1) human disturbance (i.e., the sounds and motions of construction workers and machinery) that disrupts foraging, nesting attempts, or other wildlife use of the study area and concurrently causes physiological stress, energetic costs, and increased risk of predation and (2) damage and removal of vegetation by clearing and grubbing, stockpiling of materials and soil, off-road operation of vehicles and other machinery, and earthwork that destroys nests or roost sites or harms or kills wildlife.

Fifteen special-status wildlife taxa/guilds either have been documented in the study area or have a moderate to high likelihood of being present (Table 3.4-2). Some of these species are wide-ranging raptors that may forage or perch in the study area but that are unlikely to nest in the study area (including osprey, bald eagle, and northern goshawk); these species would not be substantially affected by construction activities, and construction activities might even benefit some foraging activities. Wintering bald eagles that perch in the study area would not be affected because their use of the study area would not be during the construction season. Construction activities could disturb the foraging activities of raptors, particularly where these activities would occur near the Upper Truckee River. However, because existing recreation use is already a source of disturbance, additional construction-related disturbance might not substantially affect foraging patterns. Furthermore, abundant foraging habitat is available in other areas nearby. Construction activities associated with Alternative 1 also would not cause injury or mortality to individuals. Therefore, construction activities would not be sufficient to affect the population size or viability of these species.

However, the nesting or roosting of six special-status taxa/guilds in the study area could be adversely affected by the human disturbance or by the damage and removal of vegetation associated with construction:

- **Yellow warbler and willow flycatcher.** The yellow warbler and willow flycatcher are special-status birds associated with riparian, wetland, and aquatic habitats. They potentially could nest in the study area during construction of Alternative 1. The yellow warbler has been documented nesting in willow scrub in the study area as recently as 2004 (Borgmann and Morrison 2004). The willow flycatcher also nests in riparian vegetation and historically nested in the study area (Orr and Moffitt 1971). Protocol surveys for willow flycatcher conducted by AECOM biologists in 2011 located two male willow flycatchers within the study

area, but no evidence of nesting; however, willow flycatchers still nest in the watershed of the Upper Truckee River several miles upstream.

- **Waterfowl.** As described in Section 3.4.2, "Environmental Setting," several species of waterfowl likely nest in the study area in dense herbaceous vegetation near the open water of lagoons or river channels.

- **Long-eared owl.** As described in Section 3.4.2, "Environmental Setting," there is uncertainty regarding the nesting requirements of long-eared owl. The species occurs in the Tahoe Basin and has been observed in the Upper Truckee watershed (Fields, pers. comm., 2007), but its breeding status in the area is unknown. Long-eared owl could nest in Jeffrey pine forest, lodgepole pine forest, or willow scrub-wet meadow in the study area.

- **Western red bat and hoary bat.** For both of these bat species, suitable roosting habitat exists in trees along forest edges bordering open habitats and in trees in riparian corridors of the study area, and high-quality foraging habitat is present throughout the study area. Western red bats have been detected at Tallac Marsh, less than four miles west of the study area (Borgmann and Morrison 2004). Hoary bats have been documented in the study area as recently as 2004 (Borgmann and Morrison 2004).

Construction of Alternative 1 would involve disturbance and removal of vegetation (including willow thickets and trees) from willow scrub-wet meadow, Jeffrey pine forest, and lodgepole pine forest that provides suitable nesting habitat for yellow warbler, potentially suitable nesting habitat for willow flycatcher and long-eared owl, and suitable roosting habitat for western red bat and hoary bat. Construction would also disturb and remove dense herbaceous vegetation near the open water of lagoons and the Upper Truckee River that provides nesting habitat for waterfowl. Furthermore, construction activities would generate human disturbance (e.g., noise) near these nesting and roosting habitats.

Removing or disturbing occupied nesting habitat would result in a substantial effect on the yellow warbler, willow flycatcher, long-eared owl, or waterfowl if individuals were killed, otherwise harmed, deterred from occupying breeding and nesting locations, or caused to abandoned a nest (potentially resulting in mortality of eggs and chicks). Similarly, roost removal or disturbance causing roost abandonment would have a substantial effect on either bat species, particularly if individuals were killed or otherwise harmed. In addition, use of the study area by a number of common wildlife species would likely be disrupted. Therefore, the effect of construction activities on wildlife use of the study area would be **significant**.

Mitigation Measure 3.4-8A (Alt. 1): Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers If Necessary.

For construction activities that would occur in suitable habitat during the nesting season (April 1 through August 31), a qualified wildlife biologist will conduct focused surveys for active nest sites of the yellow warbler, willow flycatcher, waterfowl, and long-eared owl. The biologist will be able to identify Sierra Nevada bird species audibly and visually. The conduct of these surveys will conform to the following guidelines:

- **Yellow warbler, waterfowl, and long-eared owl.** Focused surveys for yellow warbler, waterfowl, and long-eared owl nests will be conducted by a qualified wildlife biologist within 14 days before construction activities are initiated each construction season. The preconstruction survey for yellow warbler, waterfowl, and long-eared owl nests will be conducted using a nest-searching technique appropriate for the species. For yellow warbler, an appropriate technique will involve first conducting point counts in suitable riparian habitat to determine occupancy, followed by nest searching if the species is present. For long-eared owl, surveys will involve tape playbacks of recorded long-eared owl calls.

- **Willow Flycatcher.** For construction activities initiated in suitable breeding habitat for the willow flycatcher after May 31, a preconstruction survey for nesting willow flycatchers will be conducted each construction season. The survey will follow *A Willow Flycatcher Survey Protocol for California* (Bombay et al. 2003).

The protocol requires a minimum of two survey visits to determine presence or absence of the willow flycatcher: one visit during survey period 2 (June 15–25) and one during either survey period 1 (June 1–14) or period 3 (June 26–July 15).

If active yellow warbler, willow flycatcher, or long-eared owl nests are located during the preconstruction surveys, the biologist will notify TRPA and CDFG. If a yellow warbler or willow flycatcher nest is located, construction will be avoided within 500 feet of the nest (or at a distance directed by CDFG) to avoid disturbance until the nest is no longer active based on monitoring. If an active long-eared owl nest is located, construction within 0.25 mile of the nest site (or at a distance directed by CDFG) will be delayed until the nest is no longer active based on monitoring.

If active waterfowl nests are located during preconstruction surveys, the biologist will notify TRPA, and to the extent feasible, construction will be avoided within 500 feet of active nests.

Mitigation Measure 3.4-8B (Alt. 1): Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary.

Bat surveys will be conducted by a qualified wildlife biologist within 14 days before any tree removal or clearing each construction season. Locations of vegetation and tree removal or excavation will be examined for potential bat roosts. Potential roost sites identified will be monitored on two separate occasions for bat activity, using bat detectors to help identify species. Monitoring will begin 30 minutes before sunset and will last up to two hours at any potential roost identified. Removal of any significant roost locations discovered will be avoided to the extent feasible. If avoidance is not feasible, roost sites will not be disturbed by project activities until September 1 or later, when juveniles at maternity roosts are able to fly.

Significance after Mitigation: With the measures above, the loss of individuals, nests, or roost sites of special-status wildlife species during construction would be substantially reduced. However, because waterfowl likely nest near the river mouth, Sailing Lagoon, Trout Creek Lagoon, and elsewhere within the study area, implementing buffers or a limited operating period that would avoid substantial effects on waterfowl nesting would not be feasible. Therefore, with implementation of Mitigation Measures 3.4-8A (Alt. 1) and 3.4-8B (Alt. 1), Impact 3.4-8 (Alt. 1) would be **significant and unavoidable**.

IMPACT 3.4-9 (Alt. 1) **Altered Extent and Quality of Wildlife Habitats Resulting from River, Floodplain, and Other Restoration and Enhancement Elements. (NEPA)** *Implementing Alternative 1 would increase the extent of lagoon, willow scrub-wet meadow, and beach and dune habitats; and enhance the habitat quality of willow scrub-wet meadow, lagoon, and other floodplain habitats by increasing hydrologic connectivity of the river and its floodplain. This effect would be* ***beneficial****.*

Implementing Alternative 1 would alter the extent and quality of wildlife habitats through restoration that would create additional willow scrub-wet meadow, beach and dune, and lagoon habitat (Table 3.4-4). Most of this increase would result from the conversion of restored upland, disturbed, and developed areas, but smaller amounts of forest and channel would also be converted. The creation of additional habitat would benefit wildlife by providing more habitat and by increasing the size and connectivity of habitat patches.

Implementing Alternative 1 would also enhance the quality of floodplain habitats by restoring a sinuous channel and an active floodplain, which would increase overbank flooding, deposition of sediment on floodplains, and periodic disturbance of vegetation by floodwaters. For example, the two-year streamflow event would inundate approximately 18 percent more area under Alternative 1 than under existing conditions (Conservancy and DGS 2006:A1). These enhanced processes would increase heterogeneity of habitat features and conditions, provide more opportunities for vegetation establishment, and increase productivity of floodplain and riparian vegetation relative to existing and future no-project/no-action conditions.

In summary, Alternative 1 would increase the extent of lagoon, willow scrub-wet meadow, and beach and dune habitats; and enhance the habitat functions of willow scrub-wet meadow, lagoon, and other floodplain habitats by increasing hydrologic connectivity of the river and its floodplain. The long-term effect on wildlife habitats would be **beneficial**.

IMPACT 3.4-10 (Alt. 1) **Altered Quality of Wildlife Habitats Resulting from Altered Recreational Use. (CEQA 1; NEPA; TRPA 9, 10, 12)** *Implementing Alternative 1 would improve the quality of wildlife habitat in much of the study area by removing user-created trails from a core habitat area and by providing habitat protection features that would discourage recreational use of sensitive habitat areas. However, implementing Alternative 1 would increase disturbance of wildlife habitat in a small portion of the study area by increasing access in the vicinity of proposed boardwalks, bridges, and bike trail. This impact would be* ***less than significant****.*

Alternative 1 would involve removing and restoring to habitat the extensive network of user-created trails in a central, 308-acre portion of the study area (i.e., the designated core habitat) and in almost eight acres of forest adjacent to the Highland Woods subdivision. Outside of the core habitat, public access features would be constructed that would also discourage use of the core habitat, and signage would inform visitors of habitat values, and encourage a resource stewardship ethic. Recreational use and the associated disruption of wildlife use would not be reduced in all sensitive habitats, however. Some of the public access facilities (boardwalks, bridges, and bike trails) are expected to increase the number of visitors to the study area, thereby increasing the disruption of wildlife use outside of the designated core area (e.g., nesting by yellow warblers and waterfowl). In the Cove East Beach area, recreational use would remain similar to or slightly greater than the existing level of use. Wintering bald eagle perching in this area would not be disrupted because these perches already exist with recreational use of the area and because winter recreational use is unlikely to change considerably under Alternative 1. Because the bridge and boardwalk components of Alternative 1 would improve access, recreational use of Barton Beach is expected to increase. Despite signage and design features that would discourage visitors from entering habitat near the boardwalk, there would be an increased human presence. Consequently, some wildlife use, particularly waterfowl nesting, could be reduced or disrupted or both in the area adjacent to the boardwalk, which includes lagoon habitat. However, in a much larger portion of the study area, the presence of humans and disruption of wildlife use, including waterfowl nesting, would be reduced.

In summary, implementing Alternative 1 would increase the quality of wildlife habitat in much of the study area by removing user-created trails from a core habitat area and by providing public access and habitat protection features that would direct recreational use away from most sensitive habitat areas. However, in habitats in the vicinity of Barton Beach, human disturbance of wildlife could increase. Overall, this long-term impact would be **less than significant**.

IMPACT 3.4-11 (Alt. 1) **Conversion of Forest Land to Nonforest Use. (CEQA 8, 9; TRPA 4, 5)** *Implementing the restoration elements of Alternative 1 would convert approximately 0.1 acre of Jeffrey pine forest and 1.1 acres of lodgepole pine forest to natural vegetation types that are dominated by shrubs or herbaceous plants. This would be long-term, but not permanent conversion. This conversion would allow continued management for resource values including recreation, biodiversity, aesthetics, and water quality. In addition, river and floodplain restoration would enhance habitat values of the remaining forest land. Because the area of forest land conversion would be small, not permanent, allow for continued management of most resource values provided by the existing forest land, and enhance the resource values of remaining forest, this impact would be* ***less than significant.***

Implementing the restoration elements of Alternative 1 would convert approximately 0.1 acre of Jeffrey pine forest and 1.1 acres of lodgepole pine forest to natural vegetation types that are dominated by shrubs or herbaceous plants. This would be long-term but not permanent conversion: it would allow for the land to support greater than ten percent tree cover in the future through natural succession (e.g., through encroachment of meadow and willow scrub by lodgepole pine). This conversion would also allow continued management for

resources including recreation, biodiversity, aesthetics, and water quality. In addition, river and floodplain restoration would enhance biodiversity values of the remaining forest land, because many forest species also use the willow scrub-wet meadow and other habitats that would be restored or enhanced (Appendix H), and because the reduction in human disturbance of wildlife that would result from habitat protection and enhancement elements of Alternative 1. Because the area of forest land conversion would be small, allow for continued management of most resource values provided by the existing forest land, and enhance the resource values of remaining forest, this impact would be **less than significant**.

IMPACT 3.4-12 (Alt. 1) **Interference with Wildlife Use of Established Movement Corridors. (CEQA 4, TRPA 11)** *The study area may function as a corridor for wildlife movement between the Lake Tahoe shorezone and riparian areas upstream. Implementing Alternative 1 would result in short-term disturbance that could interfere with wildlife use of this corridor. However, construction-related disturbance would be restricted daily and seasonally, and disturbance to vegetation would affect only a small portion of the study area temporarily. Furthermore, as described in Environmental Commitments 5 and 6, the Conservancy would minimize vegetation disturbance and revegetate. Therefore, wildlife movement would not be blocked and the effect on wildlife movement would not be substantial. This impact would be* ***less than significant.***

Although no regionally significant wildlife movement corridors have been confirmed to occupy the study area, its large size and location make it potentially suitable for localized wildlife movement. Furthermore, the Upper Truckee River's riparian corridor likely functions as a potentially important wildlife movement corridor. Depending on their setting, quality, and physical connectivity to other habitats, stream corridors are often used by wildlife as movement corridors in many landscapes; the Upper Truckee River likely serves this function. The Upper Truckee River's riparian corridor is a well-defined linear landscape feature that provides unique biophysical conditions, traverses a variety of ecotones, and connects upstream and downstream areas within the watershed; however, it is degraded in its current condition within the study area because of historic channel straightening and ongoing incision and disconnection from its floodplain. As discussed previously, the increased area and improved ecosystem functions of SEZ, floodplain, and wetland communities along the Upper Truckee River under Alternative 1 would benefit wildlife communities locally; these benefits would improve the SEZ's corridor function by increasing habitat quality in the core habitat area and removing user-created trails, therefore, increasing the corridor width.

Recreation infrastructure proposed under Alternative 1 would be located primarily outside of the riparian corridor area and adjacent to areas of existing disturbance, with the exception of the bridge and boardwalk. Existing potential for habitat at this location to function as a wildlife movement corridor is compromised by its proximity to residential neighborhoods, well-traveled roads (U.S. 50 and East Venice Drive), and recreation disturbance on Lake Tahoe. The proposed bridge would be located outside of the 100-year floodplain; therefore, wildlife communities would continue to have access within the riparian corridor and to the Lake Tahoe shorezone, under the proposed bridge. The bridge and boardwalk are not expected to bifurcate any important habitat areas or prevent wildlife from continuing to access or travel between habitat areas in the vicinity.

The increased area and improved ecosystem functions of SEZ, floodplain, and riparian and wetland communities along the Upper Truckee River under Alternative 1 would benefit wildlife communities; these benefits would improve the SEZ's wildlife corridor function by increasing habitat quality, connectivity of native vegetation, and corridor width. This long-term effect would be beneficial.

Implementing Alternative 1 could interfere with wildlife movement in the short term because it would involve four years of intermittent disturbance from construction activities and short-term disturbance of 14 acres of vegetation. However, the Conservancy would implement ECs 5 and 6 to minimize these disturbances and revegetate areas disturbed by construction. Construction activities would be temporary, restricted daily from 8:00 a.m. to 6:30 p.m. Monday–Friday, and restricted seasonally to May 1–October 15 (or a more limited period if a limited operation period is necessary to avoid effects to sensitive wildlife). The 14 acres of vegetation that would

be disturbed and require several years to recover represents a very small portion of the study area, and thus, most habitat in the study area would remain intact.

Because construction impacts on wildlife movement would be short term and corridor access would continue to be provided under the proposed bridge in the long term wildlife movement would not be blocked and the effect on wildlife movement would not be substantial. This impact would be **less than significant**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.4-1 (Alt. 2) **Introduction and Spread of Invasive Plants by Construction Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 2, construction activities could introduce or spread nonnative, invasive plant species. Unwashed construction equipment could carry invasive plant seed or other propagules from infested sites outside of the study area; seed mixes or soil amendments containing invasive plant seed could be used during revegetation; soil containing invasive plant seed could be redistributed in the study area; and multiple sites would be disturbed, providing conditions favorable for invasive plant establishment. During construction, it is likely that one or more invasive plant species would be introduced or spread by one or more of these mechanisms. However, as described in Environmental Commitment 4, the Conservancy would implement invasive plant management practices to avoid invasive species being introduced during construction. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.4-1 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.4-2 (Alt. 2) **Introduction and Spread of Invasive Plants by Recreational Activities. (NEPA)** *Under Alternative 2, there would be a slight increase in the number of visitors to the study area, and these visitors could contribute to the introduction and spread of invasive plants by dispersing these plants and disturbing habitat. However, there would also be a substantial reduction in habitat disturbance because existing user-created trails would be removed from core habitat and habitat protection features would be installed to reduce habitat disturbance by visitors. The reduction in recreational use of core habitat and habitat disturbance would reduce the introduction and spread of invasive plants by recreational activities despite the small increase in number of visitors. This effect would be* ***beneficial****.*

Recreational users can disperse invasive plants from infested sites into the study area and can disturb vegetation, which facilitates establishment of invasive plants. Currently, visitors and their pets use an extensive network of user-created trails in most habitats of the study area. Visitors also enter habitats from along the Upper Truckee River and the shoreline of Lake Tahoe. In all these areas, visitors disperse invasive plants and disturb vegetation, facilitating the establishment of invasive plants. Implementing Alternative 2 would remove these user-created trails from the core habitat area, which would reduce the disturbance of vegetation and dispersal of invasive plants in those areas. In addition, habitat protection features (e.g., signage) would be incorporated into recreation infrastructure to reduce habitat disturbance. Therefore, despite a slight increase in the number of visitors to the study area under Alternative 2, this alternative would reduce habitat disturbance and the potential for the spread of invasive plant species. This effect would be **beneficial**.

IMPACT 3.4-3 (Alt. 2) **Damage to or Mortality of Special-Status Plants Resulting from Construction Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 2, construction activities related to recreation infrastructure would not occur in occupied American mannagrass habitat. However, construction activities associated with river restoration at the mouth of the Upper Truckee River would occur in or close to Tahoe yellow cress habitat that could be occupied. Thus, these construction activities could damage or kill Tahoe yellow cress plants. This impact would be* ***potentially significant****.*

This impact is similar to Impact 3.4-3 (Alt. 1), but the potential for construction activities to affect special-status plants is less under this alternative than under Alternative 1. Construction under Alternative 2 would be limited to construction associated with the river mouth of the Upper Truckee River that would occur in or close to TYC habitat; it would not include construction of a boardwalk, bridge, and bike trail in the areas where TYC may occur. Similar to Alternative 1, this impact would be **potentially significant**.

Mitigation Measure 3.4-3 (Alt. 2): Conduct Protocol-Level Preconstruction Surveys and Avoid or Mitigate Impacts on Tahoe Yellow Cress Plants.

This mitigation measure is identical to Mitigation Measure 3.4-3 (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measure 3.4-3 (Alt. 2), for the same reasons described for Alternative 1, Impact 3.4-3 (Alt. 2) would be **less than significant**.

IMPACT 3.4-4 (Alt. 2) **Altered Extent of Special-Status Plant Habitat. (NEPA)** *Under Alternative 2, lagoon restoration would increase the extent of potential habitat for American mannagrass. Also, the restoration and increased inundation of willow scrub-wet meadow under this alternative could increase the extent of habitat suitable for American mannagrass. However, both of these effects are uncertain and may not alter the extent of suitable habitat. Under Alternative 2, beach and dune restoration could and new river mouth construction likely would increase the extent of habitat suitable for Tahoe yellow cress, and potential changes in sediment supply would not be sufficient to substantially reduce Tahoe yellow cress habitat. In summary, the effect on the extent of habitat for American mannagrass would be no effect to beneficial and for Tahoe yellow cress would be beneficial. Therefore, this impact would be* ***beneficial****.*

With regard to American mannagrass, this impact is similar to Impact 3.4-4 (Alt. 1), except that under Alternative 2, the increase in the acreage of willow scrub-wet meadow would be slightly greater than under Alternative 1 (8.7 versus 8.2 acres) (Table 3.4-4), and increased inundation of willow scrub-wet meadow could also increase the extent of habitat. With regard to TYC, beach and dune restoration could and new river mouth construction likely would increase the extent of habitat suitable for TYC, and potential changes in sediment supply would not be sufficient to substantially reduce TYC habitat. This impact would be **beneficial**.

IMPACT 3.4-5 (Alt. 2) **Damage to or Mortality of Special-Status Plants Resulting from Recreational Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 2, damage to or mortality of special-status plants resulting from recreational activities would not be substantially altered. Under existing conditions, habitat occupied by American mannagrass plants is in a location that is not substantially disturbed by recreational activities, and implementing Alternative 2 would maintain this condition. Under Alternative 2, the existing Tahoe yellow cress management plan (including the Barton Beach exclosure and adaptive management) would continue to be implemented and protect habitat occupied by Tahoe yellow cress at Barton Beach. Also, implementing Alternative 2 would not substantially alter recreational use of Barton Beach or of habitat occupied by Tahoe yellow cress at Cove East Beach. Therefore, this impact would be* ***less than significant****.*

Alternative 2 would not include the bridge and boardwalk components of Alternative 1 or other components that would increase recreational use of habitat occupied by TYC. Alternative 2 proposes the minimum level of recreation infrastructure with proposed infrastructure being located outside of areas that support TYC and American mannagrass. Under existing conditions, habitat occupied by American mannagrass plants is not substantially disturbed by recreational activities, and implementing Alternative 2 would maintain this condition. Under Alternative 2, the existing TYC management plan (including the Barton Beach exclosure and adaptive management) would continue to be implemented and protect habitat occupied by TYC at Barton Beach. Therefore, this impact would be **less than significant**.

IMPACT 3.4-6 (Alt. 2) **Short-Term Disturbance of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Construction Activities. (CEQA 2, 3; TRPA 1, 2, 4, 6)** *Implementing Alternative 2 would disturb sensitive communities. This disturbance would be short term. As described in Environmental Commitments 5 and 6, the Conservancy would minimize the risk to water quality and vegetation and comply with the terms and conditions of required permits to reduce this disturbance. Nonetheless, approximately 24 acres of sensitive communities would be disturbed. This impact would be* ***significant****.*

This impact is similar to Impact 3.4-6 (Alt. 1) but greater because the acreage of sensitive communities disturbed would be approximately 50 percent greater than under Alternative 1. For the same reasons described for Alternative 1, this impact would be **significant**.

As described for Alternative 1, with implementation of ECs 5 and 6, this impact would be reduced, but the short-term disturbance of sensitive communities would not be eliminated because such disturbance is integral to the river, floodplain, and other restoration elements. For the same reasons described for Alternative 1, Impact 3.4-6 (Alt. 2) would be **significant and unavoidable**.

IMPACT 3.4-7 (Alt. 2) **Enhancement and Creation of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from River and Floodplain Restoration. (NEPA)** *Implementing Alternative 2 would convert some disturbed, developed, and restored upland shrub to sensitive communities. The combined increase in extent of sensitive communities would be approximately 10 acres. Because the combined extent of sensitive communities would be increased, this effect would be* ***beneficial.***

This impact is similar to Impact 3.4-7 (Alt. 1); Alternative 2 differs only slightly from Alternative 1 in the acreage changes for different sensitive communities and in the increase in the combined acreage of sensitive communities. Under Alternative 2, montane meadow would decrease by 0.8 acre as opposed to a small increase (0.2 acre) under Alternative 1, and more lodgepole pine forest would be lost (1.4 versus 1.1 acres); however, slightly more beach and dune habitat would be created (2.8 versus 2.7 acres under Alternative 2), as would more willow scrub-wet meadow (8.7 versus 8.2 acres). The acreage of sensitive communities would increase by 10.1 acres under Alternative 2 versus 9.9 acres under Alternative 1. Because river and floodplain restoration under Alternative 2 would increase the combined extent of sensitive communities and enhance the functions and services provided by them, this long-term effect would be **beneficial**.

IMPACT 3.4-8 (Alt. 2) **Disruption of Wildlife Habitat Use and Loss of Wildlife Resulting from Construction Activities. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 2, construction activities could cause short-term disruption of wildlife use of the study area, cause the loss of wildlife, or both. Wintering bald eagle use of the study area does not occur during the construction season and thus would not be disrupted. However, construction of the restoration, recreation, public access, and habitat protection elements of Alternative 2 could result in the harm or loss of individuals or nests or result in substantial disruptions to nesting attempts or other activities by three special-status bird species (yellow warbler, willow flycatcher, and long-eared owl) and would affect one special-status guild (waterfowl). It also could result in abandonment or removal of active roost sites for, or harm or loss of, hoary bat or western red bat. This impact would be* ***significant****.*

This impact is identical to Impact 3.4-8 (Alt. 1). For the same reasons provided for Alternative 1, this impact would be **significant**.

Mitigation Measure 3.4-8A (Alt. 2): Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers If Necessary.

This mitigation measure is identical to Mitigation Measure 3.4-8A (Alt. 1).

Mitigation Measure 3.4-8B (Alt. 2): Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary.

This mitigation measure is identical to Mitigation Measure 3.4-8B (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measures 3.4-8A (Alt. 2) and 3.4-8B (Alt. 2), for the same reasons described for Alternative 1 that is, because avoiding substantial effects on waterfowl nesting would not be feasible, Impact 3.4-8 (Alt. 2) would be **significant and unavoidable**.

IMPACT 3.4-9 (Alt. 2) **Altered Extent and Quality of Wildlife Habitats Resulting from River, Floodplain, and Other Restoration and Enhancement Elements. (NEPA)** *Implementing Alternative 2 would increase the extent of lagoon, willow scrub-wet meadow, and beach and dune habitats; and enhance the habitat quality of willow scrub-wet meadow, lagoon, and other floodplain habitats by increasing hydrologic connectivity of the river and its floodplain. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-9 (Alt. 1), but under Alternative 2, the extent of enhanced floodplain habitat would differ from that under Alternative 1. Both alternatives have the same lagoon, and beach and dune restoration components, and the extent of willow scrub-wet meadow would increase similarly under both alternatives (Table 3.4-4). However, implementing Alternative 2 would result in a greater increase in the floodplain area inundated by two-year streamflow events when compared with Alternative 1 (that is, an increase of 97 percent versus 18 percent) (Conservancy and DGS 2006:A1). Thus, the quality of wildlife habitats would be enhanced more under Alternative 2 than under Alternative 1. For the same reasons described for Alternative 1, this effect would be **beneficial**.

IMPACT 3.4-10 (Alt. 2) **Altered Quality of Wildlife Habitats Resulting from Altered Recreational Use. (NEPA)** *Implementing Alternative 2 would improve the quality of wildlife habitat in much of the study area by removing user-created trails from a core habitat area and by providing public access and habitat protection features that would discourage recreational use of sensitive habitat areas, and engender a resource stewardship ethic in users. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-10 (Alt. 1), but under Alternative 2, recreational use and the associated human disturbance of wildlife would be much less than under Alternative 1. Alternative 2 would not include the bridge and boardwalk that is expected to increase human presence and reduce wildlife use in the vicinity of Barton Beach. Also, Alternative 2 would designate a larger area of core habitat than Alternative 1 (344 versus 308 acres). Overall, the reduction of human disturbance of wildlife by Alternative 2 would be greater than the reduction under Alternative 1. This effect would be **beneficial**.

IMPACT 3.4-11 (Alt. 2) **Conversion of Forest Land to Nonforest Use. (CEQA 8, 9; TRPA 4, 5)** *Implementing the restoration elements of Alternative 2 would convert approximately 0.1 acre of Jeffrey pine forest and 1.4 acres of lodgepole pine forest to natural vegetation types that are dominated by shrubs or herbaceous plants. This would be long-term, but not permanent conversion. This conversion would allow continued management for resource values including recreation, biodiversity, aesthetics, and water quality. In addition, river and floodplain restoration would enhance habitat values of the remaining forest land. Because the area of forest land conversion would be small, not permanent, allow for continued management of most resource values provided by the existing forest land, and enhance the resource values of remaining forest, this impact would be* ***less than significant.***

This impact is similar to Impact 3.4-11 (Alt. 1), but Alternative 2 would convert slightly more lodgepole pine forest than Alternative 1 (1.4 versus 1.1 acres, respectively). However, for the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.4-12 (Alt. 2) **Interference with Wildlife Use of Established Movement Corridors. (CEQA 4, TRPA 11)** *The study area may function as a corridor for wildlife movement between the Lake Tahoe shorezone and areas upstream. Implementing Alternative 2 would result in short-term disturbance that could interfere with wildlife use of this corridor. However, temporary construction-related disturbance would be restricted daily and seasonally, and disturbance to vegetation would affect only a small portion of the study area. Furthermore, as described in Environmental Commitments 5 and 6, the Conservancy would minimize vegetation disturbance and revegetate. Therefore, wildlife movement would not be blocked and the effect on wildlife movement would not be substantial. This impact would be* ***less than significant.***

This impact is similar to Impact 3.4-12 (Alt. 1), but Alternative 2 would not include a bridge over the Upper Truckee River. Alternative 2 would result in greater short-term disturbance of vegetation than Alternative 1 (20.7 versus 14 acres, respectively). Nonetheless, for the same reasons as described for Alternative 1, this impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.4-1 (Alt. 3) **Introduction and Spread of Invasive Plants by Construction Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 3, construction activities could introduce or spread nonnative, invasive plant species. Unwashed construction equipment could carry invasive plant seed or other propagules from infested sites outside of the study area; seed mixes or soil amendments containing invasive plant seed could be used during revegetation; soil containing invasive plant seed could be redistributed in the study area; and multiple sites would be disturbed, providing conditions favorable for invasive plant establishment. During construction, it is likely that one or more invasive plant species would be introduced or spread by one or more of these mechanisms. However, as described in Environmental Commitment 4, the Conservancy would implement invasive plant management practices to avoid invasive species being introduced during construction. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.4-1 (Alt. 1); however, Alternative 3 would construct less recreation infrastructure than Alternative 1 and more than Alternative 2. As described in EC 4 (Table 2-6), the Conservancy would implement invasive plant management practices to avoid invasive species being introduced during construction. For the same reasons as described in Impact 3.4-1 (Alt. 1), this impact would be **less than significant**.

IMPACT 3.4-2 (Alt. 3) **Introduction and Spread of Invasive Plants by Recreational Activities. (NEPA)** *Under Alternative 3, there would be a small increase in the number of visitors to the study area, and these visitors could contribute to the introduction and spread of invasive plants by dispersing these plants and disturbing habitat. However, there would also be a substantial reduction in habitat disturbance within the core habitat area because existing user-created trails would be removed and habitat protection features would be incorporated into recreation infrastructure to reduce habitat disturbance by visitors. The reduction in habitat disturbance would reduce the introduction and spread of invasive plants by recreational activities despite the small increase in number of visitors. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-2 under Alternative 2, and unlike Alternative 1, would result in a reduction in dispersal of invasive plants and habitat disturbance. Implementing Alternative 3 would cause a reduction in the introduction and spread of invasive plants less than Alternative 2 because the core habitat area would be smaller than under Alternative 2. For the same reasons as described above, this effect would be **beneficial**.

IMPACT 3.4-3 (Alt. 3) **Damage to or Mortality of Special-Status Plants Resulting from Construction Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 3, construction activities related to recreation infrastructure would not occur in occupied American mannagrass habitat. However, construction activities associated with river restoration at the mouth of the Upper Truckee River would occur in or close to Tahoe yellow cress habitat that could be occupied. Thus, these construction activities could damage or kill Tahoe yellow cress plants. This impact would be* ***potentially significant****.*

Two special-status plant species were documented in the study area by the protocol-level plant survey: American mannagrass and TYC. This impact is similar to Impact 3.4-3 (Alt. 1), but the potential for construction activities to affect special-status plants is less under this alternative than under Alternative 1 and similar to Alternative 2. Construction under Alternative 3 would be limited to construction associated with the river mouth of the Upper Truckee River that would occur in or close to TYC habitat; it would not include construction of a boardwalk, bridge, and bike trail in the areas where TYC may occur. Similar to Alternative 1, this impact would be **potentially significant**.

Mitigation Measure 3.4-3 (Alt. 3): Conduct Protocol-Level Preconstruction Surveys and Avoid or Mitigate Impacts on Tahoe Yellow Cress Plants.

This mitigation measure is identical to Mitigation Measure 3.4-3 (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measure 3.4-3 (Alt. 3), for the same reasons described for Alternative 1, Impact 3.4-3 (Alt. 3) would be **less than significant**.

IMPACT 3.4-4 (Alt. 3) **Altered Extent of Special-Status Plant Habitat. (CEQA 1, 5; TRPA 5)** *Under Alternative 3, the extent of habitat for special-status plants would remain largely unaltered. Lagoon and beach and dune restoration would not be components of Alternative 3. The restoration and increased inundation of willow scrub-wet meadow could increase the extent of habitat suitable for American mannagrass. However, both of these effects are uncertain and may not alter the extent of suitable habitat. Potential changes in sediment supply would not be sufficient to substantially reduce Tahoe yellow cress habitat. In summary, the effect on the extent of habitat for American mannagrass would be no effect to beneficial and for Tahoe yellow cress would be less than significant. Therefore, this impact would be* ***less than significant****.*

Under Alternative 3, the extent of habitat for special-status plants (i.e., American mannagrass and TYC) would remain largely unaltered. Restoration of lagoon habitat potentially suitable for American mannagrass would not be a component of Alternative 3. The restoration and increased inundation of willow scrub-wet meadow could increase the extent of habitat suitable for American mannagrass; however, because the microhabitat requirements of American mannagrass (e.g., mud benches along Trout Creek) are uncertain, habitat suitable for American mannagrass may not increase. Restoration of beach and dune habitat potentially suitable for TYC would not be a component of Alternative 3. Also, potential changes in sediment supply would not be sufficient to substantially alter TYC habitat. Therefore, the impact on the extent of habitat for American mannagrass and TYC would be **less than significant**.

IMPACT 3.4-5 (Alt. 3) **Damage to or Mortality of Special-Status Plants Resulting from Recreational Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 3, damage to or mortality of special-status plants resulting from recreational activities would not be substantially altered. Under existing conditions, habitat occupied by American mannagrass plants is in a location that is not substantially disturbed by recreational activities, and implementing Alternative 3 would maintain this condition. Under Alternative 3, the existing Tahoe yellow cress management plan (including the Barton Beach exclosure and adaptive management) would continue to be implemented and protect Tahoe yellow cress. Also, implementing Alternative 3 would not substantially alter recreational use of Barton Beach or habitat occupied by Tahoe yellow cress at Cove East Beach. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.4-5 (Alt. 2). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.4-6 (Alt. 3) **Short-Term Disturbance of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Construction Activities. (CEQA 2, 3; TRPA 1, 2, 4, 6)** *Implementing Alternative 3 would disturb sensitive communities. This disturbance would be short term. As described in Environmental Commitments 5 and 6, the Conservancy would minimize the risk to water quality and vegetation and comply with the terms and conditions of required permits to reduce this disturbance. Nonetheless, approximately 18 acres of sensitive communities would be disturbed. This impact would be* ***significant****.*

This impact would be similar to Impact 3.4-6 under Alternatives 1 and 2. It would be comparable to Alternative 1 and less than under Alternative 2 because the amount of acreage of sensitive communities disturbed would be comparable to that under Alternative 1 and less than that under Alternative 2. For the same reasons described for Alternative 1, this impact would be **significant**.

As described for Alternative 1, with implementation of ECs 5 and 6, this impact would be reduced, but the short-term disturbance of sensitive communities would not be eliminated because such disturbance is integral to the river, floodplain, and other restoration elements. For the same reasons described for Alternative 1, Impact 3.4-6 (Alt. 3) would be **significant and unavoidable**.

IMPACT 3.4-7 (Alt. 3) **Enhancement and Creation of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from River and Floodplain Restoration. (NEPA)** *Implementing Alternative 3 would convert some disturbed, developed, and restored upland shrub to sensitive communities. The combined increase in the extent of sensitive communities would be approximately eight acres. Because the combined extent of sensitive communities would be increased, this effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-7 under Alternatives 1 and 2; Alternative 3 differs from Alternatives 1 and 2 in that no net change in lagoon, beach and dune, or Jeffrey pine forest would occur; montane meadow would increase by 1.7 acres rather than increase by 0.2 acre (Alternative 1) or decrease (as under Alternative 2); and the acreage changes for different sensitive communities are less certain because natural processes would dictate the exact location of a portion of the restored river channel. Also, the increase in the combined acreage of sensitive communities would be smaller under Alternative 3 than under Alternative 1 or 2 (eight acres versus approximately ten acres) (Table 3.4-4). Because river and floodplain restoration under Alternative 3 would increase the combined extent of sensitive communities and enhance the functions and services provided by them, this long-term effect would be **beneficial**.

IMPACT 3.4-8 (Alt. 3) **Disruption of Wildlife Habitat Use and Loss of Wildlife Resulting from Construction Activities. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 3, construction activities could cause short-term disruption of wildlife use of the study area, cause the loss of wildlife, or both. Wintering bald eagle use of the study area does not occur during the construction season and thus would not be disrupted. However, construction of the restoration, recreation, public access, and habitat protection elements of Alternative 3 could result in the harm or loss of individuals or nests or result in substantial disruptions to nesting attempts or other activities by three special-status bird species (yellow warbler, willow flycatcher, and long-eared owl) and would affect one special-status guild (waterfowl). It also could result in abandonment or removal of active roost sites for, or harm or loss of, hoary bat or western red bat. This impact would be* ***significant****.*

This impact is identical to Impact 3.4-8 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **significant**.

Mitigation Measure 3.4-8A (Alt. 3): Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers If Necessary.

This mitigation measure is identical to Mitigation Measure 3.4-8A (Alt. 1).

Mitigation Measure 3.4-8B (Alt. 3): Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary.

This mitigation measure is identical to Mitigation Measure 3.4-8B (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measures 3.4-8A (Alt. 3) and 3.4-8B (Alt. 3), for the same reasons described for Alternative 1 that is, because avoiding substantial effects on waterfowl nesting would not be feasible, Impact 3.4-8 (Alt. 3) would be **significant and unavoidable**.

IMPACT 3.4-9 (Alt. 3) **Altered Extent and Quality of Wildlife Habitats Resulting from River, Floodplain, and Other Restoration and Enhancement Elements. (NEPA)** *Implementing Alternative 3 would increase the extent of willow scrub-wet meadow habitat; and enhance the habitat quality of willow scrub-wet meadow, lagoon, and other floodplain habitats by increasing hydrologic connectivity of the river and its floodplain. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-9 under Alternatives 1 and 2; however, under Alternative 3, the extent and location of restored and enhanced habitats would differ from those under Alternative 1 (Table 3.4-4), and there is greater uncertainty regarding the effects of Alternative 3 on wildlife habitats. Unlike Alternatives 1 and 2, Alternative 3 would not increase the acreage of lagoon or beach and dune habitats. As with Alternatives 1 and 2, Alternative 3 would increase the acreage of willow scrub-wet meadow (Table 3.4-4), and enhance floodplain habitats by increasing river-floodplain connectivity. However, natural processes would be allowed to dictate the exact location and form of a portion of the restored river channel, so there is less certainty regarding the resulting vegetation and floodplain properties than for Alternatives 1 and 2. It is anticipated that implementing Alternative 3 would result in greater river-floodplain connectivity than would occur under Alternatives 1 and 2. For example, the area inundated by a two-year streamflow event would increase by approximately 142 percent, compared to 18 and 97 percent under Alternatives 1 and 2, respectively (Conservancy and DGS 2006:A1). For the same reasons provided for Alternative 1, the effect of river, floodplain, and other restoration and enhancement elements on wildlife habitat would be **beneficial**.

IMPACT 3.4-10 (Alt. 3) **Altered Quality of Wildlife Habitats Resulting from Altered Recreational Use. (NEPA)** *Implementing Alternative 3 would improve the quality of wildlife habitat in much of the study area by removing user-created trails from a core habitat area and by providing public access with habitat protection features that would discourage recreational use of sensitive habitat areas, and engender a resource stewardship ethic in users. At Cove East Beach, the extent of recreational use would be similar to or slightly greater than existing conditions, and would not adversely affect wintering bald eagles. This effect would be* ***beneficial.***

This impact is similar to Impact 3.4-10 (Alts. 1 and 2), but implementing Alternative 3 would alter the human disturbance of habitat in different locations than would implementing Alternative 1 or 2. Unlike Alternative 2, Alternative 3 includes recreation infrastructure in the eastern portion of the study area, similar to but less than Alternative 1. Unlike Alternative 1, Alternative 3 would not include the bridge and boardwalk that could increase human disturbance of wildlife in the vicinity of Barton Beach. However, because Alternative 3 involves relocating the Upper Truckee River to the center of the study area, it would result in a much smaller area of core habitat than Alternatives 1 and 2 (251 acres versus 308 and 344 acres, respectively), and habitat west of the river could experience greater human disturbance than under existing conditions. Overall, under Alternative 3, the enhancement of wildlife habitat from reducing human disturbance would be comparable to that under Alternative 2. For the same reasons described for Alternative 2, this effect would be **beneficial**.

IMPACT 3.4-11 (Alt. 3) **Conversion of Forest Land to Nonforest Use. (CEQA 8, 9; TRPA 4, 5)** *Implementing the restoration elements of Alternative 3 would convert approximately 0.8 acre of lodgepole pine forest to natural vegetation types that are dominated by shrubs or herbaceous plants. This would be long-term, but not permanent conversion. This conversion would allow continued management for resource values including recreation, biodiversity, aesthetics, and water quality. In addition, river and floodplain restoration would enhance habitat values of the remaining forest land. Because the area of forest land conversion would be small, not permanent, allow for continued management of most resource values provided by the existing forest land, and enhance the resource values of remaining forest, this impact would be* ***less than significant.***

This impact is similar to Impact 3.4-11 (Alts. 1 and 2), but Alternative 3 would not convert Jeffrey pine forest, and would convert slightly less lodgepole pine forest than Alternatives 1 and 2 (0.8 acre versus 1.1 and 1.4 acres, respectively). However, for the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.4-12 (Alt. 3) **Interference with Wildlife Use of Established Movement Corridors. (CEQA 4, TRPA 11)** *The study area may function as a corridor for wildlife movement between the Lake Tahoe shorezone and areas upstream. Implementing Alternative 3 would result in short-term disturbance that could interfere with wildlife use of this corridor. However, short-term construction-related disturbance would be restricted daily and seasonally, and short-term disturbance to vegetation would affect only a small portion of the study area. Furthermore, as described in Environmental Commitments 5 and 6, the Conservancy would minimize vegetation disturbance and revegetate. Therefore, wildlife movement would not be blocked and the effect on wildlife movement would not be substantial. This impact would be* ***less than significant.***

This impact is similar to Impact 3.4-12 (Alts. 1 and 2), but implementing Alternative 3 would result in slightly less short-term disturbance of vegetation than Alternative 1 and less than Alternative 2 (13.6 acres versus 14 and 20.7 acres, respectively). Alternative 3 does not include a bridge over the Upper Truckee River. For similar reasons as described for Alternative 1, this impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.4-1 (Alt. 4) **Introduction and Spread of Invasive Plants by Construction Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 4, construction activities could introduce or spread nonnative, invasive plant species. Unwashed construction equipment could carry invasive plant seed or other propagules from infested sites outside of the study area; seed mixes or soil amendments containing invasive plant seed could be used during revegetation; soil containing invasive plant seed could be redistributed in the study area; and multiple sites would be disturbed, providing conditions favorable for invasive plant establishment. During construction, it is likely that one or more invasive plant species would be introduced or spread by one or more of these mechanisms. However, as described in Environmental Commitment 4, the Conservancy would implement invasive plant management practices to avoid invasive species being introduced during construction. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.4-1 (Alt. 1), except that recreation infrastructure construction would be less than under Alternative 1 and similar to construction under Alternative 3. For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.4-2 (Alt. 4) **Introduction and Spread of Invasive Plants by Recreational Activities. (NEPA)** *Under Alternative 4, there would be a small increase in the number of visitors to the study area, and these visitors could contribute to the introduction and spread of invasive plants by dispersing these plants and disturbing habitat. However, there would also be a substantial reduction in habitat disturbance because existing user-created trails would be removed from core habitat and habitat protection features (e.g., signage) would be incorporated into recreation infrastructure to reduce habitat disturbance by visitors. The reduction in habitat disturbance would reduce the introduction and spread of invasive plants by recreational activities despite the small increase in number of visitors. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-2 under Alternatives 2 and 3, and unlike Alternative 1, would result in a reduction in dispersal of invasive plants and habitat disturbance. Under Alternatives 1–3, the reduction of the introduction and spread of invasive plants would be related to the extent of the alternative's core habitat area. Therefore, implementing Alternative 4 would provide a comparable reduction to Alternative 2, and more of a reduction than Alternative 3. For the same reasons as described above, this effect would be **beneficial**.

IMPACT 3.4-3 (Alt. 4) **Damage to or Mortality of Special-Status Plants Resulting from Construction Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 4, construction activities would not occur in or near the habitat occupied by American mannagrass or in or near habitat occupied by or potentially suitable for Tahoe yellow cress. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.4-3 (Alt. 3). For the same reasons as described above for Alternative 3, this impact would be **potentially significant.**

Mitigation Measure 3.4-3 (Alt. 4): Conduct Protocol-Level Preconstruction Surveys and Avoid or Mitigate Impacts on Tahoe Yellow Cress Plants.

This mitigation measure is identical to Mitigation Measure 3.4-3 (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measure 3.4-3 (Alt. 4), for the same reasons described for Alternative 1, Impact 3.4-3 (Alt. 4) would be **less than significant**.

IMPACT 3.4-4 (Alt. 4) **Altered Extent of Special-Status Plant Habitat. (CEQA 1, 5; TRPA 5)** *Under Alternative 4, the extent of habitat for special-status plants would remain largely unaltered. Lagoon and beach and dune restoration would not be components of Alternative 4. The restoration and increased inundation of willow scrub-wet meadow under this alternative could increase the extent of habitat suitable for American mannagrass. However, both of these effects are uncertain and may not alter the extent of suitable habitat. Potential changes in sediment supply would not be sufficient to substantially reduce Tahoe yellow cress habitat. In summary, the effect on the extent of habitat for American mannagrass would be no effect to beneficial and for Tahoe yellow cress would be less than significant. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.4-4 (Alt. 3). For the same reasons as described for Alternative 3 above, this effect would be **less than significant**.

IMPACT 3.4-5 (Alt. 4) **Damage to or Mortality of Special-Status Plants Resulting from Recreational Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 4, damage to or mortality of special-status plants resulting from recreational activities would not be substantially altered. Under existing conditions, habitat occupied by American mannagrass is in a location that is not substantially disturbed by recreational activities, and implementing Alternative 4 would maintain this condition. Under Alternative 4, the existing Tahoe yellow cress management plan (including the Barton Beach exclosure and adaptive management) would continue to be implemented. Also, implementing Alternative 4 would not substantially alter recreational use of Barton Beach or of habitat occupied by Tahoe yellow cress at Cove East Beach. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.4-5 (Alt. 2). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.4-6 (Alt. 4) **Short-Term Disturbance of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Construction Activities. (CEQA 2, 3; TRPA 1, 2, 4, 6)** *Implementing Alternative 4 would disturb sensitive communities. This disturbance would be short term. As described in Environmental Commitments 5 and 6, the Conservancy would minimize the risk to water quality and vegetation and comply with the terms and conditions of required permits to reduce this disturbance. Nonetheless, approximately 15 acres of sensitive communities would be disturbed. This impact would be* ***significant****.*

This impact would be similar to Impact 3.4-6 under Alternatives 1–3. It would be comparable to the impact under Alternatives 1 and 3 and less than under Alternative 2 because the amount of acreage of sensitive communities disturbed would be comparable to that under Alternatives 1 and 2 and less than that under Alternative 3. Alternative 4 would not include a bridge over the Upper Truckee River. For similar reasons described for Alternative 1, this impact would be **significant**.

As described for Alternative 1, with implementation of ECs 5 and 6, this impact would be reduced, but the short-term disturbance of sensitive communities would not be eliminated because such disturbance is integral to the river, floodplain, and other restoration elements. For the same reasons described for Alternative 1, Impact 3.4-6 (Alt. 4) would be **significant and unavoidable**.

IMPACT 3.4-7 (Alt. 4) **Enhancement and Creation of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from River and Floodplain Restoration. (NEPA)** *Implementing Alternative 4 would convert some disturbed, developed, and restored upland shrub to sensitive communities. The combined increase in the extent of sensitive communities would be approximately 5 acres. Because the combined extent of sensitive communities would be increased, this effect would be* ***beneficial.***

This impact is similar to Impact 3.4-7 under Alternatives 1–3. It differs from Alternatives 1 and 2 in that developed land would not be converted to sensitive communities; no net change in lagoon or beach and dune would occur; willow scrub-wet meadow would be the only sensitive community to increase in extent; the extent of montane meadow would be reduced, unlike Alternatives 1 and 3, and by more than Alternative 2 (3.6 acres versus 0.8); and the extent of lodgepole pine forest would be reduced by 2.9 acres versus 1.1 acres, 1.4 acres, and 0.8 acre under Alternatives 1–3, respectively. The increase in the combined acreage of sensitive communities would be smaller under Alternative 4 than under Alternatives 1–3 (approximately 5 acres versus 8–10 acres) (Table 3.4-4). Because river and floodplain restoration under Alternative 4 would increase the combined extent of sensitive communities and enhance the functions and services provided by them, this long-term effect would be **beneficial**.

IMPACT 3.4-8 (Alt. 4) **Disruption of Wildlife Habitat Use and Loss of Wildlife Resulting from Construction Activities. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 4, construction activities could cause short-term disruption of wildlife use of the study area, cause the loss of wildlife, or both. Wintering bald eagle use of the study area does not occur during the construction season and thus would not be disrupted. However, construction of the restoration, recreation, public access, and habitat protection elements of Alternative 4 could result in the harm or loss of individuals or nests or result in substantial disruptions to nesting attempts or other activities by three special-status bird species (yellow warbler, willow flycatcher, and long-eared owl) and would affect one special-status guild (waterfowl). It also could result in abandonment or removal of active roost sites for, or harm or loss of, hoary bat or western red bat. This impact would be* ***significant****.*

This impact is identical to Impact 3.4-8 (Alt. 1). For the same reasons described for Alternative 1, this impact would be **significant**.

Mitigation Measure 3.4-8A (Alt. 4): Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers If Necessary.

This mitigation measure is identical to Mitigation Measure 3.4-8A (Alt. 1).

Mitigation Measure 3.4-8B (Alt. 4): Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary.

This mitigation measure is identical to Mitigation Measure 3.4-8B (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measures 3.4-8A (Alt. 4) and 3.4-8B (Alt. 4), for the same reasons described for Alternative 1 that is, because avoiding substantial effects on waterfowl nesting would not be feasible, Impact 3.4-8 (Alt. 4) would be **significant and unavoidable**.

IMPACT 3.4-9 (Alt. 4) **Altered Extent and Quality of Wildlife Habitats Resulting from River, Floodplain, and Other Restoration and Enhancement Elements. (CEQA 1; TRPA 9, 10, 12)** *Implementing Alternative 4 would increase the extent of willow scrub-wet meadow vegetation; and enhance the habitat functions of willow scrub-wet meadow, lagoon, and other floodplain habitats by increasing hydrologic connectivity of the river and its floodplain. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-9 (Alts. 1–3), but the acreage and location of restored and enhanced habitats would differ among alternatives. Unlike implementing Alternatives 1 and 2, implementing Alternative 4 would not increase the acreage of lagoon or beach and dune habitat. Implementing Alternative 4 also would result in a greater acreage of willow scrub-wet meadow than would result under Alternatives 1–3 (15.6 acres versus 8.2 to 10.6 acres) (Table 3.4-4). However, the enhancement of habitats resulting from increased river-floodplain connectivity would be limited under Alternative 4 because it provides this enhancement for the inset floodplain area only, leaving the remainder of the study area in its existing, relatively disconnected condition. Thus, the

acreage of floodplain inundated by two-year streamflow events would be increased by only approximately 25 percent, which would be similar to the increase under Alternative 1 but much smaller than under Alternatives 2 and 3 (Conservancy and DGS 2006:A1). Additional discussions related to floodplain connectivity are addressed in Section 3.8, "Hydrology and Flooding." Overall, river, floodplain, and other restoration and enhancement elements would increase the function and extent of wildlife habitats less than under Alternatives 1–3. However, for the same reasons provided for Alternative 1, this effect would be **beneficial**.

IMPACT 3.4-10 (Alt. 4) **Altered Quality of Wildlife Habitats Resulting from Altered Recreational Use. (NEPA)** *Implementing Alternative 4 would improve the quality of wildlife habitat in much of the study area by removing user-created trails from a core habitat area and by providing public access and habitat protection features that would discourage recreational use of sensitive habitat areas, and engender a resource stewardship ethic in users. At Cove East Beach, the extent of recreational use would be similar to or slightly greater than existing conditions, and would not adversely affect wintering bald eagles. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-10 (Alts. 1–3) but more beneficial. Implementing Alternative 4 would reduce human disturbance of habitat more than would implementing Alternatives 1 and 2. Alternative 4 includes most of the habitat protection components of Alternative 1 (unlike Alternative 2) but does not include the bridge and boardwalk that could increase human disturbance of wildlife in the vicinity of Barton Beach (unlike Alternative 1). Also, a larger area of core habitat would be designated under Alternative 4 than under Alternatives 1–3 (350 acres versus 251–344 acres). For the same reasons described for Alternative 1, this effect would be **beneficial**.

IMPACT 3.4-11 (Alt. 4) **Conversion of Forest Land to Nonforest Use. (CEQA 8, 9; TRPA 4, 5)** *Implementing the restoration elements of Alternative 4 would convert approximately 2.9 acres of lodgepole pine forest to natural vegetation types that are dominated by shrubs or herbaceous plants. This would be long-term, but not permanent conversion. This conversion would allow continued management for resource values including recreation, biodiversity, aesthetics, and water quality. In addition, river and floodplain restoration would enhance habitat values of the remaining forest land. Because the area of forest land conversion would be small, not permanent, allow for continued management of most resource values provided by the existing forest land, and enhance the resource values of remaining forest, this impact would be* ***less than significant.***

This impact is similar to Impact 3.4-11 (Alts. 1–3), but Alternative 4 would convert more lodgepole pine forest than Alternatives 1, 2, and 3 (2.9 acres versus 1.1 acres, 1.4 acres, and 0.8 acre, respectively). Like Alternative 3 and unlike Alternatives 1 and 2, Alternative 4 would not convert Jeffrey pine forest. For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.4-12 (Alt. 4) **Interference with Wildlife Use of Established Movement Corridors. (CEQA 4, TRPA 11)** *The study area may function as a corridor for wildlife movement between the Lake Tahoe shorezone and areas upstream. Implementing Alternative 4 would result in short-term disturbance that could interfere with wildlife use of this corridor. However, construction-related disturbance would be restricted daily and seasonally, and short-term disturbance to vegetation would affect only a small portion of the study area. Furthermore, as described in Environmental Commitments 5 and 6, the Conservancy would minimize vegetation disturbance and revegetate. Therefore, wildlife movement would not be blocked and the effect on wildlife movement would not be substantial. This impact would be* ***less than significant.***

This impact is similar to Impact 3.4-12 (Alts. 1–3), but implementing Alternative 4 would disturb 15.6 acres of vegetation for the short term versus 13.6, 14, and 20.7 acres for Alternatives 1, 2, and 3, respectively. Alternative 4 would not include a bridge over the Upper Truckee River. For similar reasons as described for Alternative 1, this impact would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.4-1 (Alt. 5) **Introduction and Spread of Invasive Plants by Construction Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.*

Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.

IMPACT 3.4-2 (Alt. 5) **Introduction and Spread of Invasive Plants by Recreational Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 5, recreational activities would remain comparable to existing conditions. Under existing conditions, visitors introduce and spread invasive plants throughout the study area. This existing adverse condition would continue. This impact would be **less than significant.***

Under Alternative 5, recreational activities would remain comparable to existing conditions. Under existing conditions, visitors introduce and spread invasive plants throughout the study area. This existing adverse condition would continue. This impact would be **less than significant.**

IMPACT 3.4-3 (Alt. 5) **Damage to or Mortality of Special-Status Plants Resulting from Construction Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.*

Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.

IMPACT 3.4-4 (Alt. 5) **Altered Extent of Special-Status Plant Habitat. (CEQA 1, 5; TRPA 5)** *Under Alternative 5, no additional special-status plant habitat would be created. Thus, **no impact** would occur.*

Under Alternative 5, no additional special-status plant habitat would be created. Thus, **no impact** would occur.

IMPACT 3.4-5 (Alt. 5) **Damage to or Mortality of Special-Status Plants Resulting from Recreational Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 5, recreational activities would remain comparable to existing conditions. Under existing conditions, habitat occupied by American mannagrass is in a location that is not substantially disturbed by recreational activities, However, visitors cause damage to and mortality of some Tahoe yellow cress. This existing adverse condition would continue. Thus, **no impact** would occur.*

Under Alternative 5, recreational activities would remain comparable to existing conditions. Under existing conditions, habitat occupied by American mannagrass is in a location that is not substantially disturbed by recreational activities, However, visitors cause damage to and mortality of some TYC. This existing adverse condition would continue. Thus, **no impact** would occur.

IMPACT 3.4-6 (Alt. 5) **Short-Term Disturbance of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Construction Activities. (CEQA 2, 3; TRPA 1, 2, 4, 6)** *Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.*

Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.

IMPACT 3.4-7 (Alt. 5) **Increased Extent of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from River and Floodplain Restoration. (CEQA 2, 3; TRPA 1, 2, 4, 6)** *Under Alternative 5, no river or floodplain restoration would occur, and the extent of sensitive communities would remain comparable to their extent under existing conditions. Thus, **no impact** would occur.*

Under Alternative 5, no river or floodplain restoration would occur, and the extent of sensitive communities would remain comparable to their extent under existing conditions. Thus, **no impact** would occur.

IMPACT 3.4-8 (Alt. 5) **Disruption of Wildlife Habitat Use and Loss of Wildlife Resulting from Construction Activities. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.*

Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.

IMPACT 3.4-9 (Alt. 5) **Altered Extent and Quality of Wildlife Habitats Resulting from River, Floodplain, and Other Restoration and Enhancement Elements. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 5, no river, floodplain, or other restoration would occur; thus, the extent and quality of wildlife habitats would remain similar to existing conditions. Where existing conditions are degraded (as along the straightened reach of the Upper Truckee River), the existing adverse conditions would continue. **No impact** would occur.*

Under Alternative 5, no river, floodplain, or other restoration would occur; thus, the extent and quality of wildlife habitats would remain similar to existing conditions. Where existing conditions are degraded (as along the straightened reach of the Upper Truckee River), the existing adverse conditions would continue. **No impact** would occur.

IMPACT 3.4-10 (Alt. 5) **Altered Quality of Wildlife Habitats Resulting from Altered Recreational Use. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 5, recreational activities would remain comparable to existing conditions. Under existing conditions, visitors disrupt wildlife use of the study area and damage all the habitats in the study area. This existing adverse condition would continue. **No impact** would occur.*

Under Alternative 5, recreational activities would remain comparable to existing conditions. Under existing conditions, visitors disrupt wildlife use of the study area and damage all the habitats in the study area. This existing adverse condition would continue. **No impact** would occur.

IMPACT 3.4-11 (Alt. 5) **Conversion of Forest Land to Nonforest Use. (CEQA 8, 9; TRPA 4, 5)** *Under Alternative 5, no conversion of forest land to nonforest uses would occur. **No impact** would occur.*

Under Alternative 5, no conversion of forest land to nonforest uses would occur. **No impact** would occur.

IMPACT 3.4-12 (Alt. 5) **Interference with Wildlife Use of Established Movement Corridors. (CEQA 4, TRPA 11)** *Under Alternative 5, no short-term disturbance would occur that could interfere with wildlife use of the study area as a movement corridor. **No impact** would occur.*

Under Alternative 5, no short-term disturbance would occur that could interfere with wildlife use of the study area as a movement corridor. **No impact** would occur.

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3.5 FISHERIES

This section describes existing fisheries and aquatic resources in the study area, discusses applicable regulations that govern the management of those resources, and presents an analysis of potential impacts to these resources from implementation of Alternatives 1–5.

3.5.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

The following federal laws and regulations related to fisheries are relevant to the proposed alternatives and described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- Federal Endangered Species Act
- U.S. Forest Service (USFS) Lake Tahoe Basin Management Unit
- Federal Clean Water Act
  - Section 401
  - Section 404

State

The following state laws and regulations related to fisheries are relevant to the proposed alternatives and described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- California Endangered Species Act
- California Fish and Game Code
- Porter-Cologne Water Quality Control Act

Tahoe Regional Planning Agency

Goals and Policies

Chapter IV (Conservation Element) of TRPA's Goals and Policies establishes goals for the preservation, development, utilization, and management of natural resources within the Tahoe Basin (TRPA 2004). These goals are designed to achieve and maintain adopted environmental threshold carrying capacities and are implemented through the Code of Ordinances.

The maintenance of essential habitat serves as the fisheries management emphasis for the Conservation Element of TRPA's Goals and Policies. Conservation Element/Fisheries Goal 1 is to "improve aquatic habitat essential for the growth, reproduction and perpetuation of existing and threatened fish resources in the Tahoe Basin" (TRPA 2004). For streams within the Tahoe Basin, the management focus is the quality and quantity of habitat provided for fish species including spawning and rearing habitat, food supply, and cover. The Conservation Element identifies five attainment policies related to instream fish habitat:

1. Development proposals affecting streams, lakes, and adjacent lands shall evaluate impacts to the fishery.

2. Unnatural blockages and other impediments to fish movement would be prohibited and removed wherever appropriate.

3. Habitat improvement projects in streams and lakes shall be encouraged.

4. Instream flows shall be maintained or enhanced.

5. State and federal efforts to reintroduce Lahontan cutthroat trout shall be supported.

Code of Ordinances

Chapter 63 (Fish Resources) of TRPA's Code of Ordinances (TRPA 2011) includes provisions for the protection of fish habitat and the enhancement of degraded habitat. For instream habitats, protection provisions include prohibiting stream channel alterations, facilitating fish movement at stream crossings, removing barriers to fish movement, mitigating impacts to fish habitat from development, maintaining instream flows, preventing sediment entry into the stream system, and encouraging native vegetative cover.

ENVIRONMENTAL SETTING

Aquatic Habitat in the Upper Truckee River

The reach of the Upper Truckee River within the study area is characterized by slow velocities and a low gradient (0–1 percent); the substrate is composed primarily of peat, clay, sand, and fine sediment. The channel is incised with steep banks and contains small amounts of woody material. Willows are the dominant woody riparian vegetation along the channel. This reach is dominated by pool and deep run habitats near Lake Tahoe. At high lake levels, substantial portions of the Upper Truckee River and its floodplain are submerged by Lake Tahoe and become backwater habitat (DGS and Conservancy 1997). In normal and wet years, a backbeach "lagoon" is seasonally created, developing in the spring in concert with increased river flows from snowmelt and then receding in early to midsummer as the lake level and river flow decline. Lagoon habitat may be valuable for spawning of lake-dwelling species and may provide temporary habitat for juvenile minnows or other fishes. Unfortunately, recently introduced warm-water species have also invaded this habitat and may be detrimental to its native species.

Fisheries in the Upper Truckee River

The fish community in the Tahoe Basin is affected primarily by trends related to decreased abundance of native fish species and a shift from native to introduced fish species. Both of these trends are accelerated by aquatic habitat degradation in the basin. Before the 1850s, nine native fish species occurred in the Tahoe Basin. Since that time, 20 nonnative fish species have been introduced. At present, 24 species of fish occur in the Tahoe Basin, of which 15 are found in Lake Tahoe (Table 3.5-1). The variety of fish introduced into the Tahoe Basin resulted from actions by state agencies to improve fishing or prey species, and also from ill-informed and illegal introductions from the public or anglers to establish new recreational fisheries. Most of these introductions were made without an understanding of their impact on the native fauna.

Native minnows, suckers, sculpin, and trout are still found in the Upper Truckee River and in Lake Tahoe. These native nongame species are important to the function of the stream ecosystem. Juveniles and smaller individuals may be important prey for larger trout. Some of these species have special management status and a high probability of occurrence in the study area (Table 3.5-2). The mountain sucker (*Catostomus platyrhynchus*) is a California Department of Fish and Game (CDFG) Species of Special Concern, and the Lahontan lake tui chub (*Gila bicolor pectinifer*) is a CDFG Species of Special Concern and a USFS Sensitive Species. These special management status designations encourage watershed managers to pay extra attention to the needs of these species.

Introduced trout occupy the habitats once dominated by the native Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*). Lahontan cutthroat trout, which are federally listed as threatened, were only recently reported present within the study area. Field crews from the USFS Lake Tahoe Basin Management Unit surveyed the Upper Truckee River from Lake Tahoe upstream approximately 19.3 kilometers (12 miles) in August and September 2011 as part of the USFS Basin-wide Non-game Fish Assessment. During this survey, two Lahontan cutthroat trout were captured in the river, approximately 1,000 meters (3,280 feet) upstream of the lake. Both fish were

Table 3.5-1
Fishes in the Tahoe Basin from the 1850s to 2002

Common Name	Scientific Name	Status
Native Fishes		
Minnows (Cyprinidae)		
Lahontan stream tui chub	*Gila bicolor obesa*	
Lahontan lake tui chub	*Gila bicolor pectinifer*	CSC, USFS
Lahontan redside	*Richardsonius egregious*	
Lahontan speckled dace	*Rhinichthys osculus robustus*	
Suckers (Catostomidae)		
Tahoe sucker	*Catostomus tahoensis*	
Mountain sucker	*Catostomus platyrhynchus*	CSC
Salmonids (Salmonidae)		
Lahontan cutthroat trout [1]	*Oncorhynchus clarkii henshawi*	FT
Mountain whitefish	*Prosopium williamsoni*	
Sculpins (Cottidae)		
Paiute sculpin	*Cottus beldingi*	
Introduced Fishes		
Extant		
Minnows (Cyprinidae)		
Goldfish [2]	*Carassius auratus*	
Carp[2]	*Cyprinus carpio*	
Golden shiner [2]	*Notemigonus crysoleucas*	
Sunfishes (Centrarchidae)		
Bluegill[2]	*Lepomis macrochirus*	
Largemouth bass [3]	*Micropterus salmoides*	
Smallmouth bass [3]	*Micropterus dolomieu*	
Black crappie[2]	*Pomoxis nigromaculatus*	
White crappie[2]	*Pomoxis annularis*	
Salmonidae		
Golden trout [2]	*Oncorhynchus aquabonita*	
Rainbow trout [1]	*Oncorhynchus mykiss*	
Kokanee salmon [1]	*Oncorhynchus nerka*	
Brown trout [1]	*Salmo trutta*	
Brook trout [1]	*Salvelinus fontinalis*	
Lake trout [1]	*Salvelinus namaycush*	
Livebearers (Poeciliidae)		
Mosquito fish [2]	*Gambusia affinis*	
Bullhead catfishes (Ictaluridae)		
Brown bullhead [3]	*Ictalurus nebulosus*	
Extirpated		
Salmonids (Salmonidae)		
Chinook salmon [1]	*Oncorhynchus tshawytscha*	
Bonneville cisco [1]	*Prosopium gemmiferum*	
Atlantic salmon [1]	*Salmo salar*	
Arctic grayling [2]	*Thymallus acrticus*	

Notes:
CSC = California Species of Special Concern; FT = Federally listed as threatened, USFS = U.S. Forest Service Sensitive species
[1] Planted into Lake Tahoe by the California Fish Commission, the California Department of Fish and Game, or the Nevada Fish Commission
[2] Identified in the Tahoe Basin, but not in Lake Tahoe or tributary streams
[3] Unauthorized introduction into Lake Tahoe
Sources: Dill and Cordone 1997, Schlesinger and Ramsos 2000, Moyle 2002

Table 3.5-2
Life History of Native Fishes of the Upper Truckee River

Common Name	Scientific Name	Status[1]	Potential for Occurrence	Migration	Spawning	Incubation	Habitat Preference		
							Fry	Juvenile	Adults
Minnows (Cyprinidae)									
Lahontan speckled dace	*Rhinichthys osculus robustus*		High		June–July	6 days	Warm shallow waters, between cobbles with interstitial space	Warm shallows near large rocks	Pools with abundant cover (rocks, vegetation)
Lahontan redside	*Richardsonius egregius*	CSC	High	May–June	May–August	3–6 days	Along stream margins or in backwater areas	Along stream margins or in backwater areas	High-velocity water at the heads of deep pools
Tui chub	*Gila bicolor*	CSC	High		April–July	3–6 days	Sandy bottoms or in mouths of streams with dense vegetation	Sandy bottoms with dense vegetation	Sandy bottoms with dense vegetation
Suckers (Catostomidae)									
Tahoe sucker	*Catostomus tahoensis*		High	April–May	March–June	3–6 days	Gravel riffles with a few large rocks	Shallow areas with slow currents	Pools and runs
Mountain sucker	*Catostomus platyrhynchus*	CSC	Medium		June–August		Gravel riffles above large pools	Shallow runs and pools with cover	Runs and pools, usually under cover
Salmonids (Salmonidae)									
Lahontan cutthroat trout	*Oncorhynchus clarkii henshawi*	FT	Low	April–May	April–July	6–8 weeks	Stream margins with shallow water, low flows	Rivers and lakes within the Lahontan Basin.	Primarily lakes within the Lahontan Basin but rivers are required for spawning
Mountain whitefish	*Prosopium williamsoni*		Medium	unknown	October–December	6–10 weeks	Shallow backwaters	Rivers, creeks, and lake bottom habitats in upper portions of the lake	Benthic habitats in larger rivers and lakes
Sculpins (Cottidae)									
Paiute sculpin	*Cottus beldingi*		High		May–August, peaks May–July		Gravel bottoms, crevices under rocks	Stream margins, lake margins (algae beds)	Streams (gravel substrate)

Note: CSC = California Species of Special Concern; FT = Federally listed as threatened (CDFG 2002)
Source: Moyle 2002

missing adipose fins and were determined to be hatchery fish that had been released by the Nevada Department of Wildlife (NDOW) into Lake Tahoe near Cave Rock during the summer of 2011. This is the first time that Lahontan cutthroat trout had been recorded as part of the fish assessment (Lemmers and Santora 2012). The Lahontan cutthroat trout released near Cave Rock by NDOW in 2011 were released into Lake Tahoe to provide anglers the chance to catch a native fish species that had not been available in the lake for a long time. This plant was considered experimental and for recreational purposes and not as an attempt to repopulate Lake Tahoe. NDOW's staff will evaluate the performance of Lahontan cutthroat trout released into the lake, along with angler satisfaction with the program (NDOW 2011).

When NDOW released Lahontan cutthroat trout into Lake Tahoe during the summer of 2011, no regulatory framework was in place with the U.S. Fish and Wildlife Service (USFWS)—the regulatory agency responsible for federally listed threatened species—but Lahontan cutthroat trout were shown to be present within the project area. Therefore, appropriate Federal Endangered Species Act consultation procedures must be followed before project construction activities may begin (UTRWAG 2012).

In addition to the NDOW release into Lake Tahoe in June 2011, Lahontan cutthroat trout were reintroduced into the headwaters of the Upper Truckee River at Meiss Meadows in 1989 and 1990. Since then, efforts have been underway to expand the species' habitat downstream of Meiss Meadows, including perennial tributaries within the Upper Truckee watershed (Moore 2010).

Brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*) are the dominant trout species within the lower sections of the Upper Truckee River, although brook trout (*Salvelinus fontinalis*) occur as well in smaller numbers (Conservancy 2007a). The USFS Lake Tahoe Basin Management Unit manages the headwaters of the Upper Truckee River for the benefit of reintroduced Lahontan cutthroat trout as part of its wild trout program.

The Upper Truckee River Marsh provides access (migration pathway) and temporary habitat for many fish species that move from the lake to upstream segments of the river and Trout Creek for spawning. Lake-run and resident rainbow and brown trout, Paiute sculpin (*Cottus beldingi*), Lahontan redside (*Richardsonius egregius*), Lahontan stream tui chub (*Gila bicolor obesa*), Tahoe sucker (*Catostomus tahoensis*), and mountain whitefish (*Prosopium williamsoni*) are known to move from the lake to tributary streams to access upstream spawning and rearing habitats (Snider et al. 1987, Washoe Meadows State Park 1994). Shallow-water and backwater areas within the marsh are known to provide important rearing habitat for minnows and juvenile suckers; however, the utilization of marsh habitats by these species is not well documented (Conservancy 2007a).

Native aquatic invertebrates and plants are also important to the Upper Truckee River ecosystem. Aquatic mollusks have received special attention due to marked declines throughout North America. The western pearlshell mussel (*Margaritifera falcata*) is known to be a highly sensitive indicator species (Nedeau, Smith, and Stone 2005; CDFG 2011) and is known to occur within the lower reaches of the Upper Truckee River, with large aggregations occurring near the airport (Conservancy 2007b). It is not known whether it occurs in the Upper Truckee River Marsh.

Herbst (2004) sampled eight sites along the main stem of the Upper Truckee River between 1998 and 2000, using the California stream bioassessment protocols consisting of physical habitat surveys and biological sampling of benthic macroinvertebrates to acquire baseline biomonitoring data. Herbst found that anthropogenic channel disturbance increased on a downstream gradient, and the distribution of invertebrate taxa in the Upper Truckee River was related to these habitat differences. He noted a general downstream trend of a loss of diversity, sensitive organisms, and community stability.

Since 2002, several warm-water fishes—largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), and brown bullhead (*Ictalurus nebulosus*)—have appeared in Lake Tahoe and some tributary streams (Moyle 2002). Their effects on native fish and invertebrates are unknown at this time. However, these introductions usually have an adverse effect on native fishes (and possibly amphibians and invertebrates) that use warm-water habitats in Lake Tahoe and tributary streams. The Tahoe Keys appears to be the location

where most of these nonnative species first became established in the lake. These species have dispersed from there into Pope Marsh, the Upper Truckee River, and Taylor Creek. Introduced warm-water fishes are being closely monitored by USFS (USFS 2012). Eurasian watermilfoil (*Myriophyllum spicatum*) is a nonnative aquatic plant that has been introduced to Lake Tahoe and has the potential to substantially alter aquatic habitat function in favor of nonnative fish species. Studies on the distribution of this plant and potential methods that may be used to control it are ongoing. USFWS is developing an approach to control and/or remove nonnative aquatic species within the Tahoe-Truckee system to protect native species.

3.5.2 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; the TRPA Initial Environmental Checklist; factual or scientific information and data; and regulatory standards of federal, state, and local agencies. These criteria also encompass the factors taken into account under NEPA to determine the significance of an action in terms of the context and intensity of its effects.

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to fisheries and other aquatic resources if it would:

- have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS (CEQA 1);
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG and USFWS (CEQA 2); or
- interfere substantially with the movement of any native resident or migratory fish species (CEQA 3).

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative was determined to result in a significant impact related to fisheries and other aquatic resources if it would:

- substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of a rare or endangered plant or animal (TRPA 1);
- change the diversity or distribution of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms, insects, mammals, amphibians, or microfauna) (TRPA 2);

- reduce the number of any unique, rare, or endangered species of animals (TRPA 3); or
- introduce new species of animals into an area, or result in a barrier to the migration or movement of animals (TRPA 4).

Although not used as significance criteria, effects on TRPA thresholds were evaluated, and these effects are reported in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities." In developing mitigation measures for significant impacts of the project, effects on environmental thresholds of the Tahoe Regional Planning Compact were considered.

METHODS AND ASSUMPTIONS

The impact analysis for fisheries and aquatic resources examines effects of each alternative in both the short term and the long term. Short-term effects could occur over hours, days, or weeks during the active construction phase Long-term effects are the result of changes to the river channel and associated riparian corridor and include changes to habitat conditions over a period of time after the channel has been activated.

Information related to the study area and vicinity and professional experience on similar projects has been referenced and incorporated into the analysis of the river system history, existing condition, likely future conditions, and conditions expected under each action alternative. The impact analysis for fisheries and aquatic resources relies on information and analysis provided in Section 3.8, "Hydrology and Flooding" and Section 3.9, "Geomorphology and Water Quality." As discussed in Section 3.9, potential violations of the narrative turbidity standard at the low end of the nephelometric turbidity unit (NTU) range, while considered a significant impact for CEQA/NEPA/TRPA analysis for the water quality discussion in this document, would not necessarily correspond to an adverse effect on beneficial uses related to fisheries and other aquatic organisms. To evaluate effects on beneficial uses, the water quality analysis considers aesthetic values under Non-Contact Recreation Use designation in the Basin Plan (Lahontan RWQCB 1995:2-2) as the most sensitive indicator of an effect on any beneficial uses. The turbidity values that would correlate with this impairment of aesthetics-related beneficial use might not occur unless turbidity was increased beyond natural seasonal background by several orders of magnitude. This is well beyond the <10 percent increase in background turbidity standard of the Basin Plan that was used to evaluate water quality impacts in the water quality section due to the sensitivity of Lake Tahoe. Turbidity levels would also likely need to exceed the minimum aesthetic criterion to have adverse effects on other beneficial uses, including those supporting aquatic organisms. A finding of a significant unavoidable water quality impact caused by exceedance of the stringent numeric standard does not automatically correspond to an adverse condition for aquatic organisms because impairment of related beneficial uses would likely require the proposed project to elevate turbidity levels considerably further than 10 percent above background for a greater magnitude and longer duration beyond the limited area and brief period that was used for the water quality analysis. Significance of a potential impact to aquatic species was evaluated based on anticipated effects on population levels, survival rates, distribution, and habitat use.

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.5-1 (Alt. 1) **Short-Term Aquatic Habitat Degradation. (CEQA 1, 2, 3; TRPA 1)** *Short-term construction activities in channels could temporarily reduce aquatic habitat quality by increasing turbidity within the construction site and possibly Lake Tahoe during construction. However, as described in Environmental Commitments 5 and 6, the Conservancy would implement effective construction-phase site management plans and comply with required permits to minimize risks of water quality degradation. Although the strict turbidity standard would likely be exceeded, the expected turbidity levels would not substantially affect the fisheries or aquatic habitat. Therefore, this impact would be* ***less than significant****.*

The proposed restoration activities under Alternative 1 would include constructing eight vertical grade controls, six lateral grade controls, 1,300 feet of bank protection work, 3,890 feet of new channel, and 200 feet of river mouth, and connecting the existing Sailing Lagoon to the river and marsh. These activities would include isolating the construction sites, removing the water from the construction sites and then "rewatering" the sites. All grading, placement of lateral and vertical grade-control structures, addition of sand, gravel, or cobble, and placement of willow clumps or revegetation efforts would occur in isolated construction sites by using isolating barriers and diverting or pumping flow around the work area. The newly constructed channels would be isolated and dewatered. Before reconnection of the new channels to the active channel, the newly excavated channel segments would be flushed with water ("rewatered") to remove as much fine sediment as possible. The water would be pumped out of the downstream end of the channel segment and used for irrigation or discharged to temporary detention basins for sediment removal. Once the quality of dewatering effluent meets previously established criteria, the isolating barriers would be removed, connecting the new segment to the active channel. Pump intakes would be screened to limit the potential for the entrainment of nonnative aquatic vegetation, fish, and invertebrates during dewatering activities.

Because of the large scale of the dewatering and rewatering activities associated with these actions, there is a high risk of some discharge of sediments to active surface waters. These discharges would be likely to cause an exceedance of the very strict turbidity standards during construction and shortly thereafter as the channel adjusts.

The extent of fisheries impacts, such as behavioral changes related to turbidity and dissolved oxygen levels would be related to the extent of in-channel disturbance and best management practices in place. For Alternative 1, 3,890 feet of new channel would be created, and eight vertical grade-control structures would be installed in the existing channel. The primary effects on water quality would occur during dewatering and rewatering of construction sites for the grade control structure and during the connection of the new channel to the existing channel. With implementation of Environmental Commitment (EC) 5, "Prepare and Implement Effective Construction Site Management Plans to Minimize Risks of Water Quality Degradation and Impacts to Vegetation," and EC 6, "Obtain and Comply with Federal, State, Regional, and Local Permits," described in Table 2-6 in Chapter 2, the potential impacts would be limited in magnitude and short in duration. Although the turbidity standard would likely be exceeded, the fisheries beneficial use would not be adversely affected. Trout initiate turbidity avoidance behaviors at around 25 NTU (ENTRIX 2005). The turbidity impact is unlikely to exceed this level, except during spikes of very short duration.

With implementation of site management practices as described in EC 5 and compliance with permits as described in EC 6, turbidity would not substantially affect fisheries or aquatic habitat. Therefore, this impact would be **less than significant**.

IMPACT 3.5-2 (Alt. 1) **Stranding of Aquatic Biota from Dewatering Work Sites and Abandoning the Old Channel. (CEQA 1, 2, 3; TRPA 2, 3, 4)** *Certain construction activities—diverting streamflow from sections of the Upper Truckee River, dewatering the Sailing Lagoon, and abandoning the old channel—could result in stranding and mortality of fish and other aquatic biota, potentially including special-status species such as Lahontan cutthroat trout and Lahontan tui chub. As described in Environmental Commitment 7, the Conservancy would implement an aquatic species rescue and relocation plan that would reduce stranding and mortality of species in dewatered areas and the abandoned channel. Therefore, this impact would be* ***less than significant****.*

Alternative 1 would involve dewatering and diverting flows around in-channel work areas to construct improvements, dewatering the Sailing Lagoon to connect it with the marsh and new river channel, and dewatering and then backfilling the old channel to abandon it. All these construction activities would require temporarily dewatering the active river channel. This dewatering would cause stranding and mortality of fish and other aquatic biota. Several special-status species, including the Lahontan cutthroat trout (federally listed as threatened) and the Lahontan tui chub (a California Species of Special Concern) could be affected.

To minimize the stranding of fish and aquatic biota, however, the Conservancy would implement EC 7, "Prepare and Implement an Aquatic Species Rescue and Relocation Plan," described in Table 2-6 in Chapter 2. Under this plan, the Conservancy would retain a qualified biologist(s) to oversee rescue and relocate fish, freshwater mussels, and other important native aquatic species when flows are diverted to a new channel, and when water is pumped out of the Sailing Lagoon and diverted around in-channel construction sites. Organisms would be removed from these sites and transported and released into suitable sites that would not be or have already been restored (i.e., Lake Tahoe or sites on the Upper Truckee River). All equipment used for dewatering and fish or mussel rescue would be properly decontaminated to kill or remove all potential invasive aquatic species (i.e., Eurasian watermilfoil). All pump intakes would be screened to limit entrainment of fish and aquatic weeds (i.e., Eurasian watermilfoil). All activities would occur in compliance with TRPA's *Lake Tahoe Region Aquatic Invasive Species Management Plan*.

Implementing EC 7 would minimize stranding and mortality of aquatic biota in the project area. Therefore, this impact would be **less than significant**.

IMPACT 3.5-3 (Alt. 1) **Short-Term Disruption of Fish Passage/Migration. (CEQA 3; TRPA 2, 3, 4)** *Construction of restoration improvements may result in short-term disruption of fish passage between the Upper Truckee River and Lake Tahoe or in-river seasonal migration. The temporary fish barriers would be in place for construction for a relatively short time period that would not encompass all of the spawning season for any of the fish species. This impact would be less than significant.*

As part of Alternative 1, eight vertical grade-control structures in the existing channel and 3,890 feet of new channel would be constructed. Installation of the grade-control structures would require dewatering and routing flows around these dewatered segments in bypass channels or pipes. Dewatering and rerouting flows may obstruct fish movement within the Upper Truckee River and to Lake Tahoe. Activating the new channel section would require diverting flow around the old channel, constructing tie-ins, and filling the old channel. These actions would result in temporary barriers to fish passage.

Several species of native minnows move locally from the lake into streams for spawning in spring, and mountain suckers move locally within the stream for spawning in midsummer. The primary spawning periods for rainbow trout and Lahontan redsides—spring and early summer—coincide with snowmelt runoff. Mountain suckers are late spring and summer spawners. Mountain whitefish migrate upstream for spawning in the fall (October–December). The project could block fish passage during some of these time periods, but not all of them.

Construction would occur during low-flow conditions, and diversions would occur between August and mid-October. The temporary fish barriers would be in place for dewatering and diversions for a relatively short time period that would not encompass all of the spawning season for any of the fish species; therefore, the construction-phase impact would be **less than significant**.

IMPACT 3.5-4 (Alt. 1) **Long-Term Disruption of Fish Passage/Migration. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Alternative 1 would not result in any long-term change to fish passage or migration because the depth of flow in the restored channels would be improved and the connection between the lake and the Upper Truckee River would be sustained. This impact would be* ***less than significant****.*

Alternative 1 would not result in any long-term change to fish passage or migration. Despite the fact grade control structures would create a positive grade feature that will promote aggradation it is expected that the depth of flow in the restored channels would be sustained during this phase over the first couple years. This impact would be **less than significant**.

IMPACT 3.5-5 (Alt. 1) **Introduction and Spread of Aquatic Invasive Species by Construction Activities. (CEQA 1, 2; TRPA 1, 4)** *Aquatic invasive species (i.e., the plant Eurasian watermilfoil) are located in the Upper Truckee River and the Sailing Lagoon and could potentially be introduced and spread to the river via construction activities. Implementation of an invasive species management plan, as described in Environmental Commitment 4 and which specifically addresses invasive plant management, would substantially reduce the potential for existing aquatic invasive species to spread. Therefore, this impact would be* ***less than significant****.*

Aquatic invasive species are located in the Upper Truckee River channel and the adjacent Sailing Lagoon. The invasive aquatic plant, Eurasian watermilfoil, is a particular species of concern. Channel construction activities and connection of the Sailing Lagoon to the marsh and channel, including direct actions and aquatic species rescue and relocation, present a risk of introducing and spreading invasive species like Eurasian watermilfoil in the river. EC 4, "Prepare and Implement an Invasive Species Management Plan," described in Table 2-6 in Chapter 2 describes the development of an invasive species management plan that would substantially reduce the risk of spreading the invasive species. A qualified biologist with experience in the Tahoe Basin and aquatic invasive species would conduct a preconstruction survey to determine the type and extent of the invasive species. An eradication plan would be implemented to ensure that all aquatic species were removed before active construction. The site would be monitored for four years after construction. Any infestations documented would be treated and eradicated.

With implementation of EC 4, the risk of introduction and spread of aquatic invasive species, such as the invasive plant Eurasian milfoil, would be substantially reduced. Therefore, this impact would be **less than significant**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.5-1 (Alt. 2) **Short-Term Aquatic Habitat Degradation. (CEQA 1, 2, 3; TRPA 1)** *Short-term construction activities in channels could temporarily reduce aquatic habitat quality by increasing turbidity within the construction site and possibly Lake Tahoe during construction. However, as described in Environmental Commitments 5 and 6, the Conservancy would implement effective construction-phase site management plans and comply with required permits to minimize risks of water quality degradation. Although the strict turbidity standard would likely be exceeded, the expected turbidity levels would not substantially affect the fisheries or aquatic habitat. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.5-1 (Alt. 1). The proposed restoration activities under Alternative 2 would include constructing two vertical grade controls, six lateral grade controls, 1,300 feet of bank protection, 8,420 feet of new channel, and 51,000 square feet of river mouth, and connecting the existing Sailing Lagoon to the river and marsh. This alternative would include the same types of construction activities, techniques, and potential impacts as Alternative 1.

With implementation of ECs 5 and 6, the potential impacts would be limited in magnitude and short in duration. Although the turbidity standard would likely be exceeded, the fisheries beneficial use would not be adversely affected. Trout initiate turbidity avoidance behaviors at around 25 NTU (ENTRIX 2005). The turbidity impact is unlikely to exceed this level, except during spikes of very short duration during construction and shortly thereafter as the channel adjusts.

With implementation of site management practices as described in EC 5 and compliance with permits as described in EC 6, turbidity would not substantially affect fisheries or aquatic habitat. Therefore, this impact would be **less than significant**.

IMPACT 3.5-2 (Alt. 2) **Stranding of Aquatic Biota from Dewatering Work Sites and Abandoning the Old Channel. (CEQA 1, 2, 3; TRPA 2, 3, 4)** *Certain construction activities—diverting streamflow from sections of the Upper Truckee River, dewatering the Sailing Lagoon, and abandoning the old channel—could result in stranding and mortality of fish and other aquatic biota, potentially including special-status species such as Lahontan cutthroat trout and Lahontan tui chub. As described in Environmental Commitment 7, the Conservancy would implement an aquatic species rescue and relocation plan that would reduce stranding and mortality of species in dewatered areas and the abandoned channel. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.5-2 (Alt. 1). The proposed restoration activities under Alternative 2 would include constructing two vertical grade controls, six lateral grade controls, 1,300 feet of bank protection, 8,420 feet of new channel, and 51,000 square feet of river mouth, and connecting the existing Sailing Lagoon to the river and marsh. The scale of rescue and relocation of aquatic species would be greater under this alternative than under Alternative 1 because the amount of new channel created, and therefore the amount of old channel filled, would be greater. The greater area would require more rescue and relocation; however, implementing an aquatic rescue and relocation plan, as described in EC 7, would minimize stranding and mortality of aquatic species in the old channel. Under this plan, the Conservancy would retain a qualified biologist(s) to rescue and relocate fish, freshwater mussels, and other important native aquatic species when flows are diverted to a new channel, and when water is pumped out of the Sailing Lagoon and diverted around in-channel construction sites. Implementing EC 7 would minimize stranding and mortality of aquatic biota in the project area. Therefore, this impact would be **less than significant**.

IMPACT 3.5-3 (Alt. 2) **Short-Term Disruption of Fish Passage/Migration. (CEQA 3; TRPA 2, 3, 4)** *Construction of restoration improvements may result in short-term disruption of fish passage between the Upper Truckee River and Lake Tahoe or in-river seasonal migration. However, fish barriers would be in place for only a short time period that would not encompass all of the spawning season for any species. Therefore, this impact would be* ***less than significant****.*

Alternative 2 would involve constructing two vertical grade controls, six lateral grade controls, 1,300 feet of bank protection, 8,420 feet of new channel, and 51,000 square feet of river mouth, and connecting the existing Sailing Lagoon to the river and marsh. The fish barriers would be in place for only a short time period that would not encompass all of the spawning season of any of the fish species. This impact would be **less than significant**.

IMPACT 3.5-4 (Alt. 2) **Long-Term Disruption of Fish Passage/Migration. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Alternative 2 would not result in any long-term change to fish passage or migration because a key element of this alternative is the excavation of a new river channel and the replacement of the existing river mouth with a new river mouth similar in size to the historical river mouth prior to dredging. This alternative also includes all other restoration and enhancement elements of Alternative 1. This impact would be* ***less than significant****.*

Alternative 2 would not result in any long-term change to fish passage or migration. This alternative would restore the river channel and its connection to the floodplain while maintaining the connection between the lake and the Upper Truckee River. This impact would be **less than significant**.

IMPACT 3.5-5 (Alt. 2) **Introduction and Spread of Aquatic Invasive Species by Construction Activities. (CEQA 1, 2; TRPA 1, 4)** *Aquatic invasive species (i.e., the plant Eurasian watermilfoil) are located in the Upper Truckee River and the Sailing Lagoon and could potentially be introduced and spread to the river via construction activities. Implementation of an invasive species management plan, as described in Environmental Commitment 4, and which specifically addresses invasive plant management, would substantially reduce the potential for existing aquatic invasive species to spread. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.5-5 (Alt. 1). The project involves construction activities in areas (Upper Truckee River and the Sailing Lagoon) where known aquatic invasive species are present. The invasive aquatic plant Eurasian watermilfoil is a particular species of concern. These activities present a risk of further introduction and spreading. With implementation of EC 4, the risk of introduction and spread of aquatic invasive species, like Eurasian watermilfoil, would be substantially reduced. Therefore, this impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.5-1 (Alt. 3) **Short-Term Aquatic Habitat Degradation. (CEQA 1, 2, 3; TRPA 1)** *Short-term construction activities in channels could temporarily reduce aquatic habitat quality by increasing turbidity within the construction site and possibly Lake Tahoe during construction. However, as described in Environmental Commitments 5 and 6, the Conservancy would comply with required permits and implement effective construction-phase site management plans to minimize risks of water quality degradation. Although the strict turbidity standard would likely be exceeded, the expected turbidity levels would not substantially affect the fisheries or aquatic habitat. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.5-1 (Alt. 2). The proposed restoration activities under Alternative 3 would include constructing multiple vertical grade controls, three lateral grade controls, at least 1,300 feet of bank protection, and 1,500 feet of new pilot channel, and connecting the existing Sailing Lagoon to the river and marsh. This alternative would include the same types of construction activities, techniques, and impacts as Alternative 1.

With implementation of ECs 5 and 6, the potential impacts would be limited in magnitude and short in duration. Although the turbidity standard would likely be exceeded, the fisheries beneficial use would not be adversely affected. Trout initiate turbidity avoidance behaviors at around 25 NTU (ENTRIX 2005). The turbidity impact is unlikely to exceed this level, except during spikes of very short duration.

With implementation of site management practices as described in EC 5 and compliance with permits as described in EC 6, turbidity would not substantially affect fisheries or aquatic habitat. Therefore, this impact would be **less than significant**.

IMPACT 3.5-2 (Alt. 3) **Stranding of Aquatic Biota from Dewatering Work Sites and Abandoning the Old Channel. (CEQA 1, 2, 3; TRPA 2, 3, 4)** *Certain construction activities—diverting streamflow from sections of the Upper Truckee River, dewatering the Sailing Lagoon, and abandoning the old channel—could result in stranding and mortality of fish and other aquatic biota, potentially including special-status species such as Lahontan cutthroat trout and Lahontan tui chub. As described in Environmental Commitment 7, the Conservancy would implement an aquatic species rescue and relocation plan that would reduce stranding and mortality of species in dewatered areas and the abandoned channel. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.5-2 (Alt. 1). The proposed restoration activities under Alternative 3 would include constructing multiple vertical grade controls, three lateral grade controls, at least 1,300 feet of bank protection, and 1,500 feet of new pilot channel, and connecting the existing Sailing Lagoon to the river and marsh. This alternative would include the same types of construction activities, techniques, and impacts as Alternative 1.

The scale of rescue and relocation of aquatic species would be greater under this alternative than under Alternative 1 and less than under Alternative 2. Implementing an aquatic rescue and relocation plan, as described in EC 7, would minimize stranding and mortality of aquatic species in the old channel. Under this plan, the Conservancy would retain a qualified biologist(s) to rescue and relocate fish, freshwater mussels, and other important native aquatic species when flows are diverted to a new channel, and when water is pumped out of the Sailing Lagoon and diverted around in-channel construction sites. Implementing EC 7 would minimize stranding and mortality of aquatic biota in the project area. Therefore, this impact would be **less than significant**.

IMPACT 3.5-3 (Alt. 3) **Short-Term Disruption of Fish Passage/Migration. (CEQA 3; TRPA 2, 3, 4)** *Construction of restoration improvements may result in short-term disruption of fish passage between the Upper Truckee River and Lake Tahoe or in-river seasonal migration. However, fish barriers would be in place for only a short time period that would not encompass all of the spawning season for any species. Therefore, this impact would be* ***less than significant****.*

Alternative 3 would involve constructing multiple vertical grade controls, three lateral grade controls, at least 1,300 feet of bank protection, and 1,500 feet of new pilot channel, and connecting the existing Sailing Lagoon to the river and marsh. This alternative would include the same types of construction activities, techniques, and impacts as Alternative 1. The temporary fish barriers would be in place for dewatering and diversions for a relatively short time period that would not encompass all of the spawning season for any of the fish species; therefore, the construction-phase impact would be **less than significant**.

IMPACT 3.5-4 (Alt. 3) **Long-Term Disruption of Fish Passage/Migration. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Use of the pilot channel to convey flow into small channels that cross the marsh to reenter the Upper Truckee River upstream of the mouth at Lake Tahoe may result in long-term disruption of fish passage between the Upper Truckee River and Lake Tahoe. Additionally, the alternative could generate natural barrier beach processes at the mouth of the river that could seasonally close off the river from the lake. This impact would be* ***potentially significant****.*

Fish passage between Lake Tahoe and the Upper Truckee River could be impeded in the absence of a defined main channel or channels across the marsh connecting the river mouth to the upstream river. Many species of fish, including rainbow trout, mountain whitefish, and Lahontan redsides, use the existing river channel as a migration corridor from the lake to spawning habitat in the river. Rainbow trout and Lahontan redsides are spring spawning fish, so it is likely that they would continue to successfully move into the Upper Truckee River for spawning purposes. Additionally, Lahontan redsides are not obligate river spawning fish and can spawn along lakeshore areas with gravel and larger substrates. Mountain whitefish, on the other hand, are large fish and fall spawners and would not successfully be able to move upstream into the Upper Truckee River during low fall flows. Mountain whitefish live for five to ten years. Passage impairments under Alternative 3 would be significant if the duration of impairment would equal or exceed the minimum life span of a species, thereby affecting reproductive success of an entire cohort (age group) of whitefish. If flow were not contained within a sufficiently deep and defined channel, mountain whitefish would not be successful in gaining access to the river for a several years into the future. A defined low-flow channel or channels would likely form after a few years, allowing sufficient passage through the river.

During spring or winter flow events, when flow is routed through the pilot channel onto the meadow, juvenile and adult fish moving downstream during these periods would be at risk of being stranded on the marsh surface. These conditions would persist until a channel or channels have formed to reconnect the river to the lake. Because of uncertainties about the period of time required for formation of a channel suitable for upstream fish passage and downstream dispersal, this alternative has the potential to disrupt whitefish migrations for a substantial number of migration seasons, and it would increase the risk from stranding for downstream moving fish in the river. Therefore, the long-term impact on these fish populations in the Upper Truckee River and from Lake Tahoe would be **potentially significant**.

Given the design of Alternative 3 (i.e., natural formation of channels downstream of the proposed “pilot channel”), guaranteed fish passage would not be possible in the long term. Construction of a low-flow channel suitable for fish passage through the upper marsh would not be consistent with the objective of Alternative 3 to reestablish naturally dynamic channel/floodplain processes in the upper marsh.

In addition to the barriers likely created by the undefined channels, there is a chance that the mouth of the Upper Truckee River and/or Trout Creek may close off to the lake at times as a result of natural barrier beach processes. Such a barrier has been built up in the past during periods of time (months, seasons, or even years) when the

balance of flows and energy from the land/marsh side was low relative to the width of the beach ridge and the height and energy of the lake's wave action. Complex interactions may occur in the future, especially given the underlying trends of beach erosion and the potential counteracting effects from climate change. It is not possible to predict the locations, duration, or extent of potential river or creek mouth closures throughout the future life of the project. This impact would be **potentially significant**.

Because the intent and purpose of this alternative is to restore natural river/marsh processes, alterations to the design (construction of a dominant single thread channel) or future management actions (artificially maintaining passage to the lake) would negate and contradict the intention of this alternative mitigation would not be possible. Therefore, this impact would be **significant and unavoidable**.

IMPACT 3.5-5 (Alt. 3) **Introduction and Spread of Aquatic Invasive Species by Construction Activities. (CEQA 1, 2; TRPA 1, 4)** *Aquatic invasive species (i.e., Eurasian watermilfoil) are located in the Upper Truckee River and the Sailing Lagoon and could potentially be introduced and spread to the river via construction activities. Implementation of an invasive species management plan, as described in Environmental Commitment 4 and which specifically addresses invasive plant management, would substantially reduce the potential for existing aquatic invasive species to spread. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.5-3 (Alt. 1). The project involves construction activities in areas (Upper Truckee River and the Sailing Lagoon) where known aquatic invasive species are present. The invasive aquatic plant, Eurasian watermilfoil, is a particular species of concern. These activities present a risk of further introduction and spreading. With implementation of EC 4, the risk of introduction and spread of aquatic invasive species, such as the invasive aquatic plant Eurasian watermilfoil, would be substantially reduced. Therefore, this impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.5-1 (Alt. 4) **Short-Term Aquatic Habitat Degradation. (CEQA 1, 2, 3; TRPA 1)** *Short-term construction activities in channels could temporarily reduce aquatic habitat quality by increasing turbidity within the construction site and possibly Lake Tahoe during construction. However, as described in Environmental Commitments 5 and 6, the Conservancy would implement effective construction-phase site management plans and comply with required permits to minimize risks of water quality degradation. Although the strict turbidity standard would likely be exceeded, the expected turbidity levels would not substantially affect the fisheries or aquatic habitat. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.5-1 (Alt. 1). Under Alternative 4, no grade or lateral control structures would be constructed and the existing Sailing Lagoon would not be connected to the river and marsh; however, improvements would include constructing 1,300 feet of bank protection and 2,400 feet of new channel and excavating inset floodplain along the upstream portion of the river. Construction activities, techniques, and impacts of this alternative would be similar to those of Alternative 1.

With implementation of ECs 5 and 6, the potential impacts would be limited in magnitude and short in duration. Although the turbidity standard would likely be exceeded, the fisheries beneficial use would not be adversely affected. Trout initiate turbidity avoidance behaviors at around 25 NTU (ENTRIX 2005). The turbidity impact is unlikely to exceed this level, except during spikes of very short duration.

With implementation of site management practices as described in EC 5 and compliance with permits as described in EC 6, turbidity would not substantially affect fisheries or aquatic habitat. Therefore, this impact would be **less than significant**.

IMPACT 3.5-2 (Alt. 4) **Stranding of Aquatic Biota from Dewatering Work Sites and Abandoning the Old Channel. (CEQA 1, 2, 3; TRPA 2, 3, 4)** *Certain construction activities—diverting streamflow from sections of the Upper Truckee River, dewatering the Sailing Lagoon, and abandoning the old channel—could result in stranding and mortality of fish and other aquatic biota, potentially including special-status species such as Lahontan cutthroat trout and Lahontan tui chub. As described in Environmental Commitment 7, the Conservancy would implement an aquatic species rescue and relocation plan that would reduce stranding and mortality of species in dewatered areas and the abandoned channel. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.5-2 (Alt. 1). Under Alternative 4, no grade or lateral control structures would be constructed and the existing Sailing Lagoon would not be connected to the river and marsh; however, improvements would include constructing 1,300 feet of bank protection and 2,400 feet of new channel and excavating inset floodplain along the upstream portion of the river. Construction activities, techniques, and impacts of this alternative would be similar to those of Alternative 1.

Implementing an aquatic rescue and relocation plan, as described in EC 7, would minimize stranding and mortality of aquatic species in the old channel. Under this plan the Conservancy would retain a qualified biologist(s) to rescue and relocate fish, freshwater mussels, and other important native aquatic species when flows are diverted to a new channel, and when water is pumped out of the Sailing Lagoon and diverted around in-channel construction sites. Implementing EC 7 would minimize stranding and mortality of aquatic biota in the project area. Therefore, this impact would be **less than significant**.

IMPACT 3.5-3 (Alt. 4) **Short-Term Disruption of Fish Passage/Migration. (CEQA 3; TRPA 2, 3, 4)** *Construction of restoration improvements may result in short-term disruption of fish passage between the Upper Truckee River and Lake Tahoe or in-river seasonal migration. However, fish barriers would be in place for only a short time period that would not encompass all of the spawning season for any species. Therefore, this impact would be* ***less than significant****.*

Under Alternative 4, no grade or lateral control structures would be constructed and the existing Sailing Lagoon would not be connected to the river and marsh; however, improvements would include constructing 1,300 feet of bank protection and 2,400 feet of new channel and excavating inset floodplain along the upstream portion of the river. Construction activities, techniques, and impacts of this alternative would be similar to those of Alternative 1. Because the temporary fish barriers would be in place for only a relatively short time period that would not encompass all of the spawning season for any of the fish species, this impact would be **less than significant**.

IMPACT 3.5-4 (Alt. 4) **Long-Term Disruption of Fish Passage/Migration. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Alternative 4 would not result in any long-term change to fish passage or migration because the depth of flow in the restored channels would be improved and the connection between the lake and the Upper Truckee River would be sustained. This impact would be* ***less than significant****.*

Alternative 4 would not result in any long-term change to fish passage or migration. The depth of flow in the restored channels would be improved and the connection between the lake and the Upper Truckee River would be sustained. This impact would be **less than significant**.

IMPACT 3.5-5 (Alt. 4) **Introduction and Spread of Aquatic Invasive Species by Construction Activities. (CEQA 1, 2; TRPA 1, 4)** *Aquatic invasive species (i.e., Eurasian watermilfoil) are located in the Upper Truckee River and could potentially be introduced and spread to the river via construction activities. Implementation of an invasive species management plan, as described in Environmental Commitment 4 and which specifically addresses invasive plant management, would substantially reduce the potential for existing aquatic invasive species to spread. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.5-5 (Alt. 1). The invasive aquatic plant, Eurasian watermilfoil, is a particular species of concern. Under Alternative 4, no grade or lateral control structures would be constructed, and the existing Sailing Lagoon would not be connected to the river and marsh; however, improvements would include constructing 1,300 feet of bank protection and 2,400 feet of new channel and excavating inset floodplain along the upstream portion of the river. Construction activities, techniques, and impacts of this alternative would be similar to those of Alternative 1. However, the impact of this alternative would much less than that of the other alternatives because the Sailing Lagoon would not be connected to the river and marsh. With implementation of EC 4 which addresses invasive plant management, the risk of introduction and spread of aquatic invasive species such as Eurasian watermilfoil would be substantially reduced. Therefore, this impact would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.5-1 (Alt. 5) **Short-Term Aquatic Habitat Degradation. (CEQA 1, 2, 3; TRPA 1)** *No construction activities would occur under Alternative 5 that could temporarily cause habitat degradation. Thus, **no impact** would occur.*

In the absence of restoration efforts, the existing degraded habitat conditions in the Upper Truckee River channel and marsh would persist. Bank erosion would result in the transport of fine sediments, which act as a stressor to aquatic biota through effects on physiology (e.g., gill abrasion), food consumption, and quality of spawning habitat. However, Alternative 5 would not include construction activities that could temporarily cause additional habitat degradation, as described for Alternatives 1–4. Consequently, **no impact** would occur.

IMPACT 3.5-2 (Alt. 5) **Stranding of Aquatic Biota from Dewatering Work Sites or Abandoning the Old Channel. (CEQA 1, 2, 3; TRPA 2, 3, 4)** *There would be no construction-related stranding of aquatic biota from Upper Truckee River habitats. **No impact** would occur.*

No restoration, recreation infrastructure, or public access features would be constructed under Alternative 5; therefore, this alternative would not cause stranding of aquatic biota. **No impact** would occur.

IMPACT 3.5-3 (Alt. 5) **Short-Term Disruption of Fish Passage/Migration. (CEQA 3; TRPA 2, 4)** *Channel restoration would not occur and there would be no disruption of fish passage or migration activity in the Upper Truckee River. **No impact** would occur.*

No restoration, recreation infrastructure, or public access features would be constructed under Alternative 5; therefore, this alternative would not disrupt fish passage. **No impact** would occur.

IMPACT 3.5-4 (Alt. 5) **Long-Term Disruption of Fish Passage/Migration. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Alternative 5 would not result in any change to fish passage or migration conditions because no construction would take place. **No impact** would occur.*

No restoration, recreation infrastructure, or public access features would be constructed under Alternative 5; therefore, this alternative would not disrupt fish passage. **No impact** would occur.

IMPACT 3.5-5 (Alt. 5) **Introduction and Spread of Aquatic Invasive Species by Construction Activities. (CEQA 1, 2; TRPA 1, 4)** *No construction activities would occur under Alternative 5 that could potentially result in introduction and spread of aquatic invasive species, such as the invasive aquatic plant Eurasian watermilfoil, to the river. **No impact** would occur.*

No restoration, recreation infrastructure, or public access features would be constructed under Alternative 5; therefore, this alternative would not result in the introduction or spread of aquatic invasive species to the Upper Truckee River as a result of project-related activities, however other vectors will continue to contribute to the spread of invasive species. **No impact** would occur.

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3.6 GEOLOGY AND SOILS, MINERAL RESOURCES, AND LAND CAPABILITY AND COVERAGE

This section discusses the regulatory guidance and existing conditions in the study area for earth resources, and evaluates potential environmental effects related to geology, soils, mineral resources, and land capability and coverage associated with project implementation. Potential environmental effects related to water quality resulting from soil erosion and other stormwater issues are addressed in Section 3.9, "Geomorphology and Water Quality." Cumulative geologic impacts are addressed in Section 3.18, "Cumulative Impacts." Consistency with TRPA goals and policies is presented in Section 3.10, "Land Use," Table 3.10-1. The project's effects on thresholds are described in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities."

3.6.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

The Earthquake Hazards Reduction Act is relevant to the proposed alternatives and is described in detail in Chapter 5, "Compliance, Consultation, and Coordination."

State

The following state laws and regulations related to geologic resources are relevant to the proposed alternatives and are described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- California Surface Mining and Reclamation Act of 1975
- Alquist-Priolo Earthquake Fault Zoning Act
- Seismic Hazards Mapping Act

Tahoe Regional Planning Agency

Goals and Policies

The following goals and policies in Chapter II (Land Use Element) of TRPA's Goals and Policies (TRPA 2006) related to land use are applicable to this analysis. (Text that is not relevant to the project has been omitted from some of the following goals and policies.)

- **Land Use Goal 3:** All new development shall conform to the coefficients of allowable land coverage as set forth in "The Land Capability Classification of the Lake Tahoe Basin, California-Nevada, A Guide for Planning, Bailey, 1974." This goal calls for policies which limit allowable impervious land coverage associated with new development. These policies set allowable land coverage by applying the recommended Bailey land coverage coefficients to specifically defined and related areas. In some instances, provisions are made to allow additional coverage by transfer. The transfer programs shall operate by a direct offset method. In addition, land capability is one of the basic factors in determining the suitability of lands for development and appropriateness of land uses.

    - **Policy 1:** Allowed base land coverage for all new projects and activities shall be calculated by applying the Bailey coefficients, as shown below, to the applicable area within the parcel boundary, or as otherwise set forth in A, B, and C of this policy. [The policy provides a table of maximum allowed land coverage for each land capability district, ranging from one percent for Land Capability Districts (LCDs) 1a, 1b, 1c, and 2 to 30 percent for Land Capability District 7.]

- **Policy 2:** The allowed coverage in Policy 1 may be increased by transfer of land coverage within hydrologically related areas up to the limits as set forth in A, B, C, D, and F of this policy [described in the Goals and Ordinances, but not provided in this EIR/EIS/EIS]:

  - Land coverage may be transferred through programs that are further described in Goal #3 of the development and implementation priorities subelement.

  - The intent of the land coverage transfer programs is to allow greater flexibility in the placement of land coverage within hydrologically related areas. Such programs include the use of land banks, lot consolidation, land coverage restoration programs, and transfer programs based on the calculation of land coverage on non-contiguous parcels located in hydrologically related areas. The coverage transfer programs allow for coverage over base coverage to be permitted and still be consistent with the soils threshold and Goal #3 of this Subelement.

- **Policy 3:** Rehabilitation, reconstruction, and upgrading of the existing inventory of structures, or other forms of coverage in the Tahoe Region, are high priorities of the regional plan. To encourage rehabilitation and upgrading of structures, the following policies shall apply:

  B. Reconstruction, rehabilitation, modification, relocation, or major repair of structures or coverage other than as specified in A may be allowed, provided such use is allowed under the land use subelement, Goal #2, Policies 8, 9, and 10. For parcels with existing coverage in excess of the Bailey Coefficients, a land coverage mitigation program shall be set by ordinance, which shall provide for the reduction of coverage in an amount proportional to the cost of the repair, reconstruction, relocation, rehabilitation, or modification, and to the extent of excess coverage. [Policy 3.B then lists the minimum options available to property owners to accomplish these reductions.]

  C. Existing coverage may be relocated within a parcel provided it is relocated to areas of equal or superior environmental capability consistent with B above.

  E. In approving repair, reconstruction, rehabilitation, modification, or relocation of structures or other coverage, the Agency shall also apply other relevant standards, including installation of Best Management practices or compliance with the design review guidelines.

- **Natural Hazards Policies, Goal 1:** Risks from natural hazards (e.g., flood, fire, avalanche, earthquake) will be minimized.

  - **Policy 2:** Prohibit construction, grading, and filling of lands within the 100-year floodplain and in the area of wave run-up except as necessary to implement the goals and policies of the plan. Require all public utilities, transportation facilities, and other necessary public uses located in the 100-year flood plain and area of wave run-up to be constructed or maintained to prevent damage from flooding and to not cause flooding.

The following goals and policies in Chapter IV (Conservation Element) of TRPA's Goals and Policies (TRPA 2004) related to soil productivity and stream environment zones (SEZs) are applicable to this analysis:

- **Soils, Goal 1: Minimize Soil Erosion and the Loss of Soil Productivity:** Protection of the Region's soil is important for maintaining soil productivity and vegetative cover and preventing excessive sediment and nutrient transport to the streams and lakes. Soil protection is especially critical in the Basin where the soils are characteristically shallow and highly susceptible to erosion. Strategies for soil conservation are consistent with thresholds established for soil, water, and vegetation.

- **Policy 1:** Allowable impervious land coverage shall be consistent with the threshold for impervious land coverage. The Land Use Subelement (see Goal 4) establishes policies which limit impervious land coverage consistent with the impervious land coverage limits set forth in the "Land-Capability Classification of the Lake Tahoe Basin, California-Nevada, a Guide for Planning", Bailey, 1974.

- **Policy 2:** No new land coverage or other permanent disturbance shall be permitted in Land Capability Districts 1-3 except for those uses as noted in … B … below:

  B. Public outdoor recreation facilities may be permitted in Land Capability Districts 1–3 if: (1) The project is a necessary part of a public agency's long range plans for public outdoor recreation; (2) The project is consistent with the recreation element of the Regional Plan; (3) The project, by its very nature must be sited in Land Capability Districts 1–3; (4) There is no feasible alternative which avoids or reduces the extent of encroachment in Land Capability Districts 1–3; (5) The impacts are fully mitigated; and (6) Land Capability Districts 1-3 lands are restored in the amount of 1.5 times the area of Land Capability Districts 1–3 which is disturbed or developed beyond that permitted by the Bailey coefficients. To the fullest extent possible, recreation facilities must be sited outside of Land Capability Districts 1–3. However, the six-part test established by the policy allows encroachment of these lands where such encroachment is essential for public outdoor recreation, and precautions are taken to ensure that such lands are protected to the fullest extent possible. The restoration requirements of this policy can be accomplished on-site or off-site, and shall be in lieu of any coverage transfer or coverage mitigation provisions elsewhere in this Plan.

- **Policy 4:** TRPA shall develop specific policies to limit land disturbance and reduce soil and water quality impacts of disturbed areas. Like impervious surfaces, disturbed and compacted areas result in increased soil loss and surface runoff. The Regional Plan sets policies designed to reduce existing surface disturbance and avoid new disturbance (see Water Quality Subelement, Goal 1, Policies 2 and 3; Vegetation Subelement, Goal 1, Policy 5). TRPA shall set guidelines defining "disturbance" and determine what types of disturbed and compacted areas should be counted as impervious surfaces for purposes of applying land coverage limits. Coverage limits shall not be applied so as to prevent application of best management practices to existing disturbed areas.

- **Policy 6:** Grading, filling, clearing of vegetation (which disturbs soil), or other disturbances of the soil are prohibited during inclement weather and for the resulting period of time when the site is covered with snow or is in a saturated, muddy, or unstable condition. Special regulations and construction techniques will apply to all construction activities occurring between October 15 and May 1. Impacts related to soil disturbance are highly exaggerated when the soil is wet. For precautionary reasons, all project sites must be adequately winterized by October 15 as a condition for continued work on the site. Exceptions to the grading prohibitions will be permitted in emergency situations where the grading is necessary for reasons of public safety or for erosion control.

- **Policy 7:** All existing natural functioning SEZs shall be retained as such and disturbed SEZs shall be restored whenever possible. Stream environment zones shall be managed to perpetuate their various functional roles, especially pertaining to water cleansing and nutrient trapment. This requires enforcement of a non-degradation philosophy. This policy is common to the Water Quality, Vegetation, Stream Environment Zone, and Wildlife Subelements and will be implemented through the Land Use Element and capital improvements program.

► **Stream Environment Zone, Goal 1: Provide for the Long-Term Preservation and Restoration of Stream Environment Zones.** The preservation of SEZs is a means for achieving numerous environmental thresholds. Policies that promote their maintenance, protection, and restoration are listed below.

- **Policy 1:** Restore all disturbed stream environment zone lands in undeveloped, unsubdivided lands, and restore 25 percent of the SEZ lands that have been disturbed, developed, or subdivided.

- **Policy 2:** SEZ lands shall be protected and managed for their natural values. SEZ lands and associated riparian vegetation are scarce in the Basin relative to other plant communities. Because SEZs provide many beneficial functions (especially pertaining to water quality) only forest management practices, stream improvement programs, and habitat restoration projects are permissible uses.

- **Policy 5:** No new land coverage or other permanent land disturbance shall be permitted in stream environment zones except for those uses as noted in A, C, and E below:

  A. Public outdoor recreation facilities are permissible uses in stream environment zones if: (1) The project is a necessary part of a public agency's long range plans for public outdoor recreation; (2) The project is consistent with the recreation element of the regional plan; (3) The project, by its very nature, must be sited in a stream environment zone; (4) There is no feasible alternative which would reduce the extent of encroachment in stream environment zones; (5) The impacts are fully mitigated; (6) Stream environment zone lands are restored in the amount of 1.5 times the area of stream environment zone which is disturbed or developed by the project. To the fullest extent possible, recreation facilities must be sited outside of stream environment zones. Some recreation facilities, such as river access points or stream crossings for hiking trails, by their very nature require some encroachment of stream environment zones. However, the six-part test established by this policy allows encroachment of SEZs where such encroachment is essential for public outdoor recreation and precautions are taken to ensure that stream environment zones are protected to the fullest extent possible. The restoration requirements of this policy can be accomplished on-site or off-site, and shall be in lieu of any coverage transfer or coverage mitigation provisions elsewhere in this Plan.

  B. Public service facilities are permissible uses in stream environment zones if: (1) The project is necessary for public health, safety, or environmental protection; (2) There is no reasonable alternative, including spans, which avoids or reduces the extent of encroachment in stream environment zones; (3) The impacts are fully mitigated; and (4) Stream environment zone lands are restored in the amount of 1.5 times the area of stream environment zone which is disturbed or developed by the project. Development within stream environment zones is not consistent with the goal of managing stream environment zones for their natural qualities and shall generally be prohibited except under extraordinary circumstances involving public works. Each circumstance shall be evaluated based on the conditions of this policy. The restoration requirements of this policy can be accomplished on-site or off-site, and shall be in lieu of any coverage transfer or coverage mitigation provisions elsewhere in this Plan.

  C Projects which require access across stream environment zones to otherwise buildable sites are permissible in SEZs if: (1) There is no reasonable alternative, which avoids or reduces the extent of encroachment in the SEZ; (2) The impacts are fully mitigated; and (3) SEZ lands are restored in the amount of 1.5 times the area of stream environment zone which is disturbed or developed by the project. The restoration requirements can be accomplished on-site or off-site, and shall be in lieu of any coverage transfer or coverage mitigation provisions elsewhere in this Plan.

  E. Stream environment zone restoration projects and erosion control projects.

- **Policy 6:** Replacement of existing coverage in stream environment zones may be permitted where the project will reduce impacts on stream environment zones and will not impede restoration efforts. Existing structures in stream environment zones may be repaired or rebuilt. Minor reconstruction may be permitted so long as drainage improvements, protection of the stream environment zone from disturbances, or other measures are carried out which provide a net benefit to the area's capacity to serve as a naturally-

functioning stream environment zone. Major reconstruction or replacement may also be permitted if there is a net benefit to the stream environment zone and if the replacement or reconstruction is consistent with stream environment zone restoration programs (see Policy 1).

Code of Ordinances

The "Site Development" and "Resource Management and Protection" sections of the TRPA Code of Ordinances (TRPA 2011, adopted 2012) contain the following chapters and sections with requirements applicable to the proposed alternatives related to geology, soils, and land coverage:

- Chapter 30, "Land Coverage," regulates implementation of the land capability system, land capability districts, land coverage, and transfer and mitigation of land coverage. Section 30.5 discusses prohibitions on installation of new land coverage or other permanent disturbances within areas assigned to LCDs 1, 2, or 3 (see "Tahoe Regional Planning Agency Land Coverage Regulations" below for a discussion of LCDs). Exceptions to these prohibitions exist for single-family dwellings that are subject to review under the individual parcel evaluation system, qualifying public outdoor recreation facilities, and qualifying public facilities (e.g., water quality control facilities, including erosion control projects; habitat restoration projects; wetland rehabilitation projects; and SEZ restoration projects). Section 30.6 discusses exceptions for coverage relocation requirements that allow for a 1:1 coverage relocation ratio for the Upper Truckee River and Marsh Restoration Project. Further exceptions are related to bridges and boardwalks that may be accounted for at a lesser coverage ratio requirement.

- Section 33.3, "Grading Standards," regulates excavation, filling, and clearing to avoid adverse effects related to exposed soils, unstable earthworks, or groundwater interference. Section 33.3 specifically addresses seasonal limitations, winterization techniques, discharge prohibitions, dust control, disposal of materials, standards for cuts and fills, and excavation limitations.

- Section 33.4, "Special Information Reports and Plans," regulates the need for special investigations, reports, and plans determined to be necessary by TRPA to protect against adverse effects from grading, including potential effects on slope stability, groundwater or antiquities.

- Section 33.5, "Grading and Construction Schedules," regulates schedules for grading and construction when those activities are anticipated to occur pursuant to a TRPA permit. Section 33.5.1 specifies, "For projects presenting special problems with regard to project completion, site development, or water quality management, such as crossings of stream environment zones, major earthworks, or major clearing projects, TRPA may require, as a condition of approval, submittal and approval of project schedules prior to site disturbance."

- Section 33.6, "Vegetation Protection during Construction," regulates the requirements for protection of vegetation and soil during construction activities. Section 33.6 specifically addresses protection of vegetation not designated and approved for removal, limits on size, type, and location of equipment use, and revegetation of disturbed areas.

- Chapter 35, "Natural Hazard Standards," regulates activities to prevent damage to property and protect public health relating to natural hazards.

- Section 60.4, "Best Management Practice Requirements," sets forth the requirements for installation of best management practices (BMPs) for the protection or restoration of water quality and attainment of minimum discharge standards. BMPs, as described in the *Handbook of Best Management Practices* (Volume II of the *Lake Tahoe Basin Water Quality Management Plan*), or equivalent practices approved by TRPA, will be applied to all public and privately owned lands. In addition to the standard requirements of Section 60.4.6, the project conditions of approval will list any other appropriate required BMPs to meet minimum discharge

standards. Construction in SEZs or Land Capability Districts 1–3, inclusive, normally will require special conditions of approval because of the sensitivity of those areas to disturbance.

Cove East Litigation Settlement Agreement

Several parcels within the study area are included as part of a litigation settlement agreement. Coverage allocations for these parcels, shown in Exhibit 3.6-1, replace the Bailey System in this defined portion of the study area.

Article 5, Section 5.2 of the litigation settlement for the west side of the study area allocates 550,148 square feet of "DilDev Net Coverage," by total land area rather than by land capability district (People of the State of California, ex rel. John K. Van de Kamp, Attorney General of the State of California v. Dillingham Development Company and Tahoe Regional Planning Agency [Superior Court, County of El Dorado CIV-S-85-0873-EJG]). 441,963 square feet of the 550,148 is available on Conservancy property. Table 3.6-1 summarizes the assignment of this coverage to parcels.

Table 3.6-1
Settlement Assigned Coverage

Parcel	Assessor's Parcel Number (APN)	Approximate Acreage	Assigned Coverage (Square Feet)
Parcel 3 – State Portion (Conservancy):	APN 022-210-41	.7	0
Parcel 3 – Remainder (Tahoe Keys Marina-owned):[1]	APN 022-210-40	5.7	108,185
Parcel 4 (Conservancy):	APN 022-210-46, 48, 50	58.9[2]	380,108
Parcel 5 (Conservancy):	APN 022-210-37	142.8	61,855

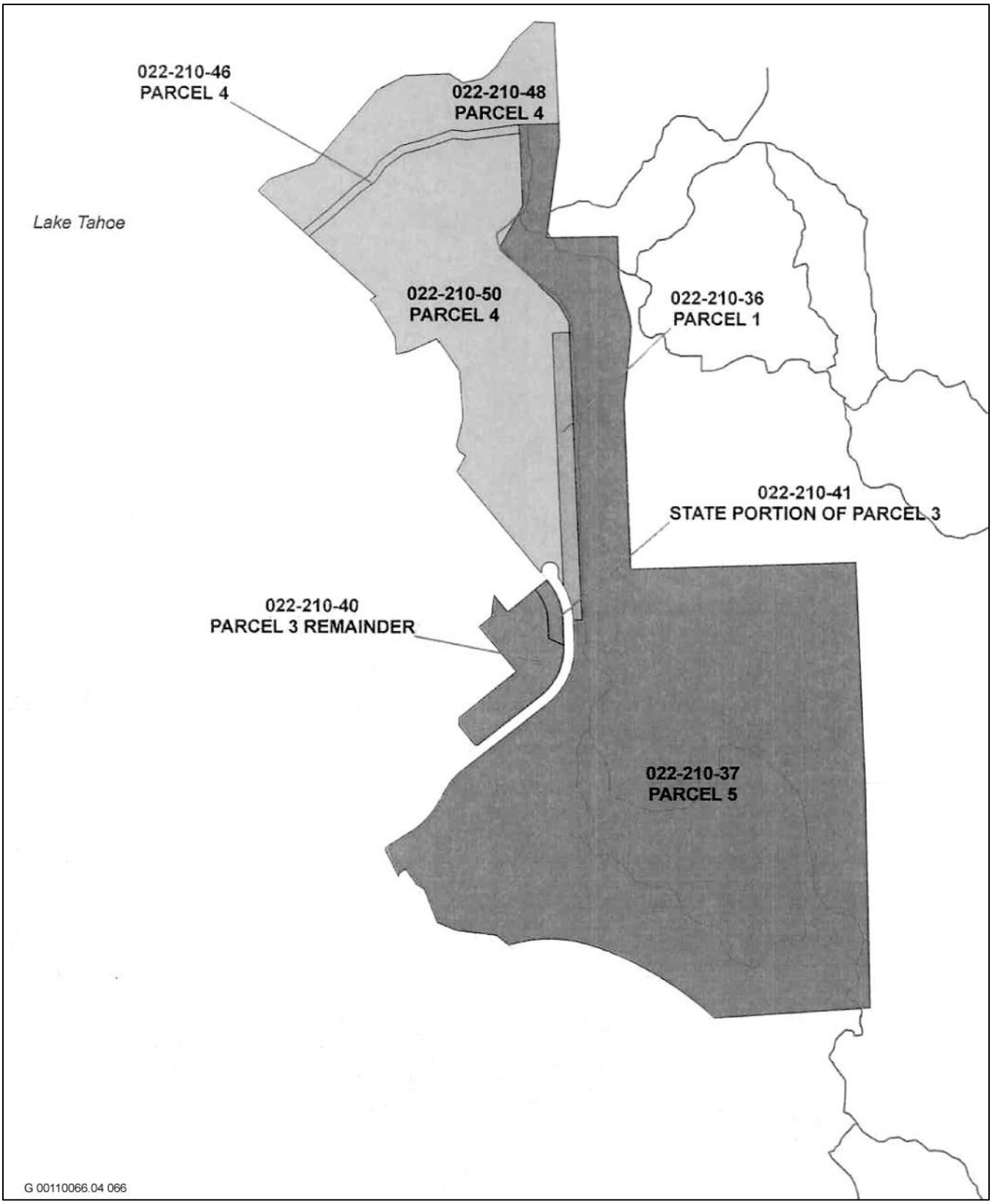
Notes:
[1] - Parcel 3 – Remainder is not within the study area.
[2] - Acreage includes areas mapped as waterbodies within parcel 4.
Source: People of the State of California, ex rel. John K. Van de Kamp, Attorney General of the State of California v. Dillingham Development Company and Tahoe Regional Planning Agency (Superior Court, County of El Dorado CIV-S-85-0873-EJG)

The settlement also sets the rules governing transfers of this coverage with respect to the settlement area (Section 5.3 of the settlement). The "settlement area," defined in Exhibit 7 of the settlement, includes the above properties, as well as properties owned by Tahoe Keys Property Owners Association (TKPOA) and the Conservancy's Parcel 1. The settlement provides for the transfer of coverage between parcels located in the settlement area, through recordation of appropriate coverage transfer instruments, without further discretionary approvals (while transfers of this "allowable" coverage to projects outside the settlement area must be carried out in conformance with the Regional Plan).

Coverage changes proposed in these parcel use the values and transfer mechanisms defined in this litigation settlement as described in the environmental consequences section below.

Land Capability Districts

Since 1972, TRPA has used the Bailey System (a land capability classification system) to evaluate applications that request either additional impervious land coverage to existing developed lots or building permits for new development (Bailey 1974). The Bailey System was developed to mitigate the deleterious effects on stream systems and water quality that result from excessive coverage of land by impervious surfaces. The Bailey System restricts the amount of impervious land coverage on all parcels and generally prohibits new land coverage in areas classified as SEZ.



Source: Conservancy 2012

Exhibit 3.6-1 **Dillingham Parcel Map**

Land capability is defined as "the level of use an area can tolerate without sustaining permanent (environmental) damage through erosion and other causes" (Bailey 1974). The Bailey system uses LCDs ranging from 1 to 7, which assign a percentage of land coverage allowable in the designated LCD area (see Table 3.6-2).

Table 3.6-2
Capability Districts for Tahoe Basin Lands

Capability Levels	Maximum Allowable Coverage (%)	Tolerance for Use	Slope Percent[1]	Relative Erosion Control	Runoff Potential[2]	Disturbance Hazards
7	30	Most	0–5		Low to moderately low	Low-hazard lands
6	30		0–16	Slight	Low to moderately low	
5	25		0–16		Moderately high to high	Moderate-hazard lands
4	20		9–30	Moderate	Low to moderately low	
3	5		9–30	Moderate	Moderately high to high	
2	1		30–50	High	Low to moderately low	
1a	1	Least	30+	High	Moderately high to high	High-hazard lands
1b	1		(Poor Natural Drainage)			
1c	1		(Fragile Flora and Fauna)[3]			

[1] Most slopes occur within this range. There may be, however, small areas that fall outside the range given.
[2] Low to moderately low - hydrologic-soil groups A and B; moderately high to high - hydrologic-soil groups C and D.
[3] Areas dominated by rocky and stony land.
Source: Data compiled by EDAW (now AECOM) from Bailey 1974

LCDs were derived by analyzing the land capability according to frequency and magnitude of hazards that might be encountered and by considering the type and intensity of uses suitable for each unit (Bailey 1974). Capability classes are expressed as levels of tolerance that a unit can withstand without sustaining permanent damage through erosion or other causes (i.e., water quality or land productivity). The integration of the LCDs and land use suitability resulted in limits on land-surface modifications for each unit. The limits are expressed as a percentage of each area that can be used for impervious coverage.

Chapter 90 of the TRPA Code of Ordinances defines land coverage as a human-made structure, improvement, or covering that prevents normal precipitation from directly reaching the surface of the land underlying the structure, improvement, or covering (TRPA 2008). Examples include roofs, decks, patios, and surfaces paved with asphalt, concrete, or stone. Such structures are defined as "hard coverage." Areas of compacted soils without structures are defined as "soft coverage" (e.g., areas where parking of cars or heavy pedestrian traffic have compacted soils to an extent that prevents substantial infiltration of water).

City of South Lake Tahoe

Chapter 36 of the City of South Lake Tahoe (CSLT) Code, Grading, Erosion, and Sediment Control Ordinance was codified for the following purposes:

- Regulating grading on both public and private property within the CSLT to safeguard life, limb, health, property and public welfare;

- To avoid pollution of watercourses with hazardous materials, nutrients, sediments, or other earthen materials generated on or caused by surface runoff or by aerial deposition of pollutants generated from the permit area on or across the permit area; and

- To ensure that the intended use of a graded site is consistent with the CSLT general plan, any specific plans adopted thereto and applicable CSLT ordinances including the zoning ordinance, flood damage prevention ordinance, environmental review ordinance, and applicable chapters of the California Building Code.

In the event of conflict between these ordinances and state or federal law, these ordinances shall prevail unless preempted by the state or federal law.

Unless in conflict with provisions of adopted general and/or specific plans, the following grading may be done without obtaining a grading permit from the CSLT (only relevant grading activities are listed):

- Grading activities governed and operating under permits issued by TRPA or Lahontan regional or state water boards or Caltrans;

- Stream restoration or alteration projects conducted under valid regional, state or federal permits, e.g., stream alteration permits, water quality certifications, etc.

ENVIRONMENTAL SETTING

Regional Geology

The Tahoe Basin is located in the northern Sierra Nevada, between the Sierra crest to the west and the Carson Range to the east. The Sierra Nevada is the most prominent mountain range in California, and in conjunction with the Central Basin, forms part of the Sierra Nevada microplate, an element of the broad Pacific–North American plate boundary (Argus and Gordon 1991). Before becoming part of the transform plate margin, the Sierra Nevada was the site of a Cenozoic volcanic arc, with related deposits draping over pre-Cenozoic metamorphic and plutonic rocks (Wakabayashi and Sawyer 2000:173). The general asymmetry of the Sierra Nevada reflects uplift and gentle westward tilting, evidenced by the mountain range sloping gently westward and abruptly eastward from its crest to west of the study area.

The Tahoe Basin was formed more than two million years ago by a combination of faulting and volcanism. As a result, the basin contains a combination of granitic, metamorphic, and volcanic rock. The predominant bedrock in the basin is Cretaceous granodiorite of the Sierra Nevada batholith. Cretaceous rock formed during the later period of the Mesozoic Era, characterized by the development of flowering plants and ending with the sudden extinction of dinosaurs and many other forms of life. Pre-Cretaceous metamorphic rocks are found in localized areas. Over the past 1.5 million years, the Tahoe region has been altered by glacial activity. During this activity, valley glaciers dammed the Truckee River Canyon, raising the water level of Lake Tahoe. Lacustrine sediments were deposited in the bays and canyons around the lake as a result of the rising lake levels. The faulting, folding, and in some cases overturning of rock formations that have taken place during various periods of geologic activity, in combination with erosion, deposition, and subsequent cementation of rock materials that have occurred during relatively quiet periods, have left a complex arrangement of geologic rock types and structures in the area. However, the extraordinary clarity of Lake Tahoe is related to the prevalence of resistant granitic bedrock in the Tahoe Basin and an unusually small drainage basin relative to the size of the lake.

Local Geology and Topography

The study area is located on the South Lake Tahoe, California, 7.5-minute U.S. Geological Survey quadrangle map. Elevations are approximately 6,228–6,245 feet above mean sea level, and the study area slopes gently toward the lake (to the north).

A review of the Geologic Map of the Lake Tahoe Basin indicates that most of the study area (approximately 80 percent) is composed of Holocene-age floodplain deposits, composed of silty sand and sandy to clayey silt (Saucedo 2005). Approximately ten percent of the study area, immediately adjacent to and north of the Highland Woods subdivision, is composed of Pleistocene-age lacustrine terrace deposits, composed of silt, sand, and gravel and forming broad, low terraces at 16–32 feet above lake level. The remaining ten percent of the study area, which includes the Lower West Side Restoration Area, is composed of late Holocene artificial fill, human-made deposits of varying composition.

Seismicity

The potential for seismic activity at a given location is most often related to the proximity of faults, fractures, or zones of closely associated fractures along which rocks on one side have been displaced with respect to those on the other side. Most faults are the result of repeated displacement that can take place suddenly or by slow creep, or both.

The study area is located along the southern shore of Lake Tahoe on a regionally significant down-faulted graben (i.e., trench-like geologic feature), sometimes referred to as a half-graben. The study area is not located in an Alquist-Priolo Earthquake Fault Zone (California Geological Survey [CGS] 2005, Hart and Bryant 1999). The nearest fault zoned under the Alquist-Priolo Act is near Minden, Nevada, approximately 20 miles from the study area. The Geologic Map of the Lake Tahoe Basin, California and Nevada, shows that several faults mapped near the study area (Saucedo 2005).The North Tahoe Fault, located beneath the lake, is a northeast-southwest trending fault, approximately 7.0 miles long. The northeast-southwest trending Incline Village Fault zone appears to be the landward extension of the submerged North Tahoe Fault and also trends northeast toward the Truckee Meadows Fault. All three of these faults may be part of a system of normal faults that rupture together. Evidence indicates that an earthquake may have occurred along the Incline Village Fault as recently as 500 years ago, and all three faults are estimated to be capable of generating an earthquake of magnitude 7.0 (Seitz and Kent 2004).

The East Tahoe Fault, much of which is also located under Lake Tahoe, is inferred to bound the east margin of the basin (Sawyer 1999). The fault shows bedding terminating against a planar west-dipping bedrock surface, suggesting young movement. Recent bathymetry of Lake Tahoe reveals that the escarpment is deeply dissected, has an irregular base, and is partly buried at the base by well-developed sediment aprons. The subaqueous fault has probably been modified by the deposition of thick debris avalanche deposits, appearing to have accumulated against the eastern basin escarpment after one or more very large debris avalanches that initiated on the west wall of the basin. Schweickert et al. (2000) speculated that at least one megalandslide on the west side of the basin was triggered by a Holocene faulting event. No evidence has been reported that the East Tahoe Fault displaces Quaternary deposits on the north or south shores of the lake.

The north-south trending West Tahoe-Dollar Point Fault zone is another prominent normal slip fault zone in the Tahoe Basin (Ichinose et al. 1999). The West Tahoe Fault is submerged from Emerald Bay to McKinney Bay. The Dollar Point Fault is the northern continuation of the West Tahoe Fault northward from McKinney Bay. Both of these faults are likely to rupture together.

According to the Earthquake Potential Map for Portions of Eastern California and Western Nevada, the Tahoe area is considered to have a relatively low to moderate potential for shaking caused by seismic-related activity (CGS 2005).

Estimates of the peak ground acceleration have been made for the Tahoe Basin based on probabilistic models that account for multiple seismic sources. Under these models, consideration of the probability of expected seismic events is incorporated into the determination of the level of ground shaking at a particular location. The CGS has estimated the expected peak horizontal acceleration (with a ten percent chance of being exceeded in the next 50 years) generated by any of the seismic sources potentially affecting the study area as 0.275. (CGS 2003). The Nevada Seismological Laboratory catalog lists eight earthquakes with Richter magnitudes (M) of 4.2 or greater

that have occurred since 1950, within approximately 18 miles of the center of Lake Tahoe. These include an M 4.5 earthquake (at Tahoe Vista, approximately 40 miles northwest of the study area) on June 3, 2004. The 2004 event has been attributed to an increase in upper crustal seismicity following a deep dike swarm of 1,611 earthquakes in the Tahoe Vista area, at the site of a deep magma injection event beneath Lake Tahoe (Smith et al. 2004:1278).

Minerals

The study area does not contain any state-designated Mineral Resources Zones, according to maps prepared by the State Mining and Geology Board (Busch 2001). The site is underlain by silt, silty sand, sandy to clayey silt, sand and gravel, and artificial fill of varying composition. No economically viable deposits of clean sand or gravel exist that would be useful to extract for riprap, aggregate, or other industrial uses.

Soils

Soil profile formation within the study area is a result of the interplay of geomorphic and hydrologic processes, vegetation, and in situ chemical processes. A significant amount of heterogeneity exists within the study area because of these processes, and the general trends are described below.

The following descriptions are qualitative summaries of soil types based on the *Soil Survey for the Lake Tahoe Basin Area* (NRCS 2007).

- Beaches (Soil Unit 7011)
- Tahoe complex, 0 to 2 percent slopes (Soil Unit 7041)
- Tahoe complex, 0 to 5 percent slopes gravelly (Soil Unit 7042)
- Tahoe mucky silt loam, drained, 0 to 5 percent slopes (Soil Unit 7043)
- Oxyaquic Xerorthents-Water association, 0 to 5 percent slopes (Soil Unit 7051)
- Watah peat, 0 to 2 percent slopes (Soil Unit 7071)
- Christopher-Gefo complex, 0 to 5 percent slopes (Soil Unit 7444)
- Marla loamy coarse sand, 0 to 5 percent slopes (Soil Unit 7471)

Beaches—This soil type is located at the shoreline area of Lake Tahoe and consists of shallow fine gravels, coarse gravels, and cobbles. The soils have rapid permeability, low shrink-swell potential, and very low water capacity. The erosion hazard is slight, and this soil type has limitations for roads and excavations.

Tahoe Complex, 0 to 2 percent slopes—This soil type is located in the southern part of the Tahoe Basin, within flood plains and valley flats. Soils consist of mucky silt loam, gravelly coarse sand, loam, sandy loam, and loamy sand. This soil type is subject to flooding, is naturally poorly drained, has low shrink-swell potential, and has a very high runoff potential. This soil type has limitations for road construction, excavations, and dwellings.

Tahoe Complex, 0 to 5 percent slopes, gravelly—This soil type is located in riparian corridors all around the Tahoe Basin, within flood plains and valley flats. The soils are derived from granitic and volcanic parent material and consist of mucky gravelly silt loam, gravelly loam, gravelly loamy fine sand, and gravelly fine sand. This soil type is occasionally subject to flooding, is naturally poorly drained with moderate permeability, has low shrink-swell potential, and has a very high runoff potential. This soil type has limitations for road construction, excavation, and dwellings.

Tahoe mucky silt loam, drained, 0 to 5 percent slopes—This soil type is located in the southern part of the Tahoe Basin, within floodplains and valley flats. The soils are derived from granitic and volcanic parent material and consist of mucky silt, loam, loamy fine sand, and fine sand. This soil type occasionally is subject to flooding, is very poorly drained with moderate permeability, has low shrink-swell potential, and has a very high runoff potential. This soil type has limitations for road construction, excavation, and dwellings.

Oxyaquic Xerorthents-Water association, 0 to 5 percent slopes—This soil type is located in the Tahoe Keys and consists of marshland fill. The fill material is derived from granodiorite parent material and consists of very gravelly coarse sand, mucky silt loam, mucky silt loam, gravelly coarse sand, and mucky silt loam. This soil type typically is subject to flooding, is well drained with slow permeability, has low shrink-swell potential, and has a high runoff potential. This soil type has limitations for excavation and dwellings.

Watah peat, 0 to 2 percent slopes—This soil type is located in the southern part of the Tahoe Basin, in fens, flood plains, and valley flats. Soils consist of peat, mucky peat, mucky gravelly coarse sandy loam, and gravelly loamy coarse sand. The soil has moderate permeability, has low shrink-swell potential, is very poorly drained, and has very high surface runoff potential. Flooding and ponding occur frequently in this soil type. It has limitations for road construction, excavation, and dwellings.

Christopher-Gefo complex, 0 to 5 percent slopes—This soil type is located in the southern part of the Tahoe Basin, within hill slopes and outwash terraces. The soils consist of loamy coarse sand to gravelly loamy coarse sand. The soil has moderate permeability, has low shrink-swell potential, is very poorly drained, and has very high surface runoff potential. Flooding and ponding occur frequently in this soil type. The wind erosion hazard is moderate. This soil type has limitations for excavations.

Marla loamy coarse sand, 0 to 5 percent slopes—This soil type is located in the southern part of the Tahoe Basin, in outwash terraces and valley flats. Soils consist of loamy coarse sand, clay loam, stratified sandy loam, and fine sandy loam. The soil has slow permeability, has low shrink-swell potential, is poorly drained, and has very high surface runoff potential. Flooding is rare but ponding does occur in this soil type. The wind erosion hazard is moderate. This soil type has limitations for road construction, excavations, and dwellings.

Land Capability and Existing Coverage

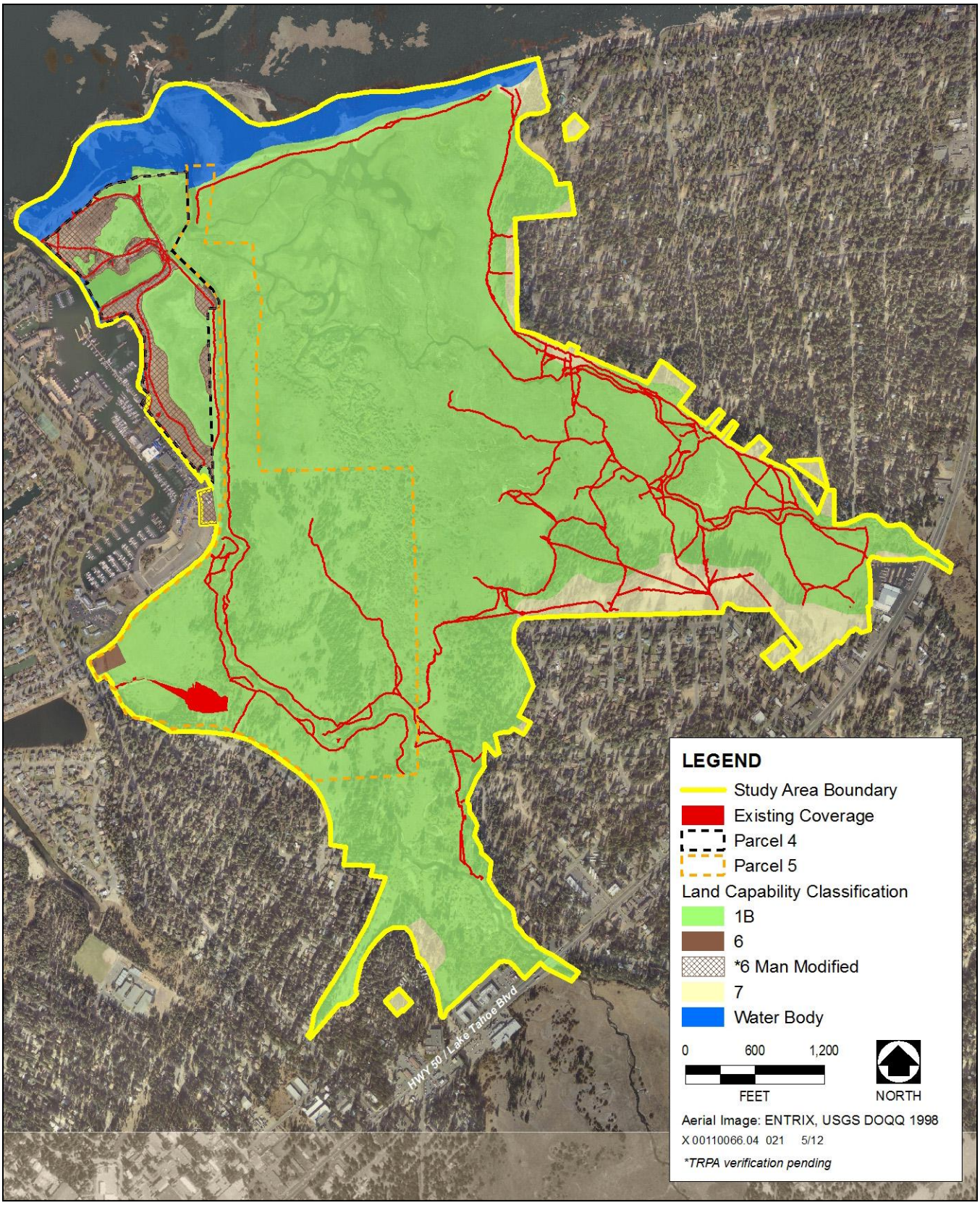
The majority of the study area has been verified as LCD 1b. There is a small area on the west edge of the study area within LCD 6 and several small areas within LCD 7 along the eastern and southern study area boundary (Exhibit 3.6-2). Table 3.6-3 presents the distribution of land coverage area in the study area within each land class as verified in the TRPA Verification of August 28, 2008. The table also shows coverage allowed within each land class. Allowable land coverage on Parcels 3, 4, and 5 is not based on land class but instead based on a litigation settlement agreement in *People of the State of California vs. Dillingham Development Company and TRPA* CIV-S-85-0873-EJG (1988) as described in the regulatory section above and summarized in Table 3.6-1.

Existing coverage within the study area includes a user-created network of trails (see Section 3.13, “Recreation,” for additional discussion on trails within the study area), a few small discrete sites, and the TKPOA Corporation Yard, most of which is located within LCD 1b. The TKPOA Corporation Yard and associated entrance consists of a compacted fill and gravel base. Two outbuildings are located within the yard. Most trails within the study area consist of compacted native soil, vary in width and length, and are not maintained as designated trails, with the exception of the trail at the Lower West Side restoration area. The Lower West Side trail is composed of compacted decomposed granite and is maintained by the Conservancy.

3.6.2 Environmental Consequences and Mitigation Measures

Significance Criteria

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; the TRPA Initial Environmental Checklist; factual or scientific information and data; and regulatory standards of Federal, State, and local agencies. These criteria also encompass the factors taken into account under NEPA to determine the significance of an action in terms of the context and intensity of its effects.



Source: TRPA 2012

Exhibit 3.6-2 **Land Capability and Existing Coverage of the Study Area**

Table 3.6-3 Existing Land Area, Land Capability, and Land Coverage Calculations for the Study Area			
Parcel/Land Class	**Gross Area (square feet)**	**TRPA Verified Existing Coverage (square feet)**	**Coverage Allowed On site (square feet)**
Parcel 3 – State Portion:			
Subtotal	23,510	NC	0[1]
Parcel 4:			
1b	1,072,450	3,416	
6	749,232	34,484	
Subtotal	1,821,680	37,900	380,108[1]
Parcel 5:			
1b	6,045,756	102,290	
6	43,522	0	
Subtotal	6,089,278	102,290	61,855[1]
Other Parcels[2]:			
1b	19,497,708	60,745	194,977
7	946,896	13,006	284,069
Subtotal	18,675,816	73,751	479,046
Total	**28,364,346**	**184,911**	**921,009**

Notes:
NC Not completed.
[1] Allowable coverage is based on a litigation settlement agreement in *People of the State of California vs. Dillingham Development Company and TRPA* CIV-S-85-0873-EJG (February 25, 1988). The coverage allowed on Parcels 3, 4, and 5 is a combined total that can be used on any of the parcels.
[2] Other Parcels includes all parcels outside of parcels 3, 4 and 5 within the study area. No coverage changes are proposed for private parcels under any alternatives.
Source: Data compiled by AECOM from TRPA 2008 coverage verification and litigation settlement agreement referenced above.

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to geology, soils, or mineral resources if it would:

- expose people or structures to potential substantial adverse effects including loss or injury from seismic hazards, including earthquake, fault rupture, strong seismic ground shaking, liquefaction, or landslides (CEQA 1);
- result in substantial soil erosion or loss of topsoil (CEQA 2);
- be located on a geologic unit that is unstable or would become unstable as a result of the project (CEQA 3);
- be located on expansive soil (CEQA 4);
- have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available (CEQA 5);

- result in the loss of availability of known mineral resources that would be of future value to the State or the region (CEQA 6); or
- would directly or indirectly destroy a unique paleontological resource or site (CEQA 7). An individual vertebrate fossil specimen may be considered unique or significant if it is identifiable and well preserved, and it meets one of the following criteria:
    - a type specimen (i.e., the individual from which a species or subspecies has been described);
    - a member of a rare species;
    - a species that is part of a diverse assemblage (i.e., a site where more than one fossil has been discovered) wherein other species are also identifiable, and important information regarding life history of individuals can be drawn;
    - a skeletal element different from, or a specimen more complete than, those now available for its species; or
    - a complete specimen (i.e., all or substantially all of the entire skeleton is present).

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis. NEPA requires documentation and discussion of any beneficial effects of a project in addition to its negative impacts. Where appropriate, these beneficial effects are discussed and called out specifically for the purposes of NEPA in the following impact analysis.

TRPA Criteria

The TRPA Land Classification System (Tables 3.6-2 and 3.6-3) is used to analyze potential impacts on sensitive slope, soils, and drainage conditions. Significance criteria used in the analysis of land coverage relate directly to the TRPA Land Classification System and coverage requirements as well as the litigation settlement agreement in *People of the State of California vs. Dillingham Development Company and TRPA* CIV-S-85-0873-EJG (1988) as described in the regulatory section above.

Based on TRPA's Initial Environmental Checklist, an alternative would result in a significant impact on geology, soils, and coverage if it would:

- result in a change in the topographic features of the site inconsistent with the natural surrounding conditions (TRPA 1);
- change the undisturbed soil or native geologic substructures or grading in excess of five feet (TRPA 2);
- continue or increase wind or water erosion of soils (TRPA 3);
- result in changes in siltation, deposition, or erosion that could modify the channel of a river or stream or the bed of a lake (TRPA 4);
- compact or cover soil with impervious surfaces beyond the limits allowed in the land capability districts (TRPA 5);

- expose people or property to seismic hazards such as earthquakes, landslides, backshore erosion, avalanches, mud slides, ground failure, or similar hazards (TRPA 6); or

- be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse (TRPA 7).

Geologic hazards, as defined in this section, relate to seismic activity and may include surface fault rupture, strong seismic ground shaking, liquefaction, subsidence, landslides, tsunami, and seiche potential. Tsunami and seiches are addressed in Section 3.8, "Hydrology and Flooding." Nonseismic geologic hazards are discussed with regard to potential impacts on the alteration of the land surface (naturally or through human actions), including grading, deposition or erosion, landslides, avalanche, or any effects that are because of or that may alter soil properties or geotechnical issues. Although landslides, mudslides, avalanches, and other geomorphological events can be triggered by seismic activity, such activity is not necessarily a prerequisite. Therefore, they are addressed separately unless site-specific conditions warrant otherwise.

Although not used as significance criteria, effects on TRPA thresholds were evaluated and these effects are reported in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities." In development of mitigation measures for significant impacts of the project, effects on environmental thresholds of the Tahoe Regional Planning Compact were considered.

METHODS AND ASSUMPTIONS

Impacts associated with geology, soils, mineral resources, and coverage that could result from project construction and operational activities were evaluated qualitatively based on expected construction practices, materials, and locations and the duration of project construction and related activities; relevant site-specific reports; a field visit; the alternatives description in Chapter 2, "Project Alternatives"; and a review of published geologic literature, including maps, books, and journal articles.

The impact analysis for earth resources also relies on information and analysis provided in Section 3.8, "Hydrology and Flooding" and Section 3.9, "Geomorphology and Water Quality." As discussed in Section 3.9, "Geomorphology and Water Quality," potential violations of the narrative turbidity standard, while considered a significant impact for CEQA/NEPA/TRPA analysis for the water quality discussion in this document, would not necessarily correspond to an adverse effect on beneficial uses. This is also true for effects on soils. Turbidity levels would also likely need to exceed the minimum aesthetic criterion to have adverse effects on soils. A finding of a significant unavoidable water quality impact does automatically correspond to an adverse condition on soils, because impairment of related beneficial uses would likely require the proposed project to elevate turbidity levels considerably more than ten percent above background for a larger magnitude and longer duration beyond the limited area and brief period used for the water quality analysis.

The 2008 verified TRPA coverage information and the TRPA Land Classification System (Tables 3.6-2 and 3.6-3) and coverage requirements required under the Bailey System or outlined in the Cove East litigation Settlement Agreement were used to analyze potential impacts on coverage, soils, and sensitive slopes. For each alternative, the anticipated change in coverage was calculated by subtracting from existing coverage the square footage that would be restored to pervious surface, and adding the square footage of impervious surface associated with the restoration, recreation infrastructure, and public access elements of that alternative. Coverage by parcel and LCD of elements of each alternative is presented in Table 3.6-4, below. The TRPA Code of Ordinances Section 20.5 discusses exceptions for coverage relocation requirements that allow for a 1:1 coverage relocation ratio for the Upper Truckee River and Marsh Restoration Project. This 1:1 ratio was used in evaluating potential project related impacts. Additional exceptions are related to bridges and boardwalks that may be accounted for at a lesser coverage ratio requirement. These were not used to evaluate impacts; therefore coverage impacts may be less than values presented in the discussion below.

Table 3.6-4 Proposed Changes in Coverage by LCD and Alternative					
Element	LCD (Shorezone/Parcel)	Coverage (ft²)[a]			
		Alternative 1	Alternative 2	Alternative 3	Alternative 4
Public Access and Recreation Infrastructure Elements					
Observation area	6 (Parcel 4)	226	-	226	226
	1b (Other Parcels)	517	-	-	517
Fishing platform	1b (Parcel 4)	-	300	517	-
Viewpoints	1b (Parcel 4)	-	-	32	
	1b (Other Parcels)	264	-	160	160
Bicycle path	1b (Parcel 4)	4,448-5,560			
	6 (Parcel 4)	31,416-39,270	-	-	-
	1b (Other Parcels)	46,464-58,080	-	-	-
	7(Other Parcels)	24,848-31,060	-	15,536-19,420	16,930
Pedestrian trail	1b (Other Parcels)	1,350	536-804	8,692-13,038	5,616-8,424
	1b (Parcel 4)	-	2,229-3,342	2,212-3,318	1,316-1,974
	6 (Parcel 4)	1,320	14,252-21,378	18,376-27,564	17,148-25,722
	7 (Other Parcels)	1,578	1,076-1,614	4,432-6,648	1,360-2,040
Bridge	1b (Other Parcels)	1,800-2,250	-	-	-
Boardwalk	1b (Other Parcels)	26,232-32,790	2,000	5,128-6,410	4,840-6,050
	1b (Parcel 4)	4,032-5,040	-	-	-
	6 (Parcel 4)	24-30			
	1b (Parcel 5)	1,160-1,450	-	-	-
	7 (Other Parcels)	-	-	1,288-1,610	3,352-4,190
Kiosk	1b (Parcel 4)	60	-	60	60
	1b (Other Parcels)	60	-	-	-
Parking area	6 (Parcel 3)	20,720	-	-	-
Restoration and Enhancement Elements[b]					
User-created trail removal and restoration	1b (Parcel 4)	-3,416	-3,416	-3,416	-3,416
	6 (Parcel 4)	-34,484	-34,484	-34,484	-34,484
	1b (Parcel 5)	-16,724	-16,724	-16,724	-16,724
	1b (Other Parcels)	-60,745	-60,745	-60,745	60,745
	7 (Other Parcels)	-13,006	-13,006	-13,006	-13,006
TKPOA Corporation Yard restoration[e]	1b (Parcel 5)	-85,566	-85,566	-85,566	-

Notes:

[a] Range of square footage is given for elements with a range of potential widths in Table 2-3 and 2-4.

[b] Restoration and enhancement calculations based on subtracting existing coverage verification components.

Sources: Conservancy and DGS 2007b and SSURGO 2008

For a detailed description of the elements of each alternative, see Chapter 2, "Project Alternatives," which provides the dimensions of the elements in Tables 2-3 and 2-4. It is noted that additional coverage verifications were completed in 1992 and 1996 for this analysis the 2008 verification superseded the previous verifications and is used in determining potential impacts.

The earth resources–related environmental consequences of implementing the proposed alternatives were determined from a comparison with existing conditions, which are also embodied in Alternative 5, the No Project/ No Action Alternative. Mitigation is identified for all potential impacts. The proposed mitigation meets CEQA, NEPA, and TRPA requirements by reducing earth resources–related impacts to a less-than-significant level when feasible.

Hydrologic implications of seiches and tsunamis are discussed in Section 3.8, "Hydrology and Flooding."

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Risks to People or Structures Caused by Surface Fault Rupture (CEQA 1) – The study area is located approximately 20 miles from the nearest Alquist-Priolo Earthquake Fault Zone, and the project site is not underlain by or adjacent to any known faults. Because the damage from surface fault rupture is generally limited to a linear zone a few yards wide, the potential for surface fault rupture to cause damage to proposed structures is negligible.

Landslide (CEQA 1) – A landslide or mudslide is the downhill movement of earth material under the force of gravity. The factors contributing to landslide potential are steep slopes, unstable terrain, and proximity to earthquake faults. The project site is relatively level and does not contain any steep slopes; therefore, it is not subject to landsliding and there would be no impact.

Expansive Soils (CEQA 4) – Based on a review of NRCS soil survey data discussed above, the entire study area is underlain by soils with low shrink-swell potential, indicating the soils are not expansive as defined in Table 18-1-B of the Uniform Building Code. Because construction would occur on soils with low shrink-swell potential, there would be no risk to life or property related to construction on expansive soils.

Septic systems (CEQA 5) – The project alternatives do not include and would not use septic tanks or alternative wastewater disposal systems. Therefore, there would be no impact.

Mineral resources (CEQA 6) – The MRZ designation provided by the CGS, coupled with the site-specific geologic and soils data indicate that there are no significant mineral deposits at the project site. Therefore, there would be no impact.

Damage or Destruction of Unique Paleontological Resources (CEQA 7) – The study area is underlain by Holocene-age artificial fill and basin deposits, which are not considered to be paleontologically sensitive rock formations. Therefore, there would be no impact related to damage or destruction of unique paleontological resources.

Avalanche Potential (TRPA 7) – An avalanche is a rapid flow of snow down a slope, from either natural triggers or human activity, typically occurring in mountainous terrain. For a slope to generate an avalanche it must be simultaneously capable of retaining snow and allowing snow to accelerate after it is set in motion. The study area is located in a flat marsh and is therefore not susceptible to avalanches. Therefore, implementing any of the project alternatives would have no effect on life and property related to avalanches.

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.6-1 (Alt. 1) **Soil Erosion, Sedimentation, and Loss of Topsoil. (CEQA 2, 3; TRPA 2, 3, 4)** *The topography, soils, vegetation, and drainage within the study area would be modified by restoration activities, public access, and recreation infrastructure planned under Alternative 1. Public access and recreation infrastructure would emphasize habitat protection by directing continued use and discouraging access to sensitive areas that are presently used by the public. Long-term conditions related to erosion, sedimentation, and loss of top soil would be improved with implementation of Alternative 1. Short-term exposure of soils to potential wind and water erosion would be protected through implementation of Environmental Commitments 5, 6, and 8. This impact would be* ***less than significant****.*

Existing user-created trails and other disturbed surfaces would be modified under Alternative 1. Defined paths, viewpoints, and signage, would emphasize habitat protection by directing continued use, and discouraging access to sensitive areas that have greater potential to be affected by disturbance. Implementing Alternative 1 would have a long-term beneficial effect by restoring some sensitive areas that are disturbed and/or compacted and limiting infiltration under the existing conditions.

Implementing Alternative 1 would require approximately four years of seasonal construction (between May 1 and October 15), with winter closedowns, except for BMP maintenance and monitoring. Construction would disturb areas in uplands, as well as in the active and 100-year floodplain and the main channels of the Upper Truckee River and Trout Creek. The extent of in-channel work would vary by year (see Alternative 1 construction schedule section in Section 2.6.2). Bridge installation, boat launch, lagoon construction, grade controls, bank protection measures, and transition connections would require work in the active channel. Floodplain reconstruction, paths, and most recreation components would be completed outside of the existing active channel. Nearly all of the disturbance areas, access routes, and staging areas would be within the 100-year floodplain (see Exhibit 3.8-14).

Implementing Alternative 1 would include implementing Environmental Commitment (EC) 5, “Prepare and Implement Effective Construction Site Management Plans to Minimize Risks of Water Quality Degradation and Impacts to Vegetation”; EC 6, “Obtain and Comply with Federal, State, Regional, and Local Permits”; and EC 8, “Prepare a Final Geotechnical Engineering Report, and Implement All Applicable Recommendations” (Table 2-6). Implementing these environmental commitments is expected to minimize vegetation removal and minimize the loss of topsoil and the need to import topsoil into the study area.

Implementing EC 5 would involve salvaging, reusing, and protecting on-site resources (e.g., willows) where possible. Efforts would be made to work as quickly as possible to move from initial disturbance through final revegetation throughout the study area. It is expected that disturbed areas would be exposed to winter conditions between summer construction seasons. Winterization protection could be needed throughout the construction zone, and possible overwinter use of staging, storage, or access areas may be necessary. All temporary stormwater controls and/or overwinter flood flow protections would be designed and sized to meet regulatory requirements but could be overwhelmed by a larger event if it occurred during the construction period. However, the probability of an event of greater magnitude occurring during either the summer low-flow seasons or the couple of intervening winters is low.

As described in EC 6, the Conservancy would obtain permits and approvals from several entities (e.g., El Dorado County, CSLT, TRPA, Lahontan Regional Water Quality Control Board, U.S. Army Corps of Engineers, and California Department of Fish and Game) that would impose conditions and requirements to minimize construction risks of water quality degradation by sediment or other pollutants. Although the general types of permit documents and their components are known, the specific measures, performance standards, and

enforcement elements would not be established until the time of acquisition. Several general construction management measures would be implemented to minimize environmental impacts, along with specific measures to control wind- and water-related erosion and to protect water quality (see Chapter 2, "Project Alternatives"). Exact erosion control measures (BMPs) or their performance standards are not specified at this time, but general BMPs would likely include use of construction fencing, silt fences, hay bales, temporary settling basins, vegetation protection, hydroseeding, and straw mulch. Construction activities that require access to the existing streambed or streambanks would require temporary dewatering of surface water in the river channel, and, where subsurface access is needed, temporary dewatering/pumping of groundwater that seeps into the work area may also be required. Conceptual approaches to dewatering have been identified for various elements of Alternative 1 in-channel work, but specific measures have not yet been determined (see Section 2.6.2, "Construction Activities and Schedule" for dewatering approaches.)

A geotechnical report would be prepared, and applicable recommendations from the report would be implemented as part of EC 8.

Based on the conceptual information regarding proposed construction management and ECs 5, 6, and 8 (Table 2-6), erosion, sedimentation, and loss of topsoil would be minimized. This impact would be **less than significant**.

IMPACT 3.6-2 (Alt. 1)	**Risks to People and Structures Caused by Strong Seismic Ground Shaking. (CEQA 1, 3; TRPA 6, 7)** *Potentially active faults in the project vicinity could subject recreational users within the study area to damage from strong seismic ground shaking. However, project components would be designed in accordance with the CSLT and County codes as required by law. Alternative 1 would not expose additional people to geologic hazards. This impact would be* ***less than significant****.*

Potentially active faults that are closest to the study area include the Genoa Fault and the Tahoe Valley Fault. The Genoa Fault is located approximately 20 miles east of the study area, and is capable of generating an earthquake of magnitude 7.4. The Tahoe Valley Fault Zone surrounds the study area to the north, west, and south. This Quaternary fault has a slip rate of <0.2 millimeter per year. Other fault zones in the Basin, including the North Tahoe and West Tahoe-Dollar Point, also may pose a hazard for strong seismic ground shaking in the project vicinity. The action alternatives would include construction of public access features, a parking lot, and a structure over the Upper Truckee River. The project does not include any buildings intended for human occupation. The project components would be designed and constructed in accordance with the CSLT's and County's seismic standards designed to reduce the risk of injury or property damage from seismic hazards, including strong ground shaking.

Alternative 1 would be constructed in soil types composed of loamy and gravelly sands, which have an extremely low shrink/swell potential. No previous landslides have been mapped in the project vicinity. The elevation in the study area is nearly level, and the public access and recreation infrastructure would be constructed to follow the existing natural contours to the extent feasible. Therefore, project construction would not result in the creation of unstable slopes that would subject recreational users to an increased hazard.

Soil liquefaction occurs when ground shaking from an earthquake causes a sediment layer saturated with groundwater to lose strength and take on the characteristics of a fluid, thus becoming similar to quicksand. Factors determining the liquefaction potential are soil type, the level and duration of seismic ground motions, the type and consistency of soils, and the depth to groundwater. Liquefaction poses a hazard to engineered structures. The loss of soil strength can result in bearing capacity insufficient to support foundation loads, increased lateral pressure on retaining walls, and slope instability. Based on a review of soil types associated with project facilities, it is possible that liquefaction could occur in the event of a large magnitude earthquake on one of the potentially active faults in the Lake Tahoe Basin. However, the project components would be designed and constructed in

accordance with CSLT and County design requirements (as required by law) that are intended to reduce the risk of injury or property damage from seismic hazards, including strong ground shaking.

Ichinose et al. (1999) show through simulations modeling wave propagation for various earthquake scenarios that if a large earthquake were to occur (approximately magnitude 7.0), a potential exists for both tsunami and seiche-related waves up to 30 feet to occur along the shore of Lake Tahoe. However, the project components would be constructed in an area that already has urban development and recreational facilities, including residential housing and a marina, and users of the public access facilities are expected to be people who already reside or recreate in the Tahoe Basin; therefore, construction of the proposed improvements would not create a situation that exposes additional people to tsunami hazards. Furthermore, there is no way of knowing whether or not a tsunami with enough force to damage project improvements or to present a safety hazard to recreational users would ever be generated during the lifetime of the project facilities. This impact would be **less than significant**.

IMPACT 3.6-3 (Alt. 1) **Changes in Land Coverage. (TRPA 5)** *Alternative 1 would involve removing and relocating land coverage in the study area. Existing coverage in the TKPOA Corporation Yard and a user-created trail network would be restored to permeable surfaces, and new public access infrastructure and parking would be created. Proposed land coverage in the study area on Parcels 3, 4, and 5 (defined by the Dillingham Settlement Agreement) under Alternative 1 would consist of approximately 63,406 – 73,676 square feet, which is significantly less than the total allowable coverage of 441,963 square feet. Proposed land coverage on all other parcels in the study area (regulated by the Bailey's System) would be 76,687–95,311 square feet in LCD 1b, and 26,426–32,638 square feet in LCD 7, which is well within the allowable coverage of 194,977 and 284,069 square feet for each LCD, respectively. Coverage relocation would be completed at a 1:1 ratio for the other parcels outside of the litigation parcels as allowed by the TRPA Code of Ordinances. Coverage relocation would be in compliance with Dillingham Settlement Agreement and as allowed by the TRPA Code of Ordinances. This impact would be* ***less than significant.***

The public access infrastructure and enhancement elements of Alternative 1 (the maximum recreation alternative) would involve removing and relocating land coverage in the study area (Table 3.6-5). This coverage would be concentrated around the perimeter of the study area, in LCDs 1b and 7. The restoration and enhancement elements of Alternative 1 would remove coverage associated with the TKPOA Corporation Yard. They also would remove coverage associated with a user-created network of trails currently found generally around the study area's perimeter and in much of the interior of the eastern half of the study area around Trout Creek (Exhibit 3.6-2). In general, coverage would be designed to reduce existing effects on sensitive resources, and/or would be situated in less-sensitive locations than the existing user-created trails that would be removed.

New coverage under Alternative 1 would include a parking area, bridge, boardwalk, and bike and pedestrian trails with observation areas and viewpoints. Coverage is typically regulated by Bailey's LCDs but because of the Dillingham Settlement Agreement (reference) coverage on portions of this study area is legally determined, while other portions are regulated by the typical methods.

In this case, Parcels 3, 4, and 5 (map reference) of the settlement agreement is allowed a total coverage amount of 441,963 regardless of parcel boundaries. The project would remove 140,190 square feet of verified coverage and add 63,406 – 73,676, depending on widths of trails. This is significantly less than the existing verified coverage and significantly less than the total allowed coverage of 441,963.

For all other parcels in the study area there are two LCD's, 1b and 7, in which coverage is proposed to be relocated. For LCD 1b, 60,745 square feet of verified coverage (volunteer trails restored) would be removed (Table 3.6-4) while 76,687–95,311 square feet (depending on trail widths) would be added. While this would increase the coverage by 15,942 – 34,566 square feet, it is significantly less than the allowed coverage of 194,977 square feet (Table 3.6-3). For LCD 7, 13,006 square feet of verified coverage (volunteer trails restored) would be removed (Table 3.6-4) while 26,426–32,638 square feet (depending on trail widths) would be added. While this

would increase the coverage by 13,420 – 19,632 square feet it is significantly less than the allowed coverage of 284,069 square feet (Table 3.6-3). Coverage relocation would be completed at a 1:1 ratio for the other parcels outside of the litigation parcels as allowed by the TRPA Code of Ordinances. Because the coverage proposed under Alternative 1 is consistent with the Dillingham Settlement Agreement and the TRPA Code of Ordinances and within the amount allowed in the study area, this impact would be **less than significant**.

Table 3.6-5
Proposed Land Coverage for Study Area

Parcel/Land Class	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Coverage Allowed On site (square feet)
Parcel 3—State Portion						
6	20,720				**0**	0[1]
Subtotal	**20,720**				**0**	**0[1]**
Parcel 4						
1b	8,540–10,660	2,529–3,642	2,821–3,927	1,376–2,034	3,416	
6	32,986–40,846	14,252–21,378	18,602–27,790	17,374–25,948	34,484	
Subtotal	**41,526–51,506**	**16,781–25,020**	**21,423–31,717**	**18,750–27,982**	**37,900**	**380,108[1]**
Parcel 5						
1b	1,160–1,450	0	0	85,566	102,290	
6	0	0	0	0	0	
Subtotal	**1,160–1,450**	**0**	**0**	**85,566**	**102,290**	**61,855[1]**
Other Parcels						
1b	76,687–95,311	2,536–2,804	13,980–19,608	11,133–15,151	60,745	194,977
7	26,426–32,638	1,076–1,614	21,256–27,678	21,642–23,160	13,006	284,069
Subtotal	**103,113–127,949**	**3,612–4,418**	**35,236–21,423**	**32,775–38,311**		**479,046**
Total	**166,519–201,625**	**20,393–29,438**	**56,659–79,003**	**137,091–151,859**	**166,810**	**1,029,194**

Notes:
[1] Allowable coverage is based on a litigation settlement agreement in *People of the State of California vs. Dillingham Development Company and TRPA*, CIV-S-85-0873-EJG (February 25, 1988). The coverage allowed on Parcels 3, 4, and 5 is a combined total that can be used on any of the parcels.
Source: Data provided by TRPA 2008, Conservancy and DGS 2007b, and SSURGO 2008

Alternative 2: New Channel – West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.6-1 (Alt. 2) **Soil Erosion, Sedimentation, and Loss of Topsoil. (CEQA 2, 3; TRPA 2, 3, 4)** *The topography, soils, vegetation, and drainage within the study area would be modified under Alternative 2 by restoration activities and public access and recreation infrastructure features. Public access elements emphasize habitat protection that will limit erosion compared to existing conditions by directing and managing continued use, and discouraging access to sensitive areas that are presently used by the public. Long-term conditions related to erosion, sedimentation, and loss of top soil would be improved with implementation of Alternative 2. Short-term exposure of soils to potential wind and water erosion would be protected through implementation of Environmental Commitments 5, 6, and 8. This impact would be* ***less than significant****.*

This impact is similar to Impact 3.6-1 (Alt. 1). Less construction associated with recreational infrastructure development would occur under Alternative 2 than Alternative 1. Based on the conceptual information regarding proposed construction management and ECs 5, 6, and 8 (as described in Table 2-6), erosion, sedimentation, and loss of topsoil would be minimized. For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.6-2 (Alt. 2) **Risks to People and Structures Caused by Strong Seismic Ground Shaking. (CEQA 1, 3; TRPA 6, 7)** *Potentially active faults in the project vicinity could subject recreational users within the study area to damage from strong seismic ground shaking. However, project components would be designed in accordance with the CSLT and County codes as required by law. Alternative 2 would not expose additional people to geologic hazards. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.6-2 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.6-3 (Alt. 2) **Changes in Land Coverage. (TRPA 5)** *Alternative 2 would involve removing and relocating land coverage in the study area. Existing coverage in the TKPOA Corporation Yard and a user-created trail network would be restored to permeable surfaces, and new public access infrastructure would be created. Proposed land coverage in the study area on Parcels 3, 4, and 5 (defined by the Dillingham Settlement Agreement) under Alternative 2 would consist of approximately 33,562 – 46,398 square feet, which is significantly less than the total allowable coverage of 441,963 square feet. Proposed land coverage on all other parcels in the study area (regulated by the Bailey's System) would be 2,536 – 2,804 square feet in LCD 1b, and 1,076 – 1,614 square feet in LCD 7, which is well within the allowable coverage of 194,977 and 284,069 square feet respectively. Coverage relocation would be completed at a 1:1 ratio for the other parcels outside of the litigation parcels as allowed by the TRPA Code of Ordinances. Coverage relocation would be in compliance with Dillingham Settlement Agreement and as allowed by the TRPA Code of Ordinances. Additionally, due to the overall reduction in coverage this impact would be* ***beneficial.***

The public access infrastructure and enhancement elements of Alternative 2 (the minimum recreation alternative) would involve removing and relocating land coverage in the study area (Table 3.6-5). This coverage would be concentrated around the perimeter of the study area, in LCDs 1b and 7. The restoration and enhancement elements of Alternative 2 would remove coverage associated with the TKPOA Corporation Yard. They also would remove coverage associated with a user-created network of trails currently found generally around the study area's perimeter and in much of the interior of the eastern half of the study area around Trout Creek (Exhibit 3.6-2). In general, coverage would be designed to reduce existing effects on sensitive resources, and/or would be situated in less-sensitive locations than the existing user-created trails that would be removed.

New coverage under Alternative 2 would include pedestrian trails, observation areas, a fishing platform, and a small boardwalk. Coverage is typically regulated by Bailey's LCDs but because of the Dillingham Settlement Agreement (1988), coverage on portions of this study area are legally determined, while other portions are regulated by the typical methods.

In this case as defined by the Settlement Agreement, parcels 3, 4, and 5 are allowed a total coverage amount of 441,963 regardless of parcel boundaries. The project would remove 140,190 square feet of verified coverage and add 33,562 – 46,398, depending on widths of trails. This is significantly less than the existing verified coverage and significantly less the total allowed coverage of 441,963.

For all other parcels in the study area there are two LCD's, 1b and 7, in which coverage is proposed to be relocated. For LCD 1b 60,745 square feet of verified coverage (volunteer trails restored and the TKPOA yard) would be removed (Table 3.6-4) while 2,536 – 2,804 square feet (depending on trail widths) would be added. This would reduce coverage by 58,209 – 57,941 square feet and is significantly less than the allowed coverage of

194,977 square feet (Table 3.6-3). For LCD 7, 13,006 square feet of verified coverage (volunteer trails restored and the TKPOA yard) would be removed (Table 3.6-4) while 1,076 – 1,614 square feet (depending on trail widths) would be added. This would reduce coverage by 11,930 – 11,392 square feet and is significantly less than the allowed coverage of 284,069 square feet (Table 3.6-3). Coverage relocation would be completed at a 1:1 ratio for the other parcels outside of the litigation parcels as allowed by the TRPA Code of Ordinances. Because the coverage proposed under Alternative 2 is consistent with the Dillingham Settlement Agreement and the Code of Ordinances and less than the existing amount, this impact would be **beneficial**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.6-1 (Alt. 3) **Soil Erosion, Sedimentation, and Loss of Topsoil. (CEQA 2, 3; TRPA 2, 3, 4)** *The topography, soils, vegetation, and drainage within the study area would be modified by restoration, public access, and recreation infrastructure features added under Alternative 3. Public access elements will emphasize habitat protection that will limit erosion compared to existing conditions by directing and managing continued use, and discouraging access to sensitive areas that are presently used by the public. Long-term conditions related to erosion, sedimentation, and loss of top soil would be improved with implementation of Alternative 3. Short-term exposure of soils to potential wind and water erosion would be protected through implementation of Environmental Commitments 5, 6, and 8. This impact would be* ***less than significant****.*

This impact is similar to Impact 3.6-1 (Alt. 1). Less construction associated with recreational infrastructure development would occur under Alternative 3 than Alternative 1.Based on the conceptual information regarding proposed construction management and ECs 5, 6, and 8 (as described in Table 2-6), erosion, sedimentation, and loss of topsoil would be minimized. For the same reasons described above, this impact would be **less than significant**.

IMPACT 3.6-2 (Alt. 3) **Risks to People and Structures Caused by Strong Seismic Ground Shaking (CEQA 1, 3; TRPA 6, 7).** *Potentially active faults in the project vicinity could subject recreational users within the study area to damage from strong seismic ground shaking. However, project components will be designed in accordance with the CSLT and County codes as required by law. Alternative 1 would not expose additional people to geologic hazards. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.6-2 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.6-3 (Alt. 3) **Changes in Land Coverage. (TRPA 5)** *Alternative 3 would involve removing and relocating land coverage in the study area. Existing coverage in the TKPOA Corporation Yard and a user-created trail network would be restored to permeable surfaces, and new public access infrastructure would be created. Proposed land coverage in the study area on Parcels 3, 4, and 5 (defined by the Dillingham Settlement Agreement) under Alternative 3 would consist of approximately 42,846 – 63,434 square feet, which is significantly less than the total allowable coverage of 441,963 square feet. Proposed land coverage on all other parcels in the study area would be 13,980 – 19,608 square feet in LCD 1b, and 21,256 – 27,678 square feet in LCD 7, which is well within the allowable coverage of 194,977 and 284,069 square feet respectively. Coverage relocation would be completed at a 1:1 ratio for the other parcels outside of the litigation parcels as allowed by the TRPA Code of Ordinances. Coverage relocation would be in compliance with Dillingham Settlement Agreement and as allowed by the TRPA Code of Ordinances. Additionally, due to the overall reduction in coverage this impact would be* ***beneficial.***

The public access infrastructure and enhancement elements of Alternative 3 (the moderate recreation alternative) would involve removing and relocating coverage in the study area (Table 3.6-5). This coverage would be concentrated around the perimeter of the study area, in LCDs 1b and 7. The restoration and enhancement elements

of Alternative 3 would remove coverage associated with the TKPOA Corporation Yard. They also would remove coverage associated with a user-created network of trails currently found generally around the study area's perimeter and in much of the interior of the eastern half of the study area around Trout Creek (Exhibit 3.6-2). In general, coverage would be designed to reduce existing effects on sensitive resources, and/or would be situated in less-sensitive locations than the existing user-created trails that would be removed.

New coverage under Alternative 3 would include a boardwalk, bike and pedestrian trails with a fishing platform, and observation areas and viewpoints. Coverage is typically regulated by Bailey's Land Capability Districts but because of the Dillingham Settlement Agreement (1988) coverage on portions of this study area are legally determined, while other portions are regulated by the typical methods.

In this case, Parcels 3, 4, and 5 (map reference) of the Settlement Agreement is allowed a total coverage amount of 441,963 regardless of parcel boundaries. The project would remove 140,190 square feet of verified coverage and add 42,846 – 63,434 square feet, depending on widths of trails. This is significantly less than the existing verified coverage and significantly less than the total allowed coverage of 441,963.

For all other parcels in the study area there are two LCD's, 1b and 7, in which coverage is proposed to be relocated. For LCD 1b, 60,745 square feet of verified coverage (volunteer trails restored) would be removed (Table 3.6-4) while 13,980 – 19,608 square feet (depending on trail widths) would be added. This would reduce coverage by 46,765 – 41,137 square feet and is significantly less than the allowed coverage of 194,977 square feet (Table 3.6-3). For LCD 7, 13,006 square feet of verified coverage (volunteer trails restored) would be removed (Table 3.6-4) while 21,256 – 27,678 square feet (depending on trail widths) would be added. While this would increase coverage by 8,250 – 14,672 square feet it is significantly less than the allowed coverage of 284,069 square feet (Table 3.6-3). Coverage relocation would be completed at a 1:1 ratio for the other parcels outside of the litigation parcels as allowed by the TRPA Code of Ordinances. Because the coverage proposed under Alternative 2 is consistent with the Dillingham Settlement Agreement and the Code of Ordinances and less than the existing amount, this impact would be **beneficial**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.6-1 (Alt. 4) **Soil Erosion, Sedimentation, and Loss of Topsoil (CEQA 2, 3; TRPA 2, 3, 4).** *The topography, soils, vegetation, and drainage within the study area would be modified by restoration, public access, and recreation infrastructure features added under Alternative 4. Public access elements will emphasize habitat protection that will limit erosion compared to existing conditions; they are intended to direct and manage continued use, and discourage access to sensitive areas that are presently used by the public. Long-term conditions related to erosion, sedimentation, and loss of top soil would be improved with implementation of Alternative 4. Short-term exposure of soils to potential wind and water erosion will be protected through implementation of Environmental Commitments 5, 6, and 8. This impact would be* ***less than significant****.*

This impact is similar to Impact 3.6-1 (Alt. 1). Less construction associated with recreational infrastructure development would occur under Alternative 4 than Alternative 1. Based on the conceptual information regarding proposed construction management and ECs 5, 6, and 8 (as described in Table 2-6), erosion, sedimentation, and loss of topsoil would be minimized. For the same reasons described above this impact would be **less than significant**.

IMPACT 3.6-2 (Alt. 4) **Risks to People and Structures Caused by Strong Seismic Ground Shaking. (CEQA 1, 3; TRPA 6, 7)** *Potentially active faults in the project vicinity could subject recreational users within the study area to damage from strong seismic ground shaking. However, project components would be designed in accordance with the CSLT and County codes as required by law. Alternative 1 would not expose additional people to geologic hazards. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.6-2 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.6-3 (Alt. 4)	**Changes in Land Coverage. (TRPA 5**) *Alternative 4 would involve removing and relocating land coverage in the study area. Existing coverage from a user-created trail network would be restored to permeable surfaces, and new public access and recreation infrastructure would be created. Proposed land coverage in the study area on Parcels 3, 4, and 5 (defined by the Dillingham Settlement Agreement) under Alternative 4 would consist of approximately 37,500 – 76,622 square feet, which is significantly less than the total allowable coverage of 441,963 square feet. Proposed land coverage on all other parcels in the study area would be 11,133 – 15,151 square feet in LCD 1b, and 21,642 – 23,160 square feet in LCD 7, which is well within the allowable coverage of 194,977 and 284,069 square feet respectively. Coverage relocation would be completed at a 1:1 ratio for the other parcels outside of the litigation parcels as allowed by the TRPA Code of Ordinances. Coverage relocation would be in compliance with Dillingham settlement agreement and as allowed by the TRPA Code of Ordinances. Additionally, due to the overall reduction in coverage this impact would be* ***beneficial****.*

The public access infrastructure and enhancement elements of Alternative 4 (the moderate recreation alternative) would involve removing and relocating land coverage in the study area (Table 3.6-5). This coverage would be concentrated around the perimeter of the study area, in LCDs 1band 7. The restoration and enhancement elements of Alternative 4 would remove coverage associated with a user-created network of trails currently found generally around the study area's perimeter and in much of the interior of the eastern half of the study area around Trout Creek (Exhibit 3.6-2). In general, created coverage would be designed to reduce existing effects on sensitive resources, and/or would be situated in less-sensitive locations than the existing user-created trails that would be removed.

The proposed coverage would include trails, viewpoints, and boardwalks. Coverage is typically regulated by Bailey's Land Capability Districts but because of the Dillingham Settlement Agreement (1988) coverage on portions of this study area are legally determined, while other portions are regulated by the typical methods.

In this case, Parcels 3, 4, and 5 (map reference) of the Settlement Agreement is allowed a total coverage amount of 441,963 regardless of parcel boundaries. The project would remove 54,624 square feet of verified coverage and add 37,500 – 76,622 square feet (depending on widths of trails). Although this could result in an increase in coverage it still would be significantly less than the total allowed coverage of 441,963.

For all other parcels in the study area there are two LCD's, 1b and 7, in which coverage is proposed to be relocated. For LCD 1b, 60,745 square feet of verified coverage (volunteer trails restored) would be removed (Table 3.6-4) while 11,133 – 15,151 square feet (depending on trail widths) would be added. This would reduce coverage by 49,612 – 45,594 square feet and is significantly less than the allowed coverage of 194,977 square feet (Table 3.6-3). For LCD 7, 13,006 square feet of verified coverage (volunteer trails restored) would be removed (Table 3.6-4) while 21,642 – 23,160 square feet (depending on trail widths) would be added. While this would increase coverage by 8,636 – 10,154 square feet it is significantly less than the allowed coverage of 284,069 square feet (Table 3.6-3). Unlike Alternatives 1–3, Alternative 4 would not remove coverage from the TKPOA Corporation Yard. Consequently, the overall reduction in coverage would be less. Coverage relocation would be completed at a 1:1 ratio for the other parcels outside of the litigation parcels as allowed by the TRPA Code of Ordinances. Because the coverage proposed under Alternative 2 is consistent with the Dillingham Settlement Agreement and the Code of Ordinances and less than the existing amount, this impact would be **beneficial**.

Alternative 5: No-Project/No-Action

IMPACT 3.6-1 (Alt. 5) **Soil Erosion, Sedimentation, and Loss of Topsoil. (CEQA 2, 3; TRPA 2, 3, 4)** *The topography, soils, vegetation, and drainage within the study area would not be modified under Alternative 5. Rates of soil erosion, sedimentation and loss of topsoil would remain comparable to existing conditions and no additional soil erosion, sedimentation, or loss of topsoil would occur as a result of construction activities. Thus, this impact would be* ***less than significant****.*

The topography, soils, vegetation, and drainage within the study area would not be modified under Alternative 5; therefore, soil erosion, sedimentation, and loss of topsoil within the study area would be similar to existing conditions. This impact would be **less than significant**.

IMPACT 3.6-2 (Alt. 5) **Risks to People and Structures Caused by Strong Seismic Ground Shaking. (CEQA 1, 3; TRPA 6, 7)** *Potentially active faults in the project vicinity could subject recreational users within the study area to damage from strong seismic ground shaking. Under Alternative 5, there would be no construction of restoration, recreation infrastructure, or public access features, so existing risks from strong seismic ground shaking would continue. No additional risks from project activities would occur. Thus,* **no impact** *would occur.*

No restoration, recreation infrastructure, or public access features would be constructed under Alternative 5; therefore, this alternative would not increase risks to people or structures related to seismic ground shaking. **No impact** would occur.

IMPACT 3.6-3 (Alt. 5) **Changes in Land Coverage. (TRPA 5)** *Under Alternative 5, no construction of restoration, recreation infrastructure, public access, or enhancement features would be completed. Existing coverage would continue to include 140,190 square feet on Parcels 3, 4, and 5 (Dillingham Settlement Agreement). All other parcels would continue to include 60,745 square feet in LCD 1b, and 13,006 square feet in LCD 6. This impact would be* ***less than significant****.*

No facilities or restoration activities would be constructed under Alternative 5; therefore, there would be no changes to land coverage within the study area. Existing coverage would continue to include 140,190 square feet in Dillingham Settlement Agreement Parcels 3, 4, and 5. All other parcels would continue to include 60,745 square feet in LCD 1b, and 13,006 square feet in LCD 6. This impact would be **less than significant.**

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3.7 HUMAN HEALTH / RISK OF UPSET

This section evaluates the potential risks to human health from hazardous materials, fire hazards, hazards to aviation, and public health impacts associated with implementation of the project. This section describes the regulatory background and existing environmental conditions in the study area and identifies potential impacts of the proposed alternatives and mitigation measures that would reduce those impacts to less-than-significant levels. Cumulative impacts are presented in Section 3.18, "Cumulative Impacts."

3.7.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

Federal laws and regulations for the following topics related to human health and risk of upset are relevant to the proposed alternatives and described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- Hazardous Materials Management
- Transport of Hazardous Materials
- Worker Safety
- Airspace Safety
  - Obstructions and Airport Land Use Compatibility
  - Wildlife Hazards.

State

State laws and regulations for the following topics related to human health and risk of upset are relevant to the proposed alternatives and described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- Hazardous Materials Management
- Transport of Hazardous Materials and Emergency Response Plan
- Worker Safety
- Airspace Safety
- Wildfire Hazard Management.

Tahoe Regional Planning Agency

Goals and Policies

The 1987 Regional Plan does not include any goals or policies related to hazardous materials, worker safety, airspace safety, or vector control (TRPA 2006); however, it does include the following policy related to wildfire hazards under Goal 1 in the "Natural Hazards" section of Chapter 2 (Land Use Element):

- **Policy 3:** Inform residents and visitors of the wildfire hazard associated with occupancy in the Basin. Encourage use of fire resistant materials and fire preventative techniques when constructing structures, especially in the highest fire hazard areas. Manage forest fuels to be consistent with state laws and other goals and policies of this plan.

Code of Ordinances

Section 61.3.6.D of the TRPA Code of Ordinances (adopted November 15, 2011, effective March 1, 2012) (TRPA 2011) provides the following guidance related to hazards and hazardous materials that is applicable to the project:

> **Vegetation Management to Prevent the Spread of Wildfire:** Within areas of significant fire hazard, as determined by local, state or federal fire agencies, flammable or other combustible vegetation shall be removed, thinned, or manipulated in accordance with local and state law. Revegetation with approved species or other means of erosion control may be required where vegetative ground cover has been eliminated or where erosion problems may occur.

City of South Lake Tahoe

The *Lake Tahoe Airport Comprehensive Land Use Plan* (CLUP) establishes planning boundaries for the Lake Tahoe Airport and defines compatible types and patterns of future land uses that might occur in the area surround the airport (CSLT 2007). The purpose of the CLUP is to provide the Lake Tahoe Airport area with compatibility guidelines for height, noise, and safety.

The CLUP designates airport safety zones to the land surrounding the airport to minimize the number of people exposed to aircraft crash hazards. This is accomplished by enforcing land use restrictions in the safety zones. The CLUP designates three safety zones:

- the clear zone, which is near the runway and is the most restrictive;
- the approach/departure zone, which is located under the takeoff and landing slopes for each runway, extends outward for 5,000 feet from Runway 36 (with a width of 500–1,500 feet) and 10,000 feet from Runway 18 (with a width of 1,010–3,500 feet), and is less restrictive than the clear zone; and
- the overflight zone, which is the area overflown by aircraft during the normal traffic pattern, extends in all directions 5,000 feet from the center of each end of each runway, and is the least restrictive.

The southeastern portion of the study area between the Highland Woods subdivision and Trout Creek is within the approach/departure zone.

El Dorado County

El Dorado County Vector Control District

In 1915, the California Legislature adopted the Mosquito Abatement Act (now incorporated into the California Health and Safety Code as Chapter 5 of Division 3), which formed the basis for the creation, function, and governing powers of mosquito abatement districts. Mosquito abatement/vector control districts are local governmental organizations responsible for controlling specific disease vectors within their jurisdictions. They are authorized to conduct surveillance for vectors, prevent the occurrence of vectors, and abate production of vectors, on both private and public properties. Vector control districts also review, comment, and make recommendations regarding federal, state, or local land-use planning and environmental quality processes, documents, permits, licenses, and entitlements for projects and their potential effects with respect to vector production.

These districts receive most of their revenue from property taxes and are primarily responsible for controlling mosquitoes as pest species and as disease vectors. California law requires that if a problem source of mosquito production exists as a result of human-made conditions, the party responsible for those conditions is liable for the cost of abatement.

The El Dorado County Vector Control District (EDCVCD) was formed in 1963. EDCVCD is a division of the Environmental Management Department of El Dorado County. EDCVCD's service area encompasses 195 square miles, including the study area. The mission of EDCVCD is to provide vector control services and protect the public health and safety with minimal impact on the environment (EDCDEM 2012a).

El Dorado County Hazardous Materials Division

Chapter 8.40 of Title 8 of the El Dorado County Ordinance Code, Section 4332, requires any property owner with an underground storage tank (UST) that contains hazardous materials to obtain a permit from EDCDEM. Attachments A–D to Ordinance 4332 present requirements for construction activities surrounding USTs, as well as sampling approach/analysis and closure requirements. General requirements for construction activities surrounding a UST include erosion control, site safety, licensing requirements, and winter restrictions within the Lake Tahoe Basin.

ENVIRONMENTAL SETTING

Hazardous Materials

Definitions

For purposes of this section, the term "hazardous materials" refers to both hazardous substances and hazardous wastes. A hazardous material is defined by Federal regulations as "a substance or material that…is capable of posing an unreasonable risk to health, safety, and property when transported in commerce" (49 CFR 171.8). Section 25501 of the California Health and Safety Code defines a hazardous material as follows:

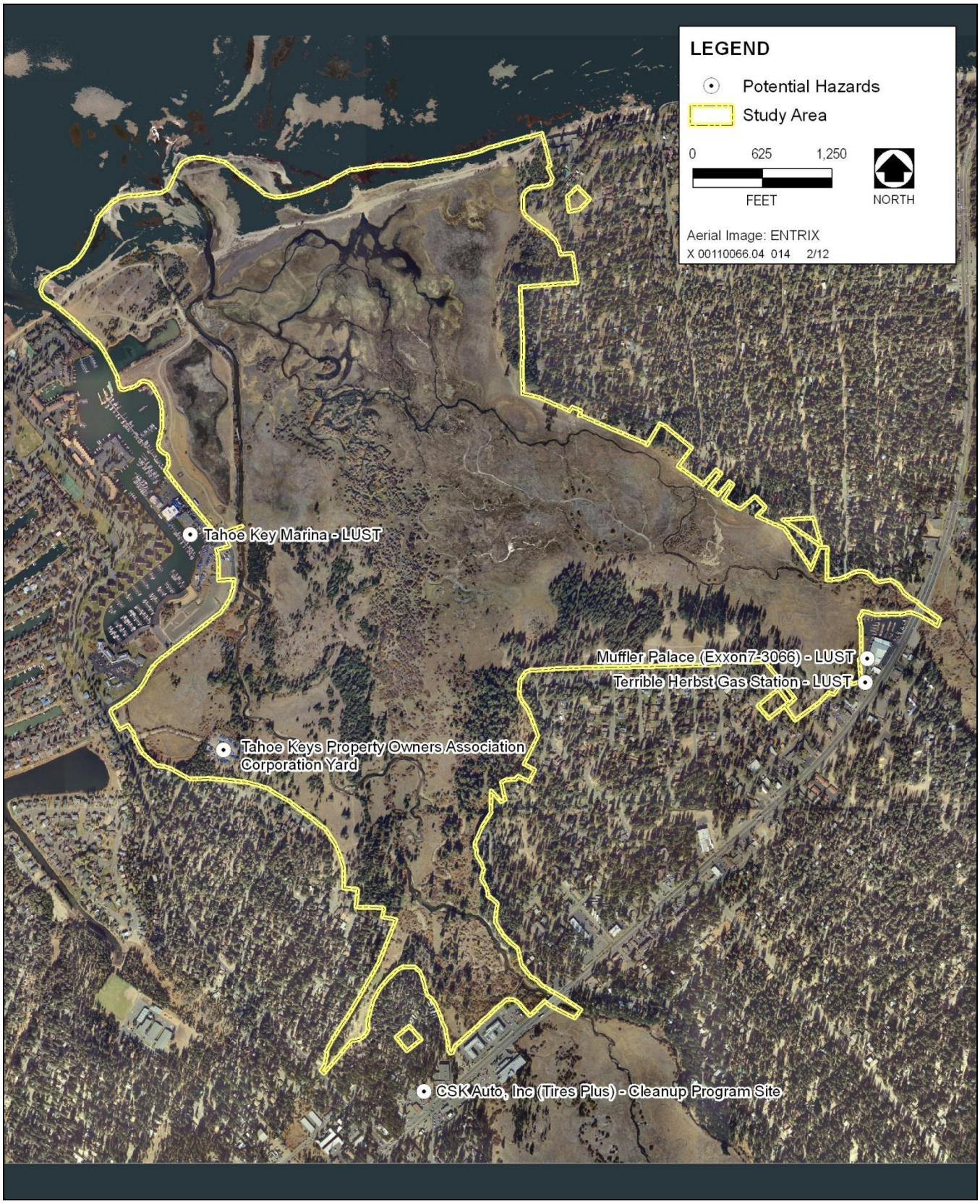
> Hazardous material means any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

Hazardous wastes are defined in Section 25141(b) of the California Health and Safety Code as wastes that:

> …because of their quantity, concentration, or physical, chemical, or infectious characteristics, [may either] cause, or significantly contribute to an increase in mortality or an increase in serious illness[, or] pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Potential Sources of Hazardous Materials in the Vicinity of the Study Area

The study area has been altered from its original condition as a result of human activities (logging; livestock grazing; road construction; and residential, commercial, and industrial developments). Thus, human-generated, hazardous wastes could exist within the study area. A search was performed by AECOM in 2008, and was updated in 2012, of the Geotracker database (the State Water Resources Control Board [SWRCB] information management system related to groundwater). Data relating to leaking underground storage tanks, and associated cleanup activities, are part of the information that SWRCB is required to maintain under California Public Resources Code (PRC) Section 65962.5 (i.e., the "Cortese List"). This search resulted in identification of three leaking underground storage tanks and one other site designated as an "Other Water Board Cleanup Site" close to, but not within the study area (SWRCB 2012). Exhibit 3.7-1 illustrates, and Table 3.7-1 lists, sites known by the SWRCB to be close to the study area.



Source: SWRCB 2012

Exhibit 3.7-1 **Known Hazardous Materials Sites within and near the Study Area**

Table 3.7-1 State Water Resources Control Board Potential Contamination Sites				
Site	**Designation**	**Potential Contaminant**	**Potential Media Affected**	**Cleanup Status**
Tahoe Keys Marina	LUST	Gasoline	Surface water	Remediation
Muffler Palace	LUST	Perchloroethylene	Aquifer/drinking water	Site assessment
Terrible Herbst Gas Station	LUST	Gasoline, waste oil/motor/ hydraulic/lubricant	Aquifer/drinking water	Verification monitoring
Berry/Hinckley Industries Bulk Fuel Plant	Cleanup program site	Diesel, gasoline	Aquifer/drinking water	Verification monitoring
Note: LUST = leaking underground storage tank Source: SWRCB 2012				

The *Hazardous Waste and Substances Site List* (i.e., the "EnviroStor" database) is maintained by the California Department of Toxic Substances Control (DTSC) as part of the requirements of PRC Section 65962.5. A search of this list by AECOM in 2012 indicated that DTSC has no records of hazardous waste sites for South Lake Tahoe (DTSC 2012).

There is one Superfund site within the South Lake Tahoe area: the Meyers Landfill, located on Forest Road No. 1204 (i.e., "Garbage Dump Road") south of Pioneer Trail, approximately 2.5 miles south of the study area. The Meyers Landfill was operated by El Dorado County under a Forest Service Special Use Permit from approximately 1955 to 1971. Groundwater beneath the landfill has been contaminated by water leaching through the decomposing landfill waste. This has resulted in a groundwater contaminant plume that currently extends approximately 1,600 feet downgradient (i.e., northeast) from the landfill. The primary contaminants of concern are vinyl chloride (a carcinogen) and related volatile organic compounds (VOCs). The landfill itself has been covered with a cap of clean soil and a geomembrane layer, along with drainage improvements, to prevent further water infiltration through the landfill and into the groundwater. A series of groundwater monitoring wells have been installed and groundwater studies are ongoing. (EPA 2009; USFS 2009, 2010).

EPA maintains records of small- and large-quantity generators of hazardous waste pursuant to the Resource Conservation and Recovery Act through a national program management and inventory system about hazardous waste handlers. Small-quantity generators produce between 220 and 2,200 pounds of hazardous waste per month; large-quantity generators produce more than 2,200 pounds of hazardous waste or more than 2.2 pounds of acutely hazardous waste per month. This information is available to the public through EPA's EnviroMapper database (EPA 2012). Although no large-quantity generators are located near the study area, a number of small-quantity generators are located in the immediate vicinity of the study area, the closest of which are listed below:

- Pacific Bell (now AT&T), 2633 Sussex Avenue
- Rite Aid Drugstore No. 6107, 1020 Al Tahoe Boulevard

Potential Sources of Hazardous Materials in the Study Area

The only portion of the study area in which hazardous materials are currently used and stored is the TKPOA Corporation Yard. The TKPOA Corporation Yard is approximately 3.3 acres and is used primarily to store maintenance equipment, including several outboard motor boats, pickup trucks, and occasionally a backhoe. Hazardous materials are stored in on-site storage containers or within one of two storage sheds. The corporation yard is also used as a transfer point for milfoil weeds harvested from the Tahoe Keys Marina and its waterways. Hazardous materials stored on-site are limited to common hazardous substances, including fuel, lubricants such as oil, and solvents such as paint (Kleinfelder 2009).

The TKPOA Corporation Yard formerly operated fueling activities at the site and properly abandoned a 2,000-gallon UST in place by filling it with concrete (EDCDEM 2010). Soil contaminated with petroleum, which was located near the maintenance shop, was excavated in 2002 and 2003. The results of a Phase II Environmental Site Assessment performed in October 2009 indicated that previous excavation activities had not removed all the contaminated soil, and one of the groundwater samples for Total Petroleum Hydrocarbons in the gasoline range exceeded the allowable maximum contaminant level (Kleinfelder 2009). Therefore, upon completion of the Phase II Environmental Site Assessment, 91.62 tons of soil contaminated with petroleum was excavated from the maintenance shop and UST locations. Two monitoring wells were installed in 2010 and groundwater sampling results over two quarters indicated that groundwater was not affected in the areas where soil was excavated. A public notice stating the site did not pose a threat to human health or the environment was released by El Dorado County on October 22, 2010 (EDCDEM 2010).

Schools within One-Quarter Mile of the Study Area

Appendix G of the State CEQA Guidelines recommends that an EIR consider whether a project might emit or handle hazardous materials within one-quarter mile of an existing or proposed school. Four schools exist within one-quarter mile of the study area:

- Jubilee Preschool, approximately 0.24 mile from the study area
- Saint Theresa Catholic School (kindergarten through 8th grade), approximately 0.2 mile from the study area
- South Tahoe Middle School, approximately 0.2 mile from the study area
- Blue Ridge School, approximately 0.18 mile from the study area

Wildlife Hazards to Aviation

The Lake Tahoe Airport is located approximately 1 mile southwest of the nearest edge of the study area. The airport is equipped to be a commercial air carrier/general-aviation airport owned and operated by the CSLT, although it does not currently support commercial flights and there is no commercial operator at the airport. The airport includes one north-south asphalt runaway, which is 8,544 feet long by 150 feet wide (CSLT 2007).

The Lake Tahoe Airport is adjacent to the Upper Truckee River and its corridor of aquatic, wetland, riparian, and upland habitats that extends from upstream of the airport through South Lake Tahoe to the lake. The airport's location in this corridor, its proximity to Lake Tahoe, and the extensive areas of natural vegetation nearby create the potential for hazardous wildlife movement through the airport's clear, approach/departure, and overflight zones.

The study area provides habitat for several groups of species that can be hazardous to aviation (FAA 2007):

- *Waterfowl.* This group includes all ducks, geese, and swans. Although not strictly waterfowl, rails and grebes are also included in this guild. Most of the study area, including the river corridor, Sailing Lagoon and other open water, and wet and montane meadows, provides habitat for waterfowl.

- *Gulls.* The beach and dune, Sailing Lagoon and other open water, disturbed areas, and to a lesser extent, most other land cover types provide habitat for gulls.

- *Sparrows, Larks, and Finches.* Species in this group forage throughout most of the study area, and also breed in most land cover types.

- *Raptors.* Several species of raptors use the study area. The open cover types (e.g., montane and wet meadows) provide foraging habitat, and the lodgepole pine and Jeffrey pine forests provide perch sites and some nesting habitat for raptors.

- *Swallows*. Swallows are summer migrants, present from spring to early fall. The river and creek corridors, Sailing Lagoon and other open water, beach and dune, wetlands, and the wet and montane meadows all provide foraging habitat for swallows. Postbreeding flocks of swallows can be present in late summer, particularly when flying insects are abundant.

- *Blackbirds and starlings*. The disturbed areas, and to a lesser extent the beach, dune, and meadows in the study area provide foraging habitat for blackbirds and starlings. All species in this guild are gregarious and can form large flocks.

- *Corvids*. This guild includes ravens, magpies, and jays. Most of the study area provides habitat for these species.

- *Columbids*. Only two species in this guild occur at the study area: rock pigeon and mourning dove. In the study area, disturbed areas, the beach and dune, and to a lesser extent the montane meadows, provide habitats for columbids.

- *Wading birds*. This guild includes herons and egrets. The Upper Truckee River and Trout Creek, the margins of the Sailing Lagoon and of other open water, and wetlands in the study area provide habitat for wading birds.

Section 3.4, "Biological Resources: Vegetation and Wildlife," provides additional information on the use by hazardous wildlife of land cover within the study area. Habitat for these species groups is provided not only in the study area, but also outside of the study area in a large portion of the clear, approach/departure, and overflight zones, and in most of the 10,000-foot-wide Critical Zone (within which the Federal Aviation Administration (FAA) recommends minimizing attractants of hazardous wildlife).

Despite the presence of extensive habitat for hazardous wildlife in its vicinity, bird-plane collisions (i.e., bird strikes) have not been a problem at the Lake Tahoe Airport. There are no records of bird strikes at the Lake Tahoe Airport in the FAA Wildlife Strike Database (FAA 2012) or within the memory of airport staff (Camp Dresser and McKee [CDM] 2007).

Wildland Fire Hazards

Fire Hazards

Jeffrey pine and lodgepole pine forests cover portions of the study area adjacent to the Tahoe Island, Highland Woods, and Al Tahoe subdivisions (see Exhibit 3.4-1). Conditions within these forests affect the level of fire hazards in these adjacent neighborhoods.

Fires spread as a series of ignitions that occur when heat is transferred from burning fuel to adjacent fuels and raise the temperature of that adjacent fuel, causing it to ignite. Heat is transferred by contact with flames, radiated heat, and flying embers. These transfers of heat (and thus fire hazards) are affected by the arrangement (and moisture content) of woody debris and plants.

The Conservancy implements treatments to reduce the fire hazards posed by forest vegetation in the study area. Treatments include removing shrubs and trees to increase the spacing between tree crowns and the distance between understory vegetation (i.e., herbaceous plants, shrubs, and smaller tree saplings) and the tree canopy, and to reduce the total amount of vegetation and dead wood (USFS et al. 2007). Such treatments would reduce the severity and rate of spread of a fire.

Fuel Management

Forest vegetation on Conservancy property that poses fuel hazards is removed by the Conservancy. Since the Conservancy acquired majority ownership of the study area in 2000, fuel reduction efforts have focused primarily on removal of vegetation reported by citizens as dead or dying. Citizen requests for removal of vegetation in the study area perceived to be a potential fuel hazard increased after the Angora fire (June 2007), prompting the Conservancy to include the study area on the agency's fuel hazard reduction list in Summer 2007. The Conservancy flags vegetation within the study area and on nearby Conservancy-owned parcels, such as those parcels scattered among the privately owned residential parcels in the Al Tahoe neighborhood. Once vegetation is marked, the Conservancy is responsible for removal of fuels and periodic maintenance.

Mosquito Hazards

Mosquito Ecology

The life cycle of the mosquito consists of four stages: egg, larva, pupa, and adult (California Department of Public Health [CDPH] 2008:5–8). The egg, larva, and pupa stages are completed in calm, standing water in permanent, seasonal, or intermittent waters, including seasonal and permanent wetlands, and even in small isolated waters such as drying pools of ephemeral drainages, tire ruts, and artificial containers. Larvae hatch from eggs in water and feed on organic matter and microorganisms, such as bacteria. Fish and predatory insects feed on mosquito larva, and greatly reduce their abundance in permanent bodies of water. The pupa stage lasts several days, during which the larva changes into an adult. Seasonal and environmental conditions determine the length of time it takes for larval mosquitoes to complete their development; some species develop faster than others under the same conditions. Depending on average temperatures, it may take from four days to a month for the mosquito to mature from egg to adult; with warmer temperatures, development accelerates.

Adults may remain close to where they hatched or may disperse from several hundred yards to several miles, depending on the species (Walton 2003:2, CDPH 2008:Appendix D). Female mosquitoes require meals of blood for protein, so that they can produce eggs (CDPH 2008:5). Hosts that can supply blood include reptiles, amphibians, mammals (including humans), and birds. Most adult females live for about two weeks, though some may survive longer, and those that emerge late in the season may hibernate through the winter to begin laying eggs in the spring.

Common mosquitoes in the Tahoe Basin include species in the genus *Aedes* that breed in the standing water that results from melting snow; species in the genus *Culiseta* that breed in ponds, basins, and human-made containers; and *Culex tarsalis*, the "encephalitis mosquito" that can transmit to humans viruses that can cause encephalitis (an inflammation of the brain) (EDCDEM 2012b). The immature stages of *C. tarsalis* can develop in almost any standing freshwater (CDPH 2008).

All mosquito species are potential vectors of organisms that can cause disease to pets, domestic animals, wildlife, or humans (El Dorado County 2008). Public concern regarding West Nile virus, a disease transmitted to humans by mosquitoes (including *C. tarsalis*), has increased since the virus was first detected in the United States in 1999. A mosquito first acquires West Nile virus by feeding on a bird with the virus in its blood. Most people and animals that are infected with the virus have mild symptoms or none. In rare cases, the virus can cause encephalitis. West Nile Virus has been detected in the vicinity of the study area.

Mosquito Control

The study area is within EDCVCD's monitoring zone, and most of the study area is recognized as a breeding ground for mosquitoes. EDCVCD technicians identify and monitor mosquito breeding sources at least every 2 weeks from March through September. In years of especially heavy precipitation, some portions of the study area are especially prone to being inundated with standing water for long periods of time. Larvacides have been applied to standing water bodies within the study area. Treatments contain either methoprene, which mimics an

insect growth hormone to prevent adult mosquito development, or the bacterium *Bacillus thuringiensis israelensis*, which produces toxins that target mosquito larvae and other insects. The type and quantity of larvacide used is regulated by the California Department of Pesticide Regulation.

3.7.2 Environmental Consequences and Mitigation Measures

Significance Criteria

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; the TRPA Initial Environmental Checklist; factual or scientific information and data; and regulatory standards of Federal, State, and local agencies. These criteria also encompass the factors taken into account under NEPA to determine the significance of an action in terms of the context and intensity of its effects.

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant impact related to hazards or hazardous materials if it would:

- create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials (CEQA 1);
- create a significant hazard to the public or the environment through reasonably foreseeable upset and/or accident conditions involving the release of hazardous materials into the environment (CEQA 2);
- emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school (CEQA 3);
- be located on a site that is included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment (CEQA 4);
- be located within an airport land use plan, or within 2 miles of a public airport or public-use airport that would result in a safety hazard for people residing or working in the project area (CEQA 5);
- impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan (CEQA 6); or
- expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands (CEQA 7).

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative was determined to have a significant impact related to hazards and/or hazardous materials if it would:

- involve a risk of explosion or the release of hazardous substances (TRPA 1);

- create a health hazard or potential health hazard (TRPA 2); or
- expose people to potential health hazards (TRPA 3).

METHODS AND ASSUMPTIONS

This analysis considers the range and nature of foreseeable use, storage, and disposal of hazardous materials resulting from the project alternatives and the No-Project/No-Action Alternative, and identifies the primary ways that these hazardous materials could expose individuals or the environment to health and safety risks. As discussed above, compliance with applicable federal, state, and local health and safety laws and regulations by residents and businesses in the project vicinity would generally protect public health and safety. State and local agencies would be expected to continue to enforce applicable requirements to the extent that they do now.

The following reports documenting potential hazardous conditions in the study area were reviewed for this analysis:

- applicable land use plans;
- available literature, including documents published by federal, state, county, and city agencies; and
- applicable elements from the *El Dorado County General Plan*.

The information obtained from these sources was reviewed and summarized to establish existing conditions and to evaluate the significance of potential environmental impacts, based on the significance criteria presented above. In determining the level of significance, this analysis assumes that construction and operation of any alternative would comply with relevant federal, state, regional, and local ordinances and regulations.

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Hazardous Materials Sites (CEQA 4)—There are no hazardous materials sites subject to compliance with Government Code Section 65962.5 in the study area.

Emergency Plans (CEQA 6)—No alternatives would impair implementation of or physically interfere with an adopted emergency response plan or evacuation plan.

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.7-1 (Alt. 1) **Potential Hazards to the Public from Use of Hazardous Materials. (CEQA 1, 2; TRPA 1, 2, 3)** *Alternative 1 would involve the storage, use, and transport of hazardous materials in the study area during construction activities. However, as described in Environmental Commitments 5 and 6, the Conservancy would develop construction site management plans and comply with Federal, State, and local regulations related to hazardous materials to avoid or minimize potential impacts on health and safety during project construction. Thus, significant hazards to the public would not be created during construction through routine transport, storage, use, disposal, and risk of upset. This impact would be* ***less than significant****.*

Alternative 1 would involve the storage, use, and transport of hazardous materials (e.g., fuels, oils, lubricants) during construction activities. However, to avoid or minimize potential impacts on health and safety during project construction, the Conservancy would implement Environmental Commitment (EC) 5, "Prepare and Implement Effective Construction Site Management Plans to Minimize Risks of Water Quality Degradation and Impacts to Vegetation," and EC 6, "Obtain and Comply with Federal, State, Regional, and Local Permits," described in Table 2-6 in Chapter 2. Transport of hazardous materials on area roadways is regulated by the California Highway Patrol and Caltrans, whereas use of these materials is regulated by DTSC, as outlined in Title

22 of the California Code of Regulations. The Conservancy, contractors, and others would be required to use, store, and transport hazardous materials in compliance with federal, state, and local regulations during project construction and operation. Activities that would use hazardous materials on-site after the project is constructed would be required to obtain permits and comply with appropriate regulatory agency standards and permit requirements designed to avoid releases of hazardous waste. No hazardous materials are expected to be needed after project completion. Because the project would implement and comply with existing hazardous-materials regulations (e.g., regulations administered by Cal OSHA, DTSC) and permit requirements, impacts related to creation of significant hazards to the public through routine transport, use, disposal, and risk of upset would not occur with project development. Therefore, this impact would be **less than significant**.

IMPACT 3.7-2 (Alt. 1) **Potential Hazards to Human Health from Exposure to Existing On-Site Hazardous Materials. (CEQA 2; TRPA 1, 2, 3)** *Alternative 1 could expose construction workers to hazardous materials present on-site during construction activities at the TKPOA Corporation Yard and hazardous materials on-site could create an environmental or health hazard if left in place. As described in Environmental Commitment 9, the Conservancy would develop and implement a construction management program; however, this impact would be* ***potentially significant****.*

The only portion of the study area in which hazardous materials are currently used and stored is the TKPOA Corporation Yard. Hazardous materials are stored in on-site storage containers or within one of two storage sheds. Hazardous materials stored on-site are confined to common hazardous substances, including fuel, lubricants such as oil, and solvents such as paint. In the past, although applicable regulations may have been followed, spills of hazardous materials may have occurred and contaminated soil at the TKPOA Corporation Yard. Furthermore, TKPOA Corporation Yard formerly operated fueling activities at the site and properly abandoned a 2,000-gallon UST in place by filling it with concrete. Soil contaminated with petroleum near the maintenance shop was excavated in 2002 and 2003. As part of a Phase II Environmental Site Assessment performed in 2009, 91.62 tons of soil contaminated with petroleum were excavated from the maintenance shop and UST locations. Two monitoring wells were installed in 2010 and groundwater sampling results over two quarters indicated that groundwater was not affected in the areas of soil excavation. A public notice stating the site did not pose a threat to human health or the environment was released by El Dorado County on October 22, 2010 (El Dorado County 2010).

Movement of stored hazardous materials and fill materials from the TKPOA Corporation Yard would occur during construction of restoration features; consequently, construction workers might be exposed to existing on-site hazardous materials at the corporation yard. To avoid or minimize potential impacts on health and safety during project construction, the Conservancy would implement EC 9, "Develop and Implement a Construction Management Program," described in Table 2-6 in Chapter 2; however, implementing EC 9 would not be sufficient to avoid all potential hazards to human health from exposure to on-site hazardous materials. Therefore, this impact would be **potentially significant**.

Mitigation Measure 3.7-2a (Alt. 1): Prepare and Implement a Health and Safety Plan and Provide Qualified Oversight of Fill Removal Related to Excavation Activities at the Corporation Yard.

- The Conservancy and their contractor(s) will develop and implement a health and safety plan (HASP) that clearly notifies all workers of the potential to encounter hazardous materials during demolition and construction activities. The HASP will identify proper handling and disposal procedures for contaminants expected to be on-site as well as maps and phone numbers for local hospitals and other emergency contacts. All protocols outlined in the HASP will be complied with throughout project implementation.

- Any stored hazardous materials present in the study area will be removed and disposed at appropriately permitted locations prior to construction. A qualified professional (e.g., geologist or engineer) will oversee fill excavation activities and abandoned UST tank removal at the Corporation Yard in order to properly identify any potentially contaminated soils. that may be present. Excavation of the UST must comply with El Dorado

County UST Ordinance No. 4332. If contaminated soils are found, implement Mitigation Measure 3.7-2b (Alt 1).

- UST tank removal will include measures that ensure the safe transport, and disposal methods. Remediation actions, if necessary, will be defined, in consultation with the EDCDEM, DTSC, and Lahontan Regional Water Quality Control Board (RWQCB), and implemented during construction.

Mitigation Measure 3.7-2b (Alt. 1): Notify Appropriate Federal, State, and Local Agencies if Contaminated Soils Are Identified, and Complete Recommended Remediation Activities.

To reduce health hazards associated with potential exposure to hazardous substances, the Conservancy would implement the following measures if necessary:

- The Conservancy and its contractor(s) will notify the appropriate federal, state, and local agencies if evidence of previously undiscovered soil or groundwater contamination (e.g., stained soil, odorous groundwater) is encountered during construction activities. Any contaminated areas will be cleaned up in accordance with recommendations made by the EDCDEM, the Lahontan RWQCB, DTSC, or other appropriate federal, state, or local regulatory agencies, as generally described above.

- The Conservancy will prepare a site plan for remediation activities appropriate for proposed land uses, including excavation and removal of on-site contaminated soils, and needed redistribution of clean fill material on the study area. The plan will include measures that ensure the safe transport, use, and disposal of contaminated soil and building debris removed from the site. If contaminated groundwater is encountered during site excavation activities, the construction contractor will report the contamination to the appropriate regulatory agencies, dewater the excavated area, and treat the contaminated groundwater to remove contaminants before discharge into the sanitary sewer system. The construction contractor will be required to comply with the plan and applicable federal, state, and local laws. The plan will outline measures for specific handling and reporting procedures for hazardous materials, and disposal of hazardous materials removed from the site at an appropriate off-site disposal facility.

Significance after Mitigation: Because the removal and remediation of any contaminated soil that may be encountered and the removal of the UST at the TKPOA Corporation Yard would be overseen by the appropriate entities, the potential for exposure to hazardous materials would be substantially reduced. Therefore, with implementation of Mitigation Measure 3.7-2a (Alt. 1) and 3.7-2 (Alt. 1) as described above, Impact 3.7-2 (Alt. 1) would be **less than significant**.

IMPACT 3.7-3 (Alt. 1) **Potential Hazardous Emissions or Handling of Hazardous or Acutely Hazardous Materials, Substances, or Waste within One-Quarter Mile of an Existing or Proposed School. (CEQA 3; TRPA 1, 2, 3)** *Under Alternative 1, some construction activities that involve the handling of hazardous or acutely hazardous materials could occur within one-quarter mile of a school. Also, hazardous materials present on-site may be exposed during construction activities within one-quarter mile of a school. However, as described in Environmental Commitment 9, the school district would be notified about proper handling of hazardous materials related to the project before the EIR/EIS/EIS is certified. This impact would be* ***less than significant****.*

Four schools are located within one-quarter mile of the study area, and under Alternative 1 some construction activities involving the handling of hazardous or acutely hazardous materials could occur within one-quarter mile of these schools. However, during construction activities, the use of hazardous materials would occur in compliance with federal, state, and local regulations. As described in Impact 3.7-1 (Alt. 1), impacts related to creation of hazards through routine transport, storage, use, disposal, and risk of upset would be less than significant. However, as described in Impact 3.7-2 (Alt. 1), hazardous materials could already be present on-site, and if present, may be exposed during construction activities. As described in EC 9 (Table 2-6), the Conservancy and its contractors shall provide written notification of the project to the Lake Tahoe Unified School District, as

required by PRC Section 21151.4, at least 30 days before certification of the EIR/EIS/EIS and shall consult with the school district regarding proper handling and disposal methods associated with substances subject to California Health and Safety Code Section 25532. Therefore, this impact would be **less than significant**.

IMPACT 3.7-4 (Alt. 1) **Potential Increase in Public Health Hazards from Mosquitoes Resulting from Increased Floodplain Inundation. (TRPA 3)** *Alternative 1 would result in more extensive floodplain inundation that could result in greater abundance of mosquitoes; however, as described in Environmental Commitment 10, the Conservancy would continue to coordinate with and support EDCVCD efforts to manage mosquito populations, and thus, not increase the potential for exposure of people to mosquito-borne viruses. This impact would be* ***less than significant****.*

Much of the study area is recognized by EDCVCD as a breeding ground for mosquitoes, and thus, the district monitors the abundance of mosquito larva and implements treatments to control mosquitoes, as necessary. Although the study area already provides existing breeding habitat for mosquitoes, in some years Alternative 1 would increase the extent of floodplain inundation (e.g., the two-year streamflow event would inundate approximately an additional 12 acres [Conservancy 2006:A1]). This additional inundation would increase the extent and duration of calm, standing water in dense vegetation, and therefore, could enhance breeding habitat for mosquitoes. As a result, Alternative 1 could increase mosquito abundance. However, as described in EC 10, "Establish and Implement a Management Agreement with the El Dorado County Vector Control District," described in Table 2-6 in Chapter 2, the Conservancy would continue to coordinate with and support EDCVCD efforts to control mosquito populations in the study area. The Conservancy would coordinate management activities with EDCVCD and implement measures as necessary to ensure necessary access for monitoring and control. Therefore, the potential for exposure of people to mosquito-borne viruses would remain comparable to existing conditions in the study area. This impact would be **less than significant**.

IMPACT 3.7-5 (Alt. 1) **Potential for Airspace Safety Hazards Associated with Restoration and Enhancement of Habitat for Hazardous Wildlife. (CEQA 5)** *Alternative 1 would restore or enhance some habitat for hazardous wildlife in and near the approach/departure zone of the Lake Tahoe Airport. However, extensive habitat attracting hazardous wildlife already exists in the study area, and thus, Alternative 1 is not anticipated to substantially increase the attraction of hazardous wildlife. Also, the CLUP identifies management of timber, fish, and wildlife habitat, as well as SEZ restoration, as compatible land uses for the approach/departure zone. Furthermore, bird-aircraft collisions have not been occurring at the Lake Tahoe Airport, notwithstanding the presence of habitat for hazardous wildlife along the Upper Truckee River at the airport. Therefore, this impact would be* ***less than significant****.*

Existing habitats in the study area are an attractant to wildlife that could potentially pose a hazard to aircraft. Alternative 1 would enhance or restore some habitat for birds that are categorized as hazardous wildlife in terms of the potential for aircraft collisions. In particular, this alternative would increase the extent of floodplain inundation and would modify existing waterways to create lagoon habitat.

This restored habitat would be located at a distance of approximately one mile or more from the airport. The increased floodplain inundation and lagoon restoration would be outside of the approach/departure zone of the Lake Tahoe Airport, but within the 10,000-foot-wide zone where FAA recommends that wildlife attractants be minimized. Bird-attracting habitats are already present in these locations, and enhancement and restoration activities are not anticipated to cause a substantial increase in the attraction of hazardous wildlife.

SEZ restoration, timber management, range management, and management of fish and wildlife habitat are identified in the CLUP as compatible land uses for the clear, approach/departure, and overflight zones of the Lake Tahoe Airport (CSLT 2007:38). Thus, a wide range of management, enhancement, and restoration activities in nearby natural vegetation is considered compatible with the airport's operations.

Furthermore, bird strikes have not historically affected aviation safety at the Lake Tahoe Airport. There are no records of bird-related air strikes in the FAA Wildlife Strike Database (FAA 2012) or within the memory of airport staff (CDM 2007). With or without project implementation, the likelihood of wildlife-aircraft accidents associated with the Lake Tahoe Airport is considered low. Recognizing that bird-aircraft collisions have not been occurring at the Lake Tahoe Airport despite the presence of extensive, immediately surrounding forest, riparian, and meadow habitat, the enhancement of habitat a mile or more from the airport would not substantially change aircraft safety conditions. Because an increase in wildlife-related hazards under Alternative 1 is not expected and the proposed land uses in under Alternative 1 are compatible with the CLUP, this impact would be **less than significant**.

IMPACT 3.7-6 (Alt. 1) **Potential for Wildland Fire Caused by Construction Equipment.** *During the dry summer season, sparks from on-site construction equipment could result in wildland fire. However, as described in Environmental Commitment 9, the Conservancy would develop and implement a fire prevention and management plan to minimize the risk of accidental ignition of wildland fires. Therefore, this impact would be* ***less than significant****.*

During summer, the project site consists of dry annual and perennial grasses and low-growing shrubs. Therefore, the project components would be constructed in an area where the combination of physical and weather factors may lead to a high wildfire hazard. Operation of construction equipment could result in accidental ignition of wildland fires that may pose a significant risk of loss, injury, or death. However, as described in EC 9 (Table 2-6), the Conservancy would develop and implement a fire prevention and management plan to minimize the risk of accidental ignition of wildland fires. This impact would be **less than significant**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.7-1 (Alt. 2) **Potential Hazards to the Public from Use of Hazardous Materials. (CEQA 1, 2 TRPA 1, 2, 3)** *Alternative 2 would involve the storage, use, and transport of hazardous materials in the study area during construction activities. However, as described in Environmental Commitments 5 and 6, the Conservancy would develop construction site management plans and comply with federal, state, and local regulations related to hazardous materials to avoid or minimize potential impacts on health and safety during project construction. Therefore, significant hazards to the public would not be created during construction through routine transport, storage, use, disposal, and risk of upset. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.7-1 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.7-2 (Alt. 2) **Potential Hazards to Human Health from Exposure to Existing On-Site Hazardous Materials. (CEQA 1, 2; TRPA 1, 2, 3)** *Alternative 2 could expose construction workers to hazardous materials present on-site during construction activities at the TKPOA Corporation Yard and hazardous materials on-site could create an environmental or health hazard if left in place. As described in Environmental Commitment 9, the Conservancy would develop and implement a construction management program; however, this impact would be* ***potentially significant****.*

This impact is identical to Impact 3.7-2 (Alt. 1). For the same reasons as described above, this impact would be **potentially significant**.

Mitigation Measure 3.7-2a (Alt. 2): Prepare and Implement a Health and Safety Plan and Provide Qualified Oversight of Fill Removal Related to Excavation Activities at the Corporation Yard.

This mitigation measure is identical to Mitigation Measure 3.7-2a (Alt. 1).

Mitigation Measure 3.7-2b (Alt. 2): Notify Appropriate Federal, State, and Local Agencies if Contaminated Soils Are Identified, and Complete Recommended Remediation Activities.

This mitigation measure is identical to Mitigation Measure 3.7-2b (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measure 3.7-2a (Alt. 2) and 3.7-2b (Alt. 2), Impact 3.7-2 (Alt. 2) would be **less than significant**.

IMPACT 3.7-3 (Alt. 2) **Potential Hazardous Emissions or Handling of Hazardous or Acutely Hazardous Materials, Substances, or Waste within One-Quarter Mile of an Existing or Proposed School. (CEQA3; TRPA 1, 2, 3)** *Under Alternative 2, some construction activities that involve the handling of hazardous or acutely hazardous materials could occur within one-quarter mile of a school. Also, hazardous materials present on-site may be exposed during construction activities within one-quarter mile of a school. However, as described in Environmental Commitment 9, the school district would be notified in regards to handling of hazardous materials related to the project before the EIR/EIS/EIS is certified. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.7-3 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.7-4 (Alt. 2) **Potential Increase in Public Health Hazards from Mosquitoes Resulting from Increased Floodplain Inundation. (TRPA 3)** *Alternative 2 would result in more extensive floodplain inundation that could result in greater abundance of mosquitoes. However, as described in Environmental Commitment 10, the Conservancy would continue to coordinate with and support EDCVCD efforts to manage mosquito populations, and thus, not increase the potential for exposure of people to mosquito-borne viruses. This impact would be* ***less than significant****.*

This impact is similar to Impact 3.7-4 (Alt. 1), but would increase floodplain inundation acreage more than Alternative 1. (For example, the two-year streamflow event under Alternative 2 would inundate an additional 63 acres, compared with an additional 12 acres under Alternative 1 [Conservancy 2006:A1].) Nonetheless, for the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.7-5 (Alt. 2) **Potential for Airspace Safety Hazards Associated with Restoration and Enhancement of Habitat for Hazardous Wildlife. (CEQA 5)** *Alternative 2 would restore or enhance some habitat for hazardous wildlife in and near the approach/departure zone of the Lake Tahoe Airport. However, extensive habitat attracting hazardous wildlife already exists in the study area, and thus, Alternative 1 is not anticipated to substantially increase the attraction of hazardous wildlife. Also, the CLUP identifies management of timber, fish, and wildlife habitat, as well as SEZ restoration, as compatible land uses for the approach/departure zone. Furthermore, bird-aircraft collisions have not been occurring at the Lake Tahoe Airport, notwithstanding the presence of the Upper Truckee River riparian corridor habitat near the airport. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.7-5 (Alt. 1), but slightly greater than Alternative 1 because Alternative 2 would inundate a greater acreage during 2-year streamflow events. However, for the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.7-6 (Alt. 2) **Potential for Wildland Fire Caused by Construction Equipment.** *During the dry summer season, sparks from on-site construction equipment could result in wildland fire. However, as described in Environmental Commitment 9, the Conservancy would develop and implement a fire prevention and management plan to minimize the risk of accidental ignition of wildland fires. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.7-6 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.7-1 (Alt. 3) **Potential Hazards to the Public from Use of Hazardous Materials. (CEQA 1, 2; TRPA 1, 2, 3)** *Alternative 3 would involve the storage, use, and transport of hazardous materials in the study area during construction activities. However, However, as described in Environmental Commitments 5 and 6, the Conservancy would develop construction site management plans and comply with federal, state, and local regulations related to hazardous materials to avoid or minimize potential impacts on health and safety during project construction. Therefore, significant hazards to the public would not be created during construction through routine transport, storage, use, disposal, and risk of upset. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.7-1 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.7-2 (Alt. 3) **Potential Hazards to Human Health from Exposure to Existing On-Site Hazardous Materials. (CEQA 2; TRPA 1, 2, 3)** *Alternative 3 could expose construction workers to hazardous materials present on-site during construction activities at the TKPOA Corporation Yard, and hazardous materials on-site could create an environmental or health hazard if left in place. As described in Environmental Commitment 9, the Conservancy would develop and implement a construction management program; however, this impact would be* ***potentially significant****.*

This impact is identical to Impact 3.7-2 (Alt. 1). For the same reasons as described above, this impact would be **potentially significant**.

Mitigation Measure 3.7-2a (Alt. 1): Prepare and Implement a Health and Safety Plan and Provide Qualified Oversight of Fill Removal Related to Excavation Activities at the Corporation Yard.

This mitigation measure is identical to Mitigation Measure 3.7-2a (Alt. 1).

Mitigation Measure 3.7-2b (Alt. 1): Notify Appropriate Federal, State, and Local Agencies if Contaminated Soils Are Identified, and Complete Recommended Remediation Activities.

This mitigation measure is identical to Mitigation Measure 3.7-2b (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measure 3.7-2a (Alt. 3) and 3.7-2b (Alt. 3), Impact 3.7-2 (Alt. 3) would be **less than significant**.

IMPACT 3.7-3 (Alt. 3) **Potential Hazardous Emissions or Handling of Hazardous or Acutely Hazardous Materials, Substances, or Waste within One-Quarter Mile of an Existing or Proposed School. (CEQA 2; TRPA 1, 2, 3)** *Under Alternative 3, some construction activities that involve the handling of hazardous or acutely hazardous materials could occur within one-quarter mile of a school. Also, hazardous materials present on-site may be exposed during construction activities within one-quarter mile of a school. However, as described in Environmental Commitment 9, the school district would be notified regarding handling of hazardous materials related to the project before the EIR/EIS/EIS is certified. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.7-3 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.7-4 (Alt. 3) **Potential Increase in Public Health Hazards from Mosquitoes Resulting from Increased Floodplain Inundation. (TRPA 3)** *Alternative 3 would result in more extensive floodplain inundation that could result in greater abundance of mosquitoes. However, as described in Environmental Commitment 10, the Conservancy would continue to coordinate with and support EDCVCD efforts to manage mosquito populations, and thus, not increase the potential for exposure of people to mosquito-borne viruses. This impact would be* ***less than significant****.*

This impact is similar to Impacts 3.7-4 (Alt. 1) and 3.7-4 (Alt. 2), but the extent of floodplain inundation would be greater than Alternatives 1 or 2. (For example, the 2-year streamflow event under Alternative 3 would inundate an additional 92 acres, compared with an additional 12 acres and 63 acres under Alternatives 1 and 2, respectively [Conservancy 2006:A1].) Nonetheless, for the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.7-5 (Alt. 3) **Potential for Airspace Safety Hazards Associated with Restoration and Enhancement of Habitat for Hazardous Wildlife (CEQA 5).** *Alternative 3 would restore or enhance habitat for hazardous wildlife in and near the approach/departure zone of the Lake Tahoe Airport. However, extensive habitat attracting hazardous wildlife already exists in the study area, and thus, Alternative 3 is not anticipated to substantially increase the attraction of hazardous wildlife. Also, the CLUP identifies management of timber, fish, and wildlife habitat, as well as SEZ restoration, as compatible land uses for the approach/departure zone. Furthermore, bird-aircraft collisions have not been occurring at the Lake Tahoe Airport, notwithstanding the presence of the Upper Truckee River riparian corridor habitat near the airport. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.7-6 under Alternatives 1 and 2, although Alternative 3 would inundate a greater area during two-year streamflow events than would Alternatives 1 and 2 and would not create lagoon habitat. For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.7-6 (Alt. 3) **Potential for Wildland Fire Caused by Construction Equipment.** *During the dry summer season, sparks from on-site construction equipment could result in wildland fire. However, as described in Environmental Commitment 9, the Conservancy would develop and implement a fire prevention and management plan to minimize the risk of accidental ignition of wildland fires. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.7-6 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.7-1 (Alt. 4) **Potential Hazards to the Public from Use of Hazardous Materials (CEQA 1, 2; TRPA 1, 2, 3).** *Alternative 4 would involve the storage, use, and transport of hazardous materials in the study area during construction activities. However, as described in Environmental Commitments 5 and 6, the Conservancy would develop construction site management plans and comply with federal, state, and local regulations related to hazardous materials to avoid or minimize potential impacts on health and safety during project construction. Therefore, significant hazards to the public would not be created during construction through routine transport, storage, use, disposal, and risk of upset. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.7-1 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.7-2 (Alt. 4) **Potential Hazards to Human Health from Exposure to Existing On-Site Hazardous Materials (CEQA 2; TRPA 1, 2, 3).** *Alternative 4 would not expose construction workers to hazardous materials present at the TKPOA Corporation Yard because no activities are proposed within this area under Alternative 4.* ***No impact*** *would occur.*

Alternative 4 would not expose construction workers to hazardous materials present at the TKPOA Corporation Yard because no activities are proposed in this area under Alternative 4. **No impact** would occur.

IMPACT 3.7-3 (Alt. 4) **Potential Hazardous Emissions or Handling of Hazardous or Acutely Hazardous Materials, Substances, or Waste within One-Quarter Mile of an Existing or Proposed School (CEQA 3; TRPA 1, 2, 3).** *Under Alternative 4, some construction activities that involve the handling of hazardous or acutely hazardous materials could occur within one-quarter mile of a school. However, as described in Environmental Commitment 9, the school district would be notified regarding handling of hazardous materials related to the project before the EIR/EIS/EIS is certified. This impact would be* ***less than significant****.*

This impact is similar to Impact 3.7-3 (Alt. 1), although no activities are proposed within the Corporation Yard where the abandoned UST is located. This impact would be **less than significant**.

IMPACT 3.7-4 (Alt. 4) **Potential Increase in Public Health Hazards from Mosquitoes Resulting from Increased Floodplain Inundation (TRPA 3).** *Alternative 4 would result in more extensive floodplain inundation that could result in greater abundance of mosquitoes. However, as described in Environmental Commitment 10, the Conservancy would continue to coordinate with and support EDCVCD efforts to manage mosquito populations, and thus, not increase the potential for exposure of people to mosquito-borne viruses. This impact would be* ***less than significant****.*

This impact is similar to but greater than Impact 3.7-4 (Alt. 1) and less than Impacts 3.7-4 (Alt. 2) and 3.7-4 (Alt. 3), because Alternative 4 would cause a greater increase in the extent of floodplain inundation than Alternative 1 and a smaller increase than Alternatives 2 and 3. (For example, the 2-year streamflow event under Alternative 4 would inundate an additional 17 acres compared to an additional 12, 63, and 92 acres under Alternatives 1, 2, and 3, respectively [Conservancy 2006:A1].) Nonetheless, for the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.7-5 (Alt. 4) **Potential for Airspace Safety Hazards Associated with Restoration and Enhancement of Habitat for Hazardous Wildlife (CEQA 5).** *Alternative 4 would restore or enhance habitat for hazardous wildlife in and near the approach/departure zone of the Lake Tahoe Airport. However, extensive habitat attracting hazardous wildlife already exists in the study area, and thus, Alternative 4 is not anticipated to substantially increase the attraction of hazardous wildlife. Also, the CLUP identifies management of timber, fish, and wildlife habitat, as well as SEZ restoration, as compatible land uses for the approach/departure zone. Furthermore, bird-aircraft collisions have not been occurring at the Lake Tahoe Airport, notwithstanding the presence of the Upper Truckee River riparian corridor habitat near the airport. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.7-5 (Alt. 1), but would be slightly less than under Alternatives 1–3 because the acreage inundated by a two-year streamflow event would be more than Alternative 1 but less than Alternatives 2 and 3, and unlike Alternatives 1 and 2, Alternative 4 would not create lagoon habitat. For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.7-6 (Alt. 4) **Potential for Wildland Fire Caused by Construction Equipment.** *During the dry summer season, sparks from on-site construction equipment could result in wildland fire. However, as described in Environmental Commitment 9, the Conservancy would develop and implement a fire prevention and management plan to minimize the risk of accidental ignition of wildland fires. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.7-6 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.7-1 (Alt. 5) **Potential Hazards to the Public from Use of Hazardous Materials (CEQA 1, 2; TRPA 1, 2, 3).** *As the No-Project/No-Action Alternative, Alternative 5 would not involve the storage, use, or transport of hazardous materials in the study area during construction.* ***No impact*** *would occur.*

As the No-Project/No-Action Alternative, Alternative 5 would not involve the storage, use, or transport of hazardous materials in the study area during construction activities. Thus, Alternative 5 would not create hazards to the public through routine transport, storage, use, and disposal of hazardous materials. **No impact** would occur.

IMPACT 3.7-2 (Alt. 5) **Potential Hazards to Human Health from Exposure to Existing On-Site Hazardous Materials (CEQA 2; TRPA 1, 2, 3).** *Alternative 5 would not expose construction workers to hazardous materials or create a health hazard.* ***No impact*** *would occur.*

Because the project would not be constructed under Alternative 5, this alternative would not involve any construction activities that could expose hazardous materials that could be present on-site. Thus, Alternative 5 would not expose construction workers to hazardous materials and would not create a health hazard by exposing and then leaving materials on-site. **No impact** would occur.

IMPACT 3.7-3 (Alt. 5) **Potential Hazardous Emissions or Handling of Hazardous or Acutely Hazardous Materials, Substances, or Waste within One-Quarter Mile of an Existing or Proposed School (CEQA 3; TRPA 1, 2, 3).** *Alternative 5 would not expose hazardous waste or involve the handling of hazardous materials, substances, or waste within one-quarter mile of a school.* ***No impact*** *would occur.*

Because no construction would occur under Alternative 5, this alternative would not include construction activities that involve excavation that could expose hazardous waste potentially existing on-site. It also would not involve the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of a school. **No impact** would occur.

IMPACT 3.7-4 (Alt. 5) **Potential Increase in Public Health Hazards from Mosquitoes Resulting From Increased Floodplain Inundation (TRPA 3).** *Alternative 5 would not result in greater potential for exposure of people to mosquitoborne viruses.* ***No impact*** *would occur.*

As the No-Project/No-Action Alternative, Alternative 5 would not result in any physical changes to the study area. This alternative would not result in more extensive floodplain inundation or otherwise increase mosquito abundance. Therefore, it would not result in greater potential for exposure of people to mosquitoborne viruses. **No impact** would occur.

IMPACT 3.7-5 (Alt. 5) **Potential for Airspace Safety Hazards Associated with Restoration and Enhancement of Habitat for Hazardous Wildlife (CEQA 5).** *Alternative 5 would not create additional wildlife attractants or otherwise substantially increase the attraction of hazardous wildlife. Furthermore, bird-aircraft collisions have not been occurring at the Lake Tahoe Airport, notwithstanding the presence of the Upper Truckee River riparian corridor habitat near the airport.* ***No impact*** *would occur.*

As the No-Project/No-Action Alternative, Alternative 5 would not create any additional attractions to hazardous wildlife. Furthermore, as described under Impact 3.7-5 (Alt. 1), bird-aircraft collisions have not been occurring at the Lake Tahoe Airport, notwithstanding the presence of the Upper Truckee River riparian corridor habitat near the airport. For these reasons, **no impact** would occur.

IMPACT 3.7-6 (Alt. 5) **Potential for Wildland Fire Caused by Construction Equipment.** *Under Alternative 5, no project-related construction activities would occur; therefore, there would be no potential for sparks from on-site construction equipment to result in wildland fire.* ***No impact*** *would occur.*

This alternative would not involve any project-related construction activities that could spark a wildland fire. Therefore, **no impact** would occur.

3.8 HYDROLOGY AND FLOODING

This section summarizes existing hydrologic conditions in the study area, presents the regulatory guidance for hydrologic resources, and evaluates potential adverse environmental effects of project implementation on hydrology.

The examination of hydrology is based primarily on (1) previous hydrologic and hydraulic analyses prepared for the project, including *Upper Truckee River and Marsh Restoration Project: Processes and Functions of the Upper Truckee Marsh* (Conservancy and DGS 2003) and *Upper Truckee River and Marsh Restoration Project Alternatives Evaluation Report* (Conservancy and DGS 2005); and (2) the preliminary engineering schematic conceptual design prepared for the alternatives. Additional important information is referenced from other relevant published and unpublished academic studies and reports and other documents issued by federal, state, and local agencies. For a discussion of geomorphology and water quality issues, please refer to Section 3.9, "Geomorphology and Water Quality." Cumulative hydrology and flooding impacts are addressed in Section 3.18, "Cumulative Impacts." Consistency with TRPA goals and policies is presented in Section 3.10, "Land Use."

3.8.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

The following federal laws and regulations related to hydrology and flooding are relevant to the proposed alternatives and described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- Clean Water Act
- Floodplain regulations
- Truckee River Operating Agreement
- Executive Order 11988

State

The following state law related to hydrology and flooding is relevant to the proposed alternatives and described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- Porter-Cologne Water Quality Control Act

TRPA

1987 Regional Plan

Goals and Policies

The Goals and Policies document of the 1987 Regional Plan presents the overall approach to meeting the environmental thresholds. A key component is the Land Use Element, which identifies fundamental philosophies directing land use and development in the Tahoe Basin. It addresses topics such as suitable development locations and maintenance of the region's environmental, social, physical, and economic well-being.

Code of Ordinances

Proposed project construction activities are regulated by Section 60.4, "Best Management Practice Requirements," of the TRPA Code of Ordinances (TRPA Code), specifically in relation to best management

practices (BMPs), especially temporary, permanent, and standard BMPs. In accordance with the *Handbook of Best Management Practices*, and as required in Section 33.5, "Grading and Construction Schedules," of the TRPA Code, temporary BMPs shall be implemented on construction sites and maintained throughout the construction period (TRPA 2003:25-1). Permanent BMPs must be applied within the parcel or all project area boundaries, unless the project is exempt. TRPA states that a project that involves Stream Environment Zone (SEZ) restoration may be exempt from the aforementioned requirements. SEZ is defined by TRPA as the major and minor streams, intermittent streams, drainage ways, meadows and marshes, primary and secondary riparian vegetation, and other water influence zones areas within the Lake Tahoe Region that provide natural treatment and conveyance of surface runoff (TRPA 2004:28).

Standard BMP requirements that are applicable to the project deal mainly with drainage conveyance. Drainage conveyances through a parcel shall be designed for at least a 10-year, 24-hour storm. Drainage conveyances through an SEZ shall be designed for a 50-year storm, at a minimum.

Chapter 35, "Natural Hazard Standards," of the TRPA Code also addresses floodplain management. TRPA defines a floodplain as that portion of a river valley, adjacent to the channel, that is built of sediments deposited during the present geological/climatic regime. Hydrologic statistics are used to estimate the magnitude of peak streamflow expected on a 100-year recurrence interval, and the area that could be inundated from that event is defined as the 100-year floodplain. TRPA reviews all additional development in 100-year floodplains and regulates any necessary public uses located in the floodplains. The 100-year floodplain is determined by the limits delineated by the Flood Insurance Rate Maps (FIRMs) issued by the Federal Emergency Management Agency (FEMA). TRPA prohibits development, grading, and filling of lands within the 100-year floodplain, with certain exceptions, including specific public outdoor recreation facilities and water quality control facilities. TRPA may permit erosion control, habitat restoration, wetland rehabilitation, SEZ restoration, and similar projects within a 100-year floodplain. To receive a permit from TRPA, the proponent of a restoration project within the floodplain must show that the project is necessary for environmental protection, must demonstrate that there is no reasonable alternative to reduce the extent of encroachment, and must fully mitigate all impacts (TRPA 1980:28-3).

TRPA's development restrictions and exemption findings for 100-year floodplains do not apply to the shorezone of Lake Tahoe, except where the study area is determined to be within the 100-year floodplain of a tributary stream, which is where this study area lies. Therefore, the restrictions and exemptions for shorezone protection in Chapter 81, "Permissible Uses and Accessory Structures in the Shorezone and Lakezone," of the TRPA Code apply in addition to those for floodplain protection mentioned above. (See Section 3.9, "Geomorphology and Water Quality," for further discussion.)

Plan Area Statements

TRPA's plan area statements (PASs) outline land use classifications, special policies, planning considerations, permissible uses, and maximum allowances for the Tahoe Basin. The PASs in which the study area is located are PAS 099 (Al Tahoe), PAS 100 (Truckee Marsh), PAS 102 (Tahoe Keys), PAS 103 (Sierra Tract Commercial), PAS 104 (Highland Woods), and PAS 111 (Tahoe Island). The criteria and permissible uses for each PAS covering the study area are described in Section 3.10, "Land Use," of this DEIR/DEIS/DEIS. Considerations include commercial and residential uses that infringe on the SEZ and restrictive highway crossings over the Upper Truckee River and Trout Creek that alter the natural functioning capacity of the SEZ. The relevant special policies outlined in this PAS are:

(1) Stream zones should be restored where U.S. Highway 50 (U.S. 50) crosses the Upper Truckee River and Trout Creek.

(2) SEZs should be restored in the vicinity of the crossings of Trout Creek at U.S. 50 and at Black Bart Road.

(3) New roadway alignments through SEZs are to be discouraged.

El Dorado County

Land under the jurisdiction of El Dorado County is located upstream of the portion of the Upper Truckee River located within the study area, so the El Dorado County Code's provisions on grading (Chapter 15.14) do not directly apply to the project. However, the project's compliance with TRPA and City of South Lake Tahoe (CSLT) grading requirements and water quality and flooding obligations required by the Clean Water Act will also provide consistency with El Dorado County requirements.

City of South Lake Tahoe

The study area is located entirely within CSLT's jurisdictional limits. Chapter 8, "Building Regulations," of the CSLT Ordinance requires that projects prepare a grading plan for review and grading-permit approval by the CSLT building official. The grading plan must include the present contours of the land and the proposed final grade and location of improvements. The purpose of the review is for CSLT to safeguard adjoining properties and public streets and ways from damage by unnatural flows of surface waters, and to prevent construction of homes and other buildings in areas likely to become flooded. CSLT is the floodplain administrator for FEMA in the project area, responsible for implementing the federal policies and regulations for floodplain management.

ENVIRONMENTAL SETTING

Hydrology

The study area's hydrology is the result of numerous physical environmental parameters. Among the important parameters are watershed characteristics and climatic conditions affecting the Upper Truckee River and Trout Creek, streamflow magnitudes and regimes, runoff from adjoining urban drainage areas, direct precipitation in the study area, Lake Tahoe surface-water elevations, and groundwater elevations and gradients.

Surface Water

Watersheds

The study area is situated at the downstream end of the Upper Truckee River and Trout Creek watersheds (Exhibit 3.8-1), the two largest watersheds that drain to Lake Tahoe. The watershed areas of the river and creek are 56.5 and 41.2 square miles, respectively; these areas comprise 18 percent and 13 percent of the total area tributary to Lake Tahoe (Rowe and Allander 2000:7–8). The general characteristics of these two watershed areas provide a background for understanding specific hydrologic events and patterns observed in the study area.

The watersheds of the Upper Truckee River and Trout Creek share several important characteristics related to surface-water and groundwater hydrology. The geology of both basins is dominated by granitic rock with glacial deposits and lacustrine sediment, and by similar distributions of soil types and land cover (Jeton 1999). In addition, they both encompass the largest urban centers in the Tahoe Basin. The land uses, transportation systems, and water use (e.g., groundwater pumping, urban stormwater) of these urban centers substantially affect the amount and patterns of runoff relative to undisturbed watersheds (Jeton 1999).

The differences in shape, orientation, and proportion of watershed land near lake level affect the runoff patterns of the Upper Truckee River and Trout Creek basins. The Upper Truckee River basin is elongated from north to south, characterized by a total valley distance of about 21 miles from the southern headwaters to Lake Tahoe. The highest headwater areas in the basin generally face north and west. The elevation of the Upper Truckee River watershed ranges from about 6,225 feet at the lake to about 10,000 feet at the crest. About 20 percent of the area within the Upper Truckee River watershed is below 6,500 feet (generally associated with a broad U-shaped valley). The Trout Creek basin is fan-shaped, with a total valley distance of about 15 miles from the headwaters to Lake Tahoe. Its broad headwater area faces northwest. The elevation of the Trout Creek watershed ranges from about 6,225 feet at the lake to about 10,800 feet; only about 10 percent of the Trout Creek watershed lies below

6,500 feet (USACE 2002:Exhibits 2-5 and 2-6). Differences in basin shape, headwater orientation, and elevation distributions produce variations in storm patterns, snowpack accumulations, snowmelt processes, and the time required for runoff to pass through the basin to the lake (Conservancy and DGS 2003:2-3).

Streams

Annual and seasonal flows in both the Upper Truckee River and Trout Creek vary substantially, as is typical of unregulated snowmelt rivers in the Sierra Nevada. The difference in flow volumes and peak magnitudes generally reflects differences in basin size (Conservancy and DGS 2003: 2-6 to 2-11), with some variations as a result of snow accumulation, snowmelt patterns, and differences in base flow.

Most precipitation in the Tahoe Basin falls between October and May, in the form of snow at higher elevations and snow and rain at lake level (Roberts and Reuter 2007:3-6 through 3-7). The seasonal snowmelt process creates annual streamflow peaks in May or June. The snowpack at lower elevations can melt completely and generate runoff in the urban areas and valley floors near the lake before the snow at the headwaters melts. The minimum streamflows on both streams occur during the summer and fall.

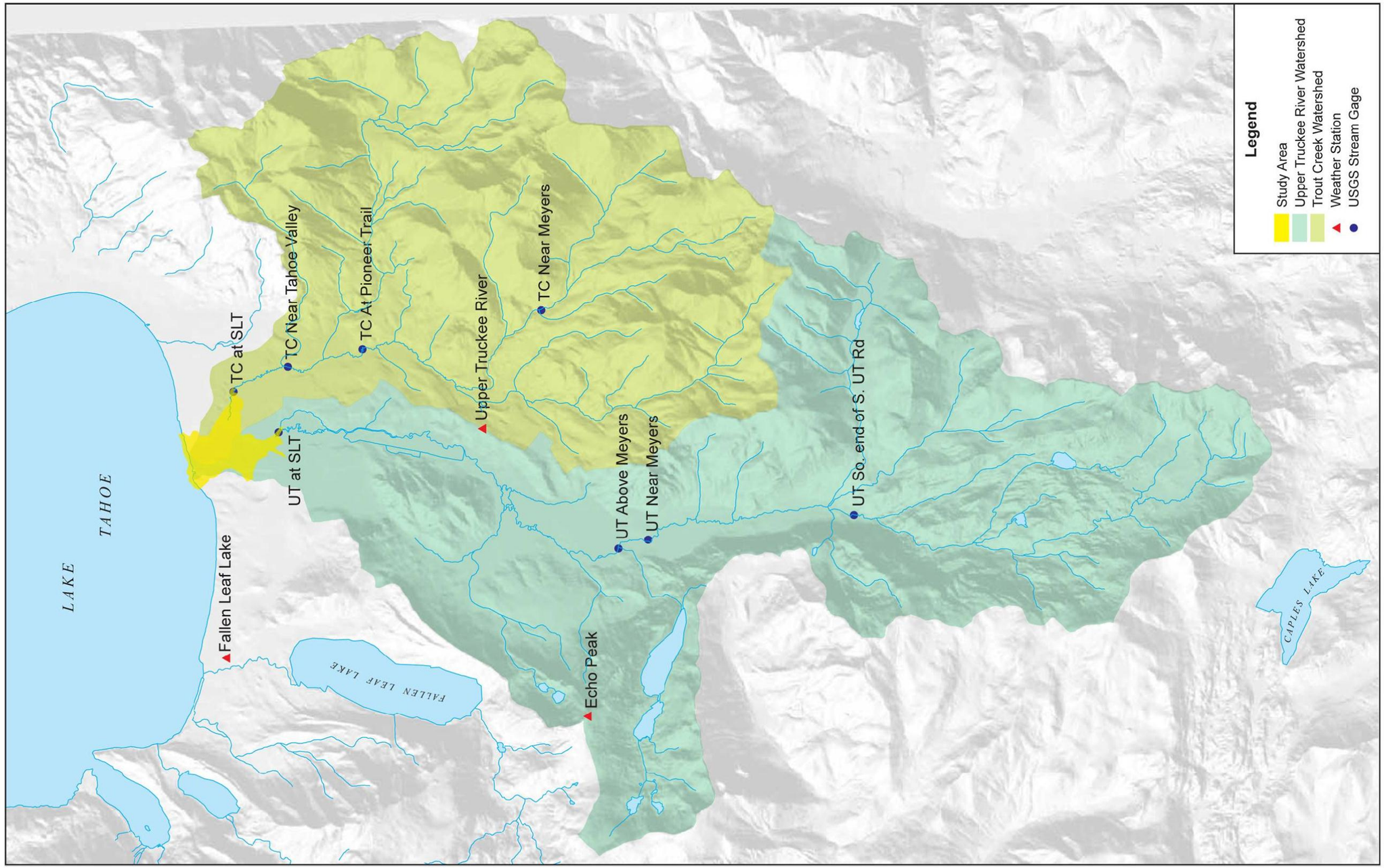
Climate-driven cycles can produce extreme highs and lows during a single year and from one year to the next. Precipitation timing and amounts and the mix of snow and rain can vary substantially from year to year (Coats and Goldman 2001:406, Rowe et al. 2002:13), producing year-to-year variability in streamflow. Future climate change may alter the spatial distribution and total amount of precipitation as well as the relative proportion of snow versus rain, and alter flood and drought extremes.

Streamflow observations made at several locations in the Upper Truckee River and Trout Creek watersheds characterize the hydrology of streamflows entering the study area from both watersheds (Table 3.8-1 and Exhibit 3.8-1).

Table 3.8-1
U.S. Geological Survey Streamflow Gauge Stations within the Upper Truckee River and Trout Creek Watersheds

Gauge Station Name	USGS Station ID	Period of Record (Water Years)	Contributing Drainage Area (Sq. Mi.)	Basin Area Gauged (%)
Upper Truckee River at South Lake Tahoe	10336610	1972–1974 1977–1978 1980–current	54.0	97.2
Upper Truckee River at U.S. 50 above Meyers	103366092	1990–current	39.2	68.8
Upper Truckee River near Meyers	10336600	1961–1986	33.2	58.6
Upper Truckee River at South Upper Truckee Road	10336580	1991–2006	14.1	25.0
Trout Creek at South Lake Tahoe	10336790	1972–1974 1988–1992	40.4	90.1
Trout Creek near Tahoe Valley	10336780	1961–current	36.7	89.1
Trout Creek at Pioneer Trail	10336775	1990–current	23.0	55.8
Trout Creek near Meyers	10336770	1990–current	7.4	17.7

Notes: ID = identification number; sq. mi. = square miles; U.S. 50 = U.S. Highway 50; USGS = U.S. Geological Survey
Sources: Rowe and Allander 2000, USACE 2002, USGS 2008



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Source: Conservancy and DGS 2003

Exhibit 3.8-1 **Upper Truckee River and Trout Creek Watersheds**

The mean daily streamflows on the Upper Truckee River and Trout Creek for water years 1972–2007 were analyzed to provide comparable years for both streams. The monthly statistics demonstrate generally similar seasonal patterns on both streams, but different magnitudes, particularly for the median and higher flows (Exhibits 3.8-2 and 3.8-3). Median flows during snowmelt season are around 200 cubic feet per second (cfs) on the Upper Truckee River, but only 50 cfs on Trout Creek. The maximum flows on the Upper Truckee River are much larger than those on Trout Creek, as might be expected based on drainage area (Conservancy and DGS 2003:2-12). However, Trout Creek has similar or slightly higher fall base flows. A later snowmelt peak, higher headwater elevations, and a larger percentage of drainage area above 8,000 feet in the Trout Creek watershed may increase the supply for base flow (Conservancy and DGS 2003:2-12). Summer/fall evaporative losses may also be reduced in the shorter, steeper, narrower valleys and channels along Trout Creek.

Local Runoff

The study area's surface-water hydrology also includes direct on-site precipitation, snowpack and snowmelt processes, and runoff from adjacent urbanized lands that drain to the meadow, streams, or both (Exhibit 3.8-4). The adjacent urban drainage areas are Al Tahoe, Highland Woods, County Cross Roads Village, Tahoe Island, and Sky Meadows. Although these local runoff sources are small compared to the upstream watersheds, the water they produce supplements that represented by the U.S. Geological Survey (USGS) gauge records. In some locations (e.g., Al Tahoe neighborhood), the urban storm drainage system may convey water from a larger-than-natural topographic watershed. In other locations (e.g., Tahoe Island neighborhood), the urban storm drainage system may reroute water to new discharge points, resulting in a smaller-than-natural local watershed. Much of the urban drainage from these areas is gravity fed via CSLT's system of curbs and gutters and is directed into the study area via simple outfalls, or in some cases, via flow across road surfaces. Drainage through Sky Meadows is in a vegetated swale/ditch.

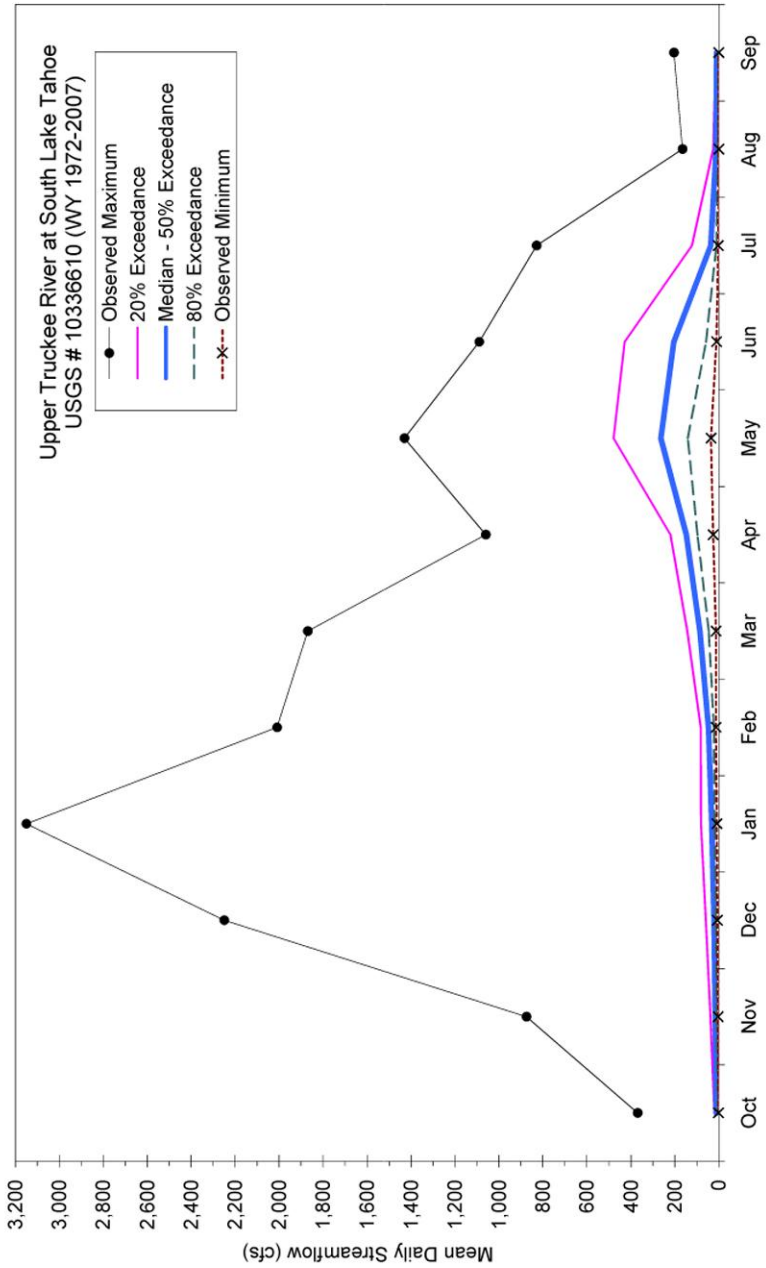
The hydrology of these small urbanized watersheds has not been measured, but it can be estimated for the purpose of sizing storm drainage features, water quality treatment improvements, or both. Hydrographs showing the levels of discharge from these drainage areas would likely reflect the urban land uses and low elevation, and thus would rise to peak sooner than the hydrographs for the overall watershed. Although they are relatively small, these areas could have larger peaks and volumes than they did in their historic, undeveloped state, except where drainage and water quality mitigation measures have been fully implemented.

At the request of the Lake Tahoe Storm Water Quality Improvement Committee, the U.S. Army Corps of Engineers (USACE) is developing a new drainage design criteria manual to improve estimates of runoff volumes, peak discharges, and hydrograph shapes (USACE 2007). The methodology approved by CSLT or the committee (or both) at the time of project review would be applied to quantify runoff as a basis for the project's modifications to storm drainage features, mitigation measures, or both. Tentative estimates of urban drainage hydrology are provided below in Section 3.8.2, "Environmental Consequences," to compare alternatives, using recommendations by USACE (2007).

Lake Tahoe

Lake Tahoe interacts with both the surface-water and groundwater hydrology of the study area. The lake directly connects with the Upper Truckee River at the river's mouth, and water flows across Barton Beach during flood events. Direct surface-water and groundwater connections also exist at the Tahoe Keys Marina and the Sailing Lagoon at a wide range of lake levels.

The natural rim of Lake Tahoe's outlet to the Truckee River at Tahoe City is 6,221.9 feet National Geodetic Vertical Datum (NGVD), or 6,223.0 feet on the U.S. Bureau of Reclamation's (Reclamation's) lake datum (Reclamation et al. 2008:3-41). Although some uncertainty exists about the elevation of the natural rim before dam construction began in 1870, the working assumption is that 6,221.9 feet NGVD represents the natural rim.



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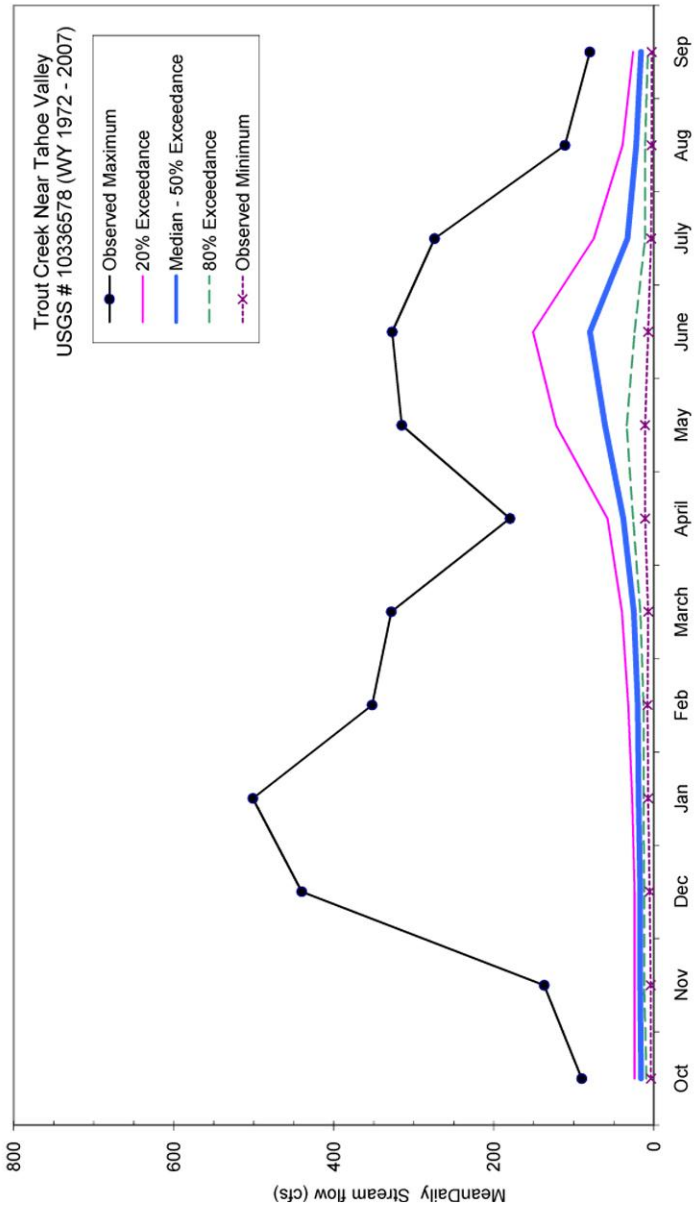
Source: USGS 2008, analyzed by Valley & Mountain Consulting in 2008

Exhibit 3.8-2 **Monthly Streamflows for the Upper Truckee River at South Lake Tahoe (Water Years 1972–2007)**



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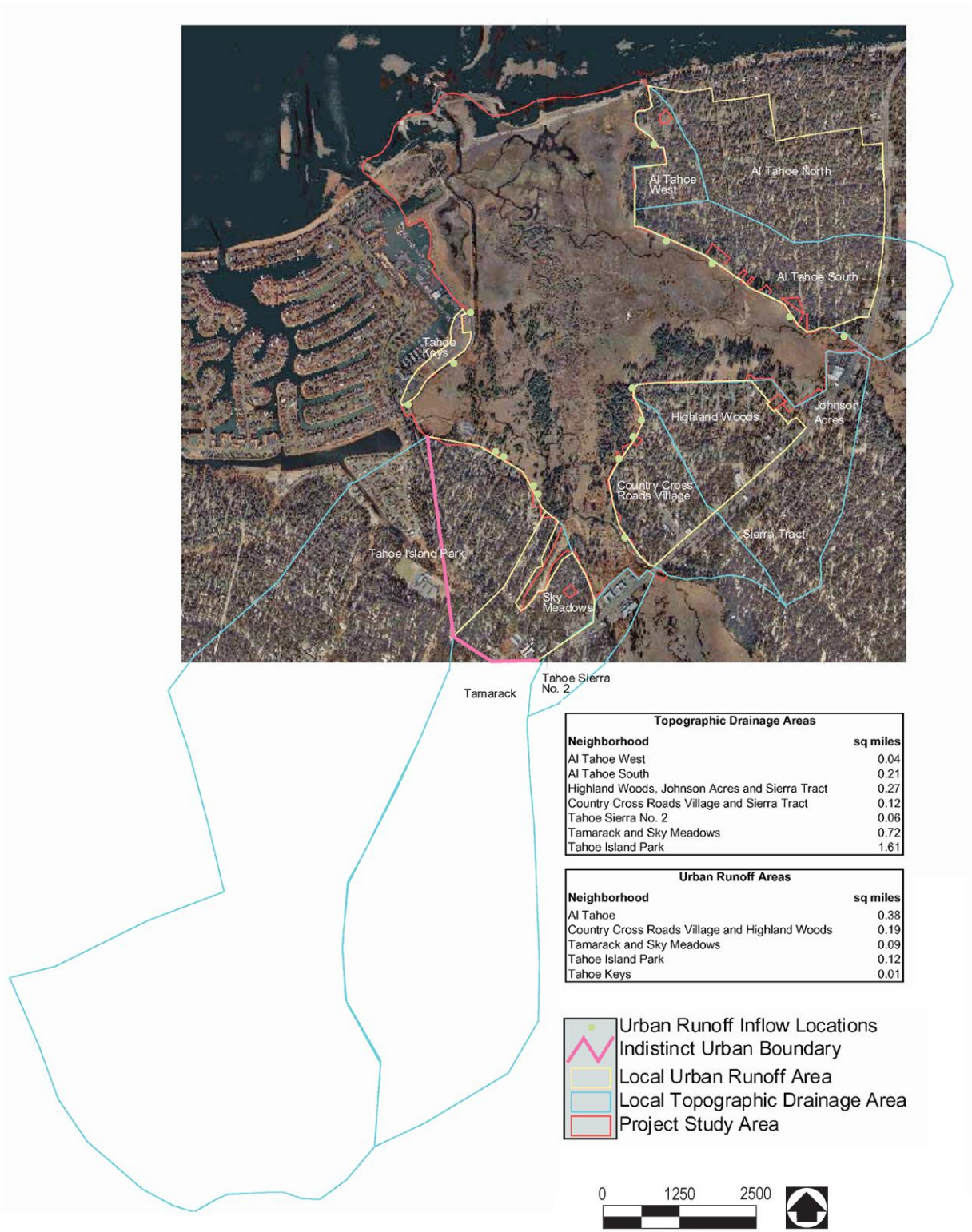
Source: Valley & Mountain Consulting 2008

Exhibit 3.8-3 **Monthly Streamflow for Trout Creek near Tahoe Valley (Water Years 1972–2007)**



Topographic Drainage Areas

Neighborhood	sq miles
Al Tahoe West	0.04
Al Tahoe South	0.21
Highland Woods, Johnson Acres and Sierra Tract	0.27
Country Cross Roads Village and Sierra Tract	0.12
Tahoe Sierra No. 2	0.06
Tamarack and Sky Meadows	0.72
Tahoe Island Park	1.61

Urban Runoff Areas

Neighborhood	sq miles
Al Tahoe	0.38
Country Cross Roads Village and Highland Woods	0.19
Tamarack and Sky Meadows	0.09
Tahoe Island Park	0.12
Tahoe Keys	0.01

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Source: Conservancy and DGS 2003

Exhibit 3.8-4 **Local Urban Drainage Areas Surrounding the Upper Truckee Marsh**

Before the outlet was altered, this would have been the maximum lake level for hundreds to thousands of years. However, the maximum level of the lake has been even higher than 6,221.9 feet NGVD on major geologic time scales (i.e., 10,000 to more than 100,000 years ago) because volcanic flow or glacial ice dams, or both, impounded the lake at its outlet. See Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage," for more information. The lake would have begun spilling whenever lake water levels exceeded this elevation.

Dam construction and modification in the last 130 years raised the outlet's elevation, and thus the maximum possible lake level. The modern dam was constructed in 1913 and was seismically retrofitted and enlarged in 1988 (Roberts and Reuter 2007:3-2). The dam controls the top 6.1 feet of storage at Lake Tahoe as a federal reservoir (Reclamation et al. 2008:3-3). Since issuance of the 1944 Orr Ditch Decree, dam operations have provided for downstream water supply, but also have limited the maximum lake level to 6,228.0 feet NGVD (6,229.1 feet Reclamation lake datum). Lake Tahoe can temporarily rise above the legal limit under extreme precipitation and runoff conditions, such as the rapid surcharge of 0.3 foot that occurred on January 4, 1997, in response to regional flooding. The outlet dam does not control minimum lake elevations, which fall below the natural rim in response to drier climatic conditions.

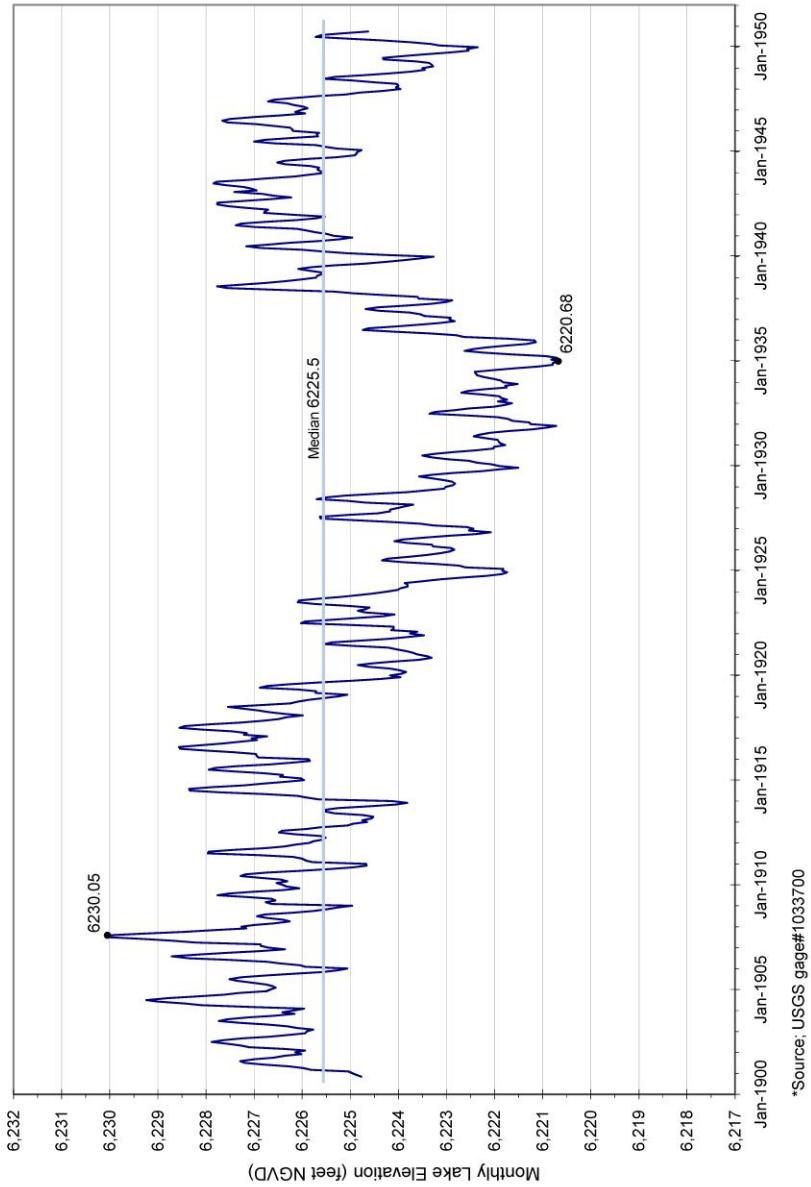
The elevation of Lake Tahoe has gone through cycles of relatively high and low stands (several years above or below median) for periods of several years (Exhibits 3.8-5 and 3.8-6). Relatively high stands occurred from 1900 to 1920, in the early 1940s, in the 1950s, from the late 1960s to the mid-1970s, in the early 1980s, and in the late 1990s. Occasional short-duration (one- to two-year) low-lake stands occurred in the late 1940s, in the early 1960s, and in the late 1970s. Prominent low stands (several years below 6,223.0 feet NGVD) occurred from the mid-1920s to the late 1930s and from the late 1980s to the mid-1990s. The recent drought did not last for as many years, but reached similar minimum elevations. Conditions since 2002 include a few years of low lake levels, followed by a high year in 2006. The trend for the next couple of years is not predictable based solely on the historic pattern.

In addition to the general year-to-year pattern, seasonal changes in Lake Tahoe's elevation are noticeable in the long-term monthly record. The seasonal changes in a given year are usually on the order of one–two feet, but sometimes Lake Tahoe falls or rises several feet within a few months (Exhibits 3.8-5 and 3.8-6).

Statistical analysis of the daily lake levels for water years 1972–2007 (the same period analyzed for stream records) describes the monthly pattern under modern watershed conditions and dam operations (Exhibit 3.8-7). The typical lake levels (minimum through 20 percent exceedance) are highest in spring and early summer (May–July) as a result of seasonal snowmelt runoff entering Lake Tahoe (Exhibit 3.8-7). However, maximum lake levels have occurred in January from major rain-on-snow floods, despite lower median and minimum values in the fall and winter months. The level of Lake Tahoe declines during the summer months as runoff input decreases and evaporative loss increases. The lowest lake levels are in October and November.

Marina/Sailing Lagoon

The Tahoe Keys Marina is an artificial surface-water body located immediately west of the study area. Owned by the Tahoe Keys Property Owners Association, the marina is generally parallel to the lower 3,000 feet of the Upper Truckee River. The Tahoe Keys Marina has been directly connected to Lake Tahoe since its construction in the late 1950s. In 1959, a navigation channel was dredged up to the mouth of the Upper Truckee River and one of its natural distributary arms, known today as the "Sailing Lagoon." (See the historic aerial maps in Appendix A of Conservancy and DGS 2003.) From 1959 to 1969, the marina was connected to Lake Tahoe via the river and the Sailing Lagoon served as a portion of the dredged navigation channel. In 1969, however, the marina's navigation channel was changed. The East Channel was excavated through Cove East Beach at its present location, connecting the marina to the lake directly. Fill was placed across the Upper Truckee River's former distributary arm to cut off the Sailing Lagoon from the river. Since 1969, the Sailing Lagoon and Tahoe Keys Marina have been connected to Lake Tahoe via the marina's East Channel.



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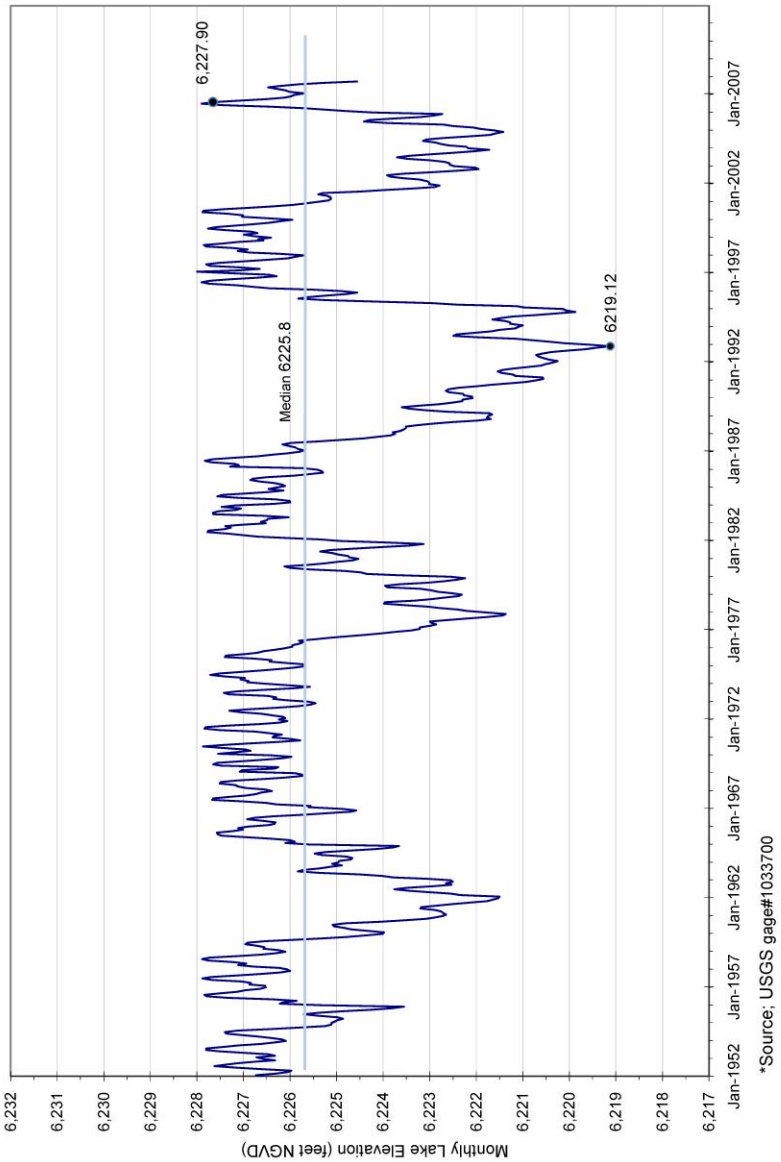
Source: Conservancy and DGS 2003

Exhibit 3.8-5 **Lake Tahoe Elevations, 1900–1950**



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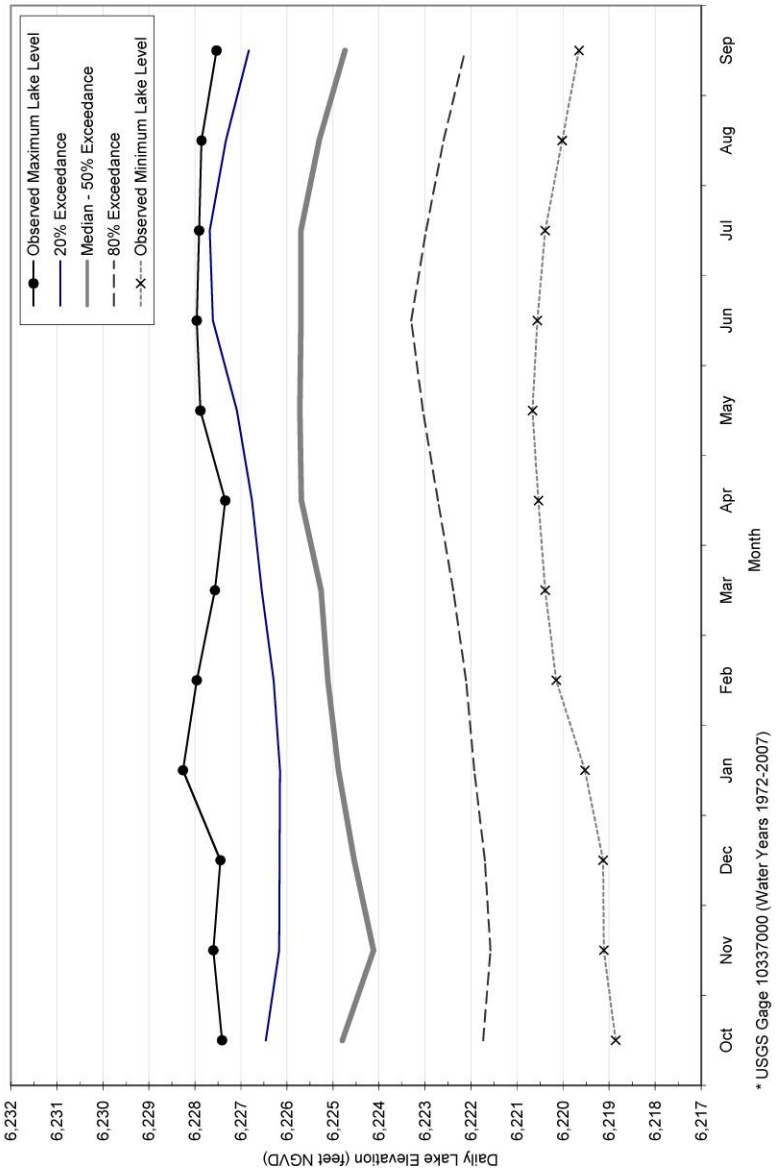
Source: Conservancy and DGS 2003

Exhibit 3.8-6 **Lake Tahoe Elevations, 1951–2007**



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Source: Valley & Mountain Consulting 2008

Exhibit 3.8-7 **Seasonal Pattern of Daily Lake Levels, 1972–2007**

The marina and East Channel are dredged to about 6,216.2 feet NGVD every few years—most recently in 2004 (TKPOA 2005)—to maintain navigation depths (Conservancy and DGS 2003:3-9, 3-10). The Sailing Lagoon has not been officially maintained as a primary navigation component since the State of California acquired it as part of the Cove East Parcel in the early 1980s.

Surface-water levels in the Tahoe Keys Marina and Sailing Lagoon likely were equivalent to the lake elevations described above (Exhibits 3.8-5, 3.8-6, and 3.8-7) for the period since 1959, once the open-water connections were established or enlarged (or both) by dredging. Surface-water elevations in the Sailing Lagoon before the 1959 dredging of the river mouth and lagoon arm likely reflected combined controls from the river, high lake levels, and groundwater. There are no direct records of these conditions, but it is likely that they were similar to the modern relationships of the Trout Creek distributaries, lagoon areas within the Upper Truckee Marsh, and Lake Tahoe.

Analysis of the standing-water areas in historical aerial photographs of the study area from 1930 to 2002 indicates that although lake level is an important control on "lagoon" areas, other factors also affect natural lagoon areas. Among these factors are groundwater levels, streamflows and overbanking, beach ridge height, and mouth depths (Conservancy and DGS 2003:3-22, 3-23). The results suggest that natural lagoons were not directly connected to the lake, except during flood events, or perhaps for a whole season in some years of very high lake levels.

Groundwater

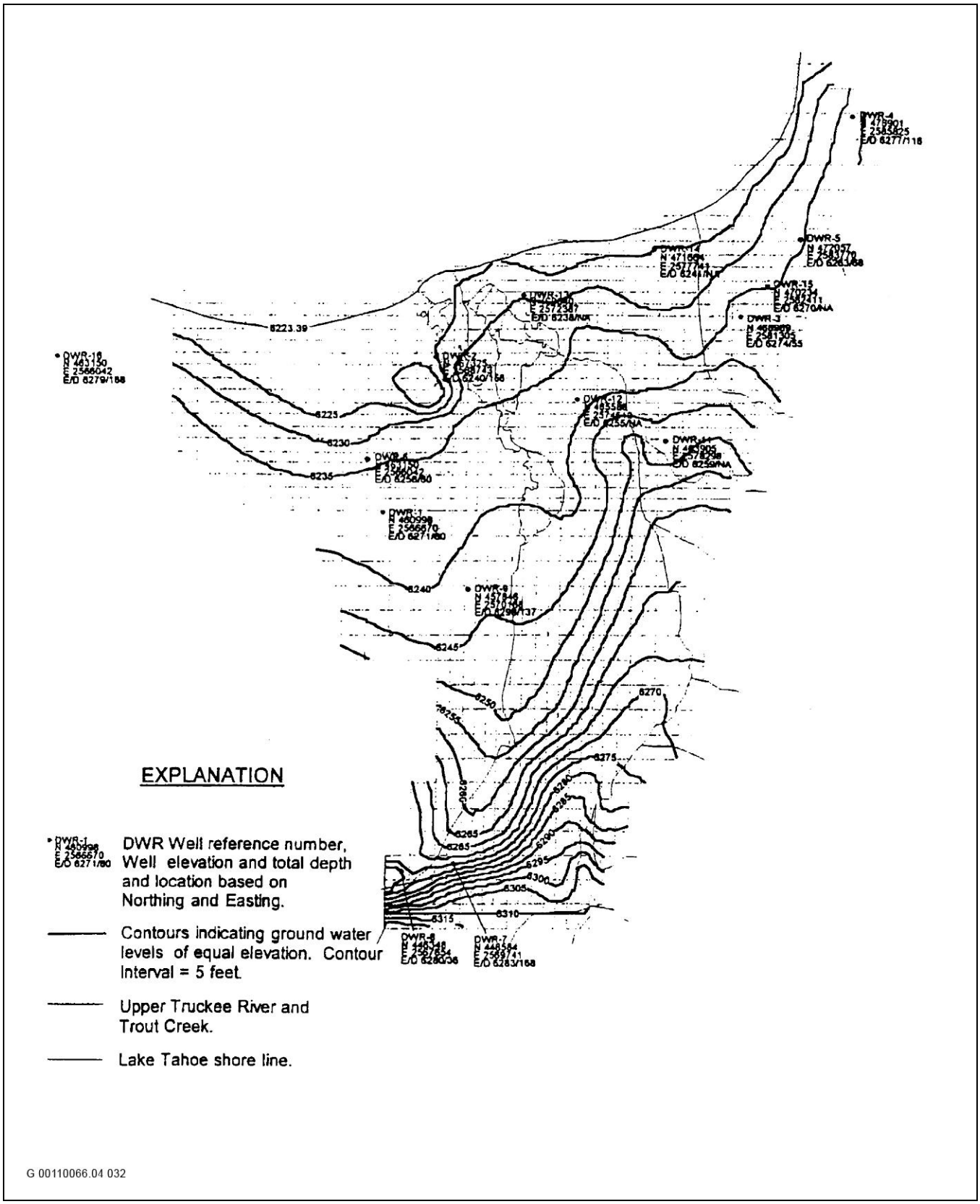
Groundwater Basins

The study area is within the South Lake Tahoe groundwater basin, the area's primary source of domestic and public water supplies. Various monitoring programs and studies have focused on concerns about groundwater withdrawals, wastewater disposal, and the water quality implications of interaction between groundwater and surface water (Rowe and Allander 2000, USACE 2003). The most recent groundwater evaluation for the total maximum daily load program (USACE 2003:4-1) places the study area within Subregion 3, Al Tahoe and Upper Truckee Marsh, of the South Lake Tahoe/Stateline region.

Groundwater Conditions in the Trout Creek and Upper Truckee River Watersheds

As reported by USACE (2003:1-2), studies have documented that the water surface of groundwater in aquifers in the Trout Creek and Upper Truckee River watersheds generally slopes toward the lake (i.e., with net flow toward the lake). The watershed-scale groundwater flow paths include discharge through springs, small lakes, and seepage to stream channels, along with direct discharge to the lake across the lakeshore (Thodal 1997:24). Groundwater elevations in the watersheds generally parallel the topography, with higher elevations in the headwaters and along ridgelines and lower elevations in the valleys and along the lake (Rowe and Allander 2000:36).

Observations from 1964 provide an estimate of the groundwater patterns that existed in the Upper Truckee River and Trout Creek watersheds before substantial pumping began (STPUD 1999). These data indicate that the natural groundwater slopes were steep in the upper reaches of the watersheds, but flattened out several miles upstream of the lake (Exhibit 3.8-8). At the Upper Truckee Marsh, groundwater was higher than the lake level and sloped toward the lake in both the Upper Truckee River and Trout Creek portions of the marsh (Exhibit 3.8-8). However, the estimated 1964 groundwater slope (gradient) was very low in the marsh—less than 10 feet per mile (0.001 to 0.002 foot vertically per foot horizontally)—even though the lake was low (STPUD 1999). Still, a shallow hydraulic slope under relatively undeveloped conditions is not unexpected. Such a slope could reflect the low-gradient valley floor and the relatively low hydraulic conductivity (i.e., ability of a porous material to transmit groundwater) of the lake bed and glacial outwash sediments that underlie the valley.



Source: AGRA Earth and Environmental, Inc. 1999

Exhibit 3.8-8 **Observed Groundwater Elevations for the Upper Truckee River and Trout Creek Watersheds circa 1964**

Regardless of the natural conditions, groundwater levels and patterns in the vicinity of the study area have changed substantially since the 1960s. These changes have occurred largely because of varied pumping and the construction of the Tahoe Keys (Loeb 1987, Thodal 1997:11–13). Depression of groundwater levels has occurred, especially in the Trout Creek portions of the study area. Also, the distance to the lake's open surface water was effectively reduced by the construction of the keys channels, which altered the groundwater slopes (and thus the rates of flow loss) to the lake on the west margin of the study area.

Local Groundwater Conditions

Groundwater monitoring data for the study area are limited to various short-term wells installed and observed by the Conservancy during different time periods related to specific project studies and construction of the Lower West Side (LWS) Restoration Area (Exhibit 3.8-9). Other short-term records exist from nearby research projects (e.g., on Pope Marsh), and long-term groundwater information is available at nearby production and monitoring wells (Exhibit 3.8-9).

Long-term data (1962–2007) from four California Department of Water Resources monitoring wells show the relationships between local groundwater and lake levels (Exhibit 3.8-10). The groundwater levels are dynamic, with seasonal shifts of a few feet (three–four feet) and year-to-year ranges of several feet. As might be expected, the groundwater elevation roughly parallels lake level (USACE 2003:B-4). The same rising-and-falling cycles over years occur in response to variations in watershed runoff and changes in pumping demand, both driven by climatic conditions. Groundwater levels can rise and have risen during periods of relatively constant high lake levels (e.g., 1966–1968 and 1995–1998) (Exhibit 3.8-10). Maximum groundwater levels are limited primarily by local topography and aquifer properties, not by the elevation of the lake-rim outlet. Groundwater discharge from the watershed, although slower than surface runoff, generally flows toward the lake. If precipitation levels are high for several years, groundwater may continue to rise after surface runoff has diminished (Conservancy 2003:2-27).

The wells upslope and west of the study area (the Tallac Village and Tahoe Valley School wells) have historic groundwater levels consistently higher than lake levels; since the late 1980s, however, they have shown some net decline (fewer feet of difference from lake levels) (Exhibit 3.8-10). East of the Upper Truckee Marsh, groundwater levels at one well (Al Tahoe West) have consistently been lower than lake levels, and another well's groundwater levels switched in the mid 1980s from generally similar to lake levels to consistently lower (Exhibit 3.8-10). These conditions reflect pumping effects that locally decrease groundwater levels (i.e., drawdown) and create slopes toward the production wells east of the study area (USACE 2003:B-5). Because of the naturally low groundwater gradient and sustained pumping, net groundwater flow to the lake from the study area is lower than net flow from neighboring subregions along the south shore (Exhibit 3.8-11).

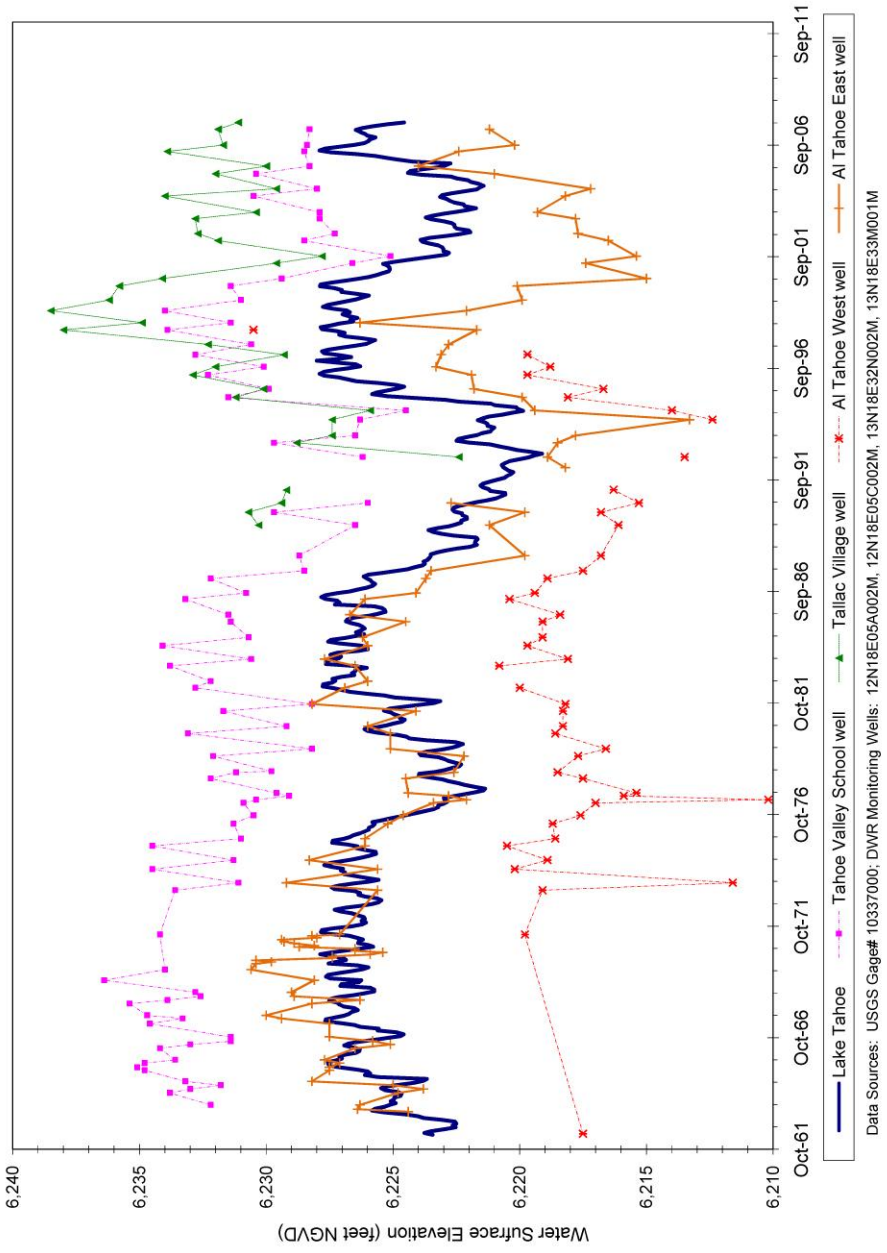
Groundwater Conditions in the Study Area

The most important control on groundwater conditions within the Upper Truckee Marsh is Lake Tahoe, including its artificially connected sections within the Tahoe Keys canal system. The lake is the major groundwater discharge boundary; groundwater within the sediments of the marsh flows toward the lake margin, including the Tahoe Keys. Therefore, groundwater levels (and gradients) within the unconfined aquifer under the marsh respond to fluctuations in lake level. Notably, construction of the Tahoe Keys effectively moved the lake's hydraulic margin, creating a human-made discharge boundary within the marsh (at the western margin of the study area). The distance to the discharge boundary from the interior of the marsh was shortened by construction of the Tahoe Keys canals, increasing localized groundwater gradients from the marsh toward the Keys.

The primary recharge of groundwater in the marsh occurs as the result of down-valley flow of groundwater, with some contributions from the local slopes at the margin of the study area. The Upper Truckee River is not the primary control on groundwater conditions. Recent investigations have suggested that the lower portions of the river are not predominantly "gaining" or "losing" reaches (with groundwater flowing into the channel or flowing

Source: Conservancy and DGS 2003

Exhibit 3.8-9 **Groundwater Data Sources in the Vicinity of the Study Area**



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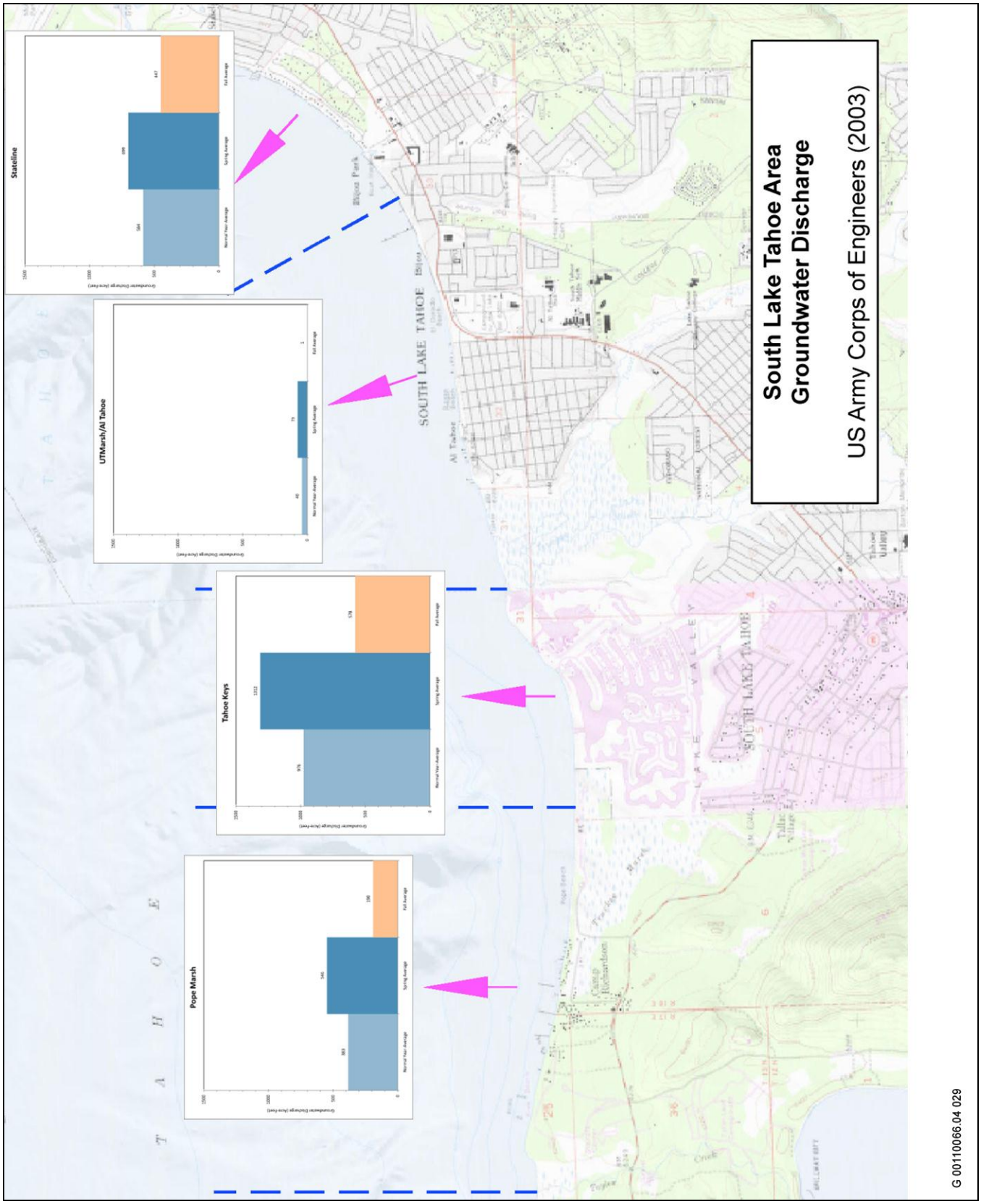
Source: Conservancy and DGS 2003

Exhibit 3.8-10 Long-Term Groundwater and Lake Elevations in the Vicinity of the Study Area



Source: USACE 2003

Exhibit 3.8-11 **Net Groundwater Discharge to Lake Tahoe along the South Shore under Average Annual and Seasonal Conditions**

out of the river to the aquifer, respectively); the reach downstream of U.S. 50 is characterized as steady relative to groundwater losses or gains (Rowe and Allander 2000:Plate 1). A more detailed investigation of conditions along Trout Creek for the period 1996 to 2001 (Allander 2003:40) indicates that groundwater flow into or away from the channel in the lower reach is variable depending on surface flow and lake level.

However, the river does temporarily and locally affect groundwater during particular seasonal conditions. During periods when surface water in the channel remains above the elevation of the groundwater level in the surrounding areas, water from the river may recharge the local aquifer (creating a "losing" river situation). During periods of sustained low-flow conditions in the stream, groundwater may discharge to the river if the surrounding groundwater levels are above the elevation of the low-flow channel (creating a "gaining" river situation).

The study area's existing groundwater levels and flow patterns have been modified by direct disturbance to the channel, and the channel's natural geomorphic response to disturbance through incision and widening. The incision of the channel has progressively lowered the transient discharge boundary that may occur during low-flow conditions. Therefore, that control on groundwater levels has been lowered relative to natural conditions, at least in the corridor adjacent to the incised channel. The effect of lowering the groundwater surface is to reduce the amount of groundwater storage space within the shallow aquifer beneath the marsh. The degraded channel condition has also increased the seasonal fluctuation of groundwater levels throughout the natural floodplain by reducing the amount of overbanking relative to more natural conditions. The reduced frequency of overbanking and smaller area of inundation reduces the amount of recharge to shallow groundwater from water infiltrating the marsh surface during and after overbanking events. All of these effects tend to reduce the availability of groundwater for marsh and floodplain habitat.

Observations of groundwater conditions in the study area are available for recent years, the same years for which vertical aerial photographs are available over a range of lake levels. These lake levels vary from extreme low (1992) to legal maximum (1999) elevations, including median lake level under high-volume runoff (1995). With these data, groundwater contours and approximate hydraulic slopes could be calculated for the study area (Conservancy 2003:2-27 to 2-36).

The 1992 data set demonstrates that at times of low lake levels (6,220 feet NGVD) and low streamflow input, groundwater along the incised Upper Truckee River was at or below the channel bed. There was a steep groundwater slope northwest or west toward the Tahoe Keys channels, steeper than the groundwater gradient north to Lake Tahoe. Groundwater in the middle marsh remained relatively high: about five feet above the lake level (Conservancy and DGS 2003: Exhibit 2-23).

The 1995 data set demonstrates that for a period with Lake Tahoe at median lake level (6,225.8 feet NGVD) and under high streamflow, groundwater levels onsite actually peaked before either the lake rise or streamflow. This indicates that the groundwater onsite was recharged from groundwater flowing from up-valley areas and/or on-site snowpack/snowmelt. The groundwater slope was still to the northwest or west toward the Tahoe Keys channels, but not as steep as during low lake levels. Small reversals of groundwater flow may have occurred west of the existing Upper Truckee River channel when the lake level rose quickly. Under these conditions, net groundwater flow would temporarily be from the Tahoe Keys Marina and channels toward the river. Groundwater in the middle marsh remained about three–four feet above the lake (Conservancy and DGS 2003:Exhibits 2-24 and 2-25).

The 1999 data set demonstrates that when Lake Tahoe was at high lake level (6,228.9 feet NGVD) and moderate streamflow occurred, groundwater levels onsite peaked before the spring runoff, perhaps because of on-site snowpack/snowmelt. The groundwater slope was extremely gentle, and groundwater was higher than the lake, as much as a couple of feet higher in spring. Groundwater in the middle marsh remained two–three feet above the lake level (Conservancy and DGS 2003:Exhibit 2-26).

The relatively high groundwater levels in the middle marsh over the range of lake levels and river flows indicate that, as expected, the groundwater supply from the upper watersheds is primarily discharging to the study area along the ridge between the Upper Truckee River and Trout Creek. The available data also suggest how important the Tahoe Keys Marina channels are in controlling groundwater levels and slopes along the west side of the study area. These excavated, open-water surfaces are connected to the lake. Therefore, they support high on-site groundwater when lake levels are high but draw it down locally when lake levels are low. The pronounced response of groundwater levels to changes in lake levels suggest that zones of high hydraulic conductivity (possibly more coarse sediments) discharge groundwater along the western study area boundary.

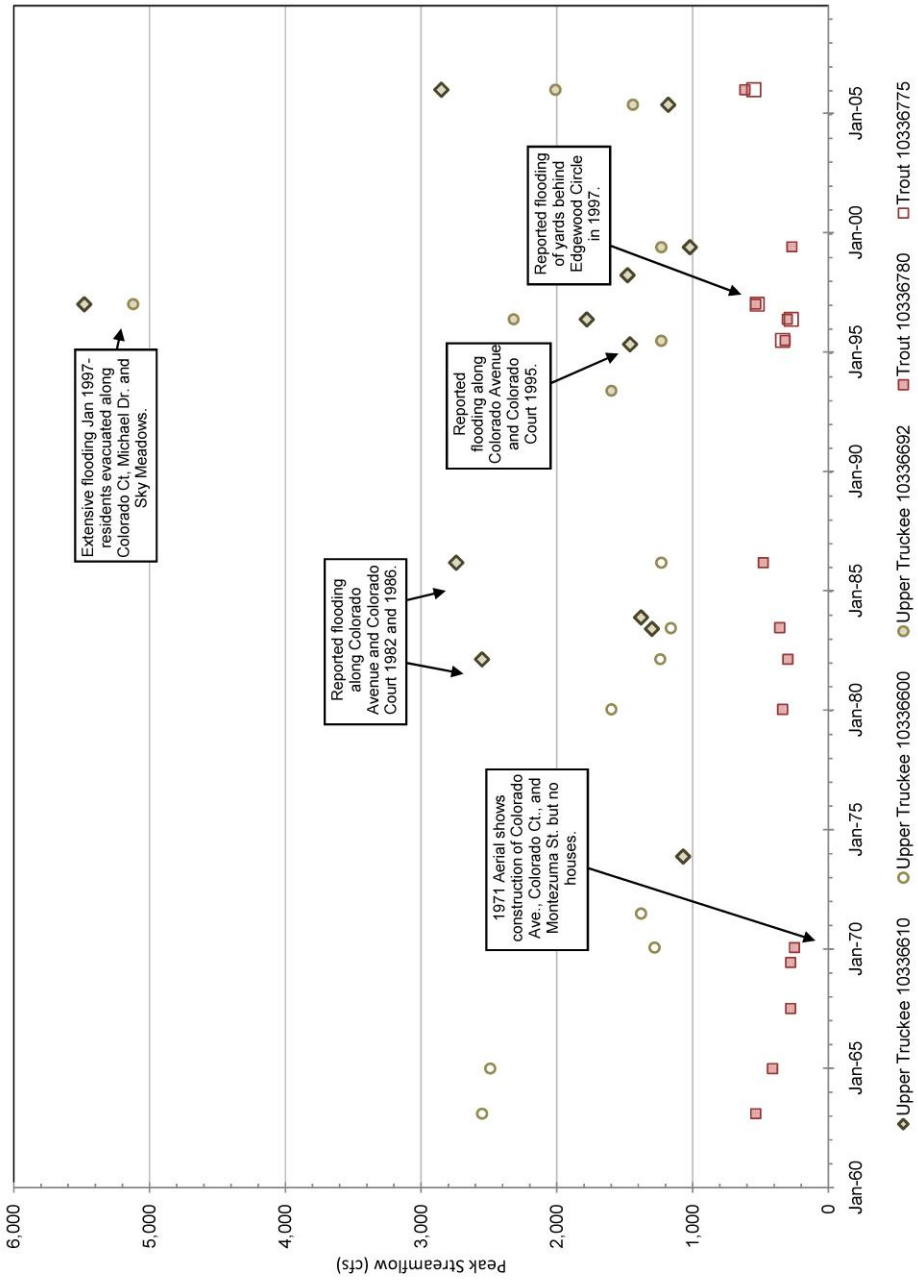
Additional information about groundwater conditions and processes in the study area is available for water years 1995–1997. During this period, monitoring programs were conducted on both the Upper Truckee Marsh (Conservancy 2003) and Pope Marsh (Green 1998). The Pope Marsh data demonstrate that upslope groundwater and local surface water (including snowmelt) are the dominant sources of water to "fill" the marsh, but lake level is an important control on the rate at which water drains out of the marsh (Green 1998). The Upper Truckee Marsh data have similarities with the Pope Marsh data, including local groundwater depressions for the monitoring wells closest to the Tahoe Keys (Conservancy and DGS 2003:Exhibits 2-21 and 2-22). Groundwater was encountered in four of seven geotechnical boring locations in the study area in April 1995, at depths below ground surface ranging from 3.75 feet to 10.0 feet (Marvin E. Davis and Associates 2005).

Flooding

Flooding is an important aspect of the hydrology of all river systems. It has a substantial influence on riparian vegetation, bank stability, water quality, wildlife habitat, and channel morphology. When flood magnitudes are large, property damage and safety risks can occur, particularly in developed areas. Although the Upper Truckee Marsh study area is undeveloped, it is surrounded by developed land uses, so flooding that may span the valley, or flooding along the margins of the study area, may result in flood hazards to urban structures and local residents.

Water begins to overtop channel banks (i.e., overbanking) when streamflow exceeds channel capacity, which is about 1,000–1,500 cfs for the Upper Truckee River and about 150–200 cfs for Trout Creek, depending on the specific locations within the study area. Over the 45-year period of record on these streams, several peak-flow events have exceeded these magnitudes (Exhibit 3.8-12). Before the mid-1970s, there were few structures at risk along the margins of the study area. During the following decades, however, flooding was reported in the Tahoe Island subdivision (at Colorado Avenue, Colorado Court, Montezuma Street, and Michael Drive) and the Sky Meadows subdivision, particularly for flows on the Upper Truckee River exceeding 1,400 cfs. As discussed below, some of this historical flooding of residential neighborhoods resulted from internal problems with the urban drainage system, and not simply from river flows crossing the floodplain. Along Trout Creek, only the most extreme flows have affected any residential areas, with effects mostly limited to backyard flooding along Edgewood Circle. The smaller overbank peak flows (less than approximately 1,400 cfs on the Upper Truckee River and less than approximately 500 cfs on Trout Creek) occur every several years but have not been associated with flood hazards.

Extreme peak flows associated with damaging floods on the Upper Truckee River and Trout Creek are mostly, but not entirely, associated with winter rain-on-snow conditions. These conditions occur during large winter rainstorms when antecedent snowpack conditions add to the total runoff. Floods of moderate magnitude may result from spring snowmelt events or rainstorms, or less intense rain-on-snow events. Flow from spring snowmelt tends to be less extreme, because the snowpack melts gradually over the watershed's various elevation zones, moderating the peak flow arriving at a downstream location like the study area. Summer thunderstorms in the Tahoe Basin are common and can be intense, but they are typically brief and cover only small portions of the watersheds. They rarely produce substantial flooding or flood hazards in the vicinity of the study area (USACE 1999).



Source: Valley & Mountain Consulting 2008

Exhibit 3.8-12 **Peak Streamflow Events on the Upper Truckee River and Trout Creek (Water Years 1962–2007)**

The flood of January 1–2, 1997, was triggered by rainfall that followed prior snowstorms (i.e., fell on top of the existing snowpack). Heavy rain and melting snow resulted in high flows throughout the Tahoe Basin (Conservancy and DGS 2005). This event was the largest flood of record at 21 of 31 USGS stream monitoring sites in the Tahoe Basin (Crompton, Hess, and Williams 2002). For other sites in the basin, the largest historic flood resulted from rainstorms during the spring or early-summer snowmelt (e.g., April and May 1973, May and June 1995) (Crompton, Hess, and Williams 2002).

Flood Frequencies

Statistical analysis of either recorded or estimated flows, or both, is typically used to characterize various flood events. Several hydrologic studies have developed flood statistics for the Upper Truckee River and Trout Creek using available data and standard methods for the specific purpose of each study (Table 3.8-2). These studies produced estimates of the statistical frequency (expressed as either a probability of occurrence in any year or as a return interval in years) and associated peak flow magnitudes (streamflow in cfs). High-magnitude flooding events with the potential to inundate adjacent residential neighborhoods have long return intervals (e.g., 10-year, 25-year, 100-year), statistically meaning that the probability of occurrence is lower (i.e., they occur less frequently).

Table 3.8-2
Flood Frequency Analyses and 100-Year Flood Estimates for the Upper Truckee River and Trout Creek

Study	Year of Study	Period of Record Used	Estimated 100-Year Peak Flow (cfs)	
			Upper Truckee River	Trout Creek
USACE	1983	1972–1983[a]	10,600	5,400
CEDR	1991	1961–1990[b]	8,000	[c]
GLOBAL—snowmelt	1996	1972–1995[a]	1,780	[c]
GLOBAL—rain	1996	1972–1995[a]	5,610	[c]
USACE—snowmelt	1999	1972–1998[a]	2,020	[c]
USACE—rain	1999	1972–1998[a]	10,500	[c]
USGS	2001	1901–2001[d]	4,700	855
ENTRIX	2001	1972–2001[a]	6,480	900
ENTRIX—extended record:				
January 1997, peak 5,480 cfs (USGS)	2001	1961–2001[b]	6,660	900
January 1997, peak 8,200 cfs (USACE)	2001	1961–2001[b]	7,650	900

Notes: cfs = cubic feet per second; CEDR = Center for Environmental Design Research; ENTRIX = ENTRIX, Inc.; USACE = U.S. Army Corps of Engineers; USGS = U.S. Geological Survey; GLOBAL = Global Environmental.
[a] Raw observed data only
[b] Extended using Meyers record
[c] Not analyzed by cited source study
[d] Extended using regional data
Source: Conservancy and DGS 2003

The estimated magnitudes of the 100-year flood peaks (i.e., those with a one percent chance of occurring in a given year) on the Upper Truckee River and Trout Creek (Table 3.8-2) have changed over the years of study as more data have become available and various methods have been applied. The January 1997 flood added important information to the data set, but damage to the Upper Truckee River gauge and flow blockage at the U.S. 50 crossing during the flood required that the peak flow be estimated (5,480 cfs by USGS and 8,200 cfs by

USACE). Based on independent analysis, ENTRIX validated the USACE estimate of 8,200 cfs as the most probable flow for the 1997 extreme event (Conservancy and DGS 2003:8-15) and entered that value into the statistical analysis. Therefore, the resulting flood hazard analysis for this project estimated a 100-year flood peak of 7,650 cfs for the Upper Truckee River and 900 cfs for Trout Creek.

Using the same statistical data and analysis, peak-flow magnitudes for both streams in the study area have been estimated over a wide range of expected return intervals (Table 3.8-3). Because these streams are unregulated (i.e., no substantial dams or other flow-control structures exist upstream), the flow magnitudes and frequencies are not managed, but occur as a function of climate and weather conditions, land use and vegetation cover, and channel and floodplain characteristics. These flows represent the anticipated streamflow to the study area over the life of the project if watershed hydrology is assumed to be similar to the hydrology of the last 35 years.

Table 3.8-3
Estimates of 1.5-Year to 200-Year Peak Streamflows on the Upper Truckee River and Trout Creek

Return Interval (years)	Estimated Peak Flow (cfs)	
	Upper Truckee River	Trout Creek
1.5	530	100
2	760	140
5	1,660	270
10	2,550	380
25	4,130	560
50	5,690	720
100	7,650	900
200	10,100	1,100

Notes: cfs = cubic feet per second
Source: ENTRIX, cited in Conservancy and DGS 2003

Historical flooding in adjacent residential areas has resulted from a combination of the flow magnitudes, the location and elevation of homes, and street drainage systems, as well as the channel capacity and floodplain topography. The interaction of these factors has caused urban flooding west of the Upper Truckee River (i.e., in the Tahoe Island subdivision at Colorado Avenue, Colorado Court, Montezuma Street, and Michael Drive and the Sky Meadows subdivision) at flows around or slightly less than the 5-year event, and in urban-fringe flooding east of Trout Creek (i.e., Al Tahoe subdivision) at flows between the 10-year and 25-year events.

The following discussion of floodplain management and flood hazards focuses on larger-magnitude, lower-frequency events of concern from a regulatory perspective (e.g., a 100-year event), but also includes evaluation of smaller events known to have created flood nuisance or hazards in the vicinity (e.g., 5- to 10-year events). Further discussion of the overbanking associated with small-magnitude, high-frequency events considered important to active floodplain processes (e.g., 2-year events) is included in Section 3.9, “Geomorphology and Water Quality.”

Historical data suggest that, unlike spring snowmelt events, which tend to have staggered peak flows on the Upper Truckee River and Trout Creek, major winter rainfall flood events produce peak flows on both streams on the same day. Therefore, the flood hazard analysis for the study area combines the 100-year peaks of the Upper Truckee River and Trout Creek channels (i.e., 8,550 cfs). The two flows would converge in the main floodplain (marsh) as influenced by:

- the lake's water-surface elevation before the flood,
- the configuration of the Upper Truckee River and Trout Creek outlet(s) through the beach ridge, and
- the amount of water stored in the entire floodplain (including the lagoon area south of Barton Beach) before the flood.

Flooding and Floodplain Storage

Most of the study area is composed of the shared floodplain of the Upper Truckee River and Trout Creek, which has the potential to store a large amount of runoff during flood events. The floodplain is about one mile long and about 0.5 mile wide, with about 14 acre-feet of storage volume at the legal maximum lake elevation of 6,229.0 feet (Conservancy and DGS 2005:6-1). It is bounded on the south and east by urbanized uplands, and on the west by a combination of urbanized upland, urbanized floodplain, and the Tahoe Keys Marina. The northern boundary of the floodplain is along the Barton Beach ridge, stretching from uplands west of the mouth of the Upper Truckee River (in the former Cove East Beach dunes) to uplands east of East Barton Beach. The only perennial (low-flow) outlet to the lake is the existing mouth of the Upper Truckee River, which was deepened by dredging in the late 1950s to late 1960s. The Trout Creek system's lagoon includes a separate mouth that was not dredged and is not active as a low-flow channel to Lake Tahoe. As shown in historic aerial photography (Conservancy and DGS 2003), Trout Creek has historically breached the Barton Beach ridge during large flood events; this breach typically stays open to discharge directly to the lake during high flows and high lake levels. Extreme flood events may overtop additional parts of the barrier beach, via the combined effects of high streamflow and floodplain (lagoon) water levels, and storm wave action on both the lake and the lagoon.

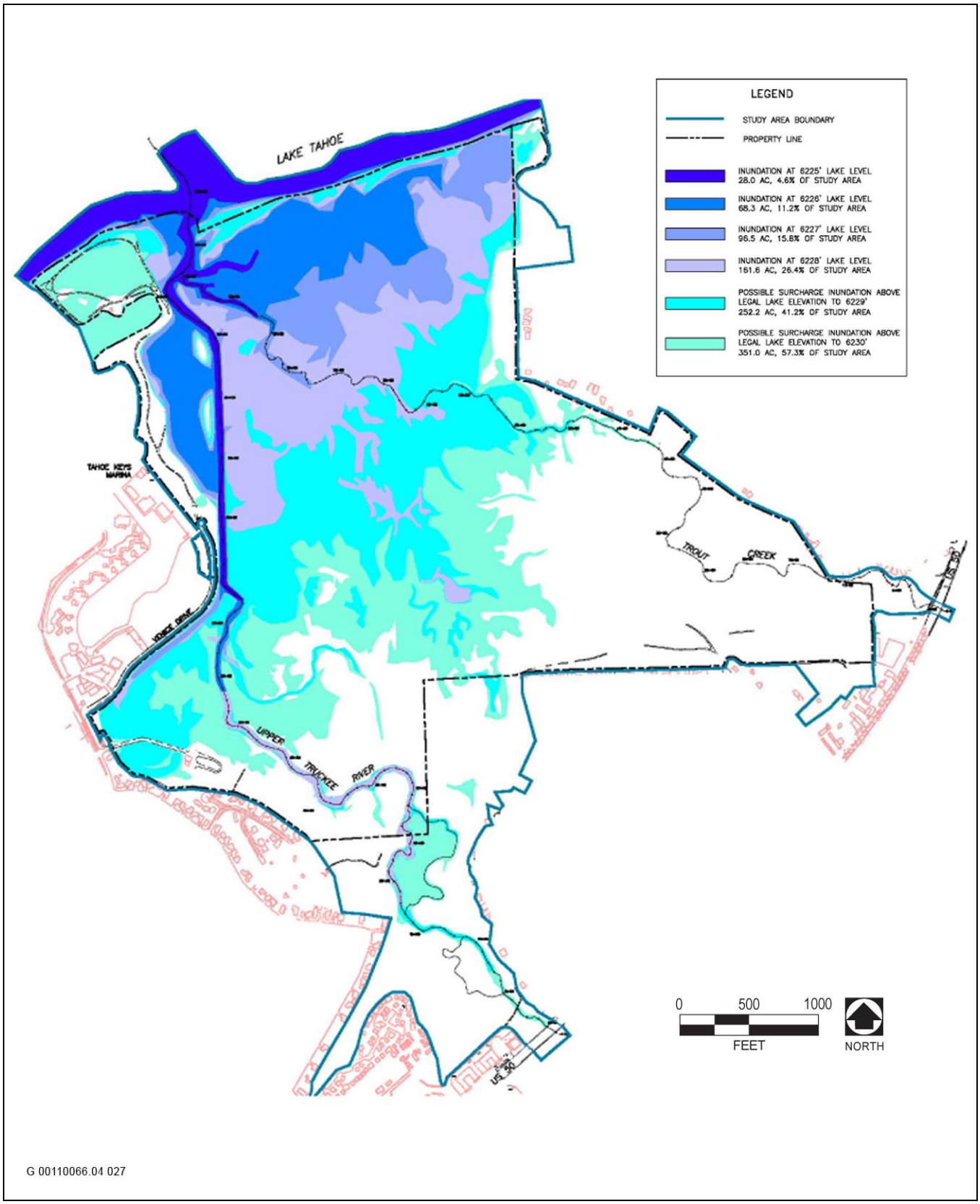
Lake Level Effects

Several aspects of hydrology in the study area are directly affected by lake level, and flood hydrology is no exception. As Lake Tahoe rises above its median level, floodplain storage is reduced because the mouth of the Upper Truckee River (and other low portions of the Barton Beach ridge) allows lake water to fill in the low-elevation areas of the marsh (Exhibit 3.8-13). About 1,000 feet of lower Trout Creek and as much as 5,000 feet of the Upper Truckee River would have reduced channel capacity under lake backwater conditions (Conservancy and DGS 2003:8-9). The area of lake backwater is a small percentage of the total floodplain storage when the lake is near median elevation (i.e., 6,225–6,226 feet). However, during high lake levels (i.e., 6,228–6,229 feet), 25 percent or more of floodplain storage could be taken up by lake backwater. The increase in area affected by backwater effects reflects the low surface gradient of the marsh.

Because of the Upper Truckee River's channel-lake connection through the straightened reach, high lake levels can also interfere with urban drainage during floods. The backwater can submerge the Colorado Avenue outlet by about two feet, possibly affecting sump performance.

Bridge Effects

The bridge at U.S. 50 also limits the maximum streamflow of both the Upper Truckee River and Trout Creek as they enter the study area. Bridge replacements and repairs by the California Department of Transportation over the years (as recently as 1996–1997) used the original bridge-capacity designs from the early 1900s, to avoid litigation in case bridge modifications would have altered upstream or downstream discharge. The effects of constriction by the bridge during high flows would be reflected in the historic gauge records and flood-frequency analysis for the Upper Truckee River (Tables 3.8-2 and 3.8-3) because the gauge is downstream of the bridge.



Source: Conservancy and DGS 2003

Exhibit 3.8-13 Potential Backwater Inundation of the Upper Truckee Marsh under High Lake Levels

Drainage Effects

Topography and urban drainage systems in the developed areas that surround the study area can also affect flooding on the margins of the study area. Flooding problems have occurred primarily on the west side of the study area in the Tahoe Island and Sky Meadows areas. In these areas, urban development occurred within the topographic floodplain, but before implementation of federal regulations that prohibit development or require specific flood protections in the 100-year floodplain. The installed street drainage infrastructure includes a sump pump system that discharges water into the Upper Truckee River. The system has been modified and updated over the years. Occasionally the system has failed, resulting in localized street flooding (Gibson, pers. comm., 2002; Rodgers, pers. comm., 1999; Conservancy and DGS 2003:8-7). Such problems can occur during intense thunderstorms, or when winter snow and ice impede drainage even if the river is not flooding. However, serious flooding in these neighborhoods is most often associated with major rain-on-snow events that also cause generalized flooding on the main floodplain.

FEMA Floodplain

The regulatory floodplain identified by FEMA is land temporarily inundated by water overflowing from an adjacent or nearby river or stream during the identified “base flood,” in this case the 100-year flood.

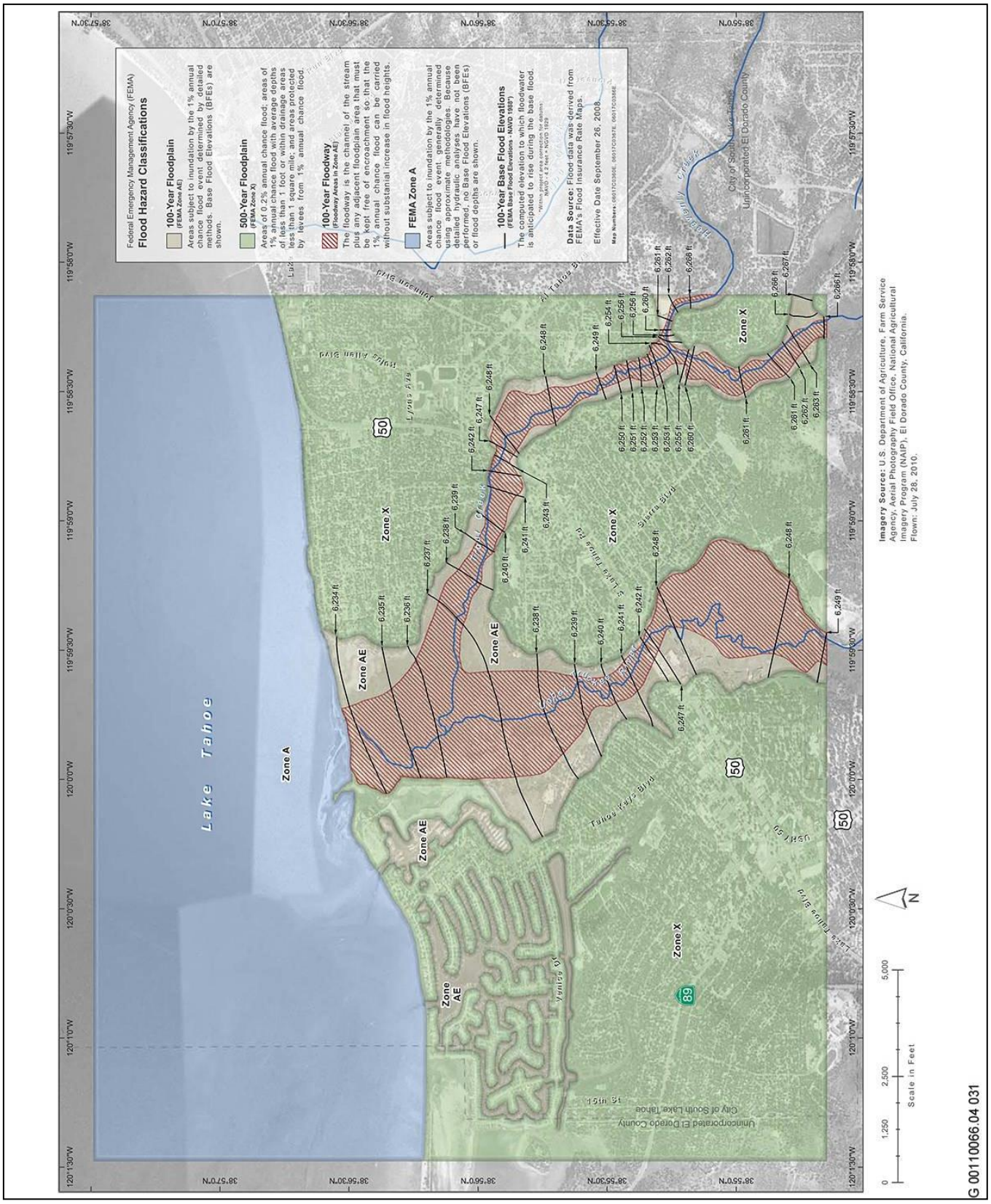
The regulatory floodplain consists of the floodway and margins of the floodplain, which are called the flood fringe. The floodway is where the water is likely to be deepest and fastest, and is considered the zone of highest flood hazard. As specifically defined by FEMA (44 Code of Federal Regulations [CFR] 59.1[d]), a floodway is the channel of a river or other watercourse, and the adjacent land areas, that must be reserved to convey and discharge floodwaters. This area within the floodplain should be kept free of all obstructions to allow floodwaters to flow freely downstream. Therefore, development in or modification of a floodway is usually prohibited. The flood fringe is a zone of floodwater storage where water moves slowly or is ponded during flooding. Development within the flood fringe is permitted by FEMA as long as the resulting water-surface profile of the 100-year flood is not increased by more than one foot at any location.

Floodplain Boundaries and Water Elevations

The boundaries of the 100-year floodplain and estimated water-surface elevations and floodway boundaries in the study area (Exhibit 3.8-14) are from FEMA’s 2008 Flood Insurance Rate Maps (FEMA 2008a, 2008b, 2008c). This regulatory floodplain is used by FEMA and CSLT in implementing floodplain development regulations. The mapping reflects revisions to the 1978 FIRM following land use changes in and around the study area, including improvements to the U.S. 50 bridges at the Upper Truckee River and Trout Creek crossings, additional urban development, record peak flood events, and restoration of the LWS Restoration Area. Additionally, a Letter of Map Revision (LOMR) was prepared in 2009 on the basis of updated topographic information for the Tahoe Keys and Lake Tallac area (FEMA 2009). The LOMR revised flood zone mapping in the northwest corner of the study area but did not revise the base flood elevations.

Nearly all of the study area is in the 100-year floodplain, except the uplands adjacent to the Highland Woods subdivision, between Cove East Beach and the Sailing Lagoon, and along the margins of the Tahoe Keys Marina (Exhibit 3.8-14). The Upper Truckee River and Trout Creek channels, adjacent areas, and the shared floodplain in the central meadow are the designated floodway. The FEMA base flood elevations in the Upper Truckee River marsh range from approximately 6,243 feet NGVD (6,247 feet NAVD [North American Vertical Datum], used by FEMA) at the U.S. 50 crossing, to approximately 6,230 feet NGVD (6,234 feet NAVD) near the mouth of the river.

Some residential areas adjacent to the study area (a couple of streets in Tahoe Island and some lots in Sky Meadows) are within the floodplain fringe west of the Upper Truckee River. A few lots in Al Tahoe (along El Dorado Avenue, Edgewood Circle, and Lilly Avenue) are along the edge of the regulatory floodplain east of Trout Creek (Exhibit 3.8-14).



Source: Conservancy and DGS 2003

Exhibit 3.8-14 **FEMA Floodplain Overlain on Aerial Map**

Flood Profiles for the Upper Truckee River

Hydraulic modeling has been performed for the study area to estimate flood boundaries and elevations, using the USACE Hydraulic Engineering Center's River Analysis System (HEC-RAS) model (Version 3.1.2) in combination with geographic information system (GIS) applications (ArcView and HEC-GeoRAS) (Conservancy 2003, Conservancy and DGS 2005).This modeling routed the large and assumed concurrent peak-flow hydrographs for both the Upper Truckee River and Trout Creek through the study area, and included the effects of changing floodplain storage on resulting water surface elevations. The worst-case analysis assumed a high lake level (6,229 feet). The modeled flood hydrographs spanned the 5-year to 100-year events, and thus covered the range of flows that are likely to be associated with flood hazards.

The flood model was calibrated using field markings in Sky Meadows and Colorado Court from the January 1997 event (Conservancy and DGS 2005:6-10, 6-11). Photographs, homeowners' recollections, and remaining flood debris/damage marks were used to field-survey water levels from the 1997 event. (The survey occurred in 2000.) Simulated water surface elevations were generated by model runs that used the range of estimated peak flow for the 1997 event. Comparison of the field-surveyed water surface data to the simulated elevations supported calibration of the model (Table 3.8-4).

Table 3.8-4
Surveyed and Simulated Water Surface Elevations for the January 1997 Flood

Location	Surveyed Elevation Range (feet)	Simulated Elevation Range (feet)*		
		At 5,560 cfs	At 6,560 cfs	At 7,500 cfs
Sky Meadows	6,236.80 to 6,237.02	6,236.44	6,236.78	6,237.08
Colorado Court	6,232.00 to 6,232.04	6,231.95	6,232.16	6,232.35

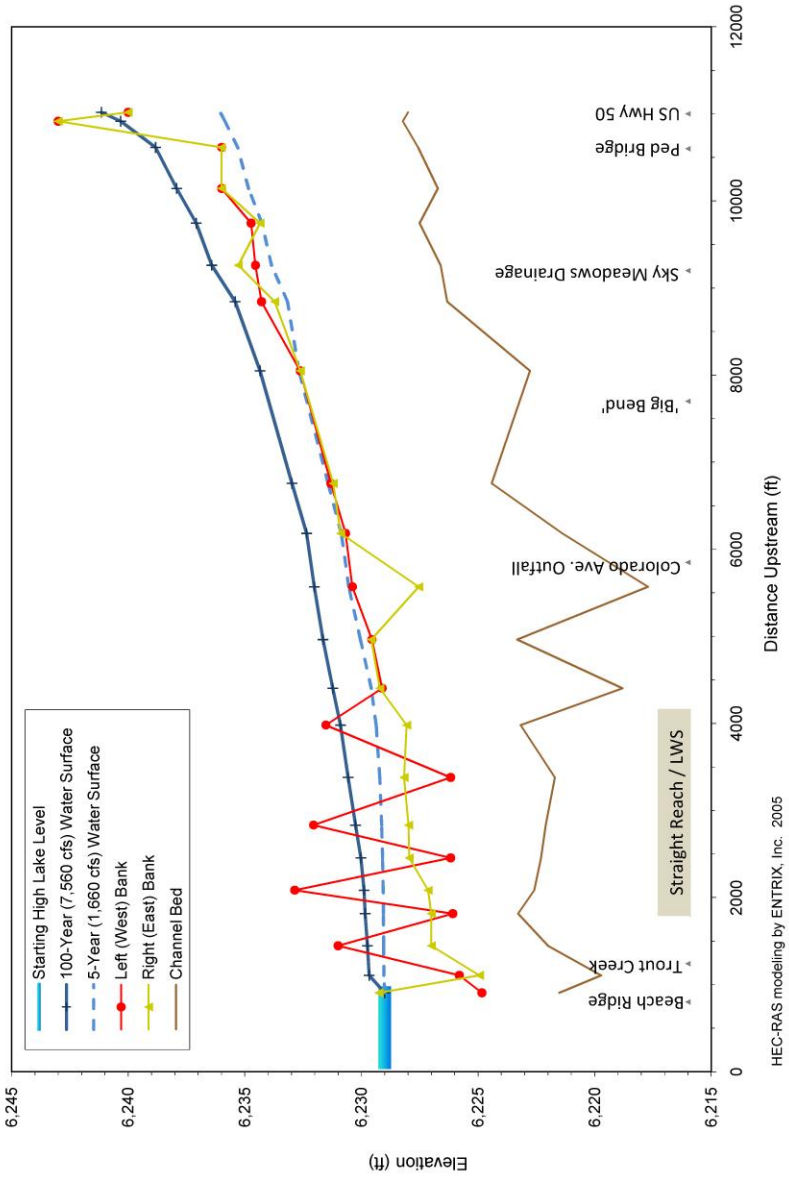
Notes: cfs = cubic feet per second
* Modeled three different peak flows for the range of estimated 1997 peak flows downstream of the U.S. Highway 50 bridge.
Source: Conservancy and DGS 2005

The calibrated results of the hydraulic modeling include profiles of the existing channel bed, banks, and floodwater surfaces of the Upper Truckee River (Exhibit 3.8-15). As discussed above, the channel's capacity is large enough to contain the 5-year event in the upstream portion of the study area between U.S. 50 and the "big bend." The 5-year floodwater surface is about equal to the bank heights from the "big bend" to just upstream of the Colorado Avenue outfall. Downstream of this area, the 5-year water surface is higher than the east bank and higher than the west bank in some short reaches, including the restored LWS wetland. As expected, the 100-year water surface elevation exceeds the bank heights throughout the project reach, with the exception of the reserved fill "islands" along the restored LWS wetlands.

Seismically Generated Waves

Seismic shaking during earthquakes can cause waves to form within open bodies of water. The two major types of seismically generated waves are tsunamis and seiches.

Tsunamis are waves generated by the displacement of a large volume of water and thus occur only in large water bodies such as oceans, bays, or large lakes. Displacements of water can be caused by several phenomena (including subaqueous landsliding or explosions), but the most common are submarine displacements of the earth's crust that result from earthquakes.



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Source: Conservancy and DGS 2003; Valley & Mountain Consulting 2008

Exhibit 3.8-15 **Simulated Flood Profiles for the Upper Truckee River for the 5-Year and 100-Year Events**

A seiche is a wave that oscillates in a lake, bay, or gulf for a few minutes to a few hours as a result of seismic or atmospheric disturbances. Small seiches are almost always present on larger lakes; the frequency of the oscillation is determined by the size of the body, its depth and contours, and the water temperature. Larger seiches can be caused by nearby or distant earthquakes and occur when the wave signature of the seismic waves is resonant with the natural period (controlled by basin geometry) of the lake.

Recent investigations of the tectonic and seismic conditions within the Lake Tahoe region indicate the potential for moderate to large earthquakes that may generate strong to very strong seismic shaking in the study area. (See Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage.") The West Tahoe and North Tahoe–Incline Village Faults are considered active and capable of generating magnitude (M) 7 or greater earthquakes (Schweickert et al. 2004). Another important seismic source in the vicinity of the study area is the Genoa Fault. This fault, which forms the eastern boundary of the Carson Range, is considered capable of generating large earthquakes (M 7.2 to 7.5). The probability of an M 7 earthquake occurring within the next 50 years in the South Lake Tahoe area has been estimated by the Nevada Earthquake Safety Council to be between 10 and 12 percent (NESC 2007).

Occurrence of such seismic events may result in the formation of tsunamis within Lake Tahoe. The amplitudes (i.e., wave heights) of these seismically induced waves are expected to be on the order of 3–10 meters (10–30 feet). Additionally, the earthquakes may generate large seiches within the lake for hours after the events (Ichinose et al. 2000).

3.8.2 ENVIRONMENTAL CONSEQUENCES

SIGNIFICANCE CRITERIA

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; the TRPA Initial Environmental Checklist; factual or scientific information and data; and regulatory standards of federal, state, and local agencies. Below are outlined the significance criteria for CEQA, NEPA, and TRPA. Each agency assigns significance to its criteria in different ways. For this document an impact is considered to be a physical change in the environment and is considered significant under TRPA and CEQA and adverse under NEPA, if the conditions described below would occur.

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to hydrology if it would:

- 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 preexisting nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted) (CEQA 1);

- 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 that would result in substantial erosion or siltation on- or off-site (CEQA 2);

- 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 that would result in flooding on- or off-site (CEQA 3);

- create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff (CEQA 4);

- place housing within a 100-year flood hazard area as mapped on a federal flood hazard boundary or FIRM or other flood hazard delineation map (CEQA 5);
- place within a 100-year flood hazard area structures that would impede or redirect flood flows (CEQA 6);
- 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 (CEQA 7); or
- expose people or structures to a significant risk of inundation by seiche, tsunami, or mudflow (CEQA 8).

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis. NEPA requires documentation and discussion of any beneficial effects of a project in addition to its negative impacts. Where appropriate, these beneficial effects are discussed and called out specifically for the purposes of NEPA in the following impact analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative would result in a significant impact for hydrology and flooding if it would result in any of the following:

- changes in currents, or the course or direction of water movements (TRPA 1);
- changes in absorption rates, drainage patterns, or the rate and amount of surface water runoff so that a 20-year, 1-hour storm runoff (approximately one inch per hour) cannot be contained on the site (TRPA 2);
- alterations to the course or flow of 100-year floodwaters (TRPA 3);
- change in the amount of surface water in any water body (TRPA 4);
- alteration of the direction or rate of flow of groundwater (TRPA 5);
- change in the quantity of groundwater, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations (TRPA 6);
- substantial reduction in the amount of water otherwise available for public water supplies (TRPA 7); or
- exposure of people or property to water-related hazards such as flooding and/or wave action from 100-year storm occurrence or seiches (TRPA 8).

METHODS AND ASSUMPTIONS

The impact analysis examines the effects of each alternative in the short term and long term for each issue and topic listed above. Temporary effects are those that could occur over hours, days, or weeks during the active construction phase. Because the river system is expected to experience adjustments after construction, the analysis of temporary effects also looks at the potential for interim effects during construction or the first three–five years after construction (assuming that streamflows are at least average), or until the first moderately large flood event (approximately ten-year peak flow).

A combination of quantitative and qualitative methods was used in the impact analysis. The analysis was performed by a team of hydrologists/geomorphologists experienced in river restoration generally and the Tahoe Basin environment specifically. Information about the study area and vicinity and the analysts' professional experience on similar projects has been incorporated into the analysis of the river system's history, existing conditions, likely future conditions, and conditions expected under each action alternative. Groundwater dewatering impacts are described in Section 3.9, "Geomorphology and Water Quality."

The results of hydraulic modeling of the study area and the initial alternatives, completed by ENTRIX (2006), are incorporated into this impact analysis. These results provide information about water surface elevations, boundaries of the inundation area, flow depths, and average velocity, allowing a comparison between existing conditions and a restored-channel alternative.

The effects of climate change on future hydrology have been incorporated into the evaluation of the No-Project/No-Action Alternative (Alternative 5). However, even the most geographically and temporally focused available forecasts of climate change effects on hydrologic parameters (Tetra Tech 2007) are relatively variable and substantially uncertain. Therefore, the possible influences of various climate change scenarios, not just the core/central scenario, are considered in this analysis. Because of the degree of uncertainty and because the influences vary by scenario, the statements are expressed only in qualitative terms.

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Placing Housing within a 100-Year Flood Hazard Area (CEQA 5)—The proposed alternatives would not place any new housing or buildings within the existing FEMA flood hazard area; therefore, no impact related to placing housing within a 100-year flood hazard area would occur. Other possible changes related to flooding hazards to existing housing are fully discussed below.

Failure of a Levee or Dam (CEQA 7, in part)—The study area is not within an identified dam-failure inundation zone or near any constructed levees; therefore, no flood hazard related to failure of a levee or dam would occur. Other possible changes related to flooding are fully discussed below.

Landslide or Mudflow Risks (CEQA 8, in part)—The study area is located within an area of relatively gentle topography within the alluvial valley of the Upper Truckee River. The potential for landslides or mudflows within this setting is low. Slope failures are restricted to small rotational slides or slumps along the river banks resulting from erosion processes.

Short-Term Dewatering of Surface Water Features (TRPA 4, in part)—Major construction activities would require temporary dewatering or bypassing of work areas along the Upper Truckee River, the Sailing Lagoon, and other surface water within the study area. Although these activities may result in temporary changes to the amount of water in the surface water features of the study area, they would not result in any long-term changes to surface water. Hydrologic effects would be less than significant. Temporary dewatering and water diversion effects on aquatic biological resources are discussed in Section 3.5, "Fisheries."

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.8-1 (Alt. 1) **Increased Runoff Volumes and Peak Flows. (CEQA 3, 4; TRPA 1, 2)** *Implementing Alternative 1 would require construction of impervious surfaces at several discrete and dispersed locations within the study area for trails, viewpoints, observation areas, boardwalks, and kiosks. As described in Environmental Commitment 11, permanent stormwater detention features or infiltration systems and other BMPs would be incorporated into the final design to accommodate all 20-year, 1-hour storm runoff without erosion. This impact would be* ***less than significant****.*

New facilities constructed at several discrete and dispersed locations under Alternative 1—a parking lot, new trails, kiosks, viewpoints and observation areas, a boardwalk, and a pedestrian bridge—would include impervious or partially pervious surfaces. Constructing these features would incrementally and locally change runoff flow volumes and direction. However, implementing Alternative 1 would also involve conversion of existing impervious areas, including the Tahoe Keys Property Owners Association (TKPOA) Corporation Yard and its access road.

Changes in land coverage are analyzed in Impact 3.6-3 (Alt. 1) in Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage." As stated in Impact 3.6-3 (Alt. 1), the proposed coverage is less than the allowable coverage in the study area. For areas outside the litigation parcels coverage relocation would be completed at a 1:1 ratio, as allowed for this type of project by the TRPA Code. The hydrologic changes resulting from construction of impervious coverage would be minimized.

Construction under Alternative 1 would modify the type of impervious surfaces on portions of the site from soft coverage (compacted soil) to hard coverage (e.g., asphalt, boardwalks). However, if permanent BMPs were installed for the proposed facilities, the 20-year, 1-hour storm runoff from these locations could still be contained. Compliance with stormwater regulations would require BMPs, but Alternative 1 does not specify the design or location of BMPs for the proposed facilities. Therefore, runoff volumes and peak flows could change incrementally on portions of the site.

However, implementing Environmental Commitment (EC) 11, "Incorporate Effective Permanent Stormwater Best Management Practices," described in Table 2-6 in Chapter 2, would ensure that the final project design would include stormwater detention features or infiltration systems for runoff from areas of proposed impervious surfaces (i.e., pavement, buildings, laid stone, bridge deck). These detention or infiltration facilities would be sized to accommodate all 20-year, 1-hour storm runoff from each developed portion of the site. In addition, the final design of partially impervious surfaces (i.e., trails, boardwalks) would incorporate materials and methods to minimize changes to existing infiltration capacity. The detention or infiltration facilities and the partially impervious surfaces would include features to convey runoff safely to discharge points without erosion, and they would be maintained over the life of the project. These measures would reduce the effect of the incremental increase in runoff that may result from constructing impervious surfaces. This impact would be **less than significant**.

IMPACT 3.8-2 (Alt. 1) **Effects on Channels from Reconfiguration of Stream Channels and Lagoon Surface Water Features. (NEPA)** *Implementing Alternative 1 would move portions of the Upper Truckee River channel, reconnect the Sailing Lagoon with the river, and reconstruct the East Barton Lagoon, which would reconfigure the study area's drainage patterns. The change to drainage patterns would reestablish the site's naturally occurring surface water features and hydrologic/hydraulic processes. This impact would be* ***beneficial****.*

Implementing Alternative 1 would involve directly modifying surface water features in the study area to counteract and/or compensate for past actions and the degraded existing condition. These modifications would include reconfiguring two lagoons to restore natural hydrologic function in both lagoon areas. In addition, constructing new channel features would increase floodplain connectivity and improve floodplain processes. Relocating the low-flow channel would affect internal drainage patterns on this portion of the site, but would not substantially affect off-site drainage patterns or the quantity of water in surface water features.

The relocation of the river's low-flow channel sections that would occur under Alternative 1 is within the range of historic locations on-site, and the changes to drainage patterns would not affect off-site drainage or the amount of water in any surface water body. Reconnecting the Sailing Lagoon to the river and reconstructing the East Barton Lagoon would reestablish surface water features and drainage patterns in the study area that occurred historically and would not adversely affect off-site drainage or the amount of water in any off-site water bodies. Therefore, this impact would be **beneficial**.

IMPACT 3.8-3 (Alt. 1) **Modified 100-Year Flood Flow Directions or Floodplain Boundaries. (CEQA 7; TRPA 3, 8)** *Implementing Alternative 1 would decrease the channel capacity, raise the streambed elevation, lower the streambank heights and lengthen the channel, but would also enlarge floodplain storage because fill would be excavated in some areas of the FEMA regulatory floodway or floodplain. As a net result, the boundaries and depth of flooding in the 100-year flood hazard area would not increase in the study area. However, constructing the bridge and boardwalk across the river and marsh could locally obstruct flood flow and increase flood levels and flood hazards. The final design of the bridge and boardwalk would be determined through iterative modeling and review by multiple agencies to ensure that the extent or elevation of the 100-year special flood hazard area as designated by FEMA would not be adversely modified. This impact would be* ***less than significant****.*

Implementing Alternative 1 would decrease the low-flow channel capacity, directly raise the streambed elevation, lower streambank heights, and increase the length of the Upper Truckee River channel in the study area to beneficially increase the frequency and extent of overbanking onto the floodplain under low to moderate flood events (i.e., 2-year and 5-year events). Proposed changes include constructing grade control structures to promote bed aggradation, constructing geomorphically sized channels, and enlarging floodplain storage by removing fill (approximately 23,000 cubic yards).

A hydraulic analysis of the study area was conducted to estimate potential changes in floodwater surface elevations, flows, and floodplain boundaries for the 100-year flood under Alternatives 1, 2, 3, and 4 (Conservancy and DGS 2005). The results of the modeling indicate that the water surface elevation for the 100-year event under Alternative 1 would be the same as or lower than the existing 100-year water surface (labeled as 'original' in the graphic). Based on existing topography at the floodplain margins, increased flood storage created by Alternative 1 would generally reduce the width of the flood area of the 100-year flood fringe. The proposed restoration efforts described above would not raise floodwater surfaces for the 100-year flood event within the study area, nor would they increase flood hazards in the surrounding area.

However, the proposed bridge upstream of the mouth of the Upper Truckee River (River Station [RS] 10+00) and the raised boardwalk across the marsh were not evaluated in the hydraulic modeling. Bridge footings and abutments and boardwalk supports could potentially obstruct flow, causing incremental increases in flood elevation. The designated floodway in the study area includes broad areas of the lower marsh, as well as the channels of the Upper Truckee River and Trout Creek (Exhibit 3.8-14). The elements of the final design of the proposed bridge and boardwalk would ensure that these structures would not obstruct flood flows, to the degree that any effective increase in the elevation of the 100-year event would occur in the study area. The final design would be supported by a hydraulic analysis that would evaluate the potential for substantial changes to flooding hazards and littoral processes. Design elements (e.g., deck height, locations of bridge or boardwalk supports, and cross-sectional areas of those supports) would be adjusted to ensure that flow capacity through the structures would be sufficient to pass the 100-year event without increasing the effective flood elevation. The final design would be submitted to CSLT for review and approval. Therefore, this impact would be **less than significant**.

IMPACT 3.8-4 (Alt. 1) **Increased Overbank Flooding for Small Streamflow Events. (NEPA)** *Implementing Alternative 1 would decrease the channel capacity, raise the streambed elevation, and lower the streambank heights to enlarge the area of overbank flooding for small (760-cfs) streamflow events within the study area by about 11 acres. This effect would reestablish natural connections between the low-flow channel and the floodplain/marsh surface. This impact would be* ***beneficial****.*

The design of Alternative 1 provides for increased overbank flows during relatively frequent, small flood events (i.e., the 2-year event). Implementing Alternative 1 would decrease the Upper Truckee River's channel capacity, raise the bed elevation, lower bank heights, and increase the length of the channel, thus enlarging the portion of the study area inundated under the existing 2-year return interval flow (e.g., 760 cfs). The existing area of inundation during a 2-year event is about 64 acres (see Table 3.8-5); the channel and floodplain modifications proposed by Alternative 1 would increase this area to about 74 acres. The increase in inundation is proposed to

improve the connectivity of the floodplain and marsh surface to the river channel. More frequent and expanded inundation would benefit riparian and marsh wildlife habitat and vegetation. The expanded inundation area would not include any existing or proposed structures.

Table 3.8-5
Comparison of Floodplain Area Inundated during 2-year Flow Event

Existing Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
64 acres	74 acres	126 acres	156 acres	82 acres	64 acres

Source: Conservancy and DGS 2005

In the long term, the watershed's response to climate change could reduce typical streamflows and the magnitude of the peak streamflow expected frequently (i.e., every couple of years). Implementing Alternative 1 would improve overbanking at specific streamflow magnitudes, but watershed hydrology shifts caused by climate change might reduce the frequency with which those flows would occur. The uncertain but possible hydrologic effects of climate change could partially offset the benefits of Alternative 1. Still, Alternative 1 would reestablish natural hydrologic/hydraulic processes and result in an improvement relative to existing conditions. Therefore, this impact would be **beneficial**.

IMPACT 3.8-5 (Alt. 1) **Modified Groundwater Levels and Flow Patterns. (NEPA)** *Implementing Alternative 1 would modify the size, shape, and location of the Upper Truckee River and change the surface connections and subsurface conditions around the channels and lagoons, which could change groundwater levels and flow patterns. This effect would partially counteract the historic effects on groundwater levels and flow patterns on the west side of the study area caused by dredging of the Tahoe Keys waterways. This impact would be* ***beneficial****.*

Implementing Alternative 1 would involve directly raising channel bed elevations and backfilling existing incised channels, which would allow for higher groundwater levels and better groundwater continuity across the study area. In addition, the stream channels would be modified to increase overbank flows across the floodplain, which would enhance opportunities for groundwater recharge within the study area. These actions would not directly counteract the historic effects on groundwater levels and flow patterns on the west side of the study area caused by dredging of the Tahoe Keys waterways, which would remain in place. However, the actions would restore groundwater storage opportunities and flow patterns previously altered by dredging and straightening of the Upper Truckee River channel and by the river's geomorphic adjustments to watershed disturbances (i.e., incision and widening).

Alternative 1 would keep the active Upper Truckee River channel close to the existing alignment, near the previously dredged waterways of the Tahoe Keys. Implementing this alternative would not effectively change the groundwater loss that occurs toward those artificial channels during low lake stands under existing conditions. This would result in an improvement relative to existing conditions. Therefore, this impact would be **beneficial**.

IMPACT 3.8-6 (Alt. 1) **Exposure to Seismically Generated Wave Hazards. (CEQA 8, TRPA 8)** *Alternative 1 proposes recreation improvements within the study area that could be damaged by seismically generated waves that could develop in Lake Tahoe. The most important hazard would be presented by a tsunami caused by a large local earthquake, rather than by seiche waves of varied sources. The potential for exposure of people or structures to the effects of a tsunami would be low. This impact would be* ***less than significant****.*

Alternative 1 proposes the development of recreational facilities within and at the margins of the Upper Truckee Marsh. The area is adjacent and graded to Lake Tahoe. The topography throughout the study area is relatively flat to gently sloping. The results of recent evaluations of seismic hazards indicate that faults within or near the Tahoe

Basin are capable of generating large earthquakes (NESC 2007). The occurrence of such earthquakes could result in the development of tsunamis with amplitudes of 10–30 feet (Ichinose 2000). A tsunami could also be generated in Lake Tahoe if a large landslide were to occur within or adjacent to the lake.

No accurate estimates are available to indicate the probability of a tsunami or the tsunami runup height at the study area. However, if a tsunami of this magnitude were to occur, it would likely overtop the barrier beach berm along the northern margin of the site and inundate much of the study area. The improvements most vulnerable to damage by a tsunami are the boardwalk proposed for the northern margin, the foot bridge over the river channel, the restored Sailing Lagoon, and the dune restoration area at Cove East Beach. Most other improvements would be inundated and may be damaged by only the largest of the estimated range of tsunamis. Visitors at the study area could be injured during inundation by a tsunami.

A variety of conditions, including nearby and distant earthquakes, could result in the development of seiches in Lake Tahoe. The amplitude (size) of possible seiches would vary, but no condition would be expected to generate seiches of the size of estimated tsunamis, as described above. Alternative 1 does not propose the construction of structures for human occupation, limiting the duration of potential human exposure to tsunami risks.

Project components would be constructed in an area that already supports urban development and recreational facilities, including residential housing and a marina, and users of the public-access facilities are expected to be people who already reside or recreate in the Tahoe Basin. Therefore, constructing the proposed improvements would not expose additional people to tsunami hazards. Furthermore, there is no way of knowing whether a tsunami with enough force to damage project improvements or to present a safety hazard to recreational users would ever be generated during the lifetime of the project facilities. The potential damage to the improvements (i.e., flooding and erosion) could be repaired. Because of the low probability of a tsunami occurring in Lake Tahoe, the relatively low human use of the study area, and the reparability of expected damage, this impact would be **less than significant**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.8-1 (Alt. 2) **Increased Runoff Volumes and Peak Flows. (CEQA 3, 4; TRPA 1, 2)** *Implementing Alternative 2 would require construction of impervious surfaces at several discrete and dispersed locations within the study area for trails, fishing access areas, and viewpoints. As described in Environmental Commitment 11, permanent stormwater detention features or infiltration systems and other BMPs would be incorporated into the final design to accommodate all 20-year, 1-hour storm runoff without erosion. This impact would be* ***less than significant****.*

This impact would be similar to Impact 3.8-1 (Alt. 1) but of smaller extent and magnitude, as described below. Implementing Alternative 2 would require construction of impervious surfaces at several discrete and dispersed locations within the study area for new trails, fishing access areas, and viewpoints. However, construction of these surfaces would be offset by the restoration of existing trails and removal of impervious cover and compacted fill within the TKPOA Corporation Yard.

Changes in land coverage are analyzed in Impact 3.6-3 (Alt. 2) in Section 3.6, “Geology and Soils, Mineral Resources, and Land Capability and Coverage.” As stated in Impact 3.6-3 (Alt. 2), the proposed coverage is less than the allowable coverage in the study area. For areas outside the litigation parcels coverage relocation would be completed at a 1:1 ratio and therefore would comply with the TRPA Code.

The features of Alternative 2 would increase the volume of runoff generated within portions of the study area and would locally redirect or increase peak flows. These runoff changes would occur in only small portions of the study area, and it is unlikely that increased flow volumes and peaks would be released off-site (e.g., into the storm drainage system and ultimately into Lake Tahoe).

As described for Alternative 1, EC 11 (Table 2-6) would be implemented. This environmental commitment would involve installing permanent BMPs, stormwater detention features, or infiltration systems that would convey runoff safely to discharge points and would be maintained over the life of the project. These measures would reduce the effect of the incremental increase in runoff that may result from constructing impervious surfaces as part of Alternative 2. This impact would be **less than significant**.

IMPACT 3.8-2 (Alt. 2) **Effects on Channels from Reconfiguration of Stream Channels and Lagoon Surface Water Features. (NEPA)** *Implementing Alternative 2 would move portions of the Upper Truckee River channel, reconnect the Sailing Lagoon with the river, and reconstruct the East Barton Lagoon, which would reconfigure the study area's drainage patterns. The change to drainage patterns would reestablish the site's naturally occurring surface water features and hydrologic/hydraulic processes. This impact would be* ***beneficial****.*

Implementing Alternative 2 would involve directly modifying surface water features in the study area to counteract and/or compensate for past actions and the degraded existing condition. Alternative 2 would also make the same changes to the surface water lagoons as Alternative 1 (see Impact 3.8-2 [Alt. 1]).

In addition, new channel features would be constructed and some of the existing floodplain areas would be modified to conditions similar to those that existed historically in portions of the site. These measures would improve the degraded surface water functions and values by restoring floodplain processes to large areas of the existing terrace surface.

Alternative 2 would also involve constructing about 8,420 feet of sinuous single-thread channel to replace the degraded existing channel (between RS 21+00 and RS 96+00) and the straightened reach adjacent to the LWS Wetlands Restoration Project area. This would move the low-flow channel up to 500 feet to the west of its existing location between RS 21+00 and 39+00, and up to 500 feet to the east between RS 39 +00 and 96+00. However, these relocations would still be within the range of location(s) of the positions of historically active low-flow channel(s). Relocating the low-flow channel would affect internal drainage patterns on this portion of the site, but would not affect off-site drainage patterns or the quantity of water in surface water features.

Also, Alternative 2 would involve reconfiguring the previously dredged mouth of the Upper Truckee River by constructing approximately 400 feet of new channel downstream of RS 96+00 and a new, smaller, higher elevation mouth. This would move the low-flow channel and river mouth as much as 200 feet west of its existing location, although it would still be within the range of location(s) of the historically active low-flow channel(s) and mouth. Relocating the low-flow channel would affect internal drainage patterns on this portion of the site, but would not affect off-site drainage patterns or the quantity of water in surface water features.

Relocating the river mouth under this alternative would modify the drainage patterns along the beach ridge and lake shoreline because it would move the river's discharge point to the new location. At times when the lake level is between the median elevation (6,226 feet NGVD) and existing river-mouth elevation (6,222 feet NGVD), the relocated, higher-elevation river mouth would discharge less water from the river to Lake Tahoe. The amount of river water discharged to the lake would not change when the lake level is below the existing river mouth or above the median elevation. The modified river mouth would retain proportionally more surface water within the lagoon and marsh system during moderately low lake level conditions (median to low) than under the existing dredged-mouth condition. Although these drainage patterns differ from the existing condition, they are within the range of historic conditions and would be typical of a river mouth within a naturally functioning barrier beach system. The proposed reduction of the capacity and elevation of the river mouth and improved water quality (i.e., reduction of transport of fine sediment to the littoral zone) would generally improve littoral processes by returning the river-lake conditions to a more natural configuration.

Alternative 2 would reestablish the same connection between the Sailing Lagoon and the Upper Truckee River near the river mouth as Alternative 1. Alternative 2 would also result in reconstruction of a back-beach lagoon behind East Barton Beach as described for Alternative 1.

Relocation of the river's low-flow channel sections as described above would present conditions falling within the range of historic conditions on-site. The changes to drainage patterns would not affect off-site drainage or the amount of water in any surface water body. Reconnecting the Sailing Lagoon to the river and reconstructing the East Barton Lagoon would reestablish surface water features and drainage patterns in the study area that occurred historically and would not adversely affect off-site drainage or the amount of water in any off-site water bodies. Therefore, this impact would be **beneficial**.

IMPACT 3.8-3 (Alt. 2) **Modified 100-Year Flood Flow Directions or Floodplain Boundaries. (CEQA 7; TRPA 3, 8)** *Implementing Alternative 2 would decrease the channel capacity, raise the streambed elevation, lower the streambank heights, and modify flow routes, but would enlarge floodplain storage because fill would be excavated in some areas within the FEMA regulatory floodway or floodplain. As a net result, the extent or elevation of the 100-year special flood hazard area as designated by FEMA would not be adversely modified. This impact would be* ***less than significant****.*

Implementing Alternative 2 would decrease the low-flow channel capacity, directly raise the streambed elevation, lower streambank elevations and increase the length of the Upper Truckee River channel in the study area. Proposed actions that would decrease existing floodplain storage would include filling abandoned channels and reducing the mouth of the river. These losses in floodplain storage would be offset by other actions proposed by Alternative 2, including creating areas of lowered floodplain along some of the new channels and removing fill at the LWS Restoration Area and the TKPOA Corporation Yard and behind East Barton Beach. This alternative would also reconnect the Sailing Lagoon to Upper Truckee River flows.

A hydraulic analysis of the study area was conducted to estimate potential changes in floodwater surface elevations, flows, and floodplain boundaries for the 100-year flood under Alternative 2 (Conservancy and DGS 2005). The results of the modeling indicate that the water surface elevation for the 100-year event (7,650 cfs) under Alternative 2 would generally be the same as or lower than the existing 100-year water surface within the study area, nor would the flood boundary enlarge or flood hazards increase in the surrounding area. Therefore, this impact would be **less than significant**.

IMPACT 3.8-4 (Alt. 2) **Increased Overbank Flooding for Small Streamflow Events. (NEPA)** *Implementing Alternative 2 would decrease the channel capacity, raise the streambed elevation, and lower the streambank heights to enlarge the area of overbank flooding for small (760-cfs) streamflow events within the study area by 61 acres. This effect would reestablish natural connections between the low-flow channel and the floodplain/marsh surface. This impact would be* ***beneficial****.*

Implementing Alternative 2 would decrease the Upper Truckee River's channel capacity, raise the bed elevation, lower the streambank heights, and increase the length of the channel, thus enlarging the portion of the study area inundated under the existing 2-year return interval flow (e.g., 760 cfs) (Table 3.8-5). However, the watershed's response to climate change could reduce typical streamflows and the magnitude of the peak streamflow expected frequently (i.e., every couple of years). Implementing Alternative 2 would improve overbanking at specific streamflow magnitudes, but watershed hydrology shifts caused by climate change might reduce the frequency with which those flows would occur. The uncertain but possible hydrologic effects of climate change could partially offset the benefits of Alternative 2. Still, the channel modifications would improve connections between the low-flow channel and the floodplain and marsh surface, reestablishing natural hydrologic/hydraulic processes, which would result in a substantial improvement relative to existing conditions. Therefore, this impact would be **beneficial**.

IMPACT 3.8-5 (Alt. 2) **Modified Groundwater Levels and Flow Patterns. (NEPA)** *Implementing Alternative 2 would modify the size, shape, and location of the Upper Truckee River and change the surface connections and subsurface conditions around the channels and lagoons, which could change groundwater levels and flow patterns. This effect would partially counteract the historic effects on groundwater levels and flow patterns on the west side of the study area caused by dredging of the Tahoe Keys waterways. This impact would be* ***beneficial****.*

Implementing Alternative 2 would involve directly raising channel bed elevations and backfilling existing incised channels. These actions would be similar to but more extensive than actions that would occur under Alternative 1. Also like Alternative 1, this alternative would additionally involve modifying the stream channels to increase overbank flows across the floodplain, but the modification would be more extensive than under Alternative 1. These actions would not directly counteract the effects on groundwater levels and flow patterns on the west side of the study area caused by dredging of the Tahoe Keys waterways, which would remain in place. However, the actions would restore groundwater storage opportunities and flow patterns previously altered by dredging and straightening of the Upper Truckee River channel and by the river's geomorphic adjustments to watershed disturbances (i.e., incision and widening).

Alternative 2 would keep the active Upper Truckee River channel close to the existing alignment, near the previously dredged waterways of the Tahoe Keys. Implementing this alternative would not worsen the groundwater loss that occurs toward those artificial channels during low lake stands under existing conditions. This would result in an improvement relative to existing conditions. This impact would be **beneficial**.

IMPACT 3.8-6 (Alt. 2) **Exposure to Seismically Generated Wave Hazards. (CEQA 8, TRPA 8)** *Alternative 2 proposes improvements within the study area that could be damaged by seismically generated waves that could develop in Lake Tahoe. The most important hazard would be presented by a tsunami caused by a large local earthquake, rather than by seiche waves of varied sources. The potential for exposure of people or structures to the effects of a tsunami would be low. This impact would be* ***less than significant****.*

Alternative 2 proposes the development of recreational facilities within and at the margins of the Upper Truckee Marsh. The area is adjacent and graded to Lake Tahoe and is exposed to inundation when large waves develop on the lake, as described above in Impact 3.8-6 (Alt. 1). The proposed improvements most vulnerable to damage by a tsunami are the reclaimed Sailing Lagoon and the dune restoration area (and facilities) at Cove East Beach. Because of the low probability of a tsunami occurring in Lake Tahoe, the relatively low human use of the study area (i.e., no proposed structures for human occupation), and the reparability of expected damage, this impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.8-1 (Alt. 3) **Increased Runoff Volumes and Peak Flows. (CEQA 3, 4; TRPA 1, 2)** *Implementing Alternative 3 would require construction of impervious surfaces at several discrete and dispersed locations within the study area for trails, viewpoints, observation areas, fishing access areas, boardwalks, and a kiosk and would incrementally modify the drainage pattern. As described in Environmental Commitment 11, permanent stormwater detention features or infiltration systems and other BMPs would be incorporated into the final design to accommodate all 20-year, 1-hour storm runoff without erosion. This impact would be* ***less than significant****.*

This impact would be similar to Impact 3.8-1 (Alt. 1), but of smaller extent and magnitude. Under Alternative 3, new foot and bike trails, six viewpoints, one observation area, a fishing access area, and a kiosk would create new impervious areas. However, Alternative 3 would also include activities and features that would decrease the volume of runoff or peak flows generated within portions of the study area, including restoration of existing trails and the TKPOA Corporation Yard and its access road.

Changes in land coverage are analyzed in Impact 3.6-3 (Alt. 3) in Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage." As stated in Impact 3.6-3 (Alt. 3), the proposed coverage is less than the allowable coverage in the study area. For areas outside the litigation parcels coverage relocation would be completed at a 1:1 ratio and therefore would comply with the TRPA Code.

The features of Alternative 3 could increase the volume of runoff generated within portions of the study area and could locally redirect or increase peak flows. These runoff changes would occur only in portions of the study area, but increased flow volumes and peaks could be released off-site (e.g., into the storm drainage system and ultimately into Lake Tahoe).

As described for Alternative 1, EC 11 (Table 2-6) would be implemented. This environmental commitment would involve installing permanent BMPs, stormwater detention features, or infiltration systems that would convey runoff safely to discharge points and would be maintained over the life of the project. These measures would reduce the effect of the incremental increase in runoff that may result from constructing impervious surfaces as part of Alternative 3. This impact would be **less than significant**.

IMPACT 3.8-2 (Alt. 3) **Effects on Channels from Reconfiguration of Stream Channels and Lagoon Surface Water Features. (CEQA 2; TRPA 1, 4)** *Implementing Alternative 3 would move portions of the Upper Truckee River channel and reconnect the Sailing Lagoon with the river, which would reconfigure the study area's drainage patterns to have both the river and Trout Creek flows in the middle of the marsh. The change to drainage patterns would reestablish the site's naturally occurring surface water features and hydrologic/hydraulic processes, and the project design would incorporate measures to protect the lower reach of Trout Creek from local erosive effects of increased flow. However, adjustments to the river mouth locations and duration of active flow through the beach may change the size of the Trout Creek lagoon and/or beach opening. Still, the changes would be within the range of natural conditions. This impact would be* ***less than significant****.*

Implementing Alternative 3 would involve directly modifying surface water features in the study area to counteract and/or compensate for past actions and the degraded existing condition. Alternative 3 would connect the main channel with the network of small remnant channel sections in the center of the study area through two direct measures.

First, the approximately 1,910-foot-long eastside channel of the Upper Truckee River channel between RS 17+00 and RS 29+00 would be reestablished as the low-flow channel to create a longer, more sinuous channel. This would move the low-flow channel as much as 200 feet to the east of its existing location, although the low-flow channel would still be within the range of location(s) of the historically active low-flow channel(s). Second, a single-thread pilot channel would be constructed, extending from RS 29+00 about 1,500 feet into the middle of the study area. This would move the low-flow channel as much as 400 feet to the east of its existing location, although the pilot channel would still be within the range of location(s) of the historically active low-flow channel(s).

Alternative 3 would also involve replacing the degraded existing channel and the straightened reach adjacent to the LWS Wetlands Restoration Project area between RS 28+00 and RS 96+00 with the reoccupied channel(s) in the middle of the study area. However, the design and construction would not dictate the location of the river's low-flow channel(s) through the middle of the marsh, because several existing topographic lows and channel fragments might be reoccupied by the river over time. Natural processes would determine the eventual location of the channel(s) downstream of the pilot channel. This could move the low-flow channel as much as 1,700 feet to the east of its existing location between RS 39 +00 and RS 96+00.

Also, Alternative 3 would involve modifying the previously dredged mouth of the Upper Truckee River by constructing a hardened grade control at RS 99+00 with a minimum elevation of 6,222.0 feet NGVD and installing biotechnical measures (e.g., willow stakings) to narrow the channel and to encourage sediment deposition. This would not relocate the existing river mouth, but would reinforce its existing vertical and lateral

position. The proposed changes to the river mouth under Alternative 3 would not be expected to change drainage patterns. Alternative 3 (as with Alternatives 1 and 2) would also reestablish the same hydrologic connection between the Sailing Lagoon and the Upper Truckee River near the river mouth.

The relocations of the river's low-flow channel sections described above are within the range of historic locations on-site, but constitute a major change relative to conditions that have existed for more than 90 years. Reconnecting the Sailing Lagoon to the river would reestablish surface water features and drainage patterns within the study area that occurred historically and would not adversely affect off-site drainage or the amount of water in any off-site water bodies. The changes to the drainage pattern in the middle of the marsh, though confined to locations within the study area, would increase the amount of water in the downstream reaches of Trout Creek and its lagoon. They also could potentially affect the location or frequency of discharge from Trout Creek to the lake through the barrier beach. These effects could modify the hydraulics of the Trout Creek lagoon and flow directions along the local shore, and could indirectly affect beach erosion or beach habitat.

Redirecting the low-flow channel(s) to the middle of the study area under Alternative 3 would increase flows in the downstream reach of Trout Creek. The relative increase in flows would be largest for low and moderate events, but increases would occur even during large events. For some flow events, more surface water could be conveyed to the Trout Creek lagoon and more flow could be directed at the Trout Creek portion of the barrier beach than under existing conditions. Although this condition would still be within the range of conditions that may have existed naturally, it would be a major change relative to conditions that have existed for at least 90 years. This would alter the amount of surface water within portions of the study area, although it would not alter the amount of water discharged from the study area to Lake Tahoe. It could alter the hydraulic forces on the portion of the beach ridge along the Trout Creek lagoon during moderate flood events.

Alternative 4 would involve constructing channel stabilization on Trout Creek (RS 66+00 to RS 95+00) and a lateral grade control structure at the existing confluence of Trout Creek and the Upper Truckee River (RS 96+00) in anticipation of possible increased flows. The design would be vertically stable up to the 100-year peak flows, assuming combined peaks of Trout Creek and the Upper Truckee River, and the bank stabilization would be designed to be stable up to the 25-year peak flows.

Therefore, although permanent changes to drainage patterns and surface water features could occur, the long-term reconfigurations after implementation of Alternative 3 would be within the range of previously occurring natural patterns. This impact would be **less than significant**.

IMPACT 3.8-3 (Alt. 3) **Modified 100-Year Flood Flow Directions or Floodplain Boundaries. (CEQA 7; TRPA 3, 8)** *Implementing Alternative 3 would decrease the channel capacity, raise the streambed elevation, lower the streambank heights, and modify flow routes (adding and reconnecting channel length), but would enlarge floodplain storage because fill would be excavated in some areas within the FEMA regulatory floodway or floodplain. As a net result, the extent or elevation of the 100-flood hazard area as designated by FEMA would not be adversely modified. This impact would be* ***less than significant****.*

Implementing Alternative 3 would decrease the low-flow channel capacity, directly raise the streambed elevation, and increase the length of the Upper Truckee River channel in the study area through both active and passive restoration. Under the alternative, about 3,300 feet of new, geomorphically sized channel would be constructed and 1,500 feet of existing secondary channel would be reshaped, creating new floodplain storage. Also, additional storage would be added by creating lowered floodplains along segments of the new and existing low-flow channel and removing fill at the LWS Restoration Area and the TKPOA Corporation Yard. However, backfilling abandoned channels would decrease storage.

A hydraulic analysis of the study area was conducted to estimate potential changes in floodwater surface elevations, flows, and floodplain boundaries for the 100-year flood under Alternative 3 Conservancy and DGS 2005. The results of the modeling indicate that the water surface elevation for the 100-year event (7,650 cfs)

under Alternative 3 would be the same as or lower than the existing 100-year water surface at most cross sections. These changes would not be associated with any expansion of the 100-year flood hazard zone and would not cause inundation of any existing structures during the 100-year event. Therefore, this impact would be **less than significant**.

IMPACT 3.8-4 (Alt. 3) **Increased Overbank Flooding for Small Streamflow Events. (NEPA)** *Implementing Alternative 3 would decrease the channel capacity, raise the streambed elevation, and lower the streambank heights to enlarge the area of overbank flooding for small (760-cfs) streamflow events within the study area by 91 acres. This effect would reestablish natural connections between the low-flow channel and the floodplain/marsh surface. This impact would be* ***beneficial****.*

Implementing Alternative 3 would decrease the Upper Truckee River's channel capacity, increase the length of the channel, and enlarge the portion of the study area inundated under the existing 2-year return interval flow (e.g., 760 cfs) (Table 3.8-5). However, the watershed's response to climate change could reduce typical streamflows and the magnitude of the peak streamflow expected frequently (i.e., every couple of years). Implementing Alternative 3 would improve overbanking at specific streamflow magnitudes, but watershed hydrology shifts caused by climate change might reduce the frequency with which those flows would occur. The uncertain but possible hydrologic effects of climate change could partially offset the benefits of Alternative 3. Still, the channel modifications would improve connections between the low-flow channel and the floodplain and marsh surface, reestablishing natural hydrologic/hydraulic processes, which would result in a substantial improvement relative to existing conditions. Therefore, this impact would be **beneficial**.

IMPACT 3.8-5 (Alt. 3) **Modified Groundwater Levels and Flow Patterns. (NEPA)** *Implementing Alternative 3 would modify the size, shape, and location of the Upper Truckee River and change the surface connections and subsurface conditions around the channels and lagoons which could change groundwater levels and flow patterns. This effect would partially counteract the historic effects on groundwater levels and flow patterns on the west side of the study area caused by dredging of the Tahoe Keys waterways. This impact would be* ***beneficial.***

Like Alternative 1, Alternative 3 would involve directly raising channel bed elevations and backfilling existing incised channels, but these actions would be more extensive than under Alternative 1. Also like Alternative 1, this alternative would additionally involve modifying the stream channels to increase overbank flows across the floodplain, but the modification would be more extensive than under Alternative 1. These actions would not directly counteract the effects on groundwater levels and flow patterns on the west side of the study area caused by dredging of the Tahoe Keys waterways, which would remain in place. However, the actions would restore groundwater storage opportunities and flow patterns previously altered by dredging and straightening of the Upper Truckee River channel and by the river's geomorphic adjustments to watershed disturbances (i.e., incision and widening).

Alternative 3 would move the active Upper Truckee River channel to the east from its existing alignment, farther from the previously dredged waterways of the Tahoe Keys. Construction of the keys channels essentially moved the natural discharge boundary (i.e., the lake margin) closer to the location of the present Upper Truckee River channel. Under this alternative, the channel would be moved away from the discharge boundary. Relocating the channel would increase the separation of the river from the discharge boundary. Theoretically, the increased separation would lengthen the groundwater flow paths (and reduce the groundwater gradients) between the river and the Tahoe Keys when the river acts as a recharge boundary (i.e., during periods when the surface flow elevation in the river is higher than the groundwater table). Under this condition, more of the water recharging from the river would be retained in the marsh area (or retained longer). Although difficult to quantify, this effect is expected to promote or prolong seasonal high-groundwater conditions in the marsh. Therefore, expected changes to groundwater conditions under Alternative 3 would result in an improvement relative to existing conditions. This impact would be **beneficial**.

IMPACT 3.8-6 (Alt. 3) **Exposure to Seismically Generated Wave Hazards. (CEQA 8, TRPA 8)** *Alternative 3 proposes improvements within the study area that could be damaged by seismically generated waves that could develop in Lake Tahoe. The most important hazard would be presented by a tsunami caused by a large local earthquake, rather than by seiche waves of varied sources. The potential for exposure of people or structures to the effects of a tsunami would be low. This impact would be* ***less than significant****.*

Alternative 3 proposes the development of recreational facilities within and at the margins of the Upper Truckee Marsh. The area is adjacent and graded to Lake Tahoe and is exposed to inundation when large waves develop on the lake, as described above in Impact 3.8-6 (Alt. 1). The proposed improvements most vulnerable to damage by a tsunami are the reclaimed Sailing Lagoon and the dune restoration area (and facilities) at Cove East Beach. Because of the low probability of a tsunami occurring in Lake Tahoe, the relatively low human use of the study area (i.e., no proposed structures for human occupation), and the reparability of expected damage to any proposed structures, this impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.8-1 (Alt. 4) **Increased Runoff Volumes and Peak Flows. (CEQA 3, 4; TRPA 1, 2)** *Implementing Alternative 4 would require construction of impervious surfaces within the study area for trails, viewpoints, observation areas, fishing access areas, boardwalks, and a kiosk. As described in Environmental Commitment 11, permanent stormwater detention features or infiltration systems and other BMPs would be incorporated into the final design to accommodate all 20-year, 1-hour storm runoff without erosion. This impact would be* ***less than significant****.*

This impact would be similar to Impact 3.8-1 (Alt. 1), but of smaller extent and magnitude. Construction of new trails, viewpoints, observation areas, and a kiosk would require placement of new impervious or partially pervious surfaces within the study area. The affected areas are generally small relative to the size of the overall study area.

Changes in land coverage are analyzed in Impact 3.6-3 (Alt. 4) in Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage." As stated in Impact 3.6-3 (Alt. 4), the proposed coverage is less than the allowable coverage in the study area. For areas outside the litigation parcels coverage relocation would be completed at a 1:1 ratio and therefore would comply with the TRPA Code.

The features of Alternative 4 would increase the volume of runoff generated within portions of the study area and would locally redirect or increase peak flows. These runoff changes would occur only in portions of the study area, but increased flow volumes and peaks could be released off-site (e.g., into the storm drainage system and ultimately into Lake Tahoe).

Alternative 4 would also involve restoring about 123,000 square feet of existing informal trails lying on compacted soils. The soils would be decompacted and native vegetation would be reestablished. This would increase infiltration and would reduce runoff volumes and peak flows generated along the informal trails.

As described for Alternative 1, EC 11 (Table 2-6) would be implemented. This environmental commitment would involve installing permanent BMPs, stormwater detention features, or infiltration systems that would convey runoff, and maintaining them over the life of the project. These measures would reduce the effect of the incremental increase in runoff that may result from constructing impervious surfaces as part of Alternative 4. This impact would be **less than significant**.

IMPACT 3.8-2 (Alt. 4) **Effects on Channels from Reconfiguration of Stream Channels and Lagoon Surface Water Features. (NEPA)** *Implementing Alternative 4 would reconfigure the low-flow channel along portions of the Upper Truckee River channel, which would modify drainage patterns within the study area. This effect on drainage patterns would reestablish naturally occurring surface water features and hydrologic/hydraulic processes on the portion of the site located along the Upper Truckee River corridor. Therefore, this impact would be* ***beneficial****.*

Implementing Alternative 4 would involve directly modifying surface water features in the study area to counteract and/or compensate for past actions and the degraded existing condition. Alternative 4 would modify the existing channel's shape and size and create an active floodplain below the existing terrace along the Upper Truckee River. Implementing this alternative would cause only minor changes to internal drainage patterns and is not expected to generate changes in either off-site drainage patterns or the quantity of water in any surface water feature.

The reconfigured Upper Truckee River low-flow channel and overbanking floodplain would be within the range of historic locations on-site. The reconfiguration would improve channel stability and reestablish natural hydrologic/hydraulic processes (i.e., overbanking) on a portion of the site without causing indirect adverse effects. Therefore, this impact would be **beneficial**.

IMPACT 3.8-3 (Alt. 4) **Modified 100-Year Flood Flow Directions or Floodplain Boundaries. (CEQA 7; TRPA 3, 8)** *Implementing Alternative 4 would not modify the river channel elevation, but would make minor changes to the size and capacity of the low-flow channel and would increase floodplain storage because an inset floodplain would be excavated and fill would be removed in some areas within the FEMA regulatory floodway or floodplain. As a net result, the extent or elevation of the 100-year special flood hazard area as designated by FEMA would not be adversely modified. This impact would be* ***less than significant****.*

Implementing Alternative 4 would directly reestablish a narrow but functional floodplain along the single-thread, degraded existing channel (RS 0+00 to RS 67+00) inset into the surrounding terrace. Local cut and fill would be used to improve sinuosity and bed diversity in the straightened reach (RS 67+00 to RS 93+00).These proposed changes have been designed to beneficially increase the frequency and extent of overbanking onto the floodplain under low to moderate flood events (i.e., the 2-year and 5-year events).

Implementing this alternative would not raise the streambed elevation or increase the channel length of the Upper Truckee River, but it would decrease the capacity of the river's active channel in the study area. A hydraulic analysis of the study area was conducted to estimate potential changes in floodwater surface elevations, flows, and floodplain boundaries for the 100-year flood under Alternative 4 (Conservancy and DGS 2005). The results of the modeling indicate that the water surface elevation for the 100-year event (7,650 cfs) under Alternative 4 would be the same as or lower than the existing 100-year water surface at all cross sections. The results reflect the increased floodplain storage formed by creation of inset floodplains and other excavation proposed by the alternative. These changes would not produce any expansion of the 100-year flood hazard zone and would not cause any existing structures to be inundated during the 100-year event. Therefore, this impact would be **less than significant**.

IMPACT 3.8-4 (Alt. 4) **Increased Overbank Flooding for Small Streamflow Events. (NEPA)** *Implementing Alternative 4 would decrease the channel capacity and lower the streambank heights to enlarge the area of overbank flooding for small (760-cfs) streamflow events within the study area by about 17 acres. This effect would reestablish natural connections between the low-flow channel and an active floodplain surface. Therefore, this impact would be* ***beneficial****.*

Implementing Alternative 4 would decrease the Upper Truckee River's channel capacity and enlarge the portion of the study area inundated under the existing 2-year return interval flow (e.g., 760 cfs) (Table 3.8-5). However, the watershed's response to climate change could reduce typical streamflows and reduce the magnitude of the peak streamflow expected frequently (i.e., every couple of years). Implementing Alternative 4 would improve overbanking at specific streamflow magnitudes, but watershed hydrology shifts caused by climate change might reduce the frequency with which those flows would occur. The uncertain but possible hydrologic effects of climate change could partially offset the benefits of Alternative 4. Still, the channel modifications would reestablish natural hydrologic/hydraulic processes along the existing Upper Truckee River alignment, which would still result in an improvement relative to existing conditions. Therefore, this impact would be **beneficial**.

IMPACT 3.8-5 (Alt. 4) **Modified Groundwater Levels and Flow Patterns. (CEQA 1; TRPA 5, 6)** *Implementing Alternative 4 would not modify the size, shape, and location of the Upper Truckee River or change the surface connections and subsurface conditions around the channels and lagoons. However, this alternative would involve excavating an inset floodplain, which would result in minor and localized changes to groundwater levels and flow patterns. This impact would be* ***less than significant****.*

Alternative 4 would not involve raising the streambed elevation but would involve excavating a widened inset floodplain throughout the study area. The length and elevation of the boundary between the groundwater level in the unconfined aquifer and the surface water would not increase or decrease substantially. Therefore, a substantial change to the channel's function as a seasonal groundwater discharge or recharge boundary would be unlikely.

Although Alternative 4 would not lower groundwater levels beneath the stream, it would not raise the streambed and groundwater, nor would it improve groundwater connectivity across the site (as under Alternatives 1, 2, and 3). The enlarged inset floodplain could move groundwater flow paths and the locations where groundwater might discharge to surface water.

Removing marsh sediments to create the inset floodplain would also reduce the available groundwater storage in the marsh, but only during periods of high groundwater levels. During such periods, the intersection of the groundwater table with the active floodplain would move outward from the channel and groundwater may discharge onto the surface of the inset floodplain, rather than directly into the channel. This condition would be transitory; the groundwater boundary would eventually fluctuate as groundwater levels and streamflow elevations change. Minor amounts of groundwater on the inset floodplain's surface may evaporate. This effect would be similar to the result of channel widening in response to past disturbance that may occur both under existing conditions and under future conditions with the No-Project/No-Action Alternative. Construction of Alternative 4 would mimic a possible future geomorphic state with an active floodplain inset within a widened stream corridor. This would result in groundwater levels and flow paths that are similar to those expected under the No-Project/No-Action Alternative, which could be worse than the existing condition.

Alternative 4 could result in future modifications of groundwater levels and patterns of flow in the study area, but the potential changes would be similar to those that would occur under existing conditions and the No-Project/No-Action Alternative. Therefore, this impact would be **less than significant**.

IMPACT 3.8-6 (Alt. 4) **Exposure to Seismically Generated Wave Hazards. (CEQA 8, TRPA 8)** *Alternative 4 proposes improvements within the study area that could be damaged by seismically generated waves that could develop in Lake Tahoe. The most important hazard would be presented by a tsunami caused by a large local earthquake, rather than by seiche waves of varied sources. The potential for exposure of people or structures to the effects of a tsunami would be low. This impact would be* ***less than significant****.*

Alternative 4 proposes the development of recreational facilities at the margins of the Upper Truckee Marsh. The area is adjacent and graded to Lake Tahoe and is exposed to inundation when large waves develop on the lake, as described above in Impact 3.8-6 (Alt. 1). The proposed improvements potentially vulnerable to damage by the

largest of estimated tsunamis are trails, viewing areas, and the self-service visitors center restoration (and facilities) at Cove East Beach. Because of the low probability of a tsunami occurring in Lake Tahoe, the relatively low human use of the study area (i.e., no proposed structures for human occupation), and the reparability of expected damage to any proposed structures, this impact would be **less than significant**.

Alternative 5: No-Project/No-Action

No-Project/No-Action Future Effects of Climate Change

Analysis of the potential impacts of the No-Project/No-Action Alternative considers the potential environmental effects that may occur within the study area should none of the action alternatives (Alternative 1, 2, 3, or 4) be implemented. The analysis assumes that no purposeful (i.e., built) changes to the channel of the Upper Truckee River or Trout Creek or to other hydrologic resources would occur in the study area. Although no human-made changes would be expected, the effects of global climate change may substantially affect the hydrology of the area. Recent research has documented expected substantial changes in California's climate, including changes within the northern Sierra Nevada and the Tahoe Basin (Moser et al. 2009). Climate change could affect hydrology and flood conditions in the study area.

The project is intended to function as a relatively self-sustaining system that is subject to the unregulated streamflows of the Upper Truckee River and Trout Creek. The designs of the project alternatives have been guided by historic data sets and by current field conditions that reflect historic geomorphic adjustments to natural factors and human disturbance. However, the project's life span is long (more than 25 years), which increases the likelihood that the effects of global climate change could alter hydrologic conditions over the life of the project. Therefore, public review of and agency decisions about the project alternatives would benefit from an analysis of whether (and to what extent) climate change is expected to affect the project's performance, benefits, or adverse impacts. No formal federal, state, or TRPA policies currently require or specify an approach to such an analysis, but climate change effects need to be considered.

Current long-term planning efforts for the Tahoe Basin are considering the potential effects of climate change either via sensitivity analyses or in approaches to adaptive management, or both. Furthermore, the increase in reported climate change effects by various media and widening application of climate change considerations in resource management decisions indicate that laypersons, regulators, and managers alike will seek information about the effects of climate change on the project's outcome.

Data resources regarding the causes and consequences of global climate change are abundant; these resources range widely in their geographic scope and applicability to the analysis of the project. This analysis focuses on the anticipated consequences of climate change on physical environmental conditions in the next 50 years in the western United States, and more specifically, in the mountainous areas of California. In the last decade or so, a few studies have looked at potential climate change effects on surface-water and groundwater hydrology, water resource issues, or forest response for the Sierra Nevada or the Lake Tahoe region, or both (Jeton et al. 1996; Knowles and Cayan 2007). These evaluations provide information about possible changes in water inputs to the project's study area (e.g., earlier seasonal snowmelt, increased winter precipitation from snow to rain, and increased streamflow).

Effects of climate change documented by these recent studies include increasing average water temperatures in Lake Tahoe and increased thermal stability and resistance to mixing within the lake (Coats et al. 2006; TERC 2009). Some studies have focused on the response of Lake Tahoe to climate change (e.g., Coats et al. 2006), but have not commented directly on expected changes in tributary rivers. However, regional studies for the Sierra Nevada suggest that under expected climate change, higher snowlines will probably increase the frequency and magnitude of flooding and floods (as larger portions of mountain watersheds may be exposed to rainfall rather than snow) (Dettinger et al. 2009).

The most useful data specific to the Lake Tahoe region are those compiled and generated by Tetra Tech (2007). Using regional (within California) projections of climate change (Dettinger 2004; Cayan et al. 2006), Tetra Tech (2007) explored the effects of climate change on the overall hydrologic response of the watershed in relation to the total maximum daily load watershed model of pollutant loadings to Lake Tahoe. The studies used somewhat different modeling, downscaling, and meta-analysis approaches, but for the Tahoe Basin, they had close agreement on modeled, representative changes. Further, Dettinger (2004) provided predictions for time intervals of interest (ca. 2050).

The central estimate for temperature and precipitation changes from the Cayan et al. (2006) paper and the Dettinger (2004) paper formed the basis of Tetra Tech's Central Projection model scenario: warming of 2 degrees Celsius (°C) and a ten percent decrease in total precipitation by midcentury. Additional modeling scenarios were formulated by Tetra Tech (2007), using temperature increases of one standard deviation on either side of that central estimate (1°C and 3°C increases above current temperatures) and precipitation changes of one standard deviation above and below the central estimate (-25 percent and +15 percent of today's total precipitation, as well as a no change from today's precipitation).

Tetra Tech simulated baseline (existing) and the various climate change scenarios for a 15-year model evaluation period (1990 through 2004) by applying the percent changes in temperature and precipitation uniformly to the historic weather data sets. Simulations with the spatially discrete and temporally detailed Tetra Tech model (with 184 subwatersheds, 20 land uses, and hourly time steps for the 15-year period) provide information about the range of conditions that could occur throughout Lake Tahoe watersheds in terms of total precipitation, air temperature and snowpack, and water yield from snow, as well as total outflow to streams (surface runoff and base flow). An analysis of annualized daily snowpack from the model results is also provided by Tetra Tech (2007), which indicates the range of likely changes in snowpack depth, snow accumulation/melt season, and timing shifts.

The following analysis of the potential impacts of the No-Project/No-Action Alternative considers the potential for the hydrologic conditions in the study area to adjust in response to possible climatic changes.

IMPACT 3.8-1 (Alt. 5) **Increased Runoff Volumes and Peak Flows. (CEQA 3, 4; TRPA 1, 2)** *Implementing Alternative 5 would not increase impervious surfaces within the study area. Therefore,* ***no impact*** *would occur.*

Existing adverse conditions related to runoff volumes and peak-flow magnitudes could worsen under the No-Project/No-Action Alternative. Alternative 5 would not directly modify runoff volumes or peak flows generated on the site. In the absence of other future actions, runoff characteristics under the No-Project/No-Action Alternative, in the absence of other future actions, would largely be controlled by climate change influences on hydrology and the associated vegetation responses and interactions. The effects of climate change would modify runoff volumes and peak flow, but there is uncertainty about the change in precipitation that, in combination with various temperature projections, could produce a range of runoff responses. The climate change analysis conducted by Tetra Tech (2007) indicates that mean runoff flows would increase in fall and winter but would decrease in spring and summer. In most climate change scenarios, mean flows and total annual runoff are similar to or less than existing flows and runoff; however, peak flows, from rainstorms and rain-on-snow events, could be similar to or worse than existing peak flows. Implementing the No-Project/No-Action Alternative would not modify the historical increase of impervious surfaces, degraded soil and vegetation cover properties, and their runoff generation and peak-flow conditions.

The above features of Alternative 5 would not measurably change the volume of runoff generated within the study area, nor would they redirect or increase peak flows. Flow volumes and peaks released off-site (e.g., to the storm drainage system and the lake) would not be expected to increase. Therefore, no adverse impacts on runoff

volumes and peak flows in the study area would result and no off-site effects would occur. **No impact** would occur.

IMPACT 3.8-2 (Alt. 5) **Effects on Channels from Reconfiguration of Stream Channels and Lagoon Surface Water Features. (CEQA 2; TRPA 1, 4)** *Implementing Alternative 5 would not directly modify the low-flow channel or lagoon areas in the study area. Therefore, **no impact** would occur.*

Under the No-Project/No-Action Alternative, the Upper Truckee River and Trout Creek channels in the study area would undergo changes as they continue to respond to past disturbances. The progressive geomorphic adjustment along the Upper Truckee River would likely be primarily in the form of streambank erosion and widening. The trend of streambed erosion in the lower reach of Trout Creek also is expected to progress. Channel instability would decrease over time and sediment yields from channel erosion would decrease. Stabilized sediment deposits or inset floodplains would be expected to form along the widened stream corridor of the Upper Truckee River, at least upstream of Lake Tahoe's backwater effect. However, these natural geomorphic adjustments would not reconnect the incised channels to the historic floodplain, maintain or increase overbank flows onto the floodplain, raise or maintain groundwater levels, or otherwise restore the degraded ecosystem functions of the stream channels.

Future channel processes and conditions under the No-Project/No-Action Alternative are generally expected to follow a predictable trend based on geomorphic channel-evolution models. However, such processes and conditions could be altered by the effects of climate change, which would likely exacerbate some of the existing degraded condition and function of the surface water features. Increased rainfall as a proportion of total precipitation, increased runoff during winter, decreased snow-water equivalent, and decreased spring/summer runoff are all likely to limit the rate of natural recovery within the incised channel systems, further reduce overbank flows, and lower groundwater levels that can support floodplain wetlands.

No proposed actions or natural processes occurring under Alternative 5 would provide "recovery" from the past direct disturbances within the study area, such as dredging and filling of surface water bodies. For example, the fill that separates the Sailing Lagoon from the Upper Truckee River would likely remain and the historical maintenance of the navigation channels would continue. Surface water in the Tahoe Keys Marina and Tahoe Keys channels would continue to circulate with the water in the Sailing Lagoon, and both would remain directly connected to Lake Tahoe via the East Channel. The physical features would be similar to existing features, but their hydrology would be altered by climate change, potentially exacerbating existing flow and water quality problems in the constructed channels.

Uncertainty exists about whether total precipitation is more likely to decrease or to increase as a result of climate change; however, the net effect of changes in precipitation and average temperature, with continued year-to-year and decadal variation (e.g., flood and drought cycles), may reduce total runoff to Lake Tahoe. Should this reduction occur, the proportion of time when the lake is below historic median elevations may increase. Correspondingly, lower water levels in the Sailing Lagoon and connected Tahoe Keys navigation channels would result, thus worsening circulation, temperature, and related water quality problems in those water bodies.

Implementing Alternative 5 would not directly change the location or size of the channels, lagoons, or other topographic features that would affect drainage within the study area. Therefore, **no impact** would occur.

IMPACT 3.8-3 (Alt. 5) **Modified 100-Year Flood Flow Directions or Floodplain Boundaries. (CEQA 7; TRPA 3, 8)** *Implementing Alternative 5 would not directly modify the existing channel, floodplain, fill materials, the lagoon configuration, or the river mouth. No direct or indirect modifications to the 100-year flow directions or floodplain boundaries would be expected, and the existing flood hazards would remain. This impact would be **less than significant**.*

Several past actions along the Upper Truckee River corridor have modified the 100-year floodplain boundaries, storage capacity, and/or flow directions: placement of fill for road crossings and other transportation facilities (e.g., U.S. 50 road fills, City of South Lake Tahoe Airport); placement of fill and/or structures for residential, commercial, or other uses (e.g., Tahoe Island area, Elks Club, Grocery Outlet, Carrows); and/or removal of floodplain area by levee protection for residential, commercial, or other uses (e.g., Tahoe Keys). Most of these actions occurred several decades ago, before floodplain management regulations took effect. However, the result of historic actions has been to degrade both the storage capacity of the 100-year floodplain and the flow routes in the study area and upstream along the Upper Truckee River relative to natural conditions. Floodplain capacity and flow routes in specific reaches affect those in adjacent reaches, and for the 100-year event these effects have influences in both upstream and downstream directions.

Under the No-Project/No-Action Alternative, the topography and physical characteristics of the existing floodplain and channel in the study area would not be modified directly. Continued geomorphic adjustments to past disturbance might enlarge the incised channel along various reaches of the Upper Truckee River, but not increase total floodplain capacity for the 100-year flood. Therefore, the degraded existing capacity of the 100-year floodplain and flow routes would remain.

Implementing Alternative 5 would not directly modify the existing channel, floodplain, or fill materials, or the configuration of the Sailing Lagoon. The alternative would not raise the streambed elevation, increase the channel length, or decrease the channel capacity of the Upper Truckee River channel within the study area. Unlike the other alternatives, under Alternative 5 the floodplain would not be enlarged by direct removal of fill, excavation of inset floodplain features, or reconnection of lagoons in the study area to the active floodplain. Alternative 5 would not modify the river mouth's location, elevation, or capacity.

Therefore, the 100-year flow directions and floodplain boundaries would not be directly modified under Alternative 5. The 100-year water surface profile would remain as simulated for existing conditions (Exhibit 3.8-15). Land uses along the margins of the study area would remain subject to existing flood hazards. In response to global climate change, future watershed hydrology may increase the 100-year return interval peak streamflow to a magnitude greater than the existing value (7,650 cfs) that has been calculated from the recorded conditions over the last several decades. This impact would be **less than significant**.

IMPACT 3.8-4 (Alt. 5) **Increased Overbank Flooding for Small Streamflow Events. (CEQA 3, TRPA 1)** *Implementing Alternative 5 would not change channel capacity, streambed elevation and streambank heights, or the area of overbank flooding for small to moderate streamflow events within the study area. The existing degraded conditions would persist. This impact would be* ***less than significant****.*

Past actions enlarged the capacity of stream channels in the study area and upstream on the Upper Truckee River and Trout Creek. The existing stream channels are now oversized both because direct actions have occurred (e.g., straightening, dredging, or adding levees) and because the channels have responded indirectly to watershed hydrology and/or the direct disturbances (e.g., through streambed and streambank erosion).

The enlarged channel capacities reduce opportunities for normal overbank flows (flows onto the floodplain) during frequent, small-magnitude streamflow events. Under natural conditions, overbank flows are typically expected on functioning streams every couple of years, lasting for a few days up to a couple of weeks. However, under existing conditions in the study area and along long sections of the Upper Truckee River and Trout Creek (except where previous restoration projects have been implemented), the channels are so large that flows only reach the top of bank every five–ten years. Given the channels' present conditions and capacities, overbank flooding does not happen in the study area during frequent, small streamflow events (i.e., streamflows of 760 cfs recurring every two years). Limited overbanking in particular reaches can reduce floodplain connectivity in adjacent downstream reaches, but does not have substantial effects in the upstream direction.

This degraded condition negatively affects channel stability. The reduced stability, in turn, increases sediment pollutant sources (i.e., sediment produced by erosion). It also negatively limits overbank processes and groundwater support for sediment and nutrient storage that would occur on a functioning active floodplain.

Under the No-Project/No-Action Alternative, the Upper Truckee River and Trout Creek channels in the study area would undergo continued progressive geomorphic adjustments in response to past disturbances. The primary adjustments would be streambank erosion and widening along the river and streambed erosion in the creek's lower reach. These changes would further enlarge the channels, thus worsening the existing degraded condition relative to overbanking.

Future channel processes and conditions are generally expected to follow a predictable trend based on geomorphic channel-evolution models. Under the No-Project/No-Action Alternative, the potential for frequent overbanking at a given streamflow magnitude (e.g., 760 cfs, the existing 2-year return interval flow) would be similar to the existing potential. However, channel processes and conditions could be altered by the effects of climate change. Precipitation changes, reductions in the percentage of precipitation falling as snow, and temperature increases caused by climate change would likely reduce mean streamflows, average annual runoff, and the magnitude of peak streamflow expected frequently (every two–five years). Therefore, climate change could exacerbate the existing degraded condition by further reducing the frequency with which the existing design overbank flow (760 cfs) would occur in the study area.

In addition, the watershed's response to climate change could reduce typical streamflows and the frequency with which the proposed design overbank flow (760 cfs) would occur in the study area. Therefore, under the No-Project/No-Action Alternative, the opportunity for frequent overbanking in the study area and along upstream reaches could be further degraded beyond the existing condition.

However, implementing Alternative 5 would not result in any actions that would change existing conditions relative to the potential for or frequency of overbanking events. Therefore, this impact would be **less than significant**.

IMPACT 3.8-5 (Alt. 5) **Modified Groundwater Levels and Flow Patterns. (CEQA 1; TRPA 5, 6)** *Implementing Alternative 5 would not modify the size, shape, and location of the Upper Truckee River or change the surface connections and subsurface conditions around the channels and lagoons. The existing degraded condition would persist. This impact would be* ***less than significant****.*

Groundwater levels and flow patterns upstream along the Upper Truckee River and Trout Creek have been altered historically by watershed-scale hydrologic changes, stream channel incision, and extraction of groundwater for water supply. These actions generally lowered groundwater levels as stream channels progressively incised. In areas of groundwater pumping, the actions modified groundwater flow rates, even reversing flows in areas with excessive extraction.

Groundwater conditions in the study area also have been affected by dredging of the Tahoe Keys waterways and the most downstream reach of the Upper Truckee River. Dredging and construction of the waterways at Tahoe Keys essentially moved the surface water/groundwater contact zone inland from the natural shoreline. As a result, groundwater rises along the west margin of the study area when the lake level is high, but is depleted rapidly when the lake level is low. This response may also indicate that the excavated channels have intercepted zones of relatively high hydraulic conductivity (e.g., Upper Truckee River channel deposits).

Along the incised stream channels throughout the watershed or dredged waterways near Lake Tahoe, groundwater flow paths may be interrupted when the surface water levels are low, and more groundwater is released to the surface water body than under natural conditions. The resulting lowered groundwater levels would reduce the total volume of groundwater storage and the rate and volume of groundwater discharge to the channel. Groundwater discharge helps to moderate variations in surface water flow, particularly during periods of reduced streamflow.

These conditions also would impair ecosystem values because lowered groundwater levels would reduce the amount of groundwater available near the surface to support high soil moisture in meadows and marshes.

Under the No-Project/No-Action Alternative, the Upper Truckee River and Trout Creek channels in the study area would continue to change as they respond to past disturbances. These natural geomorphic adjustments would not reverse or improve the degraded groundwater conditions, however. Groundwater levels could decline further in locations where future channel incision or channel widening is likely to occur as part of natural geomorphic evolution.

The effects of climate change would likely exacerbate some of the existing degraded condition and function of the groundwater levels and patterns. Increased seasonality of runoff, reduced snowpack, and possibly decreased total runoff would likely reduce groundwater recharge within the Upper Truckee River and Trout Creek watersheds. This reduction would cause groundwater volumes and flows to decrease throughout the Upper Truckee River and Trout Creek systems. If decreases in total runoff to Lake Tahoe were to increase the proportion of time that the lake is below historic median elevations, then surface water levels in the lake, the Sailing Lagoon, and the connected Tahoe Keys navigation channels would also be lowered. This could increase the rate of groundwater flow and total groundwater discharge along the north and west margins of the study area, further reducing groundwater support for the meadow and marsh.

Under the No-Project/No-Action Alternative, groundwater levels or flows in the study area would remain degraded relative to natural conditions. The geomorphic response to past actions would continue and locally worsen existing groundwater conditions as channels continue to incise and/or widen. Climate change may exacerbate existing degraded conditions. Therefore, under Alternative 5, the degraded existing groundwater levels and flow patterns would persist and possibly worsen as geomorphic response continues. This impact would be **less than significant**.

IMPACT 3.8-6 (Alt. 5) **Exposure to Seismically Generated Wave Hazards. (CEQA 8, TRPA 8)** *Implementing Alternative 5 would not result in construction of any improvements within the study area that could be damaged by seismically generated waves that could develop in Lake Tahoe. The effects of large waves would not change risks to people or structures relative to existing conditions. Therefore, this impact would be* ***less than significant****.*

The flat to gently northward-sloping topography of the study area presents the hazard of inundation during the development of large waves on Lake Tahoe. Potential tsunamis or large seiches (see Impact 3.8-6 [Alt. 1]) may inundate much of the study area. No new improvements would be constructed under the No-Project/No-Action Alternative. Therefore, the risk of damage to improvements posed by inundation by large waves would not change relative to existing conditions. However, the study area currently includes informal trail networks used by the public for recreation, as well as minor improvements that include fencing. Possible damage or injury from tsunamis would be continuing hazards. This impact would be **less than significant**.

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3.9 GEOMORPHOLOGY AND WATER QUALITY

This section presents the regulatory setting for geomorphology and water quality, describes the existing conditions in the study area related to geomorphology and water quality, and evaluates potentially adverse environmental impacts related to erosion, sedimentation, and deposition associated with project implementation.

The analysis of geomorphology and water quality is based on information obtained through review of academic research and available information published by federal, state, and local agencies, primarily the *Final Report: Upper Truckee River Upper Reach Environmental Assessment* (SH&G 2004a), the *Amendment Report: Upper Truckee River Upper Reach Reclamation Project* (SH&G 2004b), and the *Riparian Ecosystem Restoration Feasibility Report* associated with the Upper Truckee River Restoration Project (River Run Consulting 2006). The examination of geomorphology is also based on the preliminary engineering schematic designs prepared for the alternatives. For a discussion of other water resource issues, refer to Section 3.8, "Hydrology and Flooding." Cumulative geomorphology and water quality impacts are addressed in Section 3.18, "Cumulative Impacts."

3.9.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

The following federal laws and regulations related to geomorphology and water quality are relevant to the proposed alternatives and described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- Clean Water Act (CWA)
  - Section 401
  - Section 402
  - Section 404
- Safe Drinking Water Act

State

The Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.) requires establishment of water quality objectives and standards to protect water quality for beneficial uses. This act is implemented by the State Water Resources Control Board (SWRCB) and nine regional water quality control boards (RWQCBs), which are responsible for preserving California's water quality. 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 monitor water quality for the protection of waters in their specified regions. The SWRCB and the RWQCBs jointly administer federal and state laws related to water quality in coordination with the U.S. Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (USACE).

The study area is under the jurisdiction of the Lahontan RWQCB. The Lahontan RWQCB administers CWA Section 401 water quality certifications in conjunction with USACE's CWA Section 404 permit. In addition, the Lahontan RWQCB regulates discharge of stormwater from construction projects (as well as municipal and industrial stormwater) under the CWA Section 402 National Pollutant Discharge Elimination System (NPDES) permit program. Because the project would disturb more than one acre of land, the Conservancy would need to obtain and comply with the Lahontan RWQCB's NPDES General Permit Number CAG616002 for discharge of stormwater runoff associated with construction activity. The SWRCB adopted a new statewide NPDES Construction General Permit Order 2009-0009-DWQ on September 2, 2009, that became effective July 1, 2010 (SWRCB 2010). This General Permit imposes more minimum best management practices (BMPs) and establishes

three levels of risk-based requirements based on both sediment risk and receiving water risk. All dischargers are subject to narrative effluent limitations. Risk Level 2 dischargers are subject to technology-based numeric action levels (NALs) for pH and turbidity. Risk Level 3 dischargers are subject to NALs and numeric effluent limitations (NELs). Certain sites must develop and implement a storm water pollution prevention plan (SWPPP) and rain event action plan and all projects must perform effluent monitoring and reporting, along with receiving water monitoring and reporting for some Risk level 3 sites. Key personnel (e.g., SWPPP preparers, inspectors) must have certifications to ensure that they are qualified to design and evaluate project specifications that will meet the requirements. For projects commencing on or after July 1, 2010, the applicant must electronically submit several permit registration documents before commencement of construction activities: the notice of intent, risk assessment, postconstruction calculations, a site map, the SWPPP, a signed certification statement by the legally responsible person, and the first annual fee. The Lahontan RWQCB is responsible for enforcing the new statewide General Permit in its region and is updating its regional General Permit for construction stormwater discharges within the Lake Tahoe Hydrologic Unit (HU) to be as least as stringent as the statewide permit (Amorfini, pers. comm., 2010).

The *Water Quality Control Plan for the Lahontan Region* (Basin Plan), adopted March 31, 1995, and as amended, identifies the beneficial uses, water quality objectives, numerical standards, and waste discharge prohibitions for surface water and groundwater in the California portion of the Tahoe Basin (Lahontan RWQCB 1995:1-1). Table 3.9-1 summarizes the applicable environmental issues related to this project that are covered under the Basin Plan. BMPs are defined as "[m]ethods, measures or practices selected by an agency to meet its non-point source control needs. BMPs include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters" (Lahontan RWQCB 1995:5.3-1). Stream Environment Zones (SEZs) are wetland and riparian areas designated by TRPA and the Lahontan RWQCB through specific criteria using designated water, soil, and vegetation indicators (Lahontan RWQCB 1995:5.7-2). The Basin Plan incorporates water quality thresholds, programs, and regulations as developed and implemented by TRPA along with federal and state regulations. The project would be required to meet the provisions of the Basin Plan for the protection and enhancement of Lake Tahoe.

The Basin Plan lists water quality objectives for all surface waters of the region, including the Lake Tahoe HU, in addition to specific water quality objectives for certain water bodies in the Lake Tahoe HU (i.e., the entire watershed tributary to and containing Lake Tahoe), including the Upper Truckee River. The regionwide and water body–specific objectives pertaining to the Upper Truckee River, groundwater, and stormwater are summarized in Table 3.9-2. To achieve those objectives, the Basin Plan prohibits discharges and threatened discharges in 100-year floodplains. These prohibitions are described in Chapter 5 of the Basin Plan and those relevant to project implementation are summarized below in Table 3.9-3.

Tahoe Regional Planning Agency

Goals and Policies

The TRPA Regional Plan's Goals and Policies document presents specific goals and policies for achieving and maintaining adopted environmental thresholds. These goals and policies are implemented through the TRPA Code of Ordinances (TRPA Code), described below (TRPA 1986:I-1). A key component of the Goals and Policies document is the Land Use Element, which identifies the fundamental philosophies directing land use and development in the Tahoe Basin. The Land Use Element consists of seven subelements, including the Water Quality Sub Element. This subelement identifies two goals and 18 policies designed to support attainment of the water quality thresholds:

Table 3.9-1
Summary of Basin Plan Water Quality Control Measures Relevant to the Project

Water Quality Control Measure	Description
Water quality standards	State standards, including designated beneficial uses and water quality objectives, implemented by the SWRCB and RWQCBs. Regional "environmental threshold" standards implemented by TRPA.
Waste discharge prohibitions	State prohibitions against discharge of sewage, industrial waste, solid wastes, earthen materials, and so on, including prohibitions related to new subdivisions, land capability, SEZs, development not offset by remedial measures, and new piers in significant fish spawning habitat, implemented by the Lahontan RWQCB. TRPA implements similar land-use restrictions.
Best management practices	Use of mandatory BMPs for all new development. Implementation through state and TRPA permits and enforcement programs. Retrofit of BMPs required by the Lahontan RWQCB for existing development. BMPs also required for resource management uses, such as timber harvest and livestock grazing. The Basin Plan endorses the TRPA *BMP Handbook*.
Controls for SEZs and similar resources	Development and disturbance strictly limited in SEZs and setback areas, 100-year floodplains, and shorezone areas. Limited implementation through Lahontan RWQCB discharge prohibitions, TRPA land-use restrictions, and CWA Section 401 and 404 programs. Some exceptions for public projects and coverage relocation; specific exemption findings required. Restoration requirement of 1.5:1 for permitted SEZ disturbance, unless meets specific criteria, such as if the relocation is from one portion of a SEZ to another portion, there is a net environmental benefit to the SEZ. Shorezone projects must meet TRPA development standards. TRPA 208 Plan includes SEZ restoration program, which is expected to restore 25% of disturbed/developed SEZs. Control measures for other problems also serve to protect groundwater.
Water rights and water use	Limits on diversions for consumptive use from all sources in the Tahoe Basin by act of Congress. Waste discharge requirements for sewer districts include conditions to prevent use beyond limits. TRPA plans include minimum fireflow requirements, as well as requirements for use of native/adapted plants in landscaping. Recommendations or SWRCB action on water rights policy update and water meter use.
Outdoor recreation	Controls for water quality impacts of outdoor recreation (dispersed recreation, campgrounds and day-use areas, ski areas, golf courses, and boating and shorezone recreation) through Lahontan RWQCB and TRPA permits and USFS programs on national forest lands. Impact examples: erosion, SEZ disturbance, fertilizer use, dredging and underwater construction, wastewater disposal, and fuel spills.
Miscellaneous water quality problems	Control measures for problems related to fertilizer use, pesticide use, and wet and dry atmospheric deposition. Fertilizer and pesticide controls through Lahontan RWQCB and TRPA permits; atmospheric deposition control through TRPA traffic/air pollution controls and other 208 Plan commitments.

Notes: 208 Plan = regional water quality control plan required under Section 208 of the Clean Water Act; Basin Plan = *Water Quality Control Plan for the Lahontan Region*; BMP = best management practice; CWA = Clean Water Act; Lahontan RWQCB = Lahontan Regional Water Quality Control Board; SEZ = Stream Environment Zone; SWRCB = State Water Resources Control Board; TRPA = Tahoe Regional Planning Agency; USFS = U.S. Forest Service
Source: Lahontan RWQCB 1995:5-11 to 5-13

Table 3.9-2 Water Quality Objectives for the Upper Truckee River		
Water Quality Constituent	Lahontan Region Water Quality Objective	
	Numeric Standard (mg/L unless noted) [1]	Narrative Limits or Explanation of Numeric Tests
Upper Truckee River		
Ammonia	calculation	pH and temperature dependent values
Bacteria, Coliform	20/100 mL 40/100 mL	Log mean during any 30-day period Limited to no more than 10% of samples in any 30-day period.
Biostimulatory Substances	-	Concentrations must not promote aquatic growth to the extent of nuisance or adversely affect beneficial uses
Chemical Constituents	-	All MCLs and SMCLs of the CCR, for each designated beneficial use.
Chloride	4	
Chlorine (Total Residual)	0.003/0.002	Max/median based on daily measurements in any 6 month period.
Color		Water shall be free of coloration that causes nuisance or adversely affects beneficial uses.
Dissolved Oxygen	80% of saturation	Not to be depressed by more than 10%, nor shall the minimum DO saturation concentration be less than 80%; Specific limits apply to aquatic resource beneficial uses.
Floating Materials		Shall not cause nuisance or adversely affect beneficial uses.
Iron, Total	0.03	
Nitrogen, Total	0.19	
Nondegradation of Aquatic Communities and Populations		Wetlands shall be free of substances attributable to wastewater or other discharges that produce adverse response in organisms.
Oil and Grease		Shall not result in a visible film or coating on the surface of the water or on objects in the water that cause nuisance, or adversely affect beneficial uses.
Pesticides		Not to exceed lowest detectable levels.
pH	6.5-8.5	Not to be outside the stated limits: Waters designated as COLD beneficial use shall have less than 0.5 pH unit change.
Radioactivity		Shall not be present at concentrations deleterious to organisms, or result in accumulation of radionuclides.
Phosphorus, Total	0.015	
Settleable Materials		Shall not result in deposition of material that causes nuisance or adversely affects beneficial uses.
Sulfate	1	
Suspended Materials		Shall not cause nuisance or adversely affect beneficial uses.
Suspended Sediment	60	90th percentile value
Taste and Odor		Shall not impart undesirable tastes or odors to fish or other edible products, cause nuisance, or adversely affect beneficial uses.
Temperature		Natural receiving water temperatures shall not be altered
Total Dissolved Solids	55	

Table 3.9-2
Water Quality Objectives for the Upper Truckee River

Water Quality Constituent	Lahontan Region Water Quality Objective	
	Numeric Standard (mg/L unless noted) [1]	Narrative Limits or Explanation of Numeric Tests
Toxicity		Remain free of substances in concentrations that are toxic or detrimental to organisms (based on indicator organisms).
Turbidity	<10% over natural NTU	Shall not cause nuisance or adversely affect beneficial uses.
Groundwater		
Fecal Coliform	1.1/100 MPN	mL/7-day period median in groundwater designated as MUN
Chemical Constituents		Incorporates MCLs and SMCLs of the CCR for beneficial uses.
Radioactivity		For municipal groundwater, incorporates standards of the CCR.
Taste and Odor		Shall not contain in concentrations that interfere with beneficial use. For municipal groundwater, incorporates standards of the CCR.
Stormwater Runoff		
Total Nitrogen as N	0.5; 5.0	For discharges to collection systems, Lake Tahoe or any of its tributaries; For discharges to land treatment systems.
Total Phosphorus as P	0.1; 1.0	For discharges to collection systems, Lake Tahoe or any of its tributaries; For discharges to land treatment systems.
Total Iron	0.5; 4.0	For discharges to collection systems, Lake Tahoe or any of its tributaries; For discharges to land treatment systems.
Turbidity	20 NTU; 200 NTU	For discharges to collection systems, Lake Tahoe or any of its tributaries; For discharges to land treatment systems.
Grease and Oil	2; 40	For discharges to collection systems, Lake Tahoe or any of its tributaries; For discharges to land treatment systems.

Notes: CCR = California Code of Regulations; DO = dissolved oxygen; MCL = maximum contaminant level; mL = milliliter; MPN = Most Probable Number; NTU = nephelometric turbidity units; SMCL = secondary maximum contaminant level

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

Source: [1] Lahontan RWQCB 1995:Chapter 5

Table 3.9-3
Discharge Prohibitions, Lake Tahoe Hydrologic Unit

General Prohibitions

- Discharges that violate water quality objectives or impair beneficial uses
- Discharges that cause further degradation of water where objectives are already being violated
- Discharges to surface waters of the Lake Tahoe Hydrologic Unit

Prohibitions Related to Development

- Discharges or threatened discharges below the high-water rim of Lake Tahoe or in the 100-year floodplains of tributaries
- Discharges attributable to new development in Stream Environment Zones
- Discharges attributable to new development not in accordance with offset requirements

Source: Lahontan RWQCB 1995:5.8-12

- **GOAL 1:** Reduce loads of sediment and algal nutrients to Lake Tahoe; meet sediment and nutrient objectives for tributary streams, surface runoff, and subsurface runoff, and restore 80 percent of the disturbed lands.

  - **Policy 1:** Discharge of municipal or industrial wastewater to Lake Tahoe, its tributaries, or the groundwaters of the Tahoe Region is prohibited, except for existing development operating under approved alternative plans for wastewater disposal, and catastrophic wildfire protection to prevent the imminent destruction of the STPUD (South Tahoe Public Utility District) Luther Pass Pump Station.

  - **Policy 2:** All persons who own land and all public agencies that manage public lands in the Lake Tahoe Region shall put best management practices (BMP) in place; maintain their BMPs; protect vegetation on their land from unnecessary damage; and restore the disturbed soils on their land.

  - **Policy 3:** Application of BMPs to projects shall be required as a condition of approval for all projects.

  - **Policy 4:** Restore at least 80 percent of the disturbed lands within the region.

  - **Policy 5:** Units of local government, state transportation departments, and other implementing agencies shall restore 25 percent of the SEZ lands that have been disturbed, developed, or subdivided in accordance with the Capital Improvements Program (Part II).

  - **Policy 6:** The use of fertilizer within the Tahoe region shall be restricted to uses, areas, and practices identified in *The Handbook of Best Management Practices*. 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.

  - **Policy 7:** Off road vehicle use is prohibited in the Lake Tahoe region except on specified roads, trails, or designated area where the impacts can be mitigated.

  - **Policy 8:** Transportation and air quality measures aimed at reducing airborne emissions of oxides of nitrogen in the Tahoe basin shall be carried out.

- **GOAL 2:** Reduce or eliminate the addition of other pollutants that affect, or potentially affect, water quality in the Tahoe Basin.

  - **Policy 1:** All persons engaging in public snow disposal operations in the Tahoe region shall dispose of snow in accordance with site criteria and management standards in *The Handbook of Best Management Practices*.

  - **Policy 2:** Discharges of sewage to Lake Tahoe, its tributaries, or the groundwaters of the Lake Tahoe region are prohibited. Sewage collection, conveyance and treatment districts shall have approved spill contingency, prevention, and detection plans.

  - **Policy 3:** All institutional users of road salt in the Lake Tahoe region shall keep records showing the time, rate, and location of salt application. Storage of road salt shall be in accordance with *The Handbook of Best Management Practices*.

  - **Policy 4:** Underground storage tanks for sewage, fuel, or other potentially harmful substances shall meet standards set forth in TRPA ordinances, and shall be installed, maintained, and monitored in accordance with *The Handbook of Best Management Practices*.

- **Policy 5:** No person shall discharge solid wastes in the Lake Tahoe region by depositing them on or in the land, except as provided by TRPA ordinance.

- **Policy 6:** TRPA shall cooperate with other agencies with jurisdiction in the Lake Tahoe region in the preparation, evaluation, and implementation of toxic and hazardous spill control plans.

- **Policy 7:** The BMPs will be amended to include special construction techniques, discharge standards, and development criteria applicable to projects in the shorezone.

- **Policy 8:** Liquid or solid wastes from recreational vehicles and boats shall be discharged at approved pump-out facilities. Pump-out facilities will be provided by public utility districts, marinas, campgrounds, and other relevant facilities in accordance with standards set forth in *The Handbook of Best Management Practices*.

- **Policy 9:** Evaluate the feasibility and effectiveness of ponding facilities along stream corridors as a strategy for removing instream loads of sediment and nutrients.

- **Policy 10:** Reduce the impacts of motorized watercraft on water quality.

Before the TRPA Code was established, TRPA prepared Volume 1 of the regional water quality management plan required under Section 208 of the CWA (208 Plan), along with other environmental values and standards, to identify important issues relating to water quality in the Tahoe Region (TRPA 1981:1-4). The Lahontan RWQCB subsequently incorporated appropriate provisions of the 208 Plan into the Basin Plan. The 208 Plan has the same two major water quality goals as the TRPA Regional Plan. The first goal, with eight policies to support its implementation, is to reduce loading of sediment and nutrients to Lake Tahoe and meet sediment and nutrient objectives for tributary streams, surface runoff, and subsurface runoff. The second goal, with ten policies to support its implementation, is to reduce or eliminate the addition of other pollutants that affect water quality in the Tahoe Basin.

Code of Ordinances

The TRPA Code is a compilation of all the ordinances needed to implement the Goals and Policies. The following portions of the TRPA Code are most relevant to the geomorphology and water quality aspects of the project:

- Basic standards and prohibitions for all discharges to surface waters and groundwater are specified in TRPA Code Section 60.1, “Water Quality Control.” Table 3.9-4 describes the discharge limits to surface runoff and to groundwater discharges in the Tahoe Basin.

- Measures to avoid or reduce potential short- and long-term erosion and sedimentation impacts on the quality of surface water, groundwater, or both are required by TRPA Code Section 33.3, “Grading Standards”; Section 33.6, “Vegetation Protection during Construction”; and Section 61.4, “Revegetation.”

- Measures to prevent contamination of sources of drinking water and protect the public health relating to drinking water are required by TRPA Code Section 60.3, “Source Water Protection.” This measure may apply to the project since a few domestic wells are located immediately north of the study area and the confluence of the Upper Truckee River and Angora Creek. The public well south of the study area close to U.S. Highway 50 (U.S. 50) in Meyers is believed to be located far enough from the study area to avoid any potential impact.

- A section of the TRPA Code in Chapter 30, “Land Coverage,” that indirectly relates to water quality, given the ability of SEZ to buffer waterways and provide infiltration and uptake opportunities, also relates to the project. Land coverage standards, limitations, and prohibitions of additional land coverage in TRPA Code Chapter 30 would apply.

Table 3.9-4 TRPA Limits on Discharges for Water Quality Control	
Constituent	**Maximum Concentration**
Surface runoff: Pollutant concentration in surface runoff shall not exceed the following reading at the 90th percentile:	
Dissolved inorganic nitrogen as N	0.5 mg/L
Dissolved phosphorus as P	0.1 mg/L
Dissolved iron as Fe	0.5 mg/L
Grease and oil	2.0 mg/L
Suspended sediment	250 mg/L
Discharge to groundwaters: Waters infiltrated into soils shall not exceed the following maximum constituent levels:	
Total nitrogen as N	5 mg/L
Total phosphate as P	1 mg/L
Iron as Fe	4 mg/L
Turbidity	200 NTU
Grease and oil	40 mg/L
Notes: mg/L= milligrams per liter; NTU = nephelometric turbidity unit Source: TRPA 1980:81-1, 81-2	

Plan Area Statements

Each plan area statement (PAS) outlines land use classifications, special policies, planning considerations, permissible uses, and maximum allowances for a portion of the Lake Tahoe Basin. The study area is located within three PASs: PAS 099 (Al Tahoe), PAS 100 (Truckee Marsh), and PAS 102 (Tahoe Keys).

Runoff control and SEZ restoration are allowed permissible uses under resource management in PAS 009 and 102, but must be considered under a special use provision in PAS 100.

PAS 099 special considerations include a statement that projects need to address the drainage problems in the Al Tahoe Area, including the problem of stagnant water at Los Angeles and Freel Peak Streets. The study area receives water from the Al Tahoe Area, and could be affected by drainage projects in that area, but due to its location the project would only receive runoff and would not directly modify drainage within the Al Tahoe Area.

As considerations for project planning, PAS 100 identifies the commercial and residential uses infringing upon the SEZ (consisting of the Upper Truckee River and Trout Creek corridors, and adjacent marshlands) and the U.S. 50 crossings' restriction on natural function of the SEZ. PAS 100 also designates special planning considerations and policies regarding water quality that relate to the study area:

- Stream zones should be restored where U.S. 50 crosses the Upper Truckee River and Trout Creek.
- SEZ should be restored in the vicinity of the crossings of Trout Creek at U.S. 50 and at Black Bart Road.
- New roadway alignments through SEZ are to be discouraged.
- Banks along both Trout Creek and the Upper Truckee River should be stabilized.

PAS 100 includes a special planning consideration and two special policies regarding geomorphology. The special planning consideration is the localized problem of bank slumping and erosion along the Upper Truckee River. The two special policies are:

- Banks along both the Upper Truckee River and Trout Creek should be stabilized.
- Instream habitat should be improved through artificial creation of deep pools and the removal of obstructions.

City of South Lake Tahoe

The study area is located entirely within the jurisdiction of the City of South Lake Tahoe (CSLT). CSLT ordinances in Chapter 8, "Building Regulations," require projects to prepare a grading plan for review and approval of a grading permit by the city building official. The grading plan must include the present contours of the land, the proposed final grade and location of improvements. CSLT review is intended to safeguard adjoining properties and public streets and ways from damage by unnatural flows of surface waters.

ENVIRONMENTAL SETTING

This section presents both the geomorphology and water quality of the environmental setting, because the geomorphologic characteristics and related processes in the study area, including erosion and sedimentation, influence physical and biological aspects of the water quality conditions. However, some aspects of water quality in the study area and in surrounding surface and groundwater bodies are independent of geomorphic characteristics of the study area. Therefore, aspects of geomorphology and water quality that would not be affected by the project are also discussed to provide perspective on the environmental conditions of the study area.

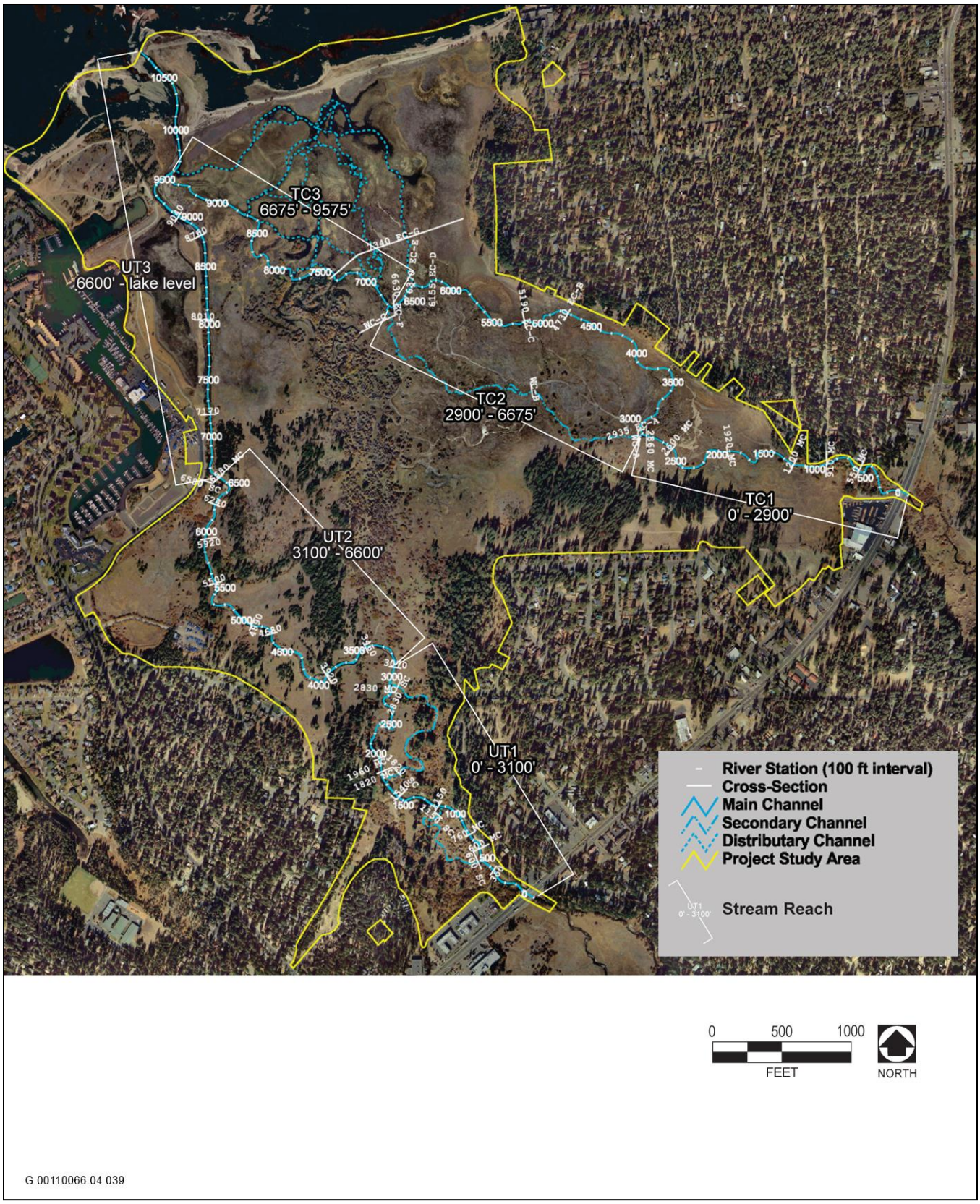
Geomorphology

Geomorphology is generally defined as the study of the processes that shape the surface of the earth and analysis of the formation of landscapes. Environmental factors that influence geomorphic processes include climate and weather, hydrologic conditions, local and regional geology, geologic history, and tectonics. The project study area is located within the Sierra Nevada Geomorphic Province and, more specifically, the southern end of the Lake Tahoe Basin. The basin has formed as the result of block faulting (i.e., tectonic movement) and damming of the outlet of Lake Tahoe (Saucedo 2005:2). The Upper Truckee River occupies a valley developed on and underlain by igneous and volcanic bedrock. Glacial deposits within the Upper Truckee River watershed reflect multiple occupations of the valley by Quaternary glaciers. The presence of lake sediments record past high stands of Lake Tahoe that inundated the valley.

River and hillslope processes have been the dominant recent geomorphic factors, resulting in creation of the active floodplain of the Upper Truckee River and deposition of fluvial and alluvial sediments. The project study area includes the reaches of the river closest to its mouth at Lake Tahoe and its confluence with Trout Creek, a major tributary. The deposition of sediment at this distal end of stream forms the Upper Truckee Marsh. The geomorphology of the area is also influenced by lake processes, which contribute to the creation of a beach and beach berm complex at the northern end of the study area.

River Reaches

Three geomorphically distinct reaches have been identified along the Upper Truckee River and Trout Creek within the study area (Conservancy 2003:4-1) that are generally associated with the "valley," "meadow," and "marsh" portions of each stream (Exhibit 3.9-1). Reach 1 is the area within a relatively narrow valley immediately north (downstream) of the U.S. 50 bridge on each stream. Reach 2 is the transition zone from the narrow valley to the broad floodplain, including the main meadow shared by both streams. Reach 3 is the marsh reach, which has numerous distributaries and a lagoon along Trout Creek, but is a single straight channel along the Upper Truckee River.



Source: Data compiled by Cardno ENTRIX in 2010

Exhibit 3.9-1 Stream Reaches on the Upper Truckee River and Trout Creek within the Study Area

Prior to modern urban development, the Upper Truckee River and Trout Creek were affected by nearly 100 years of watershed-scale changes in land use, hydrology, and sediment loads, and on-site uses (e.g., Comstock-era logging and log transport, early 1900s irrigation dams and ditches, and grazing). In the 1950s and 1960s, the Upper Truckee River channel was directly modified within the study area for urban development: distributaries were cut off and filled, the main channel was straightened and deepened, and the mouth and lagoon were periodically dredged. The following reach descriptions are of existing conditions, rather than an estimate of the undisturbed (i.e., pre-Comstock) conditions:

- Reach 1 of the Upper Truckee River is about 3,100 feet in length and includes an active, main (or primary) channel, as well as secondary channels that carry flow only during large flow events.
- Reach 2 of the Upper Truckee River is a 3,500-foot single-thread,[1] slightly meandering channel.
- Reach 3 of the Upper Truckee River is a relatively straight, deep, and wide channel. The single-thread reach extends about 3,900 linear feet to the river mouth.
- Reach 1 of Trout Creek is a 2,900-foot single-thread, meandering channel.
- Reach 2 of Trout Creek is about 3,775 feet in length and includes two meandering channels: a main (low-flow) and secondary channel.
- Reach 3 of Trout Creek is about 2,900 feet in length and includes several distributary channels that branch off the main channel to flow north through the marsh/lagoon (Exhibit 3.9-1). The lagoon of Trout Creek meets the Upper Truckee River about 240 feet upstream of the beach ridge, while the main channel of Trout Creek enters the Upper Truckee River another 90 feet upstream.

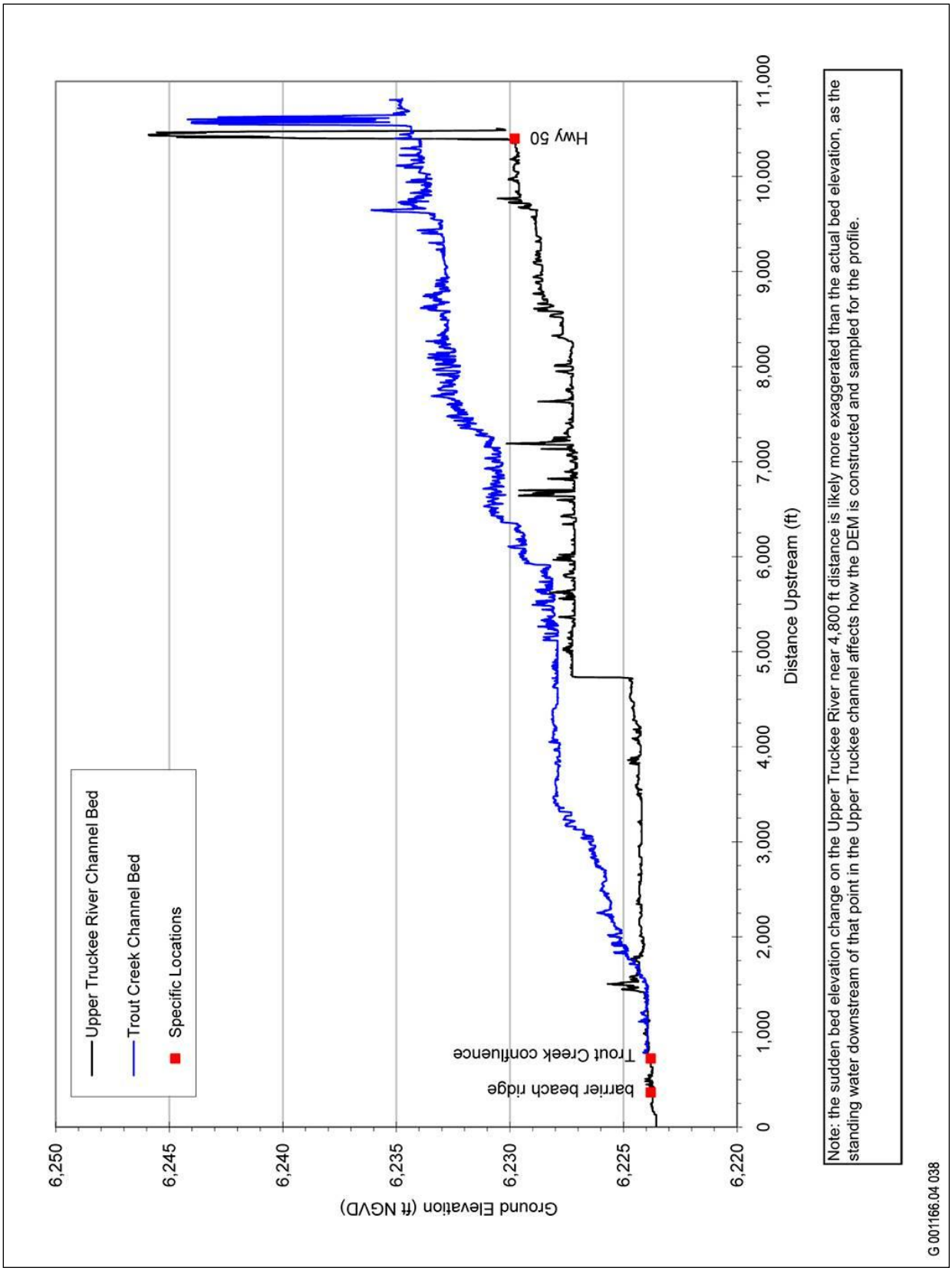
The Upper Truckee River channel position has been largely unchanged since the late 1950s. However, in Reach 1, the low-flow channel has switched position between branches (possibly in response to flood and drought events, log debris jams, and beaver dams). The Trout Creek channel position has also been relatively static since the late 1950s. In the 1980s, bed and bank stabilization was installed on Trout Creek to protect public sewer lines, reinforcing the location of the east branch of the stream.

River Profiles

Both the Upper Truckee River and Trout Creek have very low-profile gradients (i.e., channel bed steepness) within the study area. The average streambed slope of Trout Creek is 0.00106 (0.106 percent) and that on the Upper Truckee River is 0.00155 (0.155 percent). The profile steepness varies by reach on each stream. Trout Creek has a higher bed elevation (relative to the river) and a fairly consistent bed slope of 0.00085 (0.085 percent) in Reach 1. The slope steepens slightly to 0.00099 (0.099 percent) in the floodplain and meadow of Reach 2. The steepest slope on Trout Creek (0.00138 or 0.138 percent) is found within a short transition zone of Reach 3 that extends down from the meadow to the lagoon and lake. The Upper Truckee River bed in Reach 1 is lower and has a steeper slope of 0.0041 (0.41 percent) than Reach 1 on Trout Creek. The Upper Truckee River transitions to an even lower floodplain and meadow slope of 0.00089 (0.089 percent) in Reach 2. Past channelization and dredging have lowered the channel bed elevation throughout much of Reach 3 of the Upper Truckee River, resulting in an extremely low bed slope (0.00017 or 0.017 percent) (Exhibit 3.9-2).

The different bed elevations and profile shapes on the two streams (Exhibit 3.9-2) reflect differences in floodplain processes and lake interactions. The Trout Creek channel bed is higher (i.e., nearer to the floodplain/meadow ground surface), remaining above the median lake level (approximately 6,226 feet National Geodetic Vertical Datum [NGVD]) through most of the site, except along the 1,800 feet of channel closest to the lake. In contrast, the Upper Truckee River channel bed elevation is lower than the median lake level for nearly 5,000 feet upstream

[1] The term "single-thread" indicates that one primary active channel of the river is present (as opposed to multiple channels).



Source: DEM 2001

Exhibit 3.9-2 Streambed Profiles of the Upper Truckee River and Trout Creek through the Study Area

of the lake. Therefore, the Upper Truckee River channel is more affected by backwater from the lake. Whenever the lake rises, more of the Upper Truckee River channel onsite would be inundated by lake waters than would Trout Creek.

Channel Capacity

Historical alterations of the river and watershed and related channel response have resulted in increased cross-sectional area of the channel of the Upper Truckee River. Because of this increased cross-sectional area throughout the study area, the frequency and area of inundation by overbank flows (i.e., floodplain connectivity) has been reduced. A flow of at least 1,000 cubic feet per second (cfs) is required before the Upper Truckee River overtops its banks throughout most of the study area, and at least 1,212 cfs is required in some of the larger single-thread channel sections (Conservancy 2003:4-19). This magnitude of streamflow is close to the estimated 5-year recurrence interval[2] peak flow (see Section 3.8, Table 3.8-3). The capacity of the channel of the Upper Truckee River exceeds 2,000 cfs in portions of Reach 1. In these portions of Reach 1, flows close to the 10-year event magnitude may be contained in the channel. Because the oversized channel contains such large flows, erosive forces on the banks are greater than would be expected for this very-low-gradient reach. In turn, the exaggerated erosive forces create adverse erosion and water quality conditions, which are described in greater detail below.

Along Reach 1 of Trout Creek, the estimated channel capacity ranges from about 150 to 200 cfs (Conservancy 2003:4-22), which is roughly between the 2- and 5-year estimated recurrence peak flows (see Section 3.8, Table 3.8-3). Channel capacity on Trout Creek decreases in Reaches 2 and 3 in the multiple thread and distributary channel areas. Therefore, flows overtop the channel banks more frequently and erosive forces are lessened.

Streambank Erosion

Studies of sediment sources for Lake Tahoe included an estimation of contribution of streambank erosion to fine sediment loads (i.e., sediment that is less than 0.063 millimeter [mm] in diameter) delivered to the lake by individual tributary streams (Simon et al. 2003:ES-1; Simon 2006:618). The Upper Truckee River was identified as the stream with the highest fine sediment loads contributed by bank erosion. Although these studies did not make quantitative estimates of bank erosion for each reach of the river, the average annual erosion rate for fine sediment from streambanks for the Upper Truckee River is 639 tons per year and approximately 63 percent of the total fine sediment from its entire watershed (Simon 2006:635). The relatively large percentage of the total fine sediment loads attributed to streambank erosion indicates the important effect of this process on water quality.

The total maximum daily load (TMDL) analysis of Lake Tahoe sediment load reduction opportunities (California Water Boards and NDEP 2008:211-215) also produced quantitative estimates of erosion of fine sediment from streambanks of the Upper Truckee River, including estimates covering the study area reaches (Table 3.9-5). Although the study area reaches are nearly 12 percent of the total length of the river studied in this TMDL analysis, the study area reaches account for only 4.7 to 6.3 percent of the fine sediment eroded from streambanks. This indicates that the study area reaches have proportionally less streambank erosion than other upstream reaches of the river. This is not unexpected, because the upstream reaches have steeper channel slopes, greater percentages of banks actively failing, and in some locations, a greater proportion of fines in the banks than the study area reaches. These data are consistent with the relative pattern of bank failure observed by reach within the study area. The greatest bank erosion is within the study area in Reach 1, likely because there the channel is eroding against the side slope of the valley. Although the absolute values of estimates from the TMDL analysis of

[2] The magnitude, or amount, of streamflow is generally described as discharge at a point (i.e., the volume of flow per unit of time). Discharge is variable over time in response to changes in precipitation and water runoff. Expected flow event (or flood) is defined by the probability that a certain rate of flow is possible in any one year. For example, the "100-year flood" is the rate of flow with a 1 percent chance (1 in 100) occurring any one year; a 5-year flood has a 20 percent chance (1 in 5) of occurring.

load reduction opportunities should not be considered precise, these estimates provide useful data for comparisons of the impacts of project alternatives on bank erosion.

Table 3.9-5
Estimated Stream Channel Bank Erosion on the Upper Truckee River within the Study Area for Above-Average Streamflow Year and Event

River Station (feet)[1]	Length (feet)	Percent Bank Failing (% of length)	Estimated Existing Bank Erosion of Fine Sediment (cubic yards)	
			Assuming Upper Truckee River Average % Fines[2] Bank Composition	Assuming Reach-Specific % Fines[2] Bank Composition
Entire Upper Truckee River Watershed				
Upper Truckee River Total	81,693	20.2	4,174	4,320
Upper Truckee River within the Study Area				
Mouth to 53+48 (Study Reach 3 and portions of Reach 2)	5,348	13.8	12.7	3.1
53+48 to 64+30 (most of Study Reach 2)	1,082	5.2	4.8	3.9
64+30 to 96+78 (Study Reach 1)	3,248	26.6	243.3	197.8
Site Subtotal	9,678	-	260.8	204.8
Site as Percent of Upper Truckee River	11.85%	-	8.2%	6.2%

[1] River stationing is that from the total maximum daily load studies, to reflect their data set.
[2] Fine sediment is less than 0.063 millimeter in diameter.
Source: California Water Boards and NDEP 2007

Overbanking

In natural alluvial stream systems, the form and capacity of the active channel are generally developed such that high frequency flows (e.g., typical seasonal variations in discharge) are contained within the banks. Less frequent, larger flows result in overtopping of the banks and inundation of portions or all of the floodplain. Normal overbanking is considered to occur when the channel overtops during a 2-year recurrence streamflow event. In other words, a naturally or normally functioning stream would be expected to typically overbank, on average, approximately during one event (for a period of several days to a couple of weeks) every couple of years. The relatively large channel capacity of the majority of the Upper Truckee River within the study area severely limits the opportunity for flows to reach or overtop the banks during the typical snowmelt season (Table 3.9-3). Therefore, streamflow (and the sediments and nutrients conveyed by the flow) is rarely able to spread out on the floodplain. To illustrate the reduction in overbanking, 35 years of recorded streamflow data were statistically analyzed and indicate that channel reaches with a capacity of 1,000 cfs would only overtop an average of just three–five days yearly, and reaches with a capacity of 2,000 cfs would not overtop (Table 3.9-6). The enlarged river channel reduces the potential for sediment deposition on the floodplain and, therefore, results in increased transport of fine sediment through the study area and to the lake (Stubblefield et al. 2006:287-302). In spatial terms, the lengths of existing Upper Truckee River streambank in the study area that would be overtopped during a 2-year streamflow event (760 cfs), for median and low lake levels, are estimated to be 2,129 feet and 1,520 feet, respectively (Conservancy and DGS 2005:Appendix A). This indicates that less than 10 percent of the channel length within the study area would support normal overbanking processes.

Table 3.9-6 Average Percent and Number of Days during Typical Snowmelt Months that the Upper Truckee River Mean Daily Streamflow Exceeded Channel Capacity (Water Years 1972–2007)*								
Estimated Channel Capacity (cfs)	Month							
	April		May		June		July	
	Percent of Days	Number of Days	Percent of Days	Number of Days	Percent of Days	Number of Days	Percent of Days	Number of Days
1,000	0.001	<1	0.010	**3**	0.004	<1	0	0
2,000	0	0	0	0	0	0	0	0

Note: cfs = cubic feet per second
* Based on analysis of U.S. Geological Survey Upper Truckee River Gauge #10336610 mean-daily flows by month for water years 1972–2007.
Source: Data compiled by Valley & Mountain Consulting in 2008

In contrast to the river, Trout Creek has a relatively less incised channel and greater floodplain connectivity (Stubblefield et al. 2006:287–302). The channel capacity for Trout Creek ranges from about 150 to 200 cfs in Reach 1, decreasing somewhat in Reaches 2 and 3. The channel would be overtopped between the calculated 2- and 5-year recurrence peak flows in Reach 1, and more often in Reaches 2 and 3 (Conservancy 2003:4-22). The channel capacity of Trout Creek allows more flows to reach or overtop the banks during the snowmelt season than does the channel capacity of the Upper Truckee River (Table 3.9-7). Under the existing channel conditions, streamflow (and the sediments and nutrients conveyed by it) spreads out on the floodplain for over a week (about 10–11 days per year on average) over the entire season.

Table 3.9-7 Average Percent and Number of Days during Typical Snowmelt Months* that Trout Creek Mean Daily Streamflow Exceeded Channel Capacity (Water Years 1972–2007)								
Estimated Channel Capacity	Month							
	April		May		June		July	
	Percent of Days	Number of Days	Percent of Days	Number of Days	Percent of Days	Number of Days	Percent of Days	Number of Days
150 cfs	0.001	<1	0.104	**3**	0.206	**6**	0.045	**1**
200 cfs	0	0	0.042	**1**	0.079	**2**	0.021	<1

Note: cfs = cubic feet per second
*Based on analysis of U.S. Geological Survey Trout Creek mean daily flows by month for water years 1972–2007.
Source: Data compiled by Valley & Mountain Consulting in 2008

Floodplain

Most of the study area is a floodplain that is shared by the Upper Truckee River and Trout Creek under maximum streamflows and lake levels. In major floods, the waters from both streams mix in the middle of the marsh. For smaller streamflows and lower lake levels, the area of floodplain wetted by each stream becomes distinct and the area of mixing is limited to the mouth reaches or the lagoon and mouth reaches. The area and duration of floodplain inundation is affected by many variables on each stream, and in turn influence the location and amount of floodplain sedimentation.

To describe existing conditions and allow comparison with the conditions resulting from the proposed alternatives along the Upper Truckee River, modeling (HEC-RAS) of potential inundation area was performed. This modeling

used topographic cross sections and water surface profiles along with digital elevation surface analysis (using GEO-RAS). The modeling assumed a 2-year recurrence streamflow (760 cfs) and a median starting lake level. The inundation area is less if lake level is lower, and is greater if lake level is higher.

For existing topographic and geomorphic conditions, the modeled floodplain inundation area is 65 acres, covering a narrow and discontinuous area (Exhibit 3.9-3). In the upstream half of the site (approximately River Station [RS] 0+00 to RS 40+00), inundation is restricted to the area alongside channels. In the center of the site (approximately RS 40+00 to RS 70+00), some overflow from the channel onto the floodplain occurs, along with backwater up into side channels or ditches, or both. In the downstream portion of the site (approximately RS 70+00 to RS 92+00), overflow is relatively broad on both sides of the channel, particularly in the recently restored Lower West Side Restoration Area wetlands.

Although the Upper Truckee River has reduced frequency and extent of overbank flows under existing conditions, some overbank flow and floodplain sedimentation does occur. Stubblefield and others (2006:287–302) measured how differences in the frequency and extent of overbank flows in various parts of the Upper Truckee River and Trout Creek floodplain affected suspended sediment and total phosphorus loads during the 2003 snowmelt season. Measurements indicated that as water depths and floodplain connectivity increased, sediment retention on the floodplain also increased. Greatest sediment and nutrient retention were measured for water flowing through the lagoons and beaver dam backwater areas of the marsh (more or less Reach 3) on Trout Creek.

Soil cores taken from the marsh indicate that net sedimentation has been occurring on both the Trout Creek and Upper Truckee River portions of the study area (Winter 2003:64). Since the 1950s, the average vertical accretion rates have been 0.25 inch per year on the Trout Creek floodplain and 0.35 inch per year on the Upper Truckee River floodplain. These modern net sedimentation rates are significantly greater than rates averaged over the last ~1,650 years (0.032 inch per year) or over the last ~4,620 years (0.028 inch per year [Winter 2003:65]). The mass sedimentation rates on the study area are greater than at Pope Marsh (Kim 1999:25, Winter 2003:78), where net biological accumulation/decomposition of groundwater-supported peat (Green 1998) may play a stronger role in vertical accretion of the marsh surface than deposition of mineral material.

River Mouth(s)

Analysis of historic maps and aerial photographs from 1861 through 2002 was performed to study the location(s) and dimensions of the Upper Truckee River and Trout Creek as they enter Lake Tahoe (Conservancy 2003:3-11). These data indicate that the position of the mouth of the Upper Truckee River has laterally migrated about 1,000 feet over about 150 years. The migrated location has ranged from 750 feet west (in 1860s and 1914) to 275 feet east of the present location of the mouth. The oldest maps suggest that Trout Creek and the Upper Truckee River had a single outlet to the lake, similar to present conditions. However, some historical photographs (from 1940 and 1965) show a separate Trout Creek outlet through the beach ridge to the lake. A separate Trout Creek mouth has been observed recently during and following large flood events (e.g., in 1997 and 2005). The location of a separate Trout Creek mouth has been consistent, although the frequency and duration of a direct discharge from Trout Creek to the lake at this location is not known.

The historical aerial photograph analysis also documented that the Upper Truckee River mouth has ranged from around 50 feet wide to over 250 feet wide since 1940 (Conservancy 2003:3-11), with no clear trend over time. The river mouth widths in the photographs would be expected to vary in relation to lake level and streamflow, with a wider river mouth generally associated with larger flows and higher lake levels. However, the river mouth width at any given time (or photograph) could also reflect preceding conditions (such as a drought or flood), vegetation density at the mouth, and alteration by dredging and straightening.

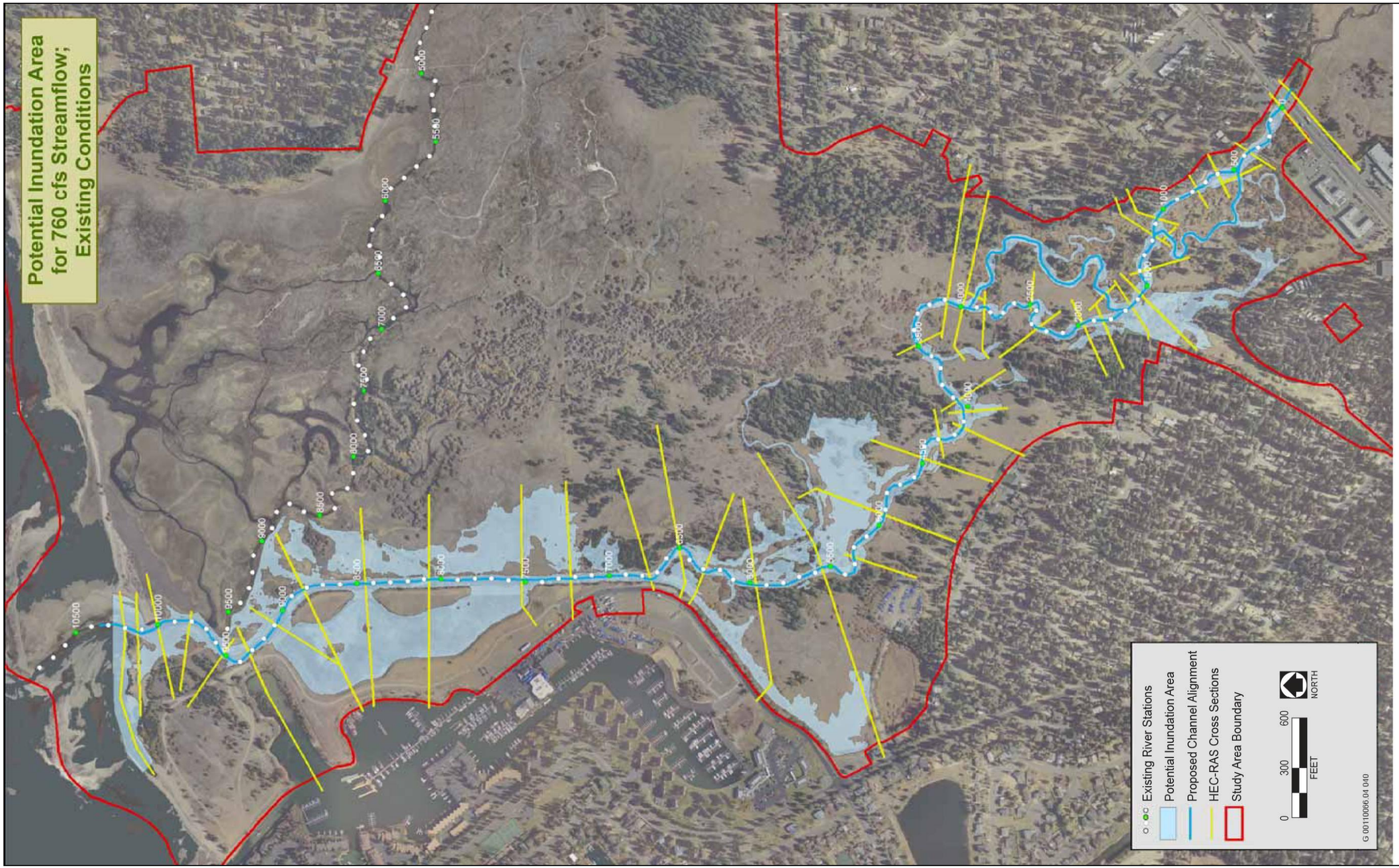


Exhibit 3.9-3 **Approximate Overbank Inundation Area from the Upper Truckee River at 760 Cubic Feet per Second Streamflow, under Median Lake Level**

Lagoons

The dynamic interaction of river and lake processes at the mouth of the Upper Truckee River results in a range of geomorphic features, including the formation of a beach, beach berm, and lagoon environments. Natural influences on these processes include variable river flows and sediment transport and changing wave conditions, lake currents, and lake levels. Under undisturbed conditions, transport of sediment along the beach probably caused the mouth of the river to close during low streamflow conditions and formation of a lagoon behind (landward of) the beach berm. The existing conditions of the Upper Truckee River mouth, beach, and lagoon system have been modified from predisturbance conditions by a combination of watershed-scale changes in land use, hydrology and sediment supply for the beach, the raising and regulation of the Lake Tahoe outlet, site-specific land and water use (e.g., Comstock-era log rafting and transport), and the navigation channel(s) construction and maintenance since the 1950s (Conservancy 2003:3-23). The direct alterations have included dredging to deepen and widen the mouth of the Upper Truckee River, excavation and dredging to create the former boat launch area (i.e., the Sailing Lagoon), and later, the placement of fill to disconnect the Sailing Lagoon and present marina from the river.

An indicator of changes in lagoon area is the total area of standing water observed on historical aerial photographs. The relationship of water area in the study area to lake level generally displays an expected increase with higher lake levels (Exhibit 3.9-4). Generally, the area of standing water increases as lake level increases. This general correlation seems fairly strong for the data in the extreme range of lake levels (e.g., lake levels 6,220–6,222 feet and 6,228–6,229 feet NGVD). However, there is considerable variation in the data points representing a relatively narrow lake elevation range (e.g., 6,225–6,228 feet NGVD), suggesting that factors aside from lake level are important controls. Several other factors may also produce the observed pattern: river mouth and back beach topography; groundwater levels; surface water flow (via stream channels or overbank flooding); evaporative losses; and temporary dams and diversions by beaver or humans (Conservancy 2003:3-26).

Lagoon-area changes over time may reflect human impacts on the lagoon system (Conservancy 2003:3-23). For example, at relatively high lake levels (6,226–6,228 feet NGVD), the older photographs display smaller areas of standing water than more recent images. Also, the area of standing water at median lake levels (approximately 6,226 feet NGVD) has decreased since the 1970s. These patterns may reflect changes resulting from dredging of the river mouth, channel incision, beach erosion or excavation, or some combination of these processes, along with historical groundwater pumping and sedimentation (i.e., filling) of the lagoon environment. At high lake levels, lake water can more readily enter the site through the current incised and dredged channel. At low lake levels, surface runoff may more readily exit the site through the incised and dredged channel and by percolation to groundwater in the lagoon area.

A comparison of the water surface area of the Sailing Lagoon to the lake level illustrates differences between this artificially modified water body and the rest of the marsh (Exhibit 3.9-5). These data show that its constructed shape (i.e., steep sided, deep, and surrounded by higher ground) maintains a surface area of water consistently between 3 and 4 acres whether lake level is high and near legal maximum (e.g., 1999) or low and down to the natural rim (e.g., 2002). The only case when the Sailing Lagoon is smaller than 3 acres is when lake level is below the natural rim (e.g., 1992). The other extreme is the 1965 photo, when the Sailing Lagoon had a very large connected water area because the river mouth was dredged to allow navigation up the river mouth into the Sailing Lagoon.

The Tahoe Keys Marina (TKM) occupies about 8 acres of land and 13.5 acres of water immediately west of the study area (TRPA 2002b:1-1). The TKM water body has an open surface water connection to Lake Tahoe through the East Channel and an open-water connection to the Sailing Lagoon within the study area. The water in the TKM interacts with water in the channels of the Tahoe Keys via a circulation system, shared with the Tahoe Keys Property Owners Association (TKPOA), that operates under a NPDES permit (Lahontan RWQCB 2004:1). Therefore, under the present configuration and operations, the surface water of the marina and keys channels may interact with that in the Sailing Lagoon.

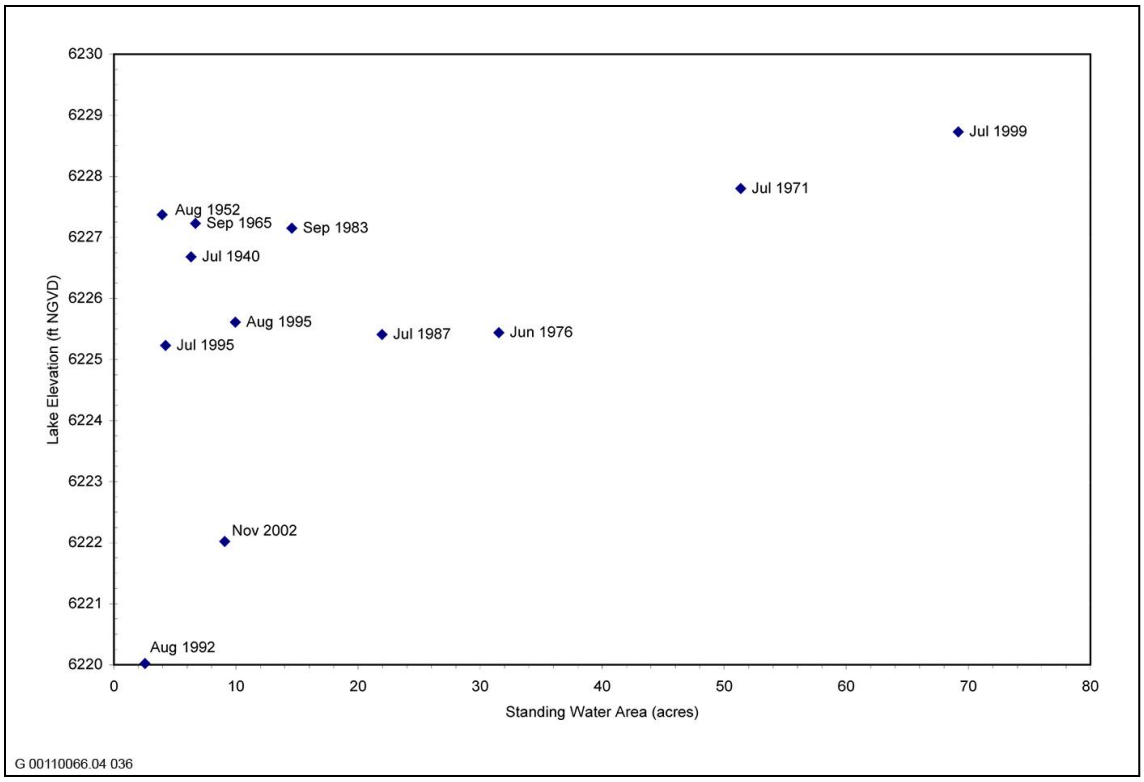


Exhibit 3.9-4 Relationship of Standing Water Area on Study Area to Lake Elevation (1940–2002)

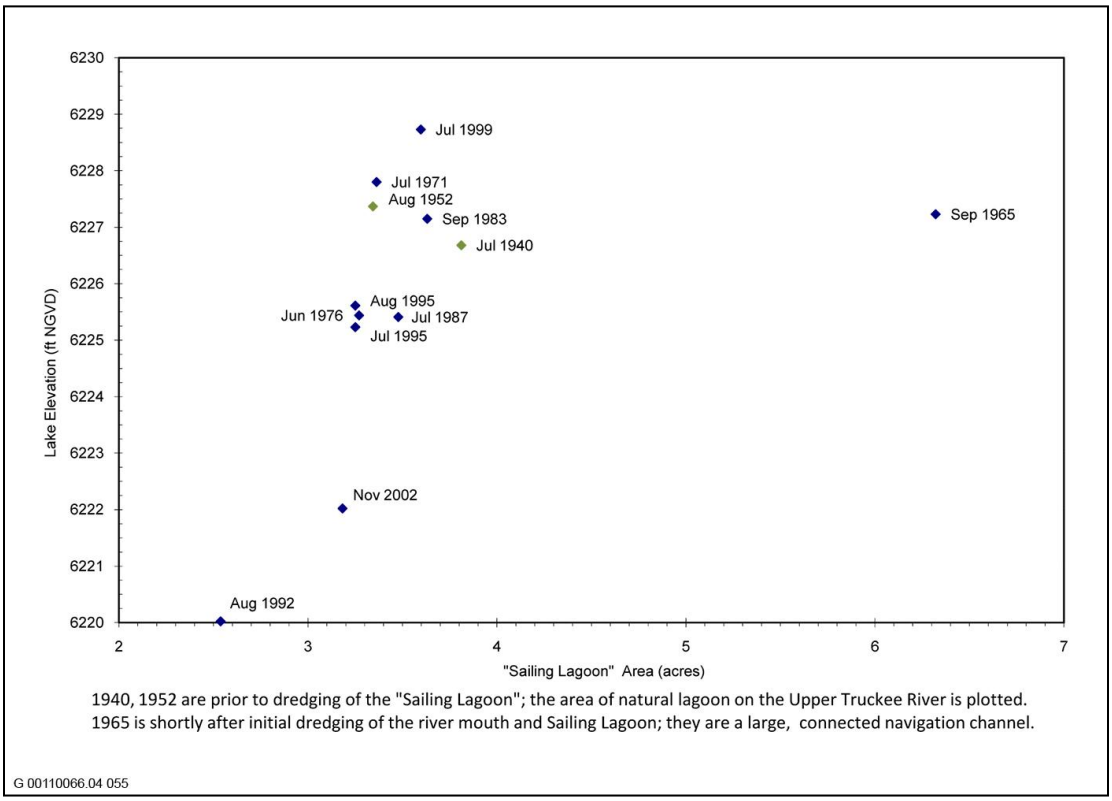


Exhibit 3.9-5 Relationship of Sailing Lagoon Water Area to Lake Elevation (1940–2002)

Because the TKM is an artificial water body and its operation requires a navigation channel out into the lake, dredging at the East Channel entrance to the TKM and out into the lake has occurred in the past and is expected to continue. The maintenance dredging of TKM occurs under permits from USACE (CWA 404), the Lahontan RWQCB (CWA 401), the California State Lands Commission, the California Department of Fish and Game (CDFG) (lakebed alteration agreement), and TRPA.

Tahoe Keys Marina and Tahoe Keys Channels

The TKM maintenance dredging has used a couple of different methods (i.e., suction dredger and clamshell bucket). Lahontan RWQCB (2005) Regional Board Order No. R6T-2005-0015 NPDES CAG616003 includes the following discussion of maintenance dredging that indicates beach replenishment is not prohibited, but would require permitting as a "complex" maintenance dredging project:

> …A simple maintenance dredging project must meet all of the following criteria: (1) no temporary on-site storage of spoils, (2) no on-site dewatering of dredged spoils, (3) no use of a flocculent for settling spoils, (4) no discharge of decant water to surface waters, and (5) no beach replenishment.
>
> …If the dredging project includes fill below high-water or beach replenishment, the Discharger must also submit a complete application for Section 401 Water Quality Certification in accordance with Title 23, Section 3856 of the California Code of Regulations.
>
> …Bypass dredging which involves beach replenishment by redeposition of dredged sediments may be allowed on a case-by-case basis only if the Discharger can show through pre-project substrate sampling that the dredged material is cleaner than the material that exists in the proposed replenishment area.

Dewatering and settling of the dredged slurry and off-site disposal has been the environmentally preferred option accepted by the Lahontan RWQCB and TRPA (TRPA 2002a). This is consistent with general BMPs requiring that all dredged sediments be removed from the lake and disposed above its high-water rim (TRPA 2002b:3-7). Sediments excavated during dredging at TKM have been removed from the area (i.e., hauled offsite), and therefore have not been transported to or deposited in the lake or shorezone (TRPA 2002b:4-9). Bypass dredging (which would redeposit sediment in another local area) has not been conducted. TKM has noted the potential beneficial impacts of bypass dredging to leave coarse material in the littoral zone of the lake (TRPA 2002b:4-4), but is uncertain whether this technique would be used for future dredging.

Beaches

The shoreline is a dynamic environment where wave action and lake-level fluctuations are dominant forces, interacting primarily with sediment supply to control the size, elevation, and position of the beach. The study area has two distinct beach areas, one on either side of the Upper Truckee River mouth (Exhibit 3.9-1). The beach west of the river, known as Cove East Beach, is about 800 feet long and lies between the TKM East Channel and the river. The beach east of the river, known as Barton Beach, is about 2,600 feet long and extends eastward from the river to the Al Tahoe residential neighborhood.

In terms of waves and currents, the study area and its adjoining shallow lake areas within one–two miles east and west likely behave as a littoral circulation cell (Orme 1971:10, Osborne et al. 1985:29). A distinct littoral cell has also been identified between the mouth of the Upper Truckee River and the Ski Run Marina (Foxx, Nielsen, and Associates 1989:8). The circulation pattern limits the possible sources of sediment for the study area beaches to other beaches and the shallow nearshore of the lake within the cell.

Generally, beach sediment has four possible sources: local cliffs, offshore bars, the nearshore, and riverbed load (Orme 1971:4-5). Under present conditions in the study area, the erosion of the beaches themselves has been

determined to be a larger source than the riverbed load (Osborne et al. 1985:9-10). These materials are delivered to or removed from the beach by onshore/offshore wave transport and alongshore drift in lake currents (Selby 1985:359–360). Long-term beach sediment loss occurs when sediment is transported to deep offshore sinks (or if dredging and upland disposal removes sediment from the river or shorezone).

Understanding changes in the study area's beach and shoreline conditions over the geologic time scale (10,000–100,000 years or more) is not critical for assessing changes resulting from the project. However, beach and shoreline changes over shorter time scales, such as hundreds to thousands of years, provide important context for evaluating the potential impacts of the project.

Over the last few thousand years, there have been substantial changes in the shoreline boundary near the study area. During the mid-Holocene (about 5,000 years ago), lake level was several feet lower than at present and the shoreline was about 0.25 mile farther north (Conservancy 2003:3-1). Over the next couple of thousand years, runoff and lake levels increased, and the barrier beaches and backshore marshes may have been initiated (Adams and Minor 2001:3).

Over the past couple hundred years, there have been substantial changes in sediment supply and hydrology that also modified lake levels and shoreline conditions (Stine 1994; Heyvaert 1998, 2001; Conservancy 2003). These include natural climate-driven shifts, the results of watershed-scale land use and vegetation changes, direct management of the lake outlet at Tahoe City, and local dredging (Orme 1971:13).

Dramatic increases in sediment delivery to the lake occurred during the Comstock logging era, followed by watershed recovery that reduced lake sedimentation rates between 1900 and 1970 (Heyvaert 1998:134) (Table 3.9-8). Similarly, increased deposition in Pope Marsh between the 1880s and 1910s has been documented (Kim 1999:34).

Table 3.9-8
Historic Watershed Condition and Lake Sedimentation Rates

Time Period	Watershed Condition Land Use [1]	Lake Core Mass Sedimentation Rate ($g/cm^2/yr$) [2]
Predisturbance "pre-1850"	Predisturbance	0.006 (± 0.003)
Comstock Era 1860–1890	Extensive logging and construction of logging roads; log runs down Upper Truckee River	0.043 (± 0.011)
1900–1970	Forest Second Growth; rapid urbanization in 1960s	0.009 (± 0.004)
Modern 1970–1990	Continued forest regrowth and urbanization	0.027 (± 0.006)

Note: $g/cm^2/yr$ = gram per square centimeter per year
[1] Source: Lindström 1996, 2000
[2] Source: Heyvaert 1998

Historical maps are consistent with the lake and Pope Marsh indicators. The study area shoreline advanced from 1861 to 1914 (i.e., moved northward into the lake), from about 50 feet in some areas to as much as 200–300 feet in other locations (Conservancy 2003:3-16). These data support hypotheses that greater watershed sediment production and delivery to the lake during the late 1800s would have been accompanied or followed by shoreline advance into the lake as sediment was mobilized, transported, and reworked over the following decade(s) (i.e., 1890s to 1910s).

For the first half of the 1900s, nearshore sediment would not have been replenished from the watershed at the same high rate as during the Comstock Era, which is a factor favoring shoreline erosion. Between 1914 and 1940, historical maps and aerial photos show net shoreline erosion at the study area (Conservancy 2003:3-12): the Barton

Beach shoreline east of the 1940 Trout Creek mouth experienced retreat of 20–60 feet in some areas and as much as 50–190 feet in others; and the west side of the study area experienced retreat of as much as 300 feet, to about the same position as in 1861. The 1940 shoreline between the mouths of Trout Creek and the Upper Truckee River did not shift. These data indicate that shoreline erosion and retreat at the study area began prior to the Tahoe Keys development, probably due to watershed sediment load changes and management of the lake outlet.

Considerable and continued shoreline retreat since 1939 has also been quantified (Adams and Minor 2002, 2001; Conservancy 2003). The continued erosion may still reflect watershed sediment trends and lake level management, but as exacerbated by local dredging. The following observations have been made from aerial photo analysis of erosion at the study area since 1940 (Conservancy 2003: Chapter 3):

- Between 1940 and 1995, the portion of the study area west of the Upper Truckee River mouth experienced net shoreline retreat on the order of 90–120 feet, with 50–100 feet of retreat near the river mouth. Barton Beach had net retreat ranging from 70 to 135 feet just east of the river, but less than 10 feet east of the Trout Creek mouth (Exhibit 3.9-6).

- Between 1940 and 1965, some local shoreline advance occurred on portions of the Barton Beach, but net erosion followed from 1965 to 1983 (Exhibit 3.9-7).

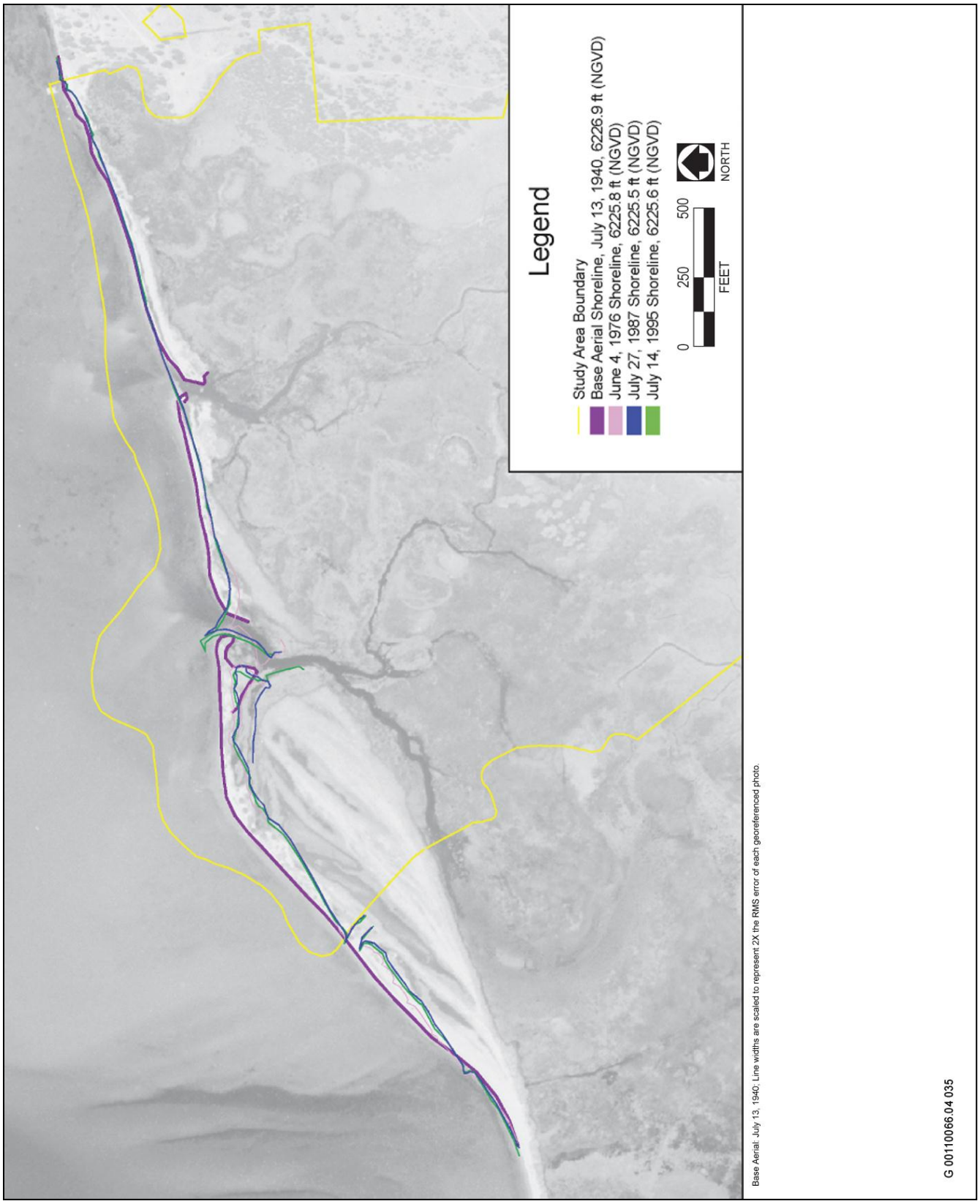
- Between 1971 and 1999, net shoreline retreat east of the Upper Truckee River mouth ranged from 35 to 50 feet and as much as 50–70 feet near the sand spit. However, some areas of sand deposition occurred over this same period east of the river mouth (Exhibit 3.9-8).

Several local studies of beach and shoreline conditions conducted shortly after development of the Tahoe Keys identified substantial net erosion (ranging from three to over 50 linear feet of retreat) for storm events in March and June 1970 (Orme 1971, Budlong 1971). Comparison of lake bed surveys from 1922 and 1970 documented a trend of net nearshore erosion and sediment loss of over 300,000 cubic yards (averaging greater than 6,000 cubic yards per year) in the vicinity of the study area. While this loss was largely attributed to development impacts on the channel and sediment delivery to the lake, more recent studies (Conservancy 2003:3-21) suggest that some sediment loss may have begun prior to development.

Beach particle composition and shape data also indicate net shoreline erosion. The study area beach sediment is primarily granitic sand of granule and small pebble diameters, with magnetite in the sand-size class (Orme 1971:5). Osborne and others (1985) determined that the beach sediment morphology was enriched with irregularly shaped and angular grains, indicating backshore erosion is now an important sediment supply to the beach.

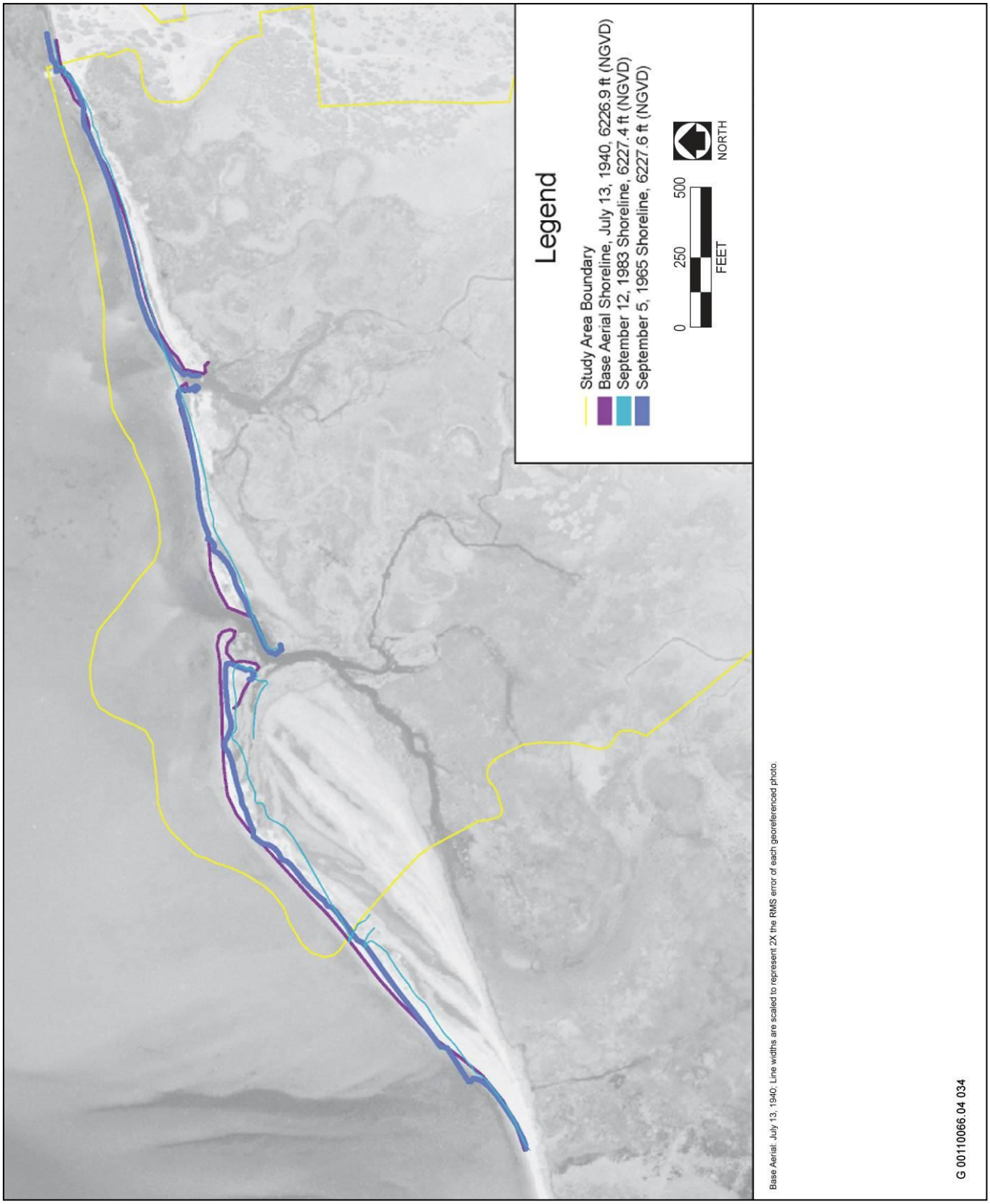
An additional indicator of net beach erosion at the study area is the change in relationship of exposed, unvegetated beach to lake elevation over the last 60 years (Exhibit 3.9-9). While generally showing the expected increase of beach exposed at lower lake levels, the variations over time reflect net shoreline erosion, and flood and drought cycles, as well as the Tahoe Keys development (Conservancy 2003:3-21). For example, historical aerial photographs in 1940, 1952, 1965, and 1983 are all for lake elevations within about one foot of each other, yet the two older, predevelopment examples have considerably more beach area.

The construction and maintenance of navigation channels, jetties, and small groins that cross through the beach and/or extend from the beach into the nearshore have altered shorezone processes and affected beach conditions west of the study area (Orme 1971:14-15). Historic grazing (discontinued after 2000) could have affected vegetation and reduced dune stability, and was identified as a possible impact on shoreline erosion along Barton Beach. Excavation, grading/leveling, and vegetation removal occurred at the former dune field west of the mouth of the Upper Truckee River in 1969 (Budlong 1971:80).



Source: CardnoENTRIX 2008

Exhibit 3.9-6 Shoreline Erosion, 1940–1995, Documented by Georeferenced Aerial Photographs for Lake Levels near Median

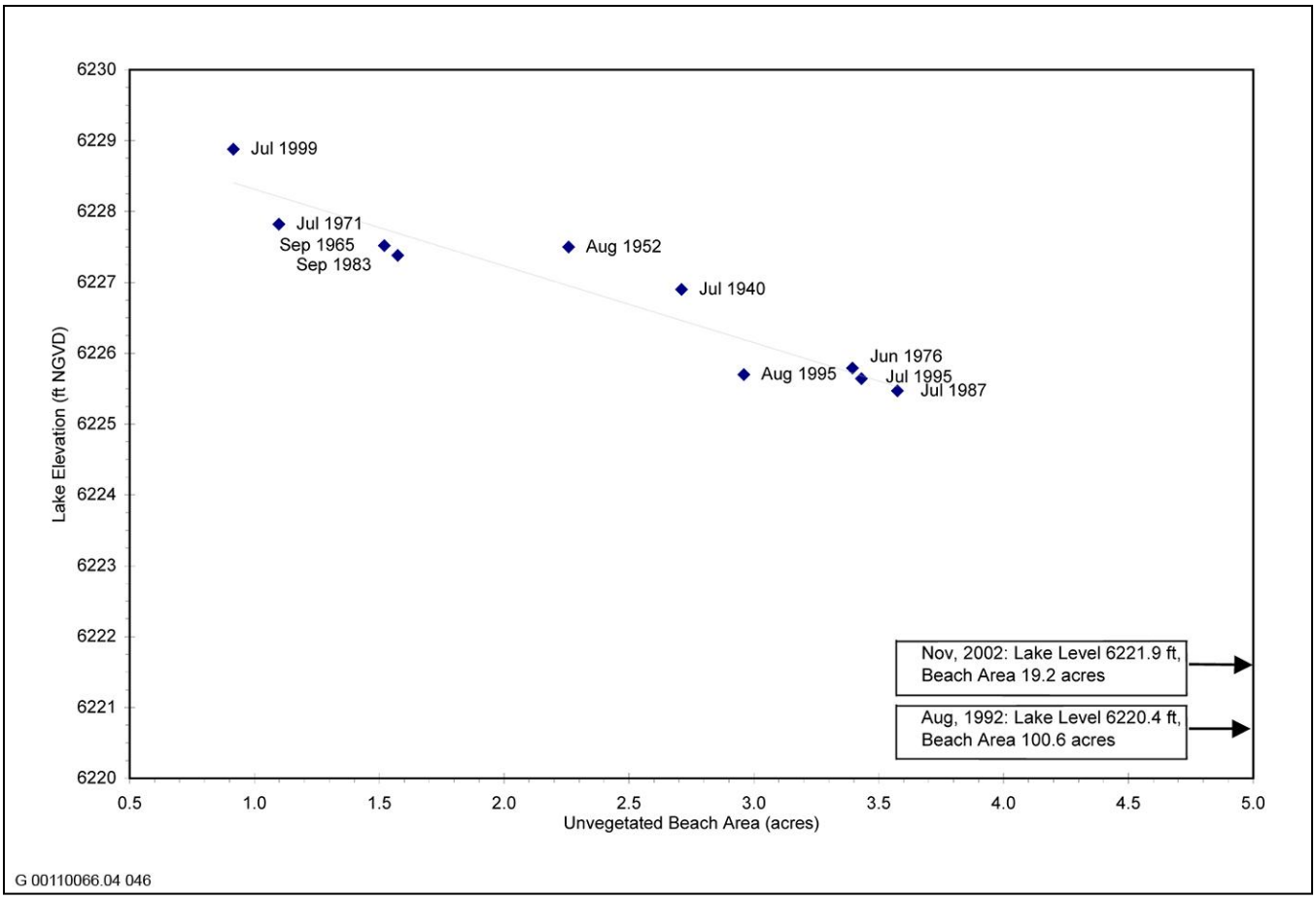


Source: CardnoENTRIX 2008

Exhibit 3.9-7 Shoreline Erosion, 1940–1983, Documented by Georeferenced Aerial Photographs for Lake Levels above Median

Source:CardnoENTRIX2008

Exhibit 3.9-8 Shoreline Erosion, 1971–1999, Documented by Georeferenced Aerial Photographs for Lake Levels near Maximum



Source: CardnoENTRIX 2008

Exhibit 3.9-9 Relationship of Study Area Unvegetated Beach Area to Lake Elevation (1940–2002)

Additionally, the sediment supply to local beaches has been adversely affected by maintenance dredging of the Tahoe Keys navigation channels during the past 50 years. The long-term average annual dredging volume is about 800 cubic yards per year (Conservancy 2003:3-11). Replacement of sand to the beach or nearshore system via bypass dredging or replenishment programs (i.e., artificial deposition) has not occurred. However, artificial beach nourishment has been used on a limited scale at the west end of the study area after storm events (Budlong 1971:92). Unfortunately, these recent site-specific impacts exacerbate the background trends of beach erosion and the reduced sand delivery by the rivers.

The volume of coarse sand supplied to the nearshore by either the Upper Truckee River or Trout Creek is meager in relation to the shoreline length of the study area. Osborne and others (1985) determined coarse sand supply to the beaches using a long-term average annual load rate of total coarse sediment (i.e., sediment greater than 0.0024 inch [0.062 mm]) of 2,800 and 1,400 tons per year for the Upper Truckee River and Trout Creek, respectively (Kroll 1976). Coarse sand supply from the Upper Truckee River was estimated to be 356 tons per year (293 cubic yards per year), and that from Trout Creek was slightly greater, 377 tons per year (310 cubic yards per year) (Osborne et al. 1985:9). For an active beach width of 25 feet, and assuming just one cubic foot covering each square foot of beach area, the Upper Truckee has sufficient annual supply for a beach 316 feet long, and Trout Creek can support a beach 335 feet long. This is much shorter than the shoreline of the study area and is a much smaller total area (0.4 acre) than half the existing area at median lake level (Exhibit 3.9-5). Assuming only one foot of depth is much shallower than the typical USACE beach nourishment rate of one cubic yards per square foot. Making a more normal or typical thickness assumption indicates that river sand supply would only

support an even smaller beach area. Therefore, the average annual river sand supply is small, and clearly inadequate to compensate for the long-term net beach erosion and continued dredging.

Water Quality

Water quality refers to a combination of characteristics (parameters) that can be quantitatively or qualitatively described for a given water body. The parameters include pollutants, such as nutrients, suspended sediment, bacteria, toxic elements or chemicals, and attributes important to biological resources such as pH, dissolved oxygen, and temperature. There are several potential pathways for nutrients, fine sediment, and other pollutants to enter waters of the study area. Several potential sources, sinks, and transformations of these constituents may occur in the study area. Sources to the study area include streamflow, urban stormwater runoff, lake water, groundwater flow, and direct atmospheric deposition. Watershed and site-scale monitoring of water quality has been performed at varied times for various purposes, but site-specific data is limited. Most available water quality information is for historical conditions of the surrounding water bodies such as Lake Tahoe, the TKM and TKPOA channels, and the two main streams that flow through the study area. The information below is organized by surface and groundwater categories, and is focused on topics that describe the existing water quality in the study area or water quality parameters that may be altered by the project.

Surface Water

Lake Tahoe

Both the federal and California governments have designated Lake Tahoe an “Outstanding National Resource Water” (Lahontan RWQCB 1995:5-1). In addition to aesthetic enjoyment, the exceptional quality of water in the Tahoe Basin supports a number of beneficial uses related to human and environmental health, including drinking water supply, water-based recreation, wildlife habitat, and aquatic life and habitat. Stringent water quality goals and watershed regulations, along with mitigation and restoration measures have been implemented, particularly since the 1980s. However, Lake Tahoe has been losing its famed clarity at a rate of nearly nine inches per year since the late 1960s and has failed to meet transparency and clarity standards (Lahontan RWQCB and NDEP 2007a:25). The lake is considered “impaired” with respect to the aesthetic-recreation beneficial use under Section 303(d) of the Federal CWA. Development of a TMDL identified the pollutant sources, quantified the amounts of pollutants the lake can accept and achieve the clarity goals, determined options for reducing pollutants, estimated load allocations, and developed implementation and monitoring plans (Lahontan RWQCB and NDEP 2007a:13-15). The Lahontan RWQCB approved Basin Plan amendments to establish the Lake Tahoe TMDL and an implementation plan for associated changes to urban stormwater regulations on November 16, 2010 (Resolution No. R6T-2010-0058). EPA approved the Lake Tahoe TMDL on August 16, 2011.

TMDL research has established that Lake Tahoe is impaired by excess nutrient (nitrogen and phosphorus) and fine sediment inputs. Nitrogen and phosphorus stimulate algae growth, which in turn absorbs light and reduces light penetration through the water (Reuter and Miller 2000). Fine sediments decrease clarity by scattering light as the particles slowly settle through the water (Swift et al. 2000, Lahontan RWQCB and NDEP 2007b:261). Fine mineral particles (i.e., particles less than 20 micrometer [µm] in diameter) have been shown to strongly affect clarity and may be responsible for 60 percent or more of the transparency loss (because of their impact on light scattering) (TRPA 2007:3-2, 3-3).

Pelagic Lake Clarity

Water clarity is measured using Secchi dish depth readings (of transparency) at established index locations on Lake Tahoe. Year-to-year variability in transparency occurs, inversely related to precipitation and runoff amounts (Jassby et al. 2003:1456). However, the overall trend has been a decrease in average annual Secchi depth from the 1967–1971 historic average of 97.4 feet (i.e., the California Standard numeric target) to 67.6 feet in 2006 (TRPA 2007a:3-11). Lake clarity varies by season, ranging from its lowest levels in May through June, to a secondary low in December, and an annual high in February (TRPA 2002a:3-30). The seasonal pattern generally reflects the

seasonal variation in suspended sediment loading from stream runoff, and the impacts of lake mixing. Substantial vertical mixing can occur during summer (CWB and NDEP 2007:3-20) as a result of sustained summer wind events. The December clarity minimum is attributed to consistent annual deep mixing. The winter average Secchi depth in 2006 was 78.4 feet, less than the TRPA standard of 109.6 feet (TRPA 2007:3-30).

Nearshore Lake Clarity

Lake clarity is measured in the deep (pelagic) waters, but the area where clarity is most obvious to the casual observer is in the littoral zone or "nearshore" (Lahontan RWQCB and NDEP 2007a:10*). There are varied working definitions of the nearshore in specific studies (Orme 1971, Taylor 2002, Taylor et al. 2004) and in regulations (e.g., Basin Plan vs. TRPA Code). Despite these variations, all of the definitions refer to portions of the lake with water depths too shallow for Secchi depth measurements to be informative.

The optical water quality concern in the shallow nearshore zone is murkiness, as indicated by turbidity and periphyton (i.e., attached filamentous algae). Turbidity is expressed in nephelometric turbidity units (NTU), which are based on an empirical relationship to light transmission in standard concentrations of formazin (a white powder) in water (Taylor 2002).

The study area is adjacent to the largest nearshore environment on the margins of Lake Tahoe. This area is characterized by a shallow shelf that extends a few thousand feet out from the beach ridge (Orme 1971:4). The nearshore lake waters adjacent to the study area consistently have the highest turbidity around the lake, and have been occasionally greater than the TRPA WQ-1 threshold (Taylor 2002:20). Recent studies have recorded high turbidity at both the mouth of the Upper Truckee River and the Tahoe Keys channel entrance. These studies include data by Taylor (2002) of all locations less than 24.6 feet deep or within 656 feet of shore, and by Taylor et al. (2004) of all locations up to 3.28 feet deep and extending offshore 328 feet or until the water is at least 98.4 feet deep.

At times when turbidity of the middle of the lake is very low (less than 0.06 NTU), the nearshore adjacent to the study area had turbidity levels up to an order of magnitude greater than any other sampling location (Taylor 2002:11). The south shore (including the study area) was one of the three high turbidity areas with large extent (more than 1.9 miles in extent and greater than 0.2 NTU) reported by Taylor (2002) from lakewide concurrent sampling. Elevated turbidity (up to a maximum of 20 NTU after a storm events) off the Upper Truckee River mouth was noted in 23 out of 23 surveys, and affects an area commonly extending 0.5 mile to the east, 0.3 mile to the west, and 0.74 mile offshore (Taylor et al. 2004:48*). Turbidity in this area and in the adjacent West Al Tahoe area was identified as "extremely elevated" relative to the middle of the lake.

The highest nearshore turbidity levels coincided with snowmelt and runoff periods characterized by the highest ratios of mineral to algal particle content. Generally, lower turbidity is recorded in winter, but localized plumes of increased turbidity linked to storm event inputs can occur. During spring peak runoff, water temperatures and turbidity levels rise, and during the summer there is a widespread increase in turbidity.

During calm conditions, increased turbidity was due to organic particles, but during storm events, up to half the particles were mineral composition (Shanafield et al. 2007:53). In all locations and times that nearshore turbidity was moderately elevated (greater than 0.35 NTU), the particles were predominantly mineral material, except within the Keys channels (Taylor et al. 2004:48).

Tahoe Keys Marina and Channels

Organic debris or living organisms that are considered noxious, invasive, or exotic to the biologic systems may also be present in the water or sediment of the Sailing Lagoon, whether or not they directly affect water or sediment quality. See the Sections 3.4 and 3.5 (Biological Resources: Vegetation and Wildlife, and Fisheries, respectively) for further details on this related topic.

Tahoe Keys Water Quality

The water quality in the Tahoe Keys Marina and other Tahoe Keys channels has been studied as part of various scientific and permit-compliance programs over many years, but the locations, parameters, and time frames of each study have differed. The following discussion is organized by study, with the most recent information presented first.

Studies have documented high levels of turbidity in the channels of the Tahoe Keys. In 2001 and 2002, the two navigation channels and the immediately adjoining nearshore in the lake have had turbidity levels that are an order of magnitude greater than any other sampling location (Taylor 2002). Channels in the Tahoe Keys had very high turbidity (greater than 0.5 NTU), with plumes of particularly high turbidity (values in excess of 2.0 NTU) (Taylor 2002:11). In 2003, channels in the Tahoe Keys had "moderately elevated" average turbidity greater than 0.4 NTU and a maximum turbidity greater than 1.5 NTU (Taylor et al. 2004:49).

The contribution of the Tahoe Keys channels and their configuration on lake turbidity is not well understood. Surface water in the Marina and Tahoe Keys channels can only enter the lake through the east and west navigation channels. Their outflow is highly time-dependent and seasonally variable. The relative contribution to nearshore turbidity from the Tahoe Keys versus outflow of the Upper Truckee River has not been determined (Taylor et al. 2004:50). However, observations during periods when lake currents were moving the Upper Truckee River outflow away from Tahoe Keys indicate the lake was only moderately affected by outflow from the Tahoe Keys and boat traffic resuspension (Taylor et al. 2004:51). Also, organic materials were always the dominant source of turbidity inside Tahoe Keys, but inorganic materials dominate as the source of turbidity in the lake (Taylor et al. 2004, Shanafield et al. 2007).

The Tahoe Keys channels and marina are served by the TKPOA circulation system, which operates under a NPDES permit (R6T 20004-0024; Board Order CA0103021-WDID No. 6A090090000 (Lahontan RWQCB 2004). The system included the TKPOA water treatment plant, which operated periodically between 1975 and 1998 (TRPA 2002b:3-6). A chemical release from the treatment system resulted in toxic levels of aluminum in August 1998, and the plant has not operated for treatment since that time. Only the circulation system portion of the plant is currently permitted and operational. The system circulates untreated water between May and October, exchanging water between the Tahoe Keys lagoons (110 acres), Tallac Lagoon (45 acres), and the TKM (32 acres, including the Sailing Lagoon). There are 13 outfalls, including one in the TKM (Lahontan RWQCB 2004:2-5). The permits have required water quality sampling at a point at the East Channel inside the marina (Point M, which is near the Sailing Lagoon) and at a point in Lake Tahoe at the East Channel outside the marina (Point MLT) since 1998. Monitoring (typically between July and October in most years) indicates that marina turbidity exceeded the 1.0-NTU limit in 1998 and 2005. Total phosphorus generally was below 0.1 milligram per liter (mg/L), except in July 2007. Total nitrogen was generally below 0.15 mg/L except in October 2005 and July 2007. Testing showed detections for various hydrocarbons between 1998 and 2000, but nondetection in more recent monitoring.

During the period 1993 to 1997, water quality at the TKM was investigated to evaluate the potential impacts of motorized watercraft, with sampling around the Fourth of July and Labor Day holidays (Lahontan RWQCB 2005, and prior permit files). Marina water samples consistently exceeded the 1.0-NTU turbidity level between 1993 and 1997. Total nitrogen exceeded 0.15 mg/L for all samples between 1993 and 1997 except in July 1997. Total phosphorus exceeded 0.01 mg/L in all samples between 1993 and 1997, except July 1995; July, August, and September 1996; and June 1997. Hydrocarbon and other contaminant detections have occasionally occurred, but nondetectible results were common by 2004. Routine sampling of the marina water was discontinued and is not required under the present permit (GA 09S0122415).

There has been monitoring of stormwater runoff from the commercial/industrial portions of the TKM facilities, and reporting of any spills or incidents. The present TKM SWPPP requires stormwater/nonstormwater observations and sampling in the marina parking, storage, and maintenance areas (Tyler, pers. comm., 2008). Review of SWPPP monitoring reports indicates that no stormwater releases were sampled because no release

events were reported during daylight hours and/or no events exceeded the installed BMP capacities. Only one spill was reported between 2002 and 2007. The spill was on April 10, 2007, and consisted of three–five gallons of hydraulic oil that was contained and cleaned up.

Water and sediment in the marina have also been sampled in association with permitted maintenance dredging, most recently in 2002 (WDID 6A098805007). The 2002 dredging included excavation in the East Channel and the approach channel in the lake. During dredging, dewatering fluids were discharged to a portion of the study area south of East Venice Drive (Conservancy Parcel Assessor's Parcel Number 22-210-37). Water discharged to the Upper Truckee meadow was required to have less than 20 NTU turbidity and nutrient levels less than 0.1 mg/L total phosphorus (TP) and less than 0.5 total nitrogen (TN). Water sampled on September 23, 2002, had turbidity of 17.6 NTU in the river and 2.0 NTU in the TKM channel, while the lake turbidity was 0.31 NTU. TN exceeded 0.15 mg/L in the TKM channel (0.2 mg/L) and in the river (0.26 mg/L), while the lake had TN of 0.14 mg/L. Total phosphorus exceeded 0.1 mg/L in the river (0.019 mg/L) and the lake (0.014 mg/L), and was highest in the TKM channel (0.024 mg/L). No volatile organic compounds (VOCs) or polycyclic aromatic hydrocarbons (PAHs) were detected in the river or the TKM channel water, but 0.03 part per billion (ppb) naphthalene (a PAH) was detected in the lake.

Tahoe Keys Sediment and Organics

In addition to water samples, sediment from the TKM channel and the lake nearshore were also tested in September 2002 and the results were reported as part of the dredging permit monitoring data. The sediment samples had much greater concentrations of TN and total phosphorus than water samples, reflecting the propensity of these materials to attach to sediment particles. The TKM channel sediment concentrations of nutrients (57 mg/L TN and 150 mg/L TP) were much less than the concentrations in lake sediments (560 mg/L TN and 310 mg/L TP). One of the TKM channel sediment samples contained 30 ppb acetone (a VOC), while no VOCs were detected in the lake sediments. Both the lake and the TKM channel sediments had some detectable PAHs, but the TKM channel had more species present (about ten) and for the PAH species detected in both locations, the concentrations were greater in the channel than in the lake.

In addition to these recent studies, sediment and interstitial water of the channel versus lake sediments were also analyzed by the University of California, Davis Tahoe Research Group in 1995 (TRPA 2002b). The 1995 study found nutrient levels in sediment interstitial water to be much greater in the marina (lagoon) than in the lake or in beach sediment (which was sampled at Valhalla Beach), and the nutrients were in more biologically available forms. However, the 1995 study found the marina and east channel sediments to be "unpolluted" with respect to either heavy metals or oil and grease. In addition to the presence of PAHs, it is possible that aluminum (Al)-contaminated sediments occur in the TKM as residual from apparently heavy application of aluminum sulfate during initial dredging of the keys.

Tributary Streams

There are 63 perennial streams tributary to Lake Tahoe and 54 intervening areas (without stream channels) that contribute runoff to Lake Tahoe (Tetra Tech 2007:3). The streams in the study area are the largest (Upper Truckee River) and third largest (Trout Creek) tributaries to the lake. Stream water quality sampling on major Lake Tahoe tributaries has been conducted since 1980, including sampling stations on the Upper Truckee River and Trout Creek near U.S. 50. Data collected at these stations indicate the water quality of streamflow entering the study area.

Average annual nutrient and suspended sediment sampling results for the two streams for water years (WYs) 1980 to 2005 and their relation to TRPA threshold standards are shown in Exhibits 3.9-10 to 3.9-13.

Nutrient concentrations in the Upper Truckee River and Trout Creek often exceed Basin Plan objectives and TRPA threshold criteria. Average annual total phosphorus concentrations in both the Upper Truckee River and Trout Creek exceeded the Basin Plan objective of 0.015 mg/L in all years and exceeded the TRPA threshold

criteria of 0.03 mg/L in about two-thirds of the years (Exhibit 3.9-10). Average annual TN concentrations exceeded the Basin Plan objective of 0.19 mg/L in 59 percent of the years on Trout Creek and in 76 percent of the years on the Upper Truckee River (Exhibit 3.9-11). The TRPA total nitrogen standard of 0.22 mg/L was exceeded in 53 percent of the years on Trout Creek and in 41 percent of the years on the Upper Truckee River (Exhibit 3.9-11). The total iron concentrations in both the Upper Truckee River and Trout Creek have only been sampled since WY 1989, but consistently exceeded the Basin Plan objective and TRPA standard of 0.03 mg/L (Exhibit 3.9-12), perhaps because of high natural background levels. The average annual total suspended sediment concentrations on Trout Creek did not exceed the TRPA standard of 60 mg/L, and only one year on the Upper Truckee River exceeded the standard (Exhibit 3.9-13).

An evaluation of median suspended sediment concentrations of the 10 largest tributaries to Lake Tahoe from 1993 to 1998 indicated that the Upper Truckee River and Trout Creek at U.S. 50 ranked sixth and fifth, respectively (Rowe et al. 2002:94). During this period, the minimum concentration of suspended sediment in the Upper Truckee was 1 mg/L, the maximum was 458 mg/L, and the median was 16 mg/L. During this same time, the minimum concentration of suspended sediment in Trout Creek was 2 mg/L, the maximum was 335 mg/L, and the median was 14 mg/L.

Although average suspended sediment concentrations in the Upper Truckee River and Trout Creek do not usually exceed water quality standards, these streams contribute much greater suspended sediment loads than any other tributary to Lake Tahoe because of their large flow volumes. Suspended sediment loading becomes more substantial with the evidence that a substantial portion of phosphorus enters Lake Tahoe as particulate phosphorus adsorbed to the sediment (Reuter and Miller 2000).

Monthly suspended sediment loads on the Upper Truckee River demonstrate, as expected, year-to-year variations that generally track precipitation and overall streamflow volume variations (Rowe et al. 2002:114). Annual suspended sediment loads on the Upper Truckee River and Trout Creek for all years of record since 1960 (using the sediment rating curves from Simon et al. 2003 and Simon 2006) also display a wide range of values. The lower estimated sediment loads are generally under 1,000 Tons/year (T/year) during drought years on the Upper Truckee River and about a third of the years on Trout Creek. The high end of the range, about 8,000 T/year or more, occurred during wet years: WY 1983 on both streams and during WY 1997 on the Upper Truckee River. Various estimates of average suspended-sediment loads for the Upper Truckee River and Trout Creek have been calculated by different studies for different data periods (Table 3.9-9), all within the same order of magnitude.

Table 3.9-9
Published Average Suspended Sediment Loads (metric tons per year) for Upper Truckee River and Trout Creek from Measured Data

Water Years	Reuter and Miller 2000 (Total Annual Average)	Kroll 1976 (Average Annual Load)	Simon and others 2003 (Average Annual Load)	Simon and others 2003 (Median Annual)
	1989–1996	1972–1974	1972–2002	1972–2002
Trout Creek	798	1,540	1,790	1,190
Upper Truckee River	3,305	3,900	2,850	2,200

Source: Simon et al. 2003

Because of the importance of fine suspended sediment to lake clarity, estimates of fine sediment loads have also been made. Simon (2006) calculated fine (less than 0.063 mm) sediment loads (metric tons per year [MT/yr]) from mean daily flow data using the sediment-rating relations developed in Simon et al. (2003). He also estimated the number (flux in n/year where n = number of particles) and proportion of fine particles (fine particles defined as less than 0.02 mm distinguished from fine sediment defined as less than 0.063 mm) using relations between the sediment mass and particle numbers established by Rabidoux (2005).

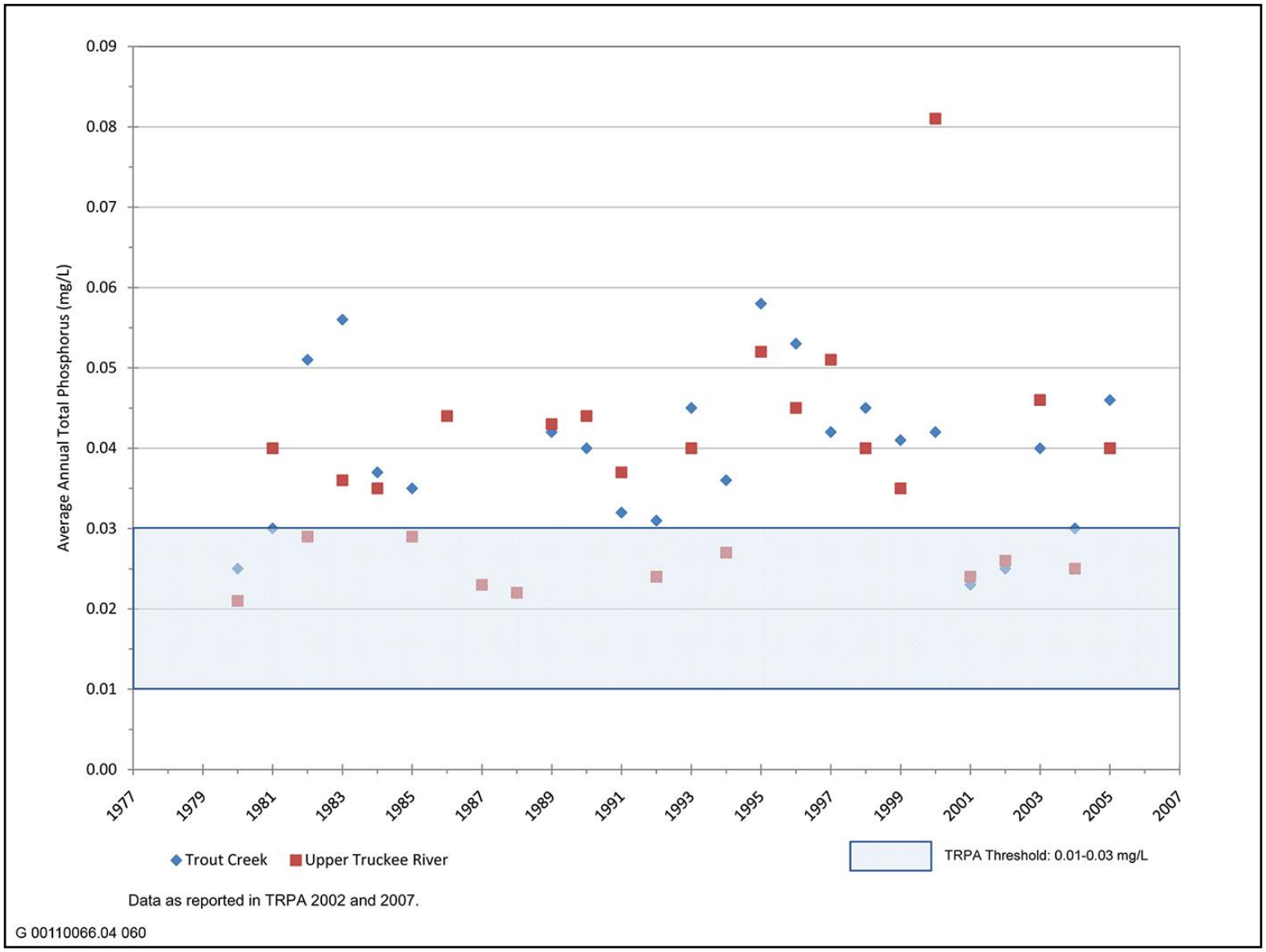


Exhibit 3.9-10 **Average Annual Total Phosphorus Concentrations (mg/L) in the Upper Truckee River and Trout Creek (Water Years 1980–2005)**

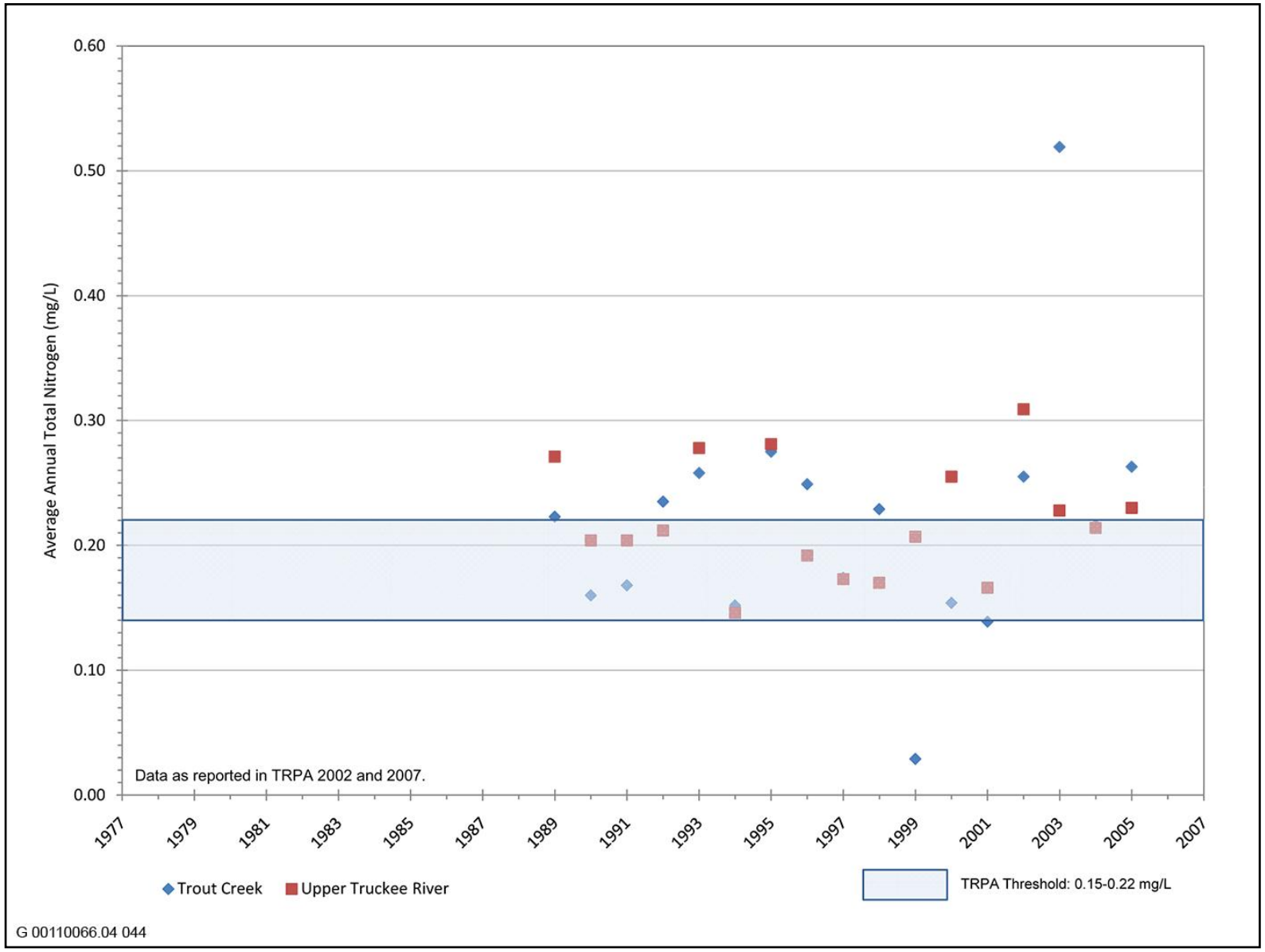


Exhibit 3.9-11 **Average Annual Total Nitrogen Concentrations (mg/L) in the Upper Truckee River and Trout Creek (Water Years 1980–2005)**

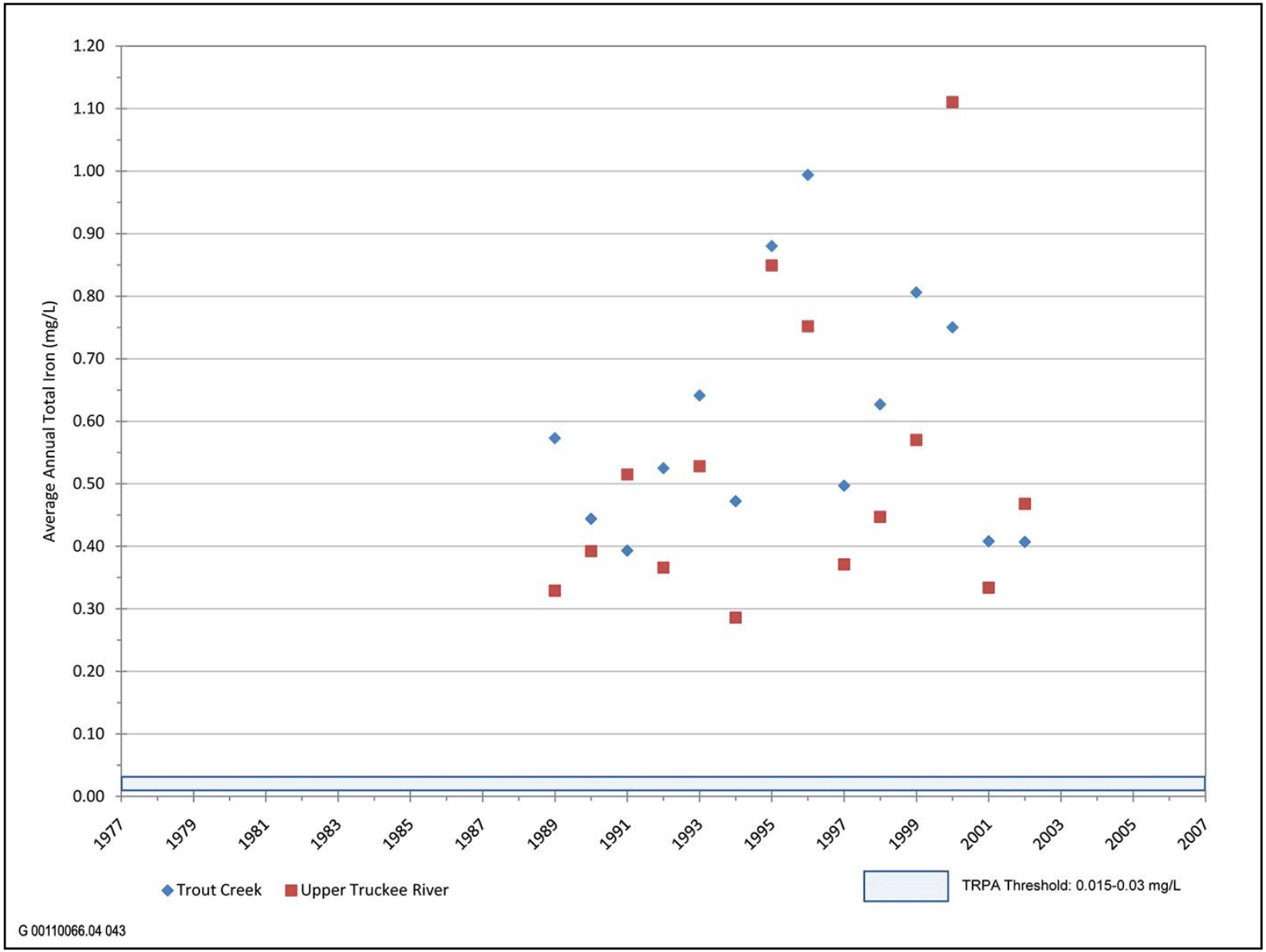


Exhibit 3.9-12 Average Annual Total Iron Concentrations (mg/L) in the Upper Truckee River and Trout Creek (Water Years 1989–2005)

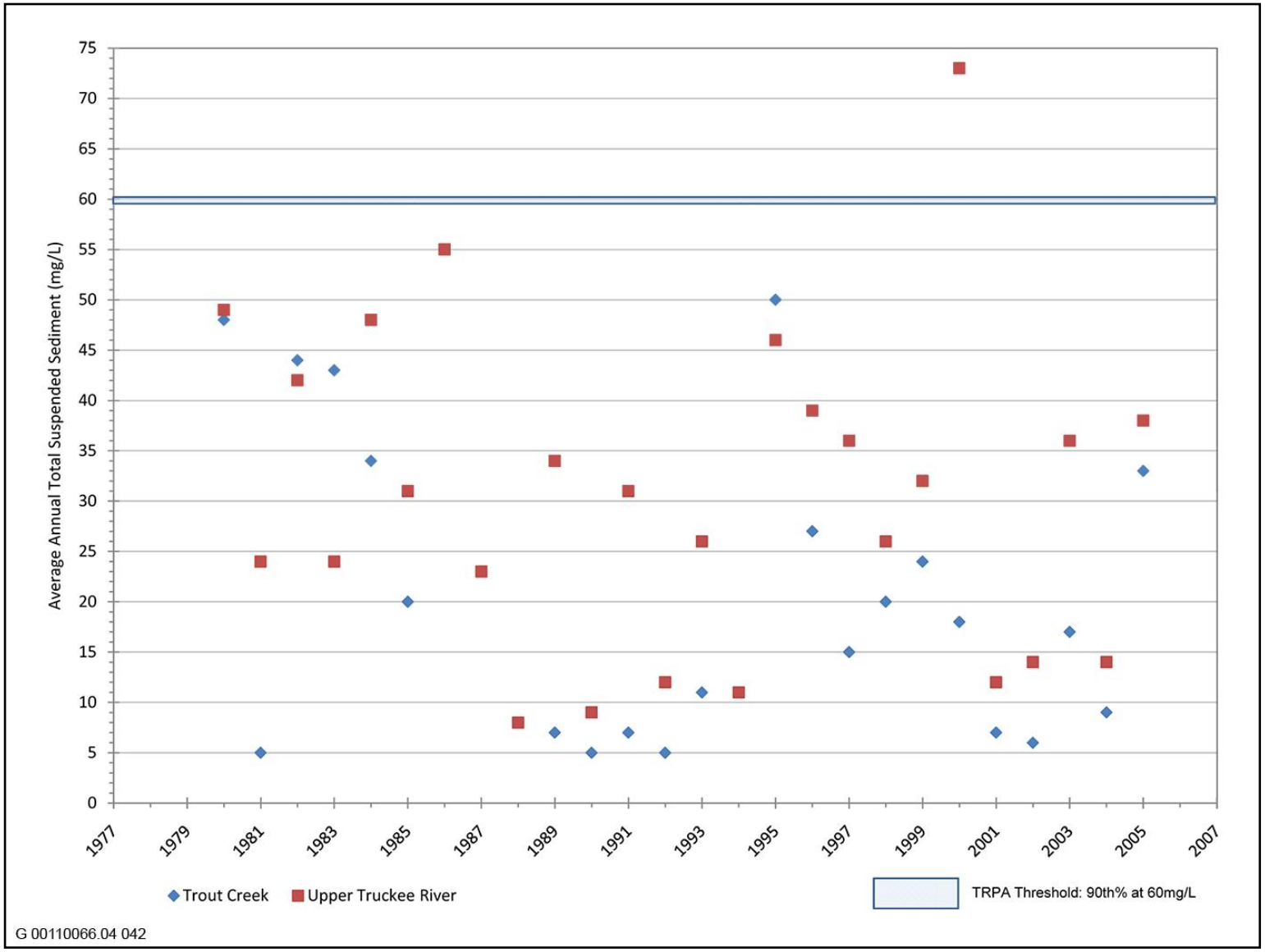


Exhibit 3.9-13 **Average Annual Total Suspended Sediment Concentrations (mg/L) in the Upper Truckee River and Trout Creek (Water Years 1980–2005)**

The calculated annual load of fine (less than 0.063 mm) sediment for the Upper Truckee River is 1,010 MT/yr and 462 MT/yr for Trout Creek (or 19.4 and 8.9 percent of the total annual suspended load for the streams, respectively) (Simon 2006:24). The Upper Truckee River fine sediment load and fine particle flux are the highest of all tributaries in the Tahoe Basin, and Trout Creek ranks third and fourth for sediment load and fine particle flux, respectively (Simon 2006:24). While the suspended sediment yields (per unit watershed area) estimated for the Upper Truckee River (6.0 tons per year per square mile) and Trout Creek (4.8 tons per year per square mile) are "moderate" relative to other watersheds at Lake Tahoe, the sheer size of these two watersheds increases their loading to the lake (Simon et al. 2003:ES-1). Rowe et al. (2004) found that the seasonal pattern of sediment loading generally follows runoff variability. The highest seasonal median loads for the Upper Truckee River occur during snowmelt months of April, May, and June, as for suspended sediment. The largest median monthly loads for all measured constituents occurred in May. The lowest seasonal loads occurred in summer (July, August, and September) with the lowest monthly loads usually in August, September, or October (Rowe et al. 2002:115).

Statistical analysis has been conducted to look at trends over time in suspended sediment and other constituents (Rowe et al. 2002, Simon et al. 2003). Simon et al. (2003) identified a possible decreasing trend in annual total and fine-grained sediment loads on the Upper Truckee River while Trout Creek had no trend. The trend for the Upper Truckee River may indicate long-term watershed recovery from past disturbances (Simon et al. 2003:7-4).

Shifts in the suspended sediment rating curves also highlight changes over the period of record. Sediment loads on the Upper Truckee River first increased during the period 1983 to 1992 and then decreased from 1993 to 2002 to values lower than recorded for 1972 to 1982 (Simon et al. 2003:3-31). Short-term analysis of suspended sediment data from before and after the 1997 flood event showed a statistically significant decrease in the rating curve after the flood event (Simon et al. 2003:3-14). The decrease resulted from flushing of readily available sediment from the channel system by the major flood event.

Floodplain Deposition

Soil cores within the Upper Truckee Marsh have been analyzed and age dated to identify sedimentation processes and rates over the past few thousand years (Winter 2003:64-65). The age of the sediments at the base of the dated cores ranged from 1,650 ± 50 to 4,620 ± 40 years before present (BP). Average mass sedimentation rates during the last 50 years (0.6 gram per square centimeter per year [$g/cm^2/yr$]) are an order of magnitude greater than for the rest of the period recorded by these cores (0.05 $g/cm^2/yr$) (Winter 2003:86). These data indicate that the modern marsh surface is accumulating and retaining sediment, despite channel deepening and widening that has reduced floodplain connectivity, especially on the Upper Truckee River. However, even these relatively high sediment retention rates represent a very small percentage of the modern sediment load being transported by the streams and surface runoff. Winter (2003) estimated that less than five percent of the average annual suspended sediment transported to the Upper Truckee Marsh is retained. Most suspended sediment continues to be delivered to the lake.

While most of the sediment retained on the floodplain represented deposition of suspended sediment, sedimentation of bedload (i.e., coarser sediments) occurred in one area along the west branch of Trout Creek near the middle of the marsh (Winter 2003:79). The other location with modern bedload sedimentation was not on the floodplain, but at the mouth of the Upper Truckee River (which may receive bedload from both streams) (Winter 2003:79). This indicates that bedload is able to be conveyed through the study area to the lake, although some net retention of bedload occurs in the middle marsh and at the river mouth.

Observations at the study area during the 2003 snowmelt season documented modern patterns and amounts of suspended sediment and total phosphorus retention within the Upper Truckee Marsh (Stubblefield et al. 2006). Using sediment budgets constructed from turbidity, suspended sediment correlations, and discharge data at seven sampling stations within the study area, Stubblefield et al. (2006) describe and compare water quality impacts of Trout Creek versus Upper Truckee River, and floodplain versus marsh portions of the study area. The Trout Creek system retained 68–90 percent of the suspended sediment and 61–85 percent of the total phosphorus (Stubblefield

et al. 2006:296). The Upper Truckee River system retained only 26 percent of the suspended sediment and 24 percent of the total phosphorus (Stubblefield et al. 2006:296). Streambank erosion was observed along the Upper Truckee River within the study area during 2003, so streambanks were a net source of sediment during part of the study period (although moderate sediment retention occurred overall, as stated above). The greatest retention was in the marsh reaches in areas of distributary channels and/or ponding (Stubblefield et al. 2006:297). Ponding increased the spreading of water across the floodplain. As water depths and floodplain connection increased later in the runoff season, sediment retention on the floodplain increased. Sedimentation in the marsh reach of Trout Creek retained all particle sizes measured (1–1,000 µm), even fine particles less than 10 µm (Stubblefield et al. 2006:298). The 2003 mass sedimentation rate (approximately 0.029 g/cm^2/year) observed by Stubblefield et al. (2006) was only about five percent of the rate measured for soil cores over the past 50 years (approximately 0.6 g/cm^2/year) (Winter 2003:86). However, the rate is similar to the modern period average (0.027 g/cm^2/year) measured in lake cores (Heyvaert 1998; see Table 3.9-8 above). Notably, WY 2003 did not include large or sustained periods of overbank flow. The variations in the rate suggest that floodplain sedimentation from large flood events is probably important in the overall net accumulation under existing conditions.

Lake and River Interaction

Limited information is available regarding the mixing of lake and river water in the adjacent nearshore or within the study area. The mixing pattern and depth of river inflow and lake water is affected by temperature, density, and streamflow (Perez-Losada and Schladow 2004). Additionally, the depth at which river water enters the main lake body can potentially have a substantial influence on lake clarity (CWB and NDEP 2007:3-21). Taylor et al. (2004) documented seasonal differences in the extent of mixing of river and lake waters and the size of high-turbidity plumes in the lake. During winter (January 2003), the river inflow was colder than the surface of the lake, and formed a plume of cold, turbid water that plunged to depth because it was denser than the lake surface water. During spring (June 2003), the river inflow was warmer than the surface of the lake, and formed a broad plume of warm, turbid water that did not mix readily because it floated on top of the relatively colder and denser lake water. The river inflow and lake water interactions in the nearshore are controlled primarily by factors not affected by conditions in the study area.

However, the study area's geomorphic and topographic conditions do affect mixing of river and lake water within the study area. The riverbed and portions of the marsh and lagoon are several feet below median lake elevation and the gradient of the river channel is very low. Therefore, water from the lake may penetrate for nearly 1 mile upstream (Exhibit 3.9-2) during periods of elevated lake levels. The enlarged, straightened channel of the Upper Truckee River becomes an arm of the lake with low velocities that favor deposition on the channel bed when the lake is high (Stubblefield et al. 2006:298). However, the material deposited on the channel bed is not stabilized by vegetation compared to deposition on a floodplain (Stubblefield et al. 2006:298). When lake level is lower, the river mobilizes materials deposited on the channel bed, and delivers these materials to the lake. The extensive lake backwater does raise water surface elevations in the channel and slightly "improves" the potential for overbanking onto the floodplain.

The effect of elevated sediment (and associated nutrient) loading is particularly adverse within the littoral zone of Lake Tahoe. Generally defined by TRPA as extending to a depth in the lake of 100 feet, the relatively shallow conditions of the littoral zone allow for the penetration of sunlight for productive aquatic plant growth. Increased turbidity and algal growth promoted by sediment and nutrient loading inhibits light penetration and the growth of aquatic plants that provide a food source and habitat for fish and other organisms.

Urban Runoff

The east, south, and west sides of the study area adjoin areas of urban development. Stormwater runoff is directed from these local neighborhoods to several outfalls that enter the study area along its meadow and forest margins. In a few locations, stormwater outfalls discharge directly to the stream channels.

Constituents of concern in urban runoff include sediment, nutrients, petroleum products, pesticides, heavy metals, organic matter, and coliform bacteria. Toxic "priority pollutants" in urban runoff include lead, zinc, copper, arsenic, chromium, cadmium, nickel, cyanide, and asbestos (Lahontan RWQCB 1995). Deicing chemicals used in these areas and "sanding" operations used on highways in the winter are also a major concern for water quality in the Lake Tahoe/Truckee region.

Between 1986 and 1989, the Lahontan RWQCB sampled urban runoff on six sites in South Lake Tahoe for total nitrogen, total phosphorus, total iron, and turbidity (TRPA 2002a). Samples collected exceeded state standards for all constituents on several occasions, with the highest concentrations occurring in late spring through late summer. TRPA monitored untreated urban runoff discharge at 10 culvert outlets to Lake Tahoe from 1991 to 1995. Approximately 80 percent of the samples exceeded TRPA and state water quality standards.

Runoff from uplands with urban land uses has been identified as producing the largest fine sediment particle load to Lake Tahoe (348 x 10^{18} particles/yr), the highest total phosphorus load (18 MT/yr), and the second largest TN load (63 MT/yr) of the major source categories in the Lake Tahoe TMDL (CWB and NDEP 2007:4-165). Stormwater runoff from urban areas has substantial pollutant concentrations (Hevyaert et al. 2006) and higher volumes and peak flows than undeveloped areas. Monitoring around Lake Tahoe during 2003–2004 was used to determine event mean concentrations for runoff from several urban land uses (Gunter 2005, Heyvaert et al. 2006) as input to recent TMDL modeling. Some of the land use categories developed for the TMDL are representative of land use in and immediately surrounding the study area (Table 3.9-10). These event mean concentrations provide an indication of the existing water quality of untreated urban runoff that enters the study area. No on-site monitoring data are available.

Table 3.9-10
Derived Event Mean Concentrations (mg/L) of Sediment and Key Nutrients Associated with Selected Land Use Types

Land Use Type	Constituent[1] as mg/L				
	TN	DN	TP	DP	TSS
Residential Single Family Pervious	1.752	0.144	0.468	0.144	56
Residential Multifamily Pervious	2.844	0.42	0.588	0.144	150
Commercial/Institutional/Communications/Utilities (CICU) Pervious	2.472	0.293	0.702	0.078	296
Vegetated Turf	4.876	0.487	1.5	0.263	12
Residential Single Family Impervious	1.752	0.144	0.468	0.144	56
Residential Multiple Family Impervious	2.844	0.420	0.588	0.144	150
CICU Impervious	2.472	0.294	0.702	0.078	296
Roads Primary	3.924	0.72	1.98	0.096	952
Roads Secondary	2.844	0.42	0.588	0.144	150

Notes:
[1] DN = dissolved nitrogen, DP = dissolved phosphorus, mg/L = milligrams per liter, TN = total nitrogen, TP = total phosphorus, TSS = total suspended solids
Source CWB and NDEP 2007

Other On-site Water Quality Data

The Lahontan RWQCB collected water quality data from 12 sampling sites on the Upper Truckee River and Trout Creek (2000 to 2002), including up to six sites within the site (Conservancy 2003:12-17). The primary purpose was to determine fecal coliform concentrations in areas heavily utilized by domestic animals (primarily cattle) and

wild animals. In general, fecal coliform was greatest during mid-summer (July and August), with no apparent trend with downstream position (Conservancy 2003:12-19). In 2000, fecal coliform concentrations varied widely by location and by month. For example, September average values for all sites ranged from 4.6 Most Probable Number (MPN)/100 milliliters (mL) to 767 MPN/100 mL. From June to August, the average values at one site ranged from 12.3 MPN/100 mL to 692 MPN/100 mL. During the 2001 and 2002 sampling periods, maximum fecal coliform concentrations were much less (13–95 MPN/100 mL, respectively) than during the 2000 sampling period (36–950 MPN/100 mL), possibly due to reduced grazing activity since 2000.

The Lahontan RWQCB also collected baseline nitrogen and phosphorus data in August and October 2000. Total phosphorus concentrations ranged from 0.019 to 0.042 mg/L, and consistently exceeded the water quality objective of 0.015 mg/L (Conservancy 2003:12-22). Total nitrogen analysis was not performed, but concentrations of nitrate-nitrite (as nitrogen) ranged from 0.02.6 to 0.044 mg/L (Conservancy 2003:12-22).

As part of Winter's (2003) marsh research project, five stations located in the study area (four on the Upper Truckee River and one on Trout Creek) were sampled in spring and summer 2001 for pH, conductivity, total Kjeldahl nitrogen (TKN), ammonia (as N), nitrate (as N), soluble phosphorus, TP, and carbon. Results from the analysis suggest that low nutrient levels occur during spring (Conservancy 2003:12-18).

Groundwater

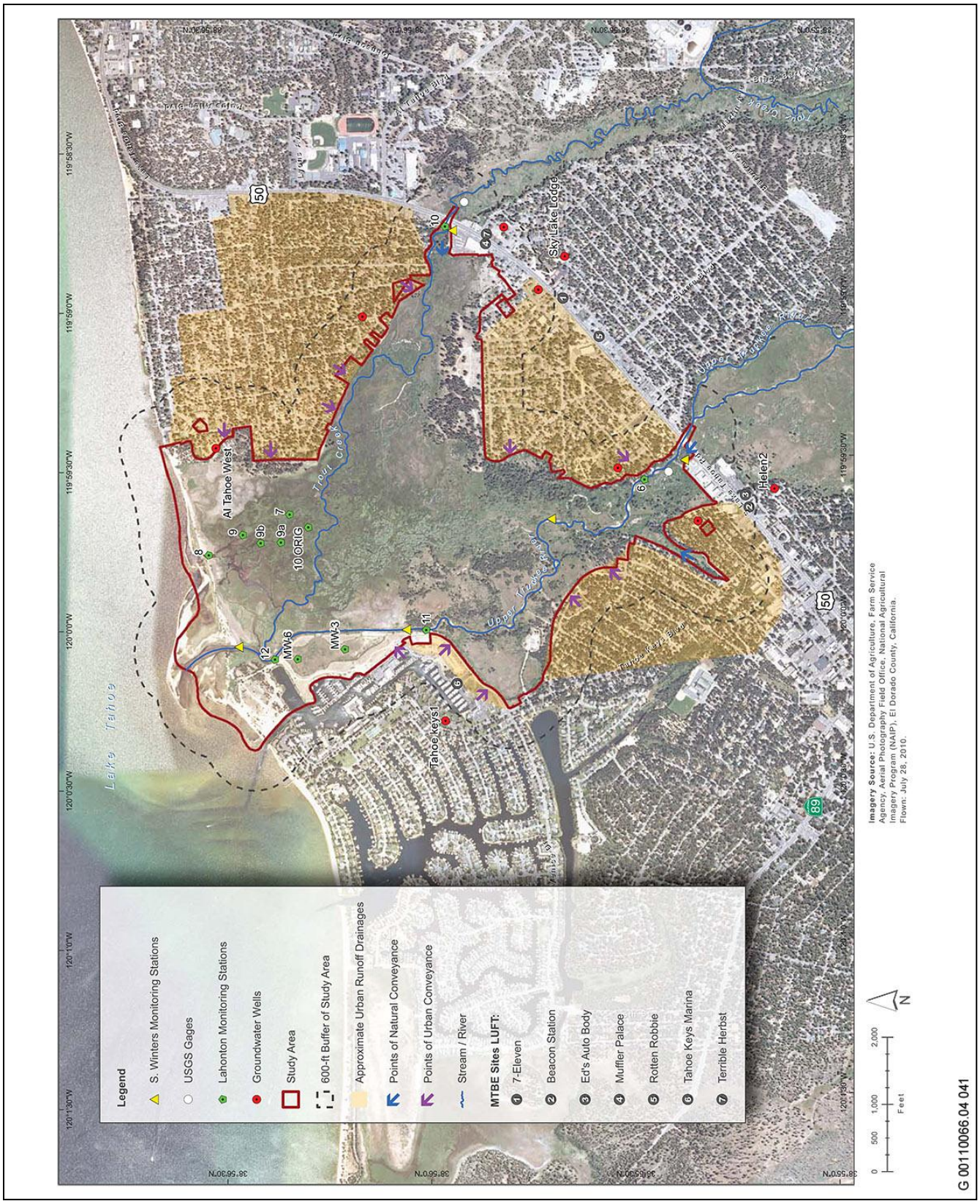
Groundwater, and the constituents contained therein, can enter the study area via underground flow from adjacent areas. Groundwater inputs include percolation from surface water, groundwater discharge to Upper Truckee River and Trout Creek stream channel beds and banks. There are also groundwater interactions with Lake Tahoe. Generally, groundwater flows from the study area toward the lake. However, a narrow zone of the study area near the lake may have net subsurface flow from the lake for short periods of time of elevated lake levels.

Groundwater Nutrients

Groundwater has been identified as a relatively large source of the TN load (50 MT/yr) to the lake and a relatively minor source of total phosphorus load (7 MT/yr) to the lake, but is assumed not to be a source of fine sediment particles (CWB and NDEP 2007:4-165). Groundwater loading to the lake from groundwater Subregion 3 on the south shore (which includes the study area) was estimated to be just 0.04 percent of the total dissolved N load and 0.6 percent of the total dissolved P load (USACE 2003:4-42). The study area is within a zone of limited groundwater discharge to the lake due to the low groundwater gradients and the impacts of groundwater pumping.

Groundwater quality data have not been collected in the study area, but Loeb (1987), Rowe and Allander (2000), and the U.S. Geological Survey have sampled groundwater quality at four wells (Al Tahoe West, Sky Lake Lodge, Helen 2, and Tahoe Keys 1 wells) surrounding the study area (Exhibit 3.9-14). These wells may have groundwater quality similar to the study area because they are close to the site and up gradient. The groundwater data collected in these studies are discussed further in the *Upper Truckee River and Marsh Restoration Project Processes and Functions of the Upper Truckee Marsh* report (Conservancy 2003:Chapter 2).

Groundwater studies in the Upper Truckee River and Trout Creek watersheds have noted generally increasing nutrient concentrations down valley in the direction of regional groundwater flow (Rowe and Allander 2000:36). Some seasonal effects have also been observed, such as lower groundwater phosphorus concentrations in the fall than in the summer (Rowe and Allander 2000:36). Studies of the potential impact of stormwater infiltration basins on groundwater quality found that, while typical urban stormwater poses little risk of migrating hydrophobic hydrocarbons, a nitrate plume into shallow groundwater may occur during spring snowmelt at some of their sampling sites (2nd Nature 2006a:19).



Source: CardnoENTRIX 2011

Exhibit 3.9-14 **Surface Water and Groundwater Inflows to the Study Area and Water Quality Monitoring Locations**

Groundwater Contaminants

Several sites that had methyl tertiary butyl ether (MTBE) groundwater contamination from leaking underground fuel tanks occur within a half mile of the study area (Exhibit 3.9-14). It is unknown whether MTBE is present within the study area, and none of the surrounding contaminated sites are close to the proposed ground disturbance areas.

3.9.2 ENVIRONMENTAL CONSEQUENCES

SIGNIFICANCE CRITERIA

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; the TRPA Initial Environmental Checklist; factual information; scientific data; and regulatory standards of federal, state, and local agencies. In development of mitigation measures for significant impacts of the project, effects on environmental thresholds of the Tahoe Regional Planning Compact were considered. The project's effects on thresholds are further described in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities."

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to geomorphology or water quality if it would:

- violate any water quality standards (CEQA 1),
- create or contribute to runoff water that would include substantial additional sources of polluted water (CEQA 2), or
- otherwise substantially degrade surface water or groundwater quality (CEQA 3).

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis. NEPA requires documentation and discussion of any beneficial effects of a project in addition to its negative impacts. Where appropriate, these beneficial effects are discussed and called out specifically for the purposes of NEPA in the following impact analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative would result in a significant impact on geomorphology and water quality if it would:

- result in continuation of or increase in wind or water erosion of soils (TRPA 1);
- create changes in deposition or erosion of beach sand, or changes in siltation, deposition, or erosion, including natural littoral processes, that may modify the channel of a river or stream or the bed of a lake (TRPA 2);
- result in discharge into surface waters or in any alteration of surface water quality, including temperature, dissolved oxygen, or turbidity (TRPA 3);

- result in the potential discharge of contaminants to the groundwater or any alteration of groundwater quality (TRPA 4); or
- result in an effect on drinking water sources located within 600 feet of the project (TRPA 5).

METHODS AND ASSUMPTIONS

The impact analysis has been completed using a combination of quantitative and qualitative methods performed by a hydrologist/geomorphologist and civil engineer experienced in river restoration in general and the Tahoe Basin environment specifically. Information for the project site and vicinity and professional experience on similar projects have been referenced and incorporated into the analysis of the river system history, existing conditions, likely future conditions, and conditions expected under each action alternative.

Climate change effects on future geomorphology and water quality are incorporated in the No Project/No Action Alternatives evaluation. However, even the most geographically and temporally focused available forecasts of climate change effects on hydrologic parameters (Tetra Tech 2007) have relatively large variability and substantial uncertainty. Due to this variability and uncertainty, a range of climate change scenarios, not just end members or a midline scenario, are considered. Depending on the scenario, the statements are expressed in only qualitative terms.

The impact analysis examines the effects of each alternative over the short term and long term for each of the criteria listed above. Short-term effects are defined as those that would be temporary and could occur over hours, days, or weeks during the active construction phase. In addition, the river system is expected to undergo changes following construction as vegetation matures and the river reoccupies and adjusts to the restoration project, so the short-term analysis also looks at interim effects that might occur during the first few years following construction, assuming that streamflows are at least average, and also considers conditions if a large flood event (approximately 25-year peak flow) occurs within five years after construction.

Wherever federal, state, or local water quality standards applicable for the region must be attained and maintained pursuant to Article V(d) of the TRPA Compact (TRPA 2004), the strictest standards are used as the significance criteria for this project; therefore, the project effects must meet or exceed such water quality standards to earn a less-than-significant conclusion, recognizing that any violation of a water quality standard is considered a water quality impact without taking in account the extent and duration of that impact. Based on informal agency consultations during alternatives development and analysis, the Lahontan RWQCB's numeric and narrative water quality standards are the most stringent factors for significance determinations. Violation of any of the numeric water quality limits or narrative standards in the objectives of the Basin Plan (see Table 3.9-2 for examples), or actions inconsistent with the "nondegradation" objective, would result in a significant impact for this analysis. While it is possible that other water quality parameters could be affected by a project alternative, the "turbidity standard" (i.e., <10 percent above natural background) appears to be the most sensitive measure that is likely to be affected by potential construction in and along the river channel. The applicable limit is related to the Lahontan RWQCB's narrative turbidity standard for receiving waters in the Basin Plan, which states that "Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses. Increases in turbidity shall not exceed natural levels by more than 10 percent" (Lahontan RWQCB 1995:5.1-9).

Natural turbidity levels range widely by season with flow magnitudes and the availability of sediment to be entrained. Over the past several years, most turbidity sampling on the Upper Truckee River has been conducted via grab samples as part of volunteer monitoring or research programs, along with some sampling during construction activities. For example, a citizen's volunteer water quality monitoring event called Snapshot Day, held in May each year, typically includes sites on the Upper Truckee River: in Christmas Valley; one in the downstream end of the Middle Reach (Mosher property); and a couple of sites near the river's mouth. May 2002 samples had turbidity readings ranging from 0.12 NTU to 1.61 NTU (in the Mosher Reach). May 2003 samples had turbidity readings ranging from 0.3 NTU to 0.98 NTU (near the mouth). May 2005 samples had turbidity

readings ranging from 2.43 NTU (near the mouth, but above Trout Creek) to 3.47 NTU (Christmas Valley) (TRPA 2002c). Additional grab samples were collected at two sites on the Upper Truckee River and two sites on Angora Creek on four dates in 2008 (January, March, the May 10th snapshot day, and in July), but none were over 4.5 NTU (Sierra Nevada Alliance 2008).

During the summer of 2008, Upper Truckee River and Angora Creek were sampled at multiple stations on the same dates as part of a Tahoe-Baikal Institute program. The Upper Truckee River samples ranged from less than 1 NTU at Meyers and by the Elks Club to less than 1.5 NTU at U.S. 50/Lake Tahoe Boulevard. The Angora Creek samples ranged from less than 0.5 NTU at the headwaters (by Angora Lakes) to just over 1 NTU at View Circle and nearly 3 NTU near the confluence with the Upper Truckee River (Tahoe-Baikal Institute 2008). Restoration project–specific water quality compliance monitoring for the Upper Truckee River Reaches 3 and 4 during construction included numerous grab samples between July 21 and September 4, 2008, along with continuous monitoring from September 5 to October 7, 2008 (Taylor, pers. comm. 2010); none of the grab samples were over 4 NTU. Median values during continuous monitoring remained between 1 and 3 NTU both upstream and downstream of the construction site for the restoration project, although a few brief spikes exceeded 10 and even 100 NTU for 10- to 20-minute periods. The brief turbidity spikes were associated with miscellaneous background disturbance (by recreation users and animals) upstream of the construction, as well as potential construction-related effects at least on one date (Taylor, pers. comm., 2010; Conservancy 2008).

The only continuous turbidity monitoring that spans multiple seasons and locations on the Upper Truckee River was conducted by CSLT (2nd Nature 2006b). This monitoring included three sites along the Upper Truckee River beginning in April 2002 (for a partial water year) and throughout WYs 2003, 2004, and 2005. The background turbidity levels (between storm events) were generally under 15 NTU and often less than 10 NTU. Short duration peaks exceeded 100 NTU (and a few exceeded 500 NTU) in all years, but the season when peak values occurred was not consistent, ranging from the onset of fall rains to snowmelt season and brief summer storms.

Background turbidity levels on the Upper Truckee River are typically extremely low (i.e., less than 10 NTU), especially during summer construction season; therefore, very small changes from the natural state (an increase of <1 NTU) could result in a violation of the Basin Plan standard. Water with turbidity less than 10 NTU, and especially less than 5 NTU, generally appears clear to the naked eye. Thus, a potential violation in this range can be determined only with sensitive instrumentation that is appropriately deployed, calibrated, and maintained (USGS 2005: TBY-47). Additionally, the Basin Plan provides no narrative or numeric distinction regarding the season or duration of a turbidity increase to be considered detrimental, so an increase more than 10 percent over natural, of any duration, could be considered a violation of the standard as written in the Basin Plan.

Potential violations of the narrative turbidity standard at the low end of the NTU range, while considered a significant impact for CEQA/NEPA/TRPA analysis (as stated above), would not necessarily correspond to an adverse effect on Lahontan RWQCB–defined beneficial uses. For example, an effect on aesthetic values under the Non-Contact Recreation Use designation in the Basin Plan (Lahontan RWQCB 1995:2-2) is considered by the Lahontan RWQCB to be the first (i.e., most sensitive) indicator of an effect on beneficial uses (Kemper, pers. comm., 2010). If persistent visible turbidity from the project site were to occur—particularly during the summer recreation period when flows are low, recreation use is high, and background conditions would exhibit low turbidity (i.e., good background clarity)—this visible turbidity would potentially impair noncontact recreation beneficial uses. However, the turbidity values that would correlate with this impairment of aesthetics-related beneficial use might not occur unless turbidity was increased beyond natural seasonal background by several orders of magnitude (i.e., well beyond the <10 percent increase limit in the turbidity standard of the Basin Plan). Summer turbidity levels would also likely need to exceed the minimum aesthetic criterion to have adverse effects on other beneficial uses, including those supporting aquatic organisms. The project alternatives would have to elevate turbidity considerably above ten percent over background to impair beneficial uses; however, the stringent ten-percent-above-background turbidity standard is used as a significance threshold for this EIR/EIS/EIS because of the CEQA checklist question regarding violation of “any water quality standard.”

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Effects on Drinking Water Sources (CEQA 1, 3; TRPA 4, 5)—There are five groundwater supply wells within 600 feet of the study area boundary (Exhibit 3.9-14). These wells are sources of public and private drinking water. All of the wells are outside of construction/disturbance areas proposed by any of the alternatives and are located upgradient from affected areas. Therefore, there would be no substantial potential for disturbance of or contaminant releases to the wells. The effect of each project alternative (i.e., promotion of increased inundation of the floodplain) would be to generally increase recharge to the uppermost water-bearing zones; the project alternatives would not adversely affect groundwater supplies. Although the specific rates and quantities of increased recharge are not known and the effects would be generally low compared to other regional recharge effects, the potential for increased infiltration to groundwater supplies would be beneficial.

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.9-1 (Alt. 1) **Short-Term Risk of Surface Water and Groundwater Degradation during Construction. (CEQA 1, 2, 3; TRPA 1, 2, 3, 4, 5)** *Implementing Alternative 1 would involve substantial construction activities along or in the channel of the Upper Truckee River, sections of Trout Creek, along the Tahoe Keys Marina (Sailing Lagoon), and near the shoreline of Lake Tahoe. Although temporary BMPs would be implemented, short-term risks of water quality degradation could occur in each summer construction season or over the intervening winters. Grading would result in ground disturbance within sensitive lands and increase the potential for erosion and sediment transport. Accidental releases of hazardous materials or other pollutants could affect surface or subsurface waters. Implementing Alternative 1 could result in short-term turbidity exceeding the Basin Plan's stringent turbidity standard (10 percent above background levels). Although the Conservancy would implement Environmental Commitments 5 and 6 to protect water quality, this impact would be* ***significant****.*

Construction activities under Alternative 1 would include large-scale grading operations and construction of permanent facilities (a bridge, boardwalk, streambed and bank structures, and two self-service kiosks). Implementing Alternative 1 would require four years of seasonal construction (between May 1 and October 15), with winter closedowns except for BMP maintenance and monitoring. Construction would disturb areas in uplands, as well as in the active floodplain of the Upper Truckee River and Trout Creek and the main channel of the Upper Truckee River.

The extent of "in-channel" (i.e., area of channel that normally carries flows year-round) work would vary by year. Installing the new bridge and constructing grade controls, bank protection measures, and transitional connections between channel segments would require work in the active channel. Reconnection of meanders and construction of new meanders, portions of the floodplain reconstruction, and filling of abandoned river segments would be conducted "off-channel" (outside of the active channel). Nearly all of the disturbance areas, access routes, and staging areas would be within the 100-year floodplain. Using motorized construction equipment would require the use of fuels, lubricants, and other hazardous materials. If accidentally released (particularly during in-channel construction activities), these materials could potentially discharge to water bodies; pollutants released to the surface could migrate to groundwater.

As discussed in Chapter 5, "Compliance, Consultation, and Coordination" and in Environmental Commitment (EC) 6, "Obtain and Comply with Federal, State, Regional, and Local Permits" (Table 2-6), the project would acquire permits and approvals from several entities (e.g., El Dorado County, TRPA, the Lahontan RWQCB, USACE, and the CDFG). Those permits and approvals would impose conditions and requirements to minimize the risks of construction-related water quality degradation by sediment or other pollutants. The general types of permit documents and their components are known; however, the specific measures, performance standards, and enforcement elements would not be established until after selection of the project alternative and completion of

the project design. For purposes of this analysis, any violation of any duration and magnitude would be potentially significant within the strict thresholds necessary for CEQA compliance.

Exact erosion control measures (i.e., BMPs) and their performance standards have not yet been specified. However, general BMPs would include the use of construction fencing, silt fences, straw bales, temporary settling basins, vegetation protection, hydroseeding, and straw mulch to assure protection of water quality. To the extent feasible, these water quality protection measures would be designed to be redundant so that if one means of protection were to fail, a backup would be in place.

Construction activities that would occur within the existing streambed or streambanks (i.e., in-channel activities) would require temporary dewatering of surface water in the river channel. Dewatering also could be required if groundwater were to collect in active excavation areas. Conceptual approaches to dewatering have been identified for various elements of the Alternative 1 in-channel work, but specific measures have not yet been determined. The options for managing dewatered effluent would depend on seasonal conditions (including groundwater levels. lake levels, and storm/flow events). The most likely options for reusing the effluent would be either to irrigate the floodplain or to pump the effluent to containment areas on the floodplain. Direct discharges of effluent to the river or to Lake Tahoe would not be allowed unless water quality standards were met. If volumes were relatively low, the effluent would be pumped and used for irrigation. If volumes or rates of effluent generated were relatively high, temporary containment areas would be created. The effluent would be pumped into the containment areas and allowed to infiltrate and evaporate. The level of water in the containment areas would be monitored to minimize the potential for overtopping. If necessary, advanced filtration would be used to treat effluent to a standard that could be discharged back to surface water. The temporary containment areas could be removed at the end of each construction season.

Newly constructed channel segments would be protected from flows; these areas would be isolated by water-filled berms, earthen berms, and/or by other approved methods. Flow would not be diverted into the new channel for at least two years as the planted vegetation became sufficiently established (i.e., during channel "seasoning"). All disturbed areas to be reclaimed to natural habitat would be revegetated and irrigated appropriately. Although these precautions would reduce the potential for erosion before stabilization, the possibility of inundation during the stabilization period exists. The strict turbidity standard presented in Section 5.2 of the Basin Plan (i.e., turbidity that is ten percent above background levels) could be exceeded if these areas were inundated.

Based on the conceptual information regarding proposed construction management for Alternative 1, water quality standards may be violated, at least for short periods during each summer's activities and/or over each intervening winter and snowmelt season. The violations would be likely to occur because of the large scale of grading and construction activities that would occur adjacent to the Upper Truckee River channel and floodplain, and especially because of the close proximity of construction to the river mouth and Lake Tahoe. Efforts would be made to work as quickly as possible to move from initial disturbance through final revegetation throughout the study area, but disturbed areas likely would be exposed to winter conditions between summer construction seasons. Winterization protection would be needed throughout the construction zone, and possible overwinter use of staging, storage, or access areas has not yet been determined.

All temporary stormwater controls and/or overwinter flood flow protections would be designed and sized to meet typical regulatory requirements (e.g., 20-year rainstorm for stormwater, 50-year peak streamflow). They could be overwhelmed by a larger storm event if it were to occur during the construction period. However, the probability that an event of greater magnitude would occur during either the summer low-flow seasons or the intervening winters is low and such a larger event is not reasonably foreseeable.

In addition, the Basin Plan's strict turbidity standards would likely be exceeded during the initial stages of use of the new channel. Flushing flows would be released to clean the new channel before activation; however, these flushing flows would not be likely to create a condition in which the turbidity of the water would be less than 10 percent above background levels. Shortly after activation, turbidity levels are expected to return to upstream

background conditions. Despite efforts to minimize risks, these effects would likely result in a violation of the Basin Plan's turbidity standard.

However, the Conservancy would implement EC 5, "Prepare and Implement Effective Construction Site Management Plans to Minimize Risks of Water Quality Degradation and Impacts to Vegetation." The measures in EC 5 would prevent surface-water and/or groundwater degradation that could be of sufficient magnitude and duration to impair the Upper Truckee River's beneficial uses, including visible turbidity that could impair aesthetic values or affect other beneficial uses. This commitment would avoid environmental damage to the river and its beneficial uses. Impairment of beneficial uses would likely require considerably higher turbidity levels, orders of magnitude above the river's very low background levels. However, as mentioned previously, in accordance with CEQA thresholds, the significance conclusion for this environmental document is based on the potential to violate the Basin Plan's turbidity standard. Therefore, this impact would be **significant**.

All feasible measures to avoid, minimize, or mitigate this impact have already been incorporated into the design of Alternative 1. However, these measures would not be sufficient to fully mitigate the potential for at least short-term violations of the Basin Plan's stringent water quality standard for turbidity. Because the potential to exceed this stringent standard would remain, Impact 3.9-1 (Alt. 1) would be **significant and unavoidable**.

IMPACT 3.9-2 (Alt. 1) **Short-Term, Project-Related Risk of Surface Water Degradation Following Construction. (CEQA 1, 2, 3; TRPA 1, 2, 3, 4, 5)** *The biotechnical streambank treatments and other revegetated areas, such as the backfilled channel segments, of Alternative 1 could be vulnerable during a flood flow within the first few years following construction. Furthermore, some of the proposed treatments would prompt aggradation and could result in channel adjustment following construction. Therefore, implementing Alternative 1 could result in short-term exceedance of the Basin Plan's stringent turbidity standard (ten percent above background levels) after the construction phase. This impact would be* ***significant****.*

Construction activities under Alternative 1 would include construction of grade control structures to foster channel aggradation between RS 29+00 and RS 63+00. This alternative would rely on natural geomorphic processes to redistribute sediment and allow vegetation stabilization within that subreach following construction. These adjustments, while intended to achieve net deposition (aggradation), may include localized erosion and redistribution of channel sediment that induces turbidity.

Under Alternative 1, the new, geomorphically sized channel constructed between RS 63+00 and RS 93+00 and the small areas of inset floodplain in the upstream portion of the study area would be relatively susceptible to erosion (compared to the well-established, undisturbed vegetated surfaces) if a large flood were to occur within the first few years after construction. The risk of sediment mobilization may increase slightly if a major flood event were to occur before the vegetation could mature.

A possible risk of water quality degradation within the first few (approximately five) years after construction could arise from two potential mechanisms:

- expected natural channel adjustments in accordance with the project design and/or
- a large flood event (e.g., 25-year recurrence or greater) occurring in the first few years after construction.

A natural channel adjustment effect could occur where engineered designs were implemented. In particular, such adjustments would be expected as normal postconstruction channel dynamics for sites where the selected restoration design would not impose the final channel size, shape, or bed and bank materials directly during construction. At least a few (approximately three-five) years of expected channel adjustments would likely be needed for flows to approach or exceed the geomorphic design flow and reach equilibrium.

The potential magnitude and duration of water quality degradation would vary by the type and degree of channel adjustment, but the effects could violate the strict water quality standards outlined in Section 5.2 of the Basin Plan

(i.e., the stringent turbidity standard of 10 percent above background levels). Channel adjustments, in the form of streambed material sorting and/or net streambed or streambank erosion, could produce turbidity effects. The effects would be greatest at each specific site of adjustment in the study area and would dissipate after the end of each erosion event, but turbidity might be detectable and could extend to Lake Tahoe, at least for short periods. Most possible channel adjustments would normally be expected to occur during periods of high streamflow when the background turbidity levels are also high, which would reduce any project-specific contribution to turbidity.

Under Alternative 1, unexpectedly large flows could damage the active channel and/or backfilled channels, causing instability that could continue beyond the initial flood event or propagate over time to affect additional locations. This effect could also occur under existing conditions, and a flood flow of this same magnitude under existing conditions or the No Project/No Action Alternative would also produce streambed and streambank erosion that could mobilize some areas of the existing floodplain. However, implementing Alternative 1 would modify the specific locations, areal extent, and soil/vegetation conditions that would be exposed to the flows in the channel or across the reactivated floodplain. Localized increases in erosion and sedimentation could occur, potentially resulting in violations of narrative or numeric water quality standards, at least briefly.

Design and revegetation specifications would be implemented for all reactivated channels and floodplain areas with remnant channels to minimize the risk that accumulated fine sediments and/or organic materials would be mobilized during a large flood in the first few years after construction. Despite these efforts to minimize risks, the effects of a flood event could cause a violation of the Basin Plan's stringent turbidity standard (ten percent above background levels). For purposes of this analysis, any violation of any duration and magnitude would be significant, in strict compliance with the impact thresholds under CEQA. Therefore, this impact would be **significant**.

Mitigation Measure 3.9-2 (Alt. 1): Adaptively Manage Potential Flood Disturbance in the Interim Period after Construction.

The Conservancy will develop and implement an adaptive management plan focused on the short-term water quality degradation that could result within the first five years after construction. The plan will identify specific data collection and monitoring protocols, describe decision-making processes and authorities, and list thresholds for corrective actions. The performance criteria for the corrective actions will focus on preventing initial flood damage or turbidity effects from becoming persistent, recurring, or chronic, whether the corrective action is needed at the initial damage site or at other locations that could be affected by channel response to the initial damage.

Significance after Mitigation: With implementation of Mitigation Measure 3.9-2 (Alt. 1) as described above, the short-term risk of surface-water or groundwater degradation following construction would be minimized, because potential flood damage in the interim period after construction would be adaptively managed. However, the potential for at least short-term violations of the Basin Plan's stringent water quality standard for turbidity cannot be feasibly eliminated. Because of the potential to exceed this stringent standard, Impact 3.9-2 (Alt. 1) would be **significant and unavoidable**.

IMPACT 3.9-3 (Alt. 1) **Upper Truckee River Channel Erosion within the Study Area. (NEPA)** *Implementing Alternative 1 would involve making direct changes to the channel of the Upper Truckee River. The changes would offset past geomorphic responses to historic disturbances by reconstructing more appropriately sized channel sections with better connectivity to the existing floodplain and constructing features to promote channel aggradation and prevent streambank erosion. This would result in a substantial long-term benefit by improving channel stability and reducing erosion of the channel bed and banks. This impact would be* ***beneficial****.*

Alternative 1 would result in the development of about 3,900 feet of "geomorphically sized" channel (i.e., channel designed to accommodate existing hydrologic/hydraulic conditions and efficiently convey expected flows and sediment) (Exhibit 2-1). Under current conditions, approximately 500 feet of the existing channel is considered

geomorphically stable (Conservancy and DGS 2005:Table 5-1). The improvement in channel stability is expected to reduce the potential for lateral migration of the channel. Additionally, bank stabilization proposed on the right (east) bank of the river downstream of the U.S. 50 bridge would minimize the potential for continued erosion in this area.

Vertical stability of the channel would be provided under Alternative 1 by the installation of seven vertical grade controls in the channel between RS 14+00 and RS 64+00. These structures would serve as relative "hard points" across the channel, minimizing the potential for downcutting (incision) and possibly promoting localized deposition (aggradation). The alternative also proposes a bioengineered grade control structure near the river mouth (RS 95+00) to minimize the potential for incision of the design channel resulting from the response of the river to possible substantial and prolonged lowered lake levels.

Compilation of the TMDL streambank-erosion results (California Water Boards and NDEP 2008) for specific subreaches of the Upper Truckee River allows a quantitative estimate of the effect of the proposed alternatives on stream channel erosion (Table 3.9-11). Using the range of treatment tiers analyzed for the TMDL, the estimated reduction in fine sediment loads from streambank erosion in the study area under Alternative 1 would be nearly 60 percent (reduced to 221 cubic yards from 538 cubic yards under existing conditions and the No-Project/No-Action Alternative). The study area is a small portion of the entire 15-mile-long river, and the proposed action alternatives alone would reduce the entire Upper Truckee River's fine sediment load from streambanks by about 7 percent relative to existing conditions. While small, this would be a considerable and measurable benefit relative to the degraded existing condition or the No-Project/No-Action Alternative.

Table 3.9-11
Estimated Stream Channel Bank Erosion on the Upper Truckee River under Alternative 1

River Reach	Distance Upstream of Lake (feet)	Bank Erosion of Fine Sediment (cubic yards)[1]	
		Alternative 1	Alternative 5 (No-Project/No-Action)
Upper Truckee Marsh study area	0–9,646	221	538
TOTAL	**79,364**	**4,002**	**4,320**

Note:
[1] Fine sediment is less than 0.063 millimeter in diameter
Source: California Water Boards and NDEP 2007 (compiled for these subreaches in Appendix I).

Alternative 1 proposes changes to the channel and overbank morphology that may alter the hydraulics of the Upper Truckee River channel downstream of the U.S. 50 bridge. The alternative's design includes bank stabilization on the right (east) bank adjacent to and downstream of the bridge. Alternative 1 would involve lowering the terrace to expand the floodplain area on the west side of the river downstream of the existing pedestrian bridge (RS 05+00 to RS 11+00). Alternative 1 would improve direction of a portion of high flows into the secondary channel. The project has evaluated the impacts of these channel modifications on water surface elevations up- and downstream of the modified areas for the 5-year through 100-year flood events (and DGS 2005:Exhibits 4.7-1 and 4.7-5). The analysis indicates that the water surface elevations would remain unchanged relative to the existing conditions downstream of (and at) the existing bridges. Therefore, no change in the hydraulic conditions at the bridge is expected as a result of implementation of the alternative.

Alternative 1 includes features that would improve future protection of the bridge. The alternative would stabilize the high eroding right streambank downstream of the bridge (including through protection of slope vegetation and the slope toe). The stabilization would minimize future enlargement of eroded areas and protect the bridge from future erosion at the hazard. Potential hydraulic impacts related to the proposed pedestrian bridge at RM 10+00 are addressed in Impact 3.8-3 (Alt. 1) in Section 3.8, "Hydrology and Flooding."

This impact addresses long-term benefits associated with a net reduction of erosion. However, all stream restoration projects, particularly those that incorporate geomorphic process–based adjustments as part of the design elements, may experience localized channel erosion during an interim period following construction. The potential adverse water quality impacts of such adjustments (including unexpected changes or responses to flood disturbance) were described as a significant short-term impact above in Impact 3.9-2 (Alt. 1). The mitigation for that impact, Mitigation Measure 3.9-2 (Alt. 1), requires implementation of an adaptive management plan that commits to actions that would prevent short-term water quality problems from becoming chronic, thus ensuring that the long-term improvements to Upper Truckee River conditions expected under Impact 3.9-3 (Alt. 1) can be realized. This impact would be **beneficial**.

IMPACT 3.9-4 (Alt. 1) **Trout Creek Channel Erosion within the Study Area. (NEPA)** *Implementing Alternative 1 would not involve directly modifying the channel of Trout Creek. However, Trout Creek would be expected to adjust to the proposed changes to the elevation and size of the Upper Truckee River channel in the vicinity of the mouth of the creek. The anticipated response of Trout Creek would likely be deposition in the lowest reach, reducing the potential for continued incision that previously was prompted by historical dredging and lowering of the Upper Truckee River channel bed. This effect would be* ***beneficial****.*

Under Alternative 1, the channel of the Upper Truckee River through the marsh (Reach 3) would be modified by abandoning the existing straightened segment and constructing a new meandering channel (Exhibit 2-1). The new channel would be narrower and its bed would be raised compared to the existing channel. These modifications would include the confluence of the river with Trout Creek. The effect of raising the elevation of the Upper Truckee River channel and mouth would likely initiate deposition at the confluence and within the lower reach of the Trout Creek. The change would also reduce the potential for further incision (vertical erosion) of the creek. Overall, modifying the Upper Truckee River channel would either have a neutral effect or reduce the potential for erosion within Trout Creek.

No quantitative estimate of streambank erosion loads or load reduction potential along Trout Creek was made in studies for the TMDL (California Water Boards and NDEP 2008). However, based on geomorphic principles and qualitative analysis, Alternative 1 would not substantially change the amount of flow (and sediment) carried by Trout Creek's main channel and distributaries under normal or flood conditions. Although the modifications at the mouth may promote some localized deposition, the low-gradient environment of the lower reach of the creek would not be expected to be subject to substantial changes in lateral or vertical erosion. The effect on lower Trout Creek would be slightly beneficial relative to existing conditions, because of the potential for reduced erosion.

As described above for the Upper Truckee River in Impact 3.9-3 (Alt. 1), implementing mitigation to prevent adverse short-term water quality impacts from becoming chronic (Mitigation Measure 3.9-2 [Alt. 1]) would ensure that the long-term improvements to Trout Creek conditions expected under Impact 3.9-4 (Alt. 1) can be realized. This effect would be **beneficial**.

IMPACT 3.9-5 (Alt. 1) **Erosion of Backfilled and/or Remnant Channel Segments on the Floodplain. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 1 would involve backfilling portions of the existing Upper Truckee River to function as part of the active floodplain, and would increase the frequency with which existing remnant channel segments on the floodplain would be inundated. Following the project design details and specifications would prevent "recapture" of the backfilled channel or an increase in erosive force on remnant channel segments that could mobilize accumulated sediment and organic matter. This impact would be* ***less than significant****.*

Alternative 1 would abandon and backfill existing Upper Truckee River channel segments between RSs 17+00 and 29+00 and between RSs 63+00 and 93+00 (about 4,200 feet). The abandoned channels would be filled with floodplain sediments generated by construction of new channel segments, existing stockpiled sediments, and imported sediments (if necessary). Lateral grade controls would be installed upstream and downstream of the

proposed intersections of backfilled abandoned channels with the newly constructed channel segments. The lateral controls would be designed to resist erosion of the backfilled channels up to the 100-year flood event.

Alternative 1 may also incrementally increase the exposure of existing remnant (i.e., naturally abandoned) channel segments on the floodplain to flood flows. The remnant channels are discontinuous, curved depressions on the marsh surface that are partially filled with fine sediment and accumulated organic material. Alternative 1 would increase the area inundated during low-magnitude, high-frequency flow events (i.e., 2-year and 5-year flows), but would not substantially alter inundation in the area during high-magnitude events (i.e., 25-year flows or greater). The increased inundation from small floods might raise the potential for flow to enter remnant channel segments and possibly erode them more often, but these areas would be subject to erosion from larger floods under existing conditions. Additionally, the portion of the study area that would experience increased overbank inundation under Alternative 1 does not include well-defined remnant channels. Therefore, the potential risk of reoccupation and erosion of remnant channels under Alternative 1 would be small.

Following the project's proposed specifications for backfill areas would prevent uneven placement of backfill, differential compaction, or varied success of revegetation, which induce erosion of either the backfill or adjacent natural soil/sediment. Potential erosion along the backfilled abandoned channel segments would be reduced. This impact would be **less than significant**.

IMPACT 3.9-6 (Alt. 1) **Retention of Fine Sediment and Nutrients within the Study Area. (NEPA)** *Implementing Alternative 1 would directly reduce the Upper Truckee River's channel capacity and raise the streambed elevation in the lowest reach of the study area, make modifications that would reduce channel capacity and streambank height in other subreaches, and restore lagoon features along the river and behind East Barton Beach. These modifications would increase the frequency of overbanking, enlarge the area of functional active floodplain, and offset past geomorphic adjustments to historic disturbances. Overtopping of the banks during small to moderate flood peaks would result in a substantial improvement in fine sediment and nutrient retention on the floodplain (i.e., marsh surface). This effect would be* ***beneficial****.*

Alternative 1 proposes modifying the Upper Truckee River to generally raise the elevation of and narrow the low-flow channel (decreasing the channel capacity) and increase the frequency of overbanking events. With implementation of Alternative 1, the length of channel experiencing overbanking during the 2-year recurrence flow (at median lake levels) would increase from approximately 2,129 feet under existing conditions to about 12,145 feet (about 54 percent of new channel length, inclusive of both banks) (Table 3.9-12). The expected area of inundation during such an event would increase from about 65 acres to 74 acres under Alternative 1.

Table 3.9-12
Floodplain Connectivity and Floodplain Process Indicators under Alternative 1

Upper Truckee Marsh Alternative	Length of Channel with Overbanking at 760 cfs[1] (feet)	Percent of Channel with Overbanking at 760 cfs[1] (%)	Area of Floodplain Inundated at 760 cfs[1] (acres)
Alternative 1	12,145	54	74
Alternative 5 (No Project/No Action)	2,129	10	65

Note: cfs = cubic feet per second
[1] Based on hydraulic modeling (HEC-RAS), assuming median lake level.
Source: Conservancy and DGS 2005

The increased frequency and increased area of inundation during relatively frequent flow events would promote the deposition of fine-grained sediment on portions of the floodplain that are not inundated as frequently under existing conditions. During an overtopping event, streamflow would spread over a wider area, resulting in

decreased flow velocity and depth. These hydraulic conditions would favor the retention of sediment particles transported by the storm flows. The retention of sediment and associated nutrients, including phosphorous and nitrogen, on the floodplain would enhance nutrient delivery to marsh soils and vegetation. Additionally, infiltration of water in inundated areas would increase soil moisture and would recharge (and temporarily raise) shallow groundwater. The increased nutrient delivery and increased available water in the shallow subsurface would improve conditions for riparian and marsh vegetation. The magnitude of these benefits would vary depending on the timing and duration of inundation.

Alternative 1 would involve removing fill and grading the west streambank of the Upper Truckee River to reconnect the existing Sailing Lagoon to the river, while isolating it from the dredged marina. Restoration of the surface water connection with the river would increase the opportunity for overbank flows to convey sediment and nutrients into the lagoon. Increased sediment retention and nutrient cycling in the lagoon relative to the existing condition is an additional benefit beyond active floodplain inundation.

Alternative 1 would also include removal of sediment behind (landward of) East Barton Beach to recreate lagoon and wet meadow conditions. These modifications would also increase the areas along the floodplain margin to capture sediment and nutrients.

The combined effects of creating more stable channel segments, promoting more frequent overtopping events and sediment deposition on the floodplain, implementing bank protection, and creating/improving functioning lagoon and wetland environments under Alternative 1 would help to reduce transport of fine sediment to Lake Tahoe. The proposed reduction of the river mouth's capacity and retention of sediment would return long-term littoral processes at the river-lake interface to a more natural regime. This impact would be **beneficial**.

IMPACT 3.9-7 (Alt. 1) **Decreased Delivery of Coarse Sediment to Cove East and Barton Beaches. (TRPA 2)** *Implementing Alternative 1 could result in a net decrease in the transport of coarse sediment by the Upper Truckee River to beach areas adjacent to its mouth. The reduction in coarse-sediment delivery could hinder beach replenishment in the short term and worsen the ongoing trend of net beach erosion. In the long term, the amount of coarse sediment transported through the study area would be similar to the amount transported under existing conditions. Also, climate change effects could either exacerbate or counteract present trends. In the long term, the potential effects could range from worse than the existing degraded condition to a possible improvement. Any determination regarding* ***long-term effects of climate change on coarse-sediment transport and delivery downstream would be too speculative for a meaningful conclusion****. In the short term, however, implementing Alternative 1 would directly modify transport of coarse sediment and foster deposition within various portions of the study area, which may temporarily decrease delivery of coarse sediment to the adjacent beaches. This short-term impact would be* ***potentially significant.***

Under Alternative 1, the Upper Truckee River would be modified to develop a more stable channel and to improve the natural interaction of the river with its floodplain and marsh environments. A goal of Alternative 1 is to design and construct a channel that would minimize channel instability (particularly incision) and efficiently convey flows and related sediment load. The design would include raising the channel bed and installing vertical grade control structures. The structures would encourage localized deposition of bedload (coarse-grained sediments). Therefore, some sediment would be expected to remain in temporary storage within the active channel of the river. Given the design geometry of the proposed channel, each of the eight grade control structures has the potential to result in the deposition of approximately 300 cubic yards of coarse sediment each for a total of 2,400 cubic yards (3,600 tons).

Estimates of the total annual sediment transport in the Upper Truckee River range from 439 tons per year (USGS 2002) to 17,040 tons per year (DSC 1969). Bedload transport is approximately ten percent of the Upper Truckee River's total sediment load (Swanson 1996), or 44–1,704 tons per year. Assuming all deposition promoted by the proposed placement of grade controls necessary to achieve the streambed aggradation needed for Alternative 1 would occur over a relatively short period (one–five years), the retention would represent a substantial reduction

in the annual bedload transport of the Upper Truckee River near the mouth. The net short-term effect would be the loss of bedload (coarse-grained) sediment transported via the mouth of the river and available to local beaches.

Additionally, the modified channel would be designed to promote development of bars, which could also temporarily store sediment. This effect would be transitory because sediment forming the bars would migrate downstream (and eventually to the mouth). Therefore, over time, the amounts of coarse sediment transported through the study area would be similar to that input from upstream. The long-term effects on sediment transport and input of coarse sediment to the littoral zone would be to restore a more natural regime.

Alternative 1 would involve connecting the river to the Sailing Lagoon (at high flows) and modifying the marsh landward of East Barton Beach, providing increased potential for deposition and storage of coarse sediment transported by the river and/or Trout Creek. If not controlled, the overflow of river flows into the Sailing Lagoon could result in a permanent low-flow connection of the river to the lagoon. In the event that the area ("highlands") between the lagoon and design channel (approximate elevation 6,227 feet) were overtopped during a flood flow when the water level in the lagoon was relatively low (e.g., a low lake level on the order of elevation 6,220 feet), a channel could develop through incision of the highlands. If a permanent connecting channel between the river and lagoon were created at relatively low flows, it could increase deposition and permanent storage of coarse sediment in the lagoon. Final project design would include a flow control feature to manage water flowing into the Sailing Lagoon during bank overtopping events when the lagoon's starting water surface would be low. The control feature (e.g., a rock-lined channel or weir structure) would be designed to control the location and minimum elevation of overflow into the lagoon. It would prevent the development of a permanent, uncontrolled erosion channel connecting the river to the lagoon at low flows.

However, as under the No-Project/No-Action Alternative, potentially offsetting factors may result from climate change in the long term. The net effect on river dynamics and beach erosion is highly uncertain. Even after thorough investigation, any determination regarding climate change effects on coarse-sediment transport and delivery downstream would be speculative.

Regardless of uncertainty about long-term effects of climate change, Alternative 1 has the potential to decrease the delivery of coarse sediment to Lake Tahoe relative to existing conditions in the short term. The reduction in sediment delivery could incrementally decrease replenishment of sand to the beaches at the south margin of the lake. The decrease in replenishment could modify littoral processes and promote continued or increased erosion of the beaches and reduced supply of sediment to dunes. This short-term impact would be **potentially significant**.

Mitigation Measure 3.9-7 (Alt. 1): Monitor and Adaptively Manage Delivery of Coarse Sediment to Cove East and Barton Beaches.

During the period of channel adjustments following construction, and until the streambed profile attains a relatively continuous slope within the study area, the Conservancy will monitor the supply of coarse sediment entering the study area, deposition within the treated reaches, and beach-face erosion at least once a year. Specifically, the Conservancy will make observations of net deposition or scour during low-water conditions. If substantial coarse-sediment deposition is occurring within large portions of the study area or beach-face erosion has worsened, and coarse-sediment input from upstream has not decreased, the Conservancy will respond with site-specific adaptive management. The Conservancy will develop and implement an adaptive management plan that will review and evaluate monitoring data and project conditions and recommend follow-up actions. Such actions could include continued or revised monitoring, corrective actions or interventions, and documentation.

Significance after Mitigation: With implementation of Mitigation Measure 3.9-7 (Alt. 1) as described above, the potential adverse geomorphic consequences of short-term interruption of coarse-sediment delivery would be **less than significant** because the coarse sediment would be supplemented if necessary to prevent additional beach erosion.

IMPACT 3.9-8 (Alt. 1) **Stormwater Drainage and Treatment. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 1 would involve constructing permanent recreational features. The development of these features could potentially result in the release of pollutants and degradation of water quality. As described in Environmental Commitments 5, 6, and 11, effective permanent BMPs to protect water quality would be included in the final design of all recreation features. This impact would be* ***less than significant****.*

Alternative 1 would include several recreational features, including two kiosks, observation areas, trails at the margins of the marsh, and a boardwalk across the northern end of the marsh. The facilities generally would be restricted to the margins of the SEZ to minimize the extent of encroachment in this sensitive area. Developing these features would require disturbance of floodplain areas within an SEZ, presenting potential erosion hazards. Recreational facilities with impervious cover (e.g., the surfaces of bicycle paths) could also increase or concentrate runoff and increase erosion potential.

The design of recreational features has not been finalized. Developing these features may increase the potential for the transport of sediment or other pollutants to the Upper Truckee River and Lake Tahoe, which would be a potentially significant effect. However, the Conservancy would implement ECs 5 and 6 (Table 2-6). Implementing these environmental commitments would require implementation of effective construction site management plans and compliance with federal and state permits and thus would minimize short-term construction-related impacts. The final project design and implementation would include permanent stormwater detention features or infiltration systems for runoff from areas of proposed impervious surfaces (see Impact 3.8-1 [Alt. 1] in Section 3.8, "Hydrology and Flooding," for further discussion). The Conservancy would also implement EC 11, "Incorporate Effective Permanent Stormwater Best Management Practices," to provide effective permanent BMPs for all recreation features. With implementation of ECs 5, 6, and 11, this impact would be **less than significant**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.9-1 (Alt. 2) **Short-Term Risk of Surface Water and Groundwater Degradation During Construction. (CEQA 1, 2, 3; TRPA 1, 2, 3, 4, 5)** *Implementing Alternative 2 would involve substantial construction activities along or in the channel of the Upper Truckee River, sections of Trout Creek, along the Tahoe Keys Marina, and near the shoreline of Lake Tahoe. Although temporary BMPs would be implemented, short-term risks of water quality degradation could occur in each summer construction season or over the intervening winters. Grading would result in ground disturbance within sensitive lands and increase the potential for erosion and sediment transport. Accidental releases of hazardous materials or other pollutants could affect surface or subsurface waters. Implementing Alternative 2 could result in short-term turbidity potentially impairing noncontact recreation beneficial uses (aesthetics). Although the Conservancy would implement Environmental Commitments 5 and 6, this impact would be* ***significant****.*

Construction activities under Alternative 2 would include large-scale grading operations and construction of permanent facilities during multiple construction seasons. These activities pose a similar range and magnitude of possible impacts, under the same permit conditions, and within the same conceptual level of BMPs and design certainty as discussed for Impact 3.9-1 (Alt. 1). Despite efforts to minimize risks, the effects could result in a the turbidity standard described in Section 5.2 of the Basin Plan. For purposes of this analysis, any violation of any duration and magnitude would be potentially significant.

The Conservancy would implement ECs 5 and 6 (Table 2-6). These measures would prevent surface-water and/or groundwater degradation that could be of sufficient magnitude and duration to impair the Upper Truckee River's beneficial uses, including visible turbidity that could impair aesthetic values or affect other beneficial uses. Impairment of beneficial uses would likely require considerably higher turbidity levels, orders of magnitude above the river's very low background levels. However, as mentioned previously for Impact 3.9-1 (Alt. 1), the

significance conclusion for this environmental document is based on the potential to violate the Basin Plan's turbidity standard. Therefore, this impact would be **significant**.

All feasible measures to avoid, minimize, or mitigate this impact have already been incorporated into the design of Alternative 2. However, these measures would not be sufficient to fully mitigate the potential for at least short-term violations of the Basin Plan's stringent water quality standard for turbidity. Because the potential to exceed this stringent standard would remain, this impact would be **significant and unavoidable**.

IMPACT 3.9-2 (Alt. 2) **Short-Term, Project-Related Risk of Surface Water Degradation Following Construction. (CEQA 1, 2, 3; TRPA 1, 2, 3, 4, 5)** *Implementing Alternative 2 would require completion of in-channel construction activities. The biotechnical streambank treatments and other revegetated areas, such as the backfilled channel segments and inset floodplains, could be vulnerable during a flood flow within the first few years following construction. Therefore, implementing Alternative 2 could result in short-term exceedance of the Basin Plan's stringent turbidity standard (ten percent above background levels) after the construction phase. This impact would be* ***significant****.*

Possible risks from natural channel adjustment effects (described further under Impact 3.9-2 [Alt. 1]) would be minimal under Alternative 2. The final channel size, shape, and bed and bank materials would be installed during construction and would be allowed to season and establish before the release of live stream flows, and natural channel adjustments would not be needed to meet final design grade or functions.

Under Alternative 2, the new, geomorphically sized channel constructed between RS 20+00 and the mouth of the Upper Truckee River and the small areas of inset floodplain in the upstream portion of the study area would be relatively susceptible to erosion (compared to the well-established, undisturbed vegetated surfaces) if a large flood were to occur within the first few years after construction. A slightly increased risk of sediment mobilization may occur if a major flood event were to occur before the vegetation could mature.

Design and revegetation specifications would be implemented for all reactivated channels and floodplain areas with remnant channels to minimize the risk that accumulated fine sediments and/or organic materials would be mobilized during a large flood in the first few years after construction. Despite these efforts to minimize risks, the effects could cause a violation of Section 5.2 of the Basin Plan (i.e., the stringent turbidity standard of ten percent above background levels). This impact would be **significant**.

Mitigation Measure 3.9-2 (Alt. 2): Adaptively Manage Potential Flood Disturbance in the Interim Period after Construction.

This mitigation measure is identical to Mitigation Measure 3.9-2 (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measure 3.9-2 (Alt. 2) as described above, the short-term risk of surface-water or groundwater degradation following construction would be minimized, because potential flood damage in the interim period after construction would be adaptively managed. However, the potential for at least short-term violations of the Basin Plan's stringent water quality standard for turbidity cannot be feasibly eliminated. Because of the potential to exceed this stringent standard, Impact 3.9-2 (Alt. 2) would be **significant and unavoidable**.

IMPACT 3.9-3 (Alt. 2) **Upper Truckee River Channel Erosion within the Study Area. (NEPA)** *Implementing Alternative 2 would involve making direct changes to the channel of the Upper Truckee River. The changes would offset past geomorphic responses to historic disturbances by reconstructing more appropriately sized channel sections with better connectivity to the existing floodplain and constructing features to prevent streambank erosion. This would result in a substantial long-term benefit by improving channel stability and reducing erosion of the channel bed and banks. This impact would be* ***beneficial.***

Alternative 2 would involve constructing a new, more geomorphically stable channel for the Upper Truckee River between RS 20+00 and RS 10+700 (Exhibit 2-2). The proposed channel has been designed to improve channel stability and to promote more natural interaction of the river with its floodplain and relocate the mouth of the river. The new channel would increase the length of channel that is "geomorphically sized" from approximately 500 feet under existing conditions to 6,150 feet. The proposed improvements in channel morphology would promote a more stable channel, reducing the potential for lateral and vertical erosion. The alternative also proposes the construction of bank stabilization and new floodplain areas downstream of the U.S. 50 bridge (RS 0+00 to RS 20+00) to reduce existing bank erosion. These improvements are specifically proposed to minimize the potential for future erosion and sediment transport from the study area (and to Lake Tahoe).

In addition to these features, Alternative 2 proposes installation of a vertical grade control just downstream of the confluence of the river with Trout Creek. This structure would reduce the potential for upstream migration of a knickpoint in the Upper Truckee River that might develop in the future in response to sustained periods of low lake levels.

Compilation of the TMDL streambank-erosion results (California Water Boards and NDEP 2008) for specific subreaches of the Upper Truckee River allows a quantitative estimate of the effect of the proposed alternatives on stream channel erosion (Table 3.9-13). Using the range of treatment tiers analyzed for the TMDL, the estimated reduction in fine sediment loads from streambank erosion in the study area under Alternative 2 would be nearly 60 percent (reduced to 221 cubic yards from 538 cubic yards under existing conditions and the No-Project/No-Action Alternative). The study area is a small portion of the entire 15-mile-long river, and the proposed action alternatives alone would reduce the entire Upper Truckee River's fine sediment load from streambanks by about 1 percent relative to existing conditions. While small, this would be a considerable and measurable benefit relative to the degraded existing condition or the No-Project/No-Action Alternative.

Table 3.9-13
Estimated Stream Channel Bank Erosion on the Upper Truckee River under Alternative 2

River Reach	Distance Upstream of Lake (feet)	Bank Erosion of Fine Sediment (cubic yards) [1]	
		Alternative 2	Alternative 5 (No-Project/No-Action)
Upper Truckee Marsh study area	0–9,646	221	538
TOTAL	**79,364**	**4,002**	**4,320**

Note:
[1] Fine sediment is less than 0.063 millimeter in diameter
Source: California Water Boards and NDEP 2007 (compiled for these subreaches in Appendix I).

Alternative 2 proposes the same changes as Alternative 1 to the channel and overbank morphology, which may alter the hydraulics of the Upper Truckee River channel downstream of the U.S. 50 bridge, and the same bank stabilization. These features would generally improve channel stability downstream of the bridge and may help prevent future adverse effects on bridge stability.

This impact addresses long-term benefits associated with a net reduction of erosion. However, all stream restoration projects, particularly those that incorporate geomorphic process–based adjustments as part of the design elements, may experience localized channel erosion during an interim period following construction. The potential adverse water quality impacts of such adjustments (including unexpected changes or responses to flood disturbance) were described as a significant short-term impact above in Impact 3.9-2 (Alt. 2). The mitigation for that impact, Mitigation Measure 3.9-2 (Alt. 2), requires implementation of an adaptive management plan that commits to actions that would prevent short-term water quality problems from becoming chronic, thus ensuring that the long-term improvements to Upper Truckee River conditions expected under Impact 3.9-3 (Alt. 2) can be realized. This impact would be **beneficial**.

IMPACT 3.9-4 (Alt. 2) **Trout Creek Channel Erosion within the Study Area. (NEPA)** *Implementing Alternative 2 would not involve directly modifying the channel of Trout Creek. However, Trout Creek would be expected to adjust to the proposed changes to the elevation and size of the Upper Truckee River channel in the vicinity of the mouth of the creek. The anticipated response of Trout Creek would likely be deposition in the lowest reach, reducing the potential for continued incision that previously was prompted by historical dredging and lowering of the Upper Truckee River Channel bed. This impact would be* ***beneficial****.*

Under Alternative 2, the channel of the Upper Truckee River through the marsh (Reach 3) would be modified by abandoning the existing straightened segment and constructing a new meandering channel (Exhibit 2-2). The new river channel would be narrower and its bed would be raised compared to the existing channel. Although the effect of raising the river's elevation may be to initiate deposition at the confluence and within the lower reach of the creek, the change would also reduce the potential for continued incision (vertical erosion) of the river. Raising the bed of the river would also reduce the potential for future incision of the creek channel. Overall, modifying the Upper Truckee River channel would either have a neutral effect or reduce the potential for erosion within Trout Creek.

No quantitative estimate of streambank erosion loads or load reduction potential along Trout Creek was made in studies for the TMDL (California Water Boards and NDEP 2008). However, based on geomorphic principles and qualitative analysis, Alternative 1 would not substantially change the amount of flow (and sediment) carried by Trout Creek's main channel and distributaries under normal or flood conditions. Although the modifications at the mouth may promote some localized deposition, the low-gradient environment of the lower reach of the creek would not be expected to be subject to substantial changes in lateral or vertical erosion. The effect on lower Trout Creek would be slightly beneficial relative to existing conditions.

As described above for the Upper Truckee River (Impact 3.9-3 [Alt. 2]), implementing mitigation to prevent adverse short-term water quality impacts from becoming chronic conditions (Mitigation Measure 3.9-2 [Alt. 2]) would ensure that the long-term improvements to Trout Creek conditions expected under Impact 3.9-4 (Alt. 2) can be realized. This impact would be **beneficial**.

IMPACT 3.9-5 (Alt. 2) **Erosion of Backfilled and/or Remnant Channel Segments on the Floodplain. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 2 would involve backfilling portions of the existing Upper Truckee River to function as part of the active floodplain, and would increase the frequency with which existing remnant channel segments on the floodplain would be inundated. Following the project design details and specifications would prevent "recapture" of the backfilled channel or an increase in erosive force on remnant channel segments that could mobilize accumulated sediment and organic matter. This impact would be* ***less than significant.***

Alternative 2 may incrementally increase the exposure of existing remnant (i.e., naturally abandoned) channel segments on the floodplain to flood flows. The remnant channels are discontinuous, curved depressions on the marsh surface that are partially filled with fine sediment and accumulated organic material. Alternative 2 would increase the area inundated during low-magnitude, high-frequency flow events (i.e., two-year and five-year flows), but would not substantially alter inundation in the area during high magnitude events (i.e., 25-year flows or greater). The increased inundation from small floods might raise the potential for flow to enter remnant channel segments and possibly erode them more often, but these areas would be subject to erosion from larger floods under existing conditions. The portion of the study area that would experience increased overbank inundation under Alternative 2 includes an abandoned ditch east of the river and the upstream portion of a remnant channel. Flow in the ditch would be expected to return to the river, but the remnant channel would not discharge to the river or Trout Creek except under major flood flows. Potential erosion of the ditch caused by improved overbanking under Alternative 2 could increase transport of sediment and nutrients to the river and lake during small to moderate events rather than just under large, less frequent events. The change would relate to long-term timing and not to the total magnitude; therefore, this would not be a substantial effect.

Alternative 2 also would abandon existing channel segments between RS 20+00 and RS 107+00 (about 8,700 feet). The abandoned channels would be filled with floodplain sediments generated by construction of new channel segments, existing stockpiled sediments, and imported sediments (if necessary). Lateral grade controls would be installed upstream and downstream of the proposed intersections of backfilled abandoned channels with the newly constructed channel segments. The lateral controls would be designed to resist erosion of the backfilled channel in that vicinity at forces up to the 100-year flood event.

Following the project's proposed specifications for backfill areas would prevent uneven placement of backfill, differential compaction, or varied success of revegetation, which induce erosion of either the backfill or adjacent natural soil/sediment. Potential erosion along the backfilled abandoned channel segments would be avoided. This impact would be **less than significant**.

IMPACT 3.9-6 (Alt. 2) **Retention of Fine Sediment and Nutrients within the Study Area. (NEPA)** *Implementing Alternative 2 would directly reduce the Upper Truckee River's channel capacity and raise the streambed elevation throughout much of the study area, make modifications that would reduce streambank height in other subreaches, and restore lagoon features along the river and behind East Barton Beach. These modifications would increase the frequency of overbanking, enlarge the area of functional active floodplain, and offset past geomorphic adjustments to historic disturbances. Overtopping of the banks during small to moderate flood peaks would result in a substantial improvement in fine sediment and nutrient retention on the floodplain (i.e., marsh surface). This effect would be* ***beneficial****.*

Alternative 2 proposes a channel design that would reduce the Upper Truckee River's channel capacity and/or bank heights relative to the floodplain surface to reestablish overbanking and expand the area of active floodplain that receives flow during small events (e.g., the 2- to 5-year-magnitude storms). With implementation of Alternative 2, the length of channel experiencing overbanking during the two-year flow (at median lake levels) would increase from approximately 2,129 feet under existing conditions to about 16,345 feet (about 79 percent of the new channel) (Table 3.9-14). The expected area of inundation during such an event would increase from about 65 to 126 acres under Alternative 2.

Table 3.9-14
Floodplain Connectivity and Floodplain Process Indicators under Alternative 2

Upper Truckee Marsh Alternative	Length of Channel with Overbanking at 760 cfs[1] (feet)	Percent of Channel with Overbanking at 760 cfs[1] (%)	Area of Floodplain Inundated at 760 cfs[1] (acres)
Alternative 2	16,345	79	126
Alternative 5 (No Project/No Action)	2,129	10	65

Note: cfs = cubic feet per second
[1] Based on hydraulic modeling (HEC-RAS), assuming median lake level.
Source: Conservancy and DGS 2005

The increased frequency and area of inundation during relatively frequent flow events would promote the retention of fine-grained sediment on portions of the floodplain that are not inundated as frequently under existing conditions. During an overtopping event, streamflow would spread over a wider area, resulting in decreased flow velocity and depth. These hydraulic conditions would favor the retention of sediment particles transported by the storm flows. The retention of sediment and associated nutrients, including phosphorous and nitrogen, on the floodplain would enhance nutrient delivery to marsh soils and vegetation. Additionally, infiltration of water in inundated areas would increase soil moisture and would recharge (and temporarily raise) shallow groundwater. The increased nutrient delivery and increased available water in the shallow subsurface would improve conditions

for riparian and marsh vegetation. The magnitude of these benefits would vary depending on the timing and duration of inundation.

Alternative 2 would involve removing fill and grading the west streambank of the Upper Truckee River to reconnect the existing Sailing Lagoon to the river, while isolating it from the dredged marina. Restoration of the surface water connection with the river would increase the opportunity for overbank flows to convey sediment and nutrients into the lagoon. Increased sediment retention and nutrient cycling relative to the existing condition is an additional benefit beyond active floodplain inundation.

Alternative 2 would also include removal of fill behind (landward of) East Barton Beach to recreate lagoon and wet meadow conditions. These modifications would also increase the areas along the floodplain margin to capture sediment and nutrients.

The combined effects of creating more stable channel segments, promoting more frequent overtopping events and sediment retention on the floodplain, implementing bank protection, and creating/improving functioning lagoon and wetland environments under Alternative 2 would help to reduce transport of fine sediment to Lake Tahoe. The proposed reduction of the river mouth's capacity and raising of its elevation and the retention of sediment would return long-term littoral processes at the river-lake interface to a more natural regime. This effect would be **beneficial**.

IMPACT 3.9-7 (Alt. 2) **Decreased Delivery of Coarse Sediment to Cove East and Barton Beaches. (TRPA 2)** *Implementing Alternative 2 could result in a net decrease in the transport of coarse sediment by the Upper Truckee River to beach areas adjacent to its mouth. The reduction in coarse-sediment delivery could hinder beach replenishment and worsen the ongoing trend of net beach erosion. In the long term, climate change effects could either exacerbate or counteract present trends; potential effects could range from worse than the existing degraded condition to a possible improvement. Any determination regarding long-term effects of climate change on coarse-sediment transport and delivery downstream would be too speculative for a meaningful conclusion. In the short term, however, implementing Alternative 2 would directly modify transport of coarse sediment and foster deposition within various portions of the study area, which may temporarily decrease delivery of coarse sediment to the adjacent beaches. This short-term impact would be* ***less than significant.***

Under Alternative 2, the Upper Truckee River would be modified to develop a more stable channel and to improve the natural interaction of the river with its floodplain and marsh environments. A goal of the design of Alternative 2 is to design and construct a channel that would minimize channel instability (particularly incision) and efficiently convey flows and related sediment load. The design would include raising the channel bed and installing two vertical grade control structures. The structures would reduce the potential for erosion and transport (i.e., remobilization) of marsh/floodplain sediments, including some coarse sediment. A continuous low-flow channel would be created and would not require aggradation to reach its design elevation.

Alternative 2 would involve connecting the river to the Sailing Lagoon (at high flows) and modifying the marsh landward of East Barton Beach providing increased potential for deposition and storage of coarse sediment transported by the river. If not controlled, the overflow of river flows into the Sailing Lagoon could result in a permanent connection of the river to the lagoon (see discussion in Impact 3.9-5 [Alt. 1]) and the potential for transporting coarse sediment into the lagoon during more frequent flows. Final project design would include a flow control feature to manage water flowing into the Sailing Lagoon during bank overtopping events when the lagoon's starting water surface would be low. The control feature (e.g., a rock-lined channel or weir structure) would be designed to control the location and minimum elevation of overflow into the lagoon. It would prevent the development of a permanent, uncontrolled erosion channel connecting the river to the lagoon at low flows.

However, as under the No-Project/No-Action Alternative, potentially offsetting factors may result from climate change in the long term. The net effect on downstream river dynamics and beach erosion is highly uncertain. Even

after thorough investigation, any determination regarding climate change effects on coarse-sediment transport and delivery downstream would be speculative.

Regardless of uncertainty about long-term effects of climate change, Alternative 2 has the potential to temporarily decrease the delivery of coarse sediment to Lake Tahoe relative to existing conditions. However, the design elements of Alternative 2 include a low-flow channel that would be complete at the time of construction, and none of the features would require aggradation to meet the finished grade or function. Therefore, any temporary reduction in sediment delivery would be expected to be minor. Sediment transport and coarse sediment input to the littoral zone would continue.

This short-term impact would be **less than significant**.

IMPACT 3.9-8 (Alt. 2) **Stormwater Drainage and Treatment. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 2 would involve incorporating site-specific measures along the margins of the study area to provide additional stormwater pretreatment and/or flow routing improvements to enhance water quality treatment before discharge to the SEZ or directly to the Upper Truckee River and Trout Creek in the study area. Implementing these measures would improve conditions and help to reduce the amount of urban pollutants discharged to surface waters. However, this alternative would also involve constructing permanent recreational facilities. The development of these facilities could potentially result in degradation of water quality. As described in Environmental Commitments 5, 6, and 11, effective permanent BMPs to protect water quality would be included in the final design of all recreation features. This impact would be* ***less than significant.***

Implementing Alternative 2 would involve incorporating site-specific measures along the margins of the study area to provide additional stormwater treatment and/or flow routing improvements to enhance water quality treatment before discharge within the SEZ or directly to the surface water in the Upper Truckee River and Trout Creek. This would be beneficial relative to the no-project future. Alternative 2 would provide treatment areas for urban stormwater runoff flowing into the study area from developed areas to the west. Specifically, the alternative would include two “stormwater treatment areas” near the western margin of the site: one area at the existing storm drain outfall from Colorado Court, the second in the area east of East Venice Drive. The alternative designates areas to be available for the treatment of stormwater, but does not specify the method or type of treatment. The areas appear sufficiently large to accommodate a range of typical and effective urban runoff treatment options: vegetated swales, infiltration trenches or basins, wet ponds or extended detention basins, or some combination of options. These areas provide for stormwater quality treatment before discharge within the SEZ and/or directly to the surface water in the Upper Truckee River. The opportunity to provide treatment of runoff would be an improvement relative to existing conditions.

Alternative 2 proposes limited permanent public access, recreation, and habitat protection elements: a pedestrian trail extending from East Venice Drive to the Sailing Lagoon (with a new fishing platform) and Cove East Beach (with a viewpoint), and viewpoint areas along the eastern margin of the study area. The facilities generally would be restricted to the margins of the SEZ to minimize the extent of encroachment in this sensitive area. Developing these features would require disturbance of floodplain areas within an SEZ, presenting potential erosion hazards. Recreational facilities with impervious cover (e.g., pavements and other structures) could also increase or concentrate runoff and increase erosion potential.

The design of these features has not been finalized. However, without proper mitigation of their effects, these features may increase the potential for the transport of sediment or other pollutants to surface water bodies, which would be a potentially significant effect. However, the Conservancy would implement ECs 5 and 6 (Table 2-6). Implementing these environmental commitments would require implementation of effective construction site management plans and compliance with federal and state permits and thus would minimize short-term construction-related impacts. The final project design and implementation would include permanent stormwater detention features or infiltration systems for runoff from areas of proposed impervious surfaces (see Impact 3.8-1 [Alt. 2] in Section 3.8, “Hydrology and Flooding,” for further discussion). The Conservancy would also

implement EC 11 to provide effective permanent BMPs for all recreation features. With implementation of ECs 5, 6, and 11, this impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.9-1 (Alt. 3) **Short-Term Risk of Surface Water and Groundwater Degradation During Construction. (CEQA 1, 2, 3; TRPA 1, 2, 3, 4, 5)** *Implementing Alternative 3 would involve substantial construction activities along or in the channel of the Upper Truckee River, along the Tahoe Keys Marina, and near the shoreline of Lake Tahoe. Although temporary BMPs would be implemented, short-term risks of water quality degradation could occur in each summer construction season or over the intervening winters. Grading would result in ground disturbance within sensitive lands and increase the potential for erosion and sediment transport. Accidental releases of hazardous materials or other pollutants could affect surface or subsurface waters. Implementing Alternative 3 could result in short-term turbidity exceeding the Basin Plan's stringent turbidity standard (10 percent above background levels). Although the Conservancy would implement Environmental Commitments 5 and 6, this impact would be* ***significant****.*

Construction activities under Alternative 3 would include large-scale grading operations and construction of permanent facilities during multiple construction seasons. These activities pose a similar range and magnitude of possible impacts, under the same permit conditions, and within the same conceptual level of BMPs and design certainty as discussed for Impact 3.9-7 (Alt. 1). The Conservancy would implement ECs 5 and 6 (Table 2-6) to minimize the likelihood and potential magnitude of short-term water quality degradation that could persist. These protective measures would be expected to avoid adverse effects on beneficial uses. However, this impact would be **significant**.

All feasible measures to avoid, minimize, or mitigate this impact have already been incorporated into the design of Alternative 3. However, these measures would not be sufficient to fully mitigate the potential for at least short-term violations of the Basin Plan's stringent water quality standard for turbidity. Because the potential to exceed this stringent standard would remain, Impact 3.9-1 (Alt. 3) would be **significant and unavoidable**.

IMPACT 3.9-2 (Alt. 3) **Short-Term, Project-Related Risk of Surface Water Degradation Following Construction. (CEQA 1, 2, 3; TRPA 1, 2, 3, 4, 5)** *Implementing Alternative 3 would require completion of in-channel construction activities. The biotechnical streambank treatments and other revegetated areas, such as the backfilled channel segments, could expose areas of existing remnant channels to vulnerability during a flood flow within the first few years following construction. Additionally, Alternative 3 expects natural geomorphic erosion processes to reestablish one or more Upper Truckee River low-flow or overflow channels within the main marsh after construction of the pilot channel. Therefore, implementing Alternative 3 could result in short-term exceedance of the Basin Plan's stringent turbidity standard (ten percent above background levels) after the construction phase. This impact would be* ***significant****.*

Possible risks from natural channel adjustment effects (described further under Impact 3.9-2 [Alt. 1]) could be substantial under Alternative 3.The final location, size, and shape of newly formed channels and the bed and bank materials downstream of the pilot channel would not be controlled by design or construction; rather they would be established by natural geomorphic processes. Although the processes would be natural, the potential magnitude and severity of short-term channel dynamics would be greater under Alternative 3 than under the other action alternatives.

The existing main marsh has numerous remnant channel features of irregular width and depth, many of which have accumulated fine sediment and organics. It is not possible to accurately predict which or how many remnant channel segments would be activated by natural geomorphic processes after construction. However, historic aerial photos and existing topography suggest at least one moderately prominent abandoned channel that intersects the existing Trout Creek between RS 70+00 and RS 80+00 (on Trout Creek). Formation of one or more new Upper

Truckee River channels within the central portion of the marsh could erode existing sediment and organic material. A rough estimate (based on existing topographic data) suggests that 34,815 cubic yards of material could be mobilized if a single channel were to form with a length of about 4,700 feet and a cross-section area similar to the "geomorphically sized" design channel (about 200 square feet).

Disturbed and revegetated areas present under Alternative 3, such as inset floodplains, the pilot channel, and Sailing Lagoon margins, would be similar to those in Alternatives 1 and 2. These areas would be relatively susceptible to erosion (compared to the well-established, undisturbed vegetated surfaces) if a large flood were to occur within the first few years after construction. Design and revegetation specifications would be implemented for all reactivated channels and floodplain areas with remnant channels to minimize the risk that accumulated fine sediments and/or organic materials would be mobilized during a large flood in the first few years after construction. Although some of the material may be removed in advance or redeposited on the surrounding floodplain, some material could be transported to Lake Tahoe. Given the strict turbidity standard included in Section 5.2 of the Basin Plan (ten percent above background levels), this standard could be violated even if the channel adjustments were to occur during large streamflow events with high background turbidity. This impact would be **significant**.

Mitigation Measure 3.9-2 (Alt. 3): Adaptively Manage Potential Flood Disturbance in the Interim Period after Construction.

This mitigation measure is identical to Mitigation Measure 3.9-2 (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measure 3.9-2 (Alt. 3) as described above, the short-term risk of surface-water or groundwater degradation following construction would be minimized, because potential flood damage in the interim period after construction would be adaptively managed. However, the potential for at least short-term violations of the Basin Plan's stringent water quality standard for turbidity cannot be feasibly eliminated. Because of the potential to exceed this stringent standard, Impact 3.9-2 (Alt. 3) would be **significant and unavoidable**.

IMPACT 3.9-3 (Alt. 3) **Upper Truckee River Channel Erosion within the Study Area. (NEPA)** *Implementing Alternative 3 would involve making direct changes to the channel of the Upper Truckee River and redirect its flow to the center of the marsh via a constructed "pilot" channel. The flow would not be directed or controlled downstream of the pilot channel, and natural geomorphic processes would be allowed to form one or more new river channels over time. The changes would offset past geomorphic response to historic disturbances by allowing the river to reestablish channels on the existing floodplain surface. The long-term effects would be beneficial relative to the existing degraded channel condition. This impact would be* ***beneficial****.*

Under Alternative 3, the low-flow channel of the Upper Truckee River would be relocated eastward to promote the development of a main channel and/or distributary channels in the central portion of the Upper Truckee Marsh (Exhibit 2-3). A new channel would be built (beginning at RS 17+00) to redirect flow to the east of the existing channel. The constructed "pilot" channel would be approximately 3,300 feet long and would be designed similarly to the "geomorphically sized" channels proposed in Alternatives 1 and 2. The banks and bed of the channel would be stabilized with vegetation and a sand and gravel fill. At its northern end, the pilot channel would terminate in a flared energy-dissipation structure. From this point, the flow would be uncontrolled and allowed to seek a preferred drainage path. The flow would likely form one or more meandering channels, possibly reoccupying existing remnant channel segments. The newly formed channels would be expected to connect with the existing lower reach of Trout Creek and flow out of the marsh through the existing mouth of the combined Upper Truckee River and Trout Creek channel. Vertical grade control structures and bank stabilization would be built into the lower reaches of the system.

Like Alternatives 1 and 2, Alternative 3 would provide bank protection for actively eroding banks downstream of the U.S. 50 bridge and reconnect the Sailing Lagoon to the Upper Truckee River floodplain during high-flow events.

Alternative 3 would include installation of a vertical grade control upstream of the mouth of the Upper Truckee River near the beach ridge (RS 99+00). The grade control would reconstruct the streambed elevation and conditions to be similar to those that likely existed before historic dredging. The vertical grade control would reduce the potential for downcutting of the Upper Truckee River channel (and Trout Creek) during any future periods of sustained low lake levels.

Compilation of the TMDL streambank-erosion results (California Water Boards and NDEP 2008) for specific subreaches of the Upper Truckee River allows a quantitative estimate of the effect of the proposed alternatives on stream channel erosion (Table 3.9-15). Using the range of treatment tiers analyzed for the TMDL, the estimated reduction in fine sediment loads from streambank erosion in the study area under Alternative 3 would be nearly 59 percent (reduced to 221 cubic yards from 538 cubic yards under existing conditions and the No-Project/No-Action Alternative). The study area is a small portion of the entire 15-mile-long river, and the proposed action alternatives alone would reduce the entire Upper Truckee River's fine sediment load from streambanks by about 1 percent relative to existing conditions. While small, this would be a considerable and measurable benefit relative to the degraded existing condition or the No-Project/No-Action Alternative.

Table 3.9-15
Estimated Stream Channel Bank Erosion on the Upper Truckee River under Alternative 3

River Reach	Distance Upstream of Lake (feet)	Bank Erosion of Fine Sediment (cubic yards)[1]	
		Alternative 3	Alternative 5 (No-Project/No-Action)
Upper Truckee Marsh study area	0–9,646	221	538
TOTAL	**79,364**	**4,002**	**4,320**

Note:
[1] Fine sediment is less than 0.063 millimeter in diameter.
Source: California Water Boards and NDEP 2007 (compiled for these subreaches in Appendix I)

Potential Upper Truckee River channel erosion during the interim period after construction is discussed above under Impact 3.9-2 (Alt. 3).

Alternative 3 proposes the same changes as Alternatives 1 and 2 to the channel and overbank morphology, which may alter the hydraulics of the Upper Truckee River channel downstream of the U.S. 50 bridge, and the same bank stabilization. In addition, under this alternative, two arched corrugated-metal pipes would be installed under U.S. 50 (west of the bridge, through the roadfill) to allow a portion of flood flows to bypass the bridge and flow onto a inset floodplain downstream during high-flow conditions. The bypass flow would reduce hydraulic pressure on the bridge for flow levels above 6,233 feet NGVD at the bridge. These improvements would generally improve channel stability downstream of the bridge and would not result in adverse effects on bridge stability.

This impact addresses long-term benefits associated with a net reduction of erosion. However, all stream restoration projects, particularly those that incorporate geomorphic process–based adjustments as part of the design elements, may experience localized channel erosion during an interim period following construction. The potential adverse water quality impacts of such adjustments (including unexpected changes or responses to flood disturbance) were described as a significant short-term impact above in Impact 3.9-2 (Alt. 3). The mitigation for that impact, Mitigation Measure 3.9-2 (Alt. 3), requires implementation of an adaptive management plan that commits to actions that would prevent short-term water quality problems from becoming chronic, thus ensuring

that the long-term improvements to Upper Truckee River conditions expected under Impact 3.9-3 (Alt. 3) can be realized. This impact would be **beneficial**.

IMPACT 3.9-4 (Alt. 3) **Trout Creek Channel Erosion within the Study Area. (CEQA 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 3 would involve modifying the hydrology and geomorphic processes in the lower reach of Trout Creek. Additional streamflow and sediment would be conveyed to lower Trout Creek from the channel(s) of the Upper Truckee River downstream of the constructed pilot channel. The future confluence of the Upper Truckee River and Trout Creek would not be constructed but would form through natural geomorphic response to the construction of the pilot channel, and it would likely be located upstream of the existing confluence. The changes in flow, sediment loads, and confluence location could worsen ongoing streambed incision in the lower reach of Trout Creek or extend channel instability upstream, or both. However, stabilization of the streambed and streambank along the lower 2,600 feet of Trout Creek would be provided to prevent this potential response. This impact would be* ***less than significant.***

No quantitative estimate of streambank erosion loads or load reduction potential along Trout Creek was made in studies for the TMDL (California Water Boards and NDEP 2008). However, based on geomorphic principles and qualitative analysis, Alternative 3 would be expected to have the following varied effects on erosion of the Trout Creek channel within the study area.

Alternative 3 could create unstable conditions within the Trout Creek channel that could result in adverse erosion of the creek's bed or banks. Directing the flow of the Upper Truckee River into the center of the marsh would convey the flows into the existing Trout Creek channel. This would likely destabilize the segment of Trout Creek downstream of the newly formed confluence with the river (a possible location would be near RS 78+00 on Trout Creek). The increase in flows conveyed by this creek segment would result in erosion of the bed and/or banks.

The assumed intersection of the new Upper Truckee River channel and Trout Creek would move the confluence approximately 1,700 feet upstream (along Trout Creek) from the present location. The effect would be to shorten the overall length of Trout Creek. Assuming that the bed at the confluence would be controlled by the river channel, the gradient of Trout Creek would be expected to steepen, possibly resulting in lateral or vertical erosion in Trout Creek. Such erosion would also increase the amount of sediment transported through the combined Upper Truckee River/Trout Creek system.

In anticipation of some of these changes, the final project design for Alternative 3 would involve stabilizing the Upper Truckee River's streambed elevation downstream of the existing confluence of the river and Trout Creek. In addition, vertical grade controls and streambank stabilization measures would be designed based on the combined peak flows of the creek and river. These grade controls and stabilization measures would be incorporated along about 2,600 feet of lower Trout Creek (RS 66+00 to RS 95+00). The vertical grade controls would be adequate to maintain the channel's existing average slope and elevation and remain stable under 100-year peak flows. The streambank stabilization measures would be designed to remain stable under 25-year peak flows.

As described above for the Upper Truckee River (Impact 3.9-3 [Alt. 3]), implementing mitigation to prevent adverse short-term water quality impacts from becoming chronic (Mitigation Measure 3.9-2 [Alt. 3]) would protect Trout Creek from project-related erosion in the long term. This net impact would be **less than significant**.

IMPACT 3.9-5 (Alt. 3) **Erosion of Backfilled and/or Remnant Channel Segments on the Floodplain. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 3 would involve backfilling portions of the existing Upper Truckee River to function as part of the active floodplain. A full range of river flows would be redirected into areas of remnant channel segments on the floodplain. Following the project design details and specifications would prevent "recapture" of the backfilled channel or an increase in erosive force on remnant channel segments that could mobilize accumulated sediment and organic matter. This impact would be* ***less than significant.***

Alternative 3 would increase the exposure of existing remnant (i.e., naturally abandoned) channel segments on the floodplain to flood flows. The remnant channels are discontinuous, curved depressions on the marsh surface that are partially filled with fine sediment and accumulated organic material. Alternative 3 would increase the area inundated during low-magnitude, high-frequency flow events (i.e., two- and five-year flows). Because the main flows of the Upper Truckee River would be directed to the central marsh, some characteristics of inundation could also change during larger magnitude events (i.e., 25-year flows or greater).

Several partial remnant channels and at least one well-expressed remnant channel could potentially concentrate overbank flows and initiate erosion of sediment and/or organic material. In the long term, increased inundation might raise the potential for flows to enter remnant channel segments and possibly erode them more often; however, these areas would be subject to erosion from larger floods under existing conditions. Potential erosion of the remnant channel(s) by Alternative 3 could increase transport of sediment and nutrients to Trout Creek and Lake Tahoe under small to moderate flood events, rather than just under large, less-frequent events. The change would relate to long-term timing and not to the total magnitude; therefore, this would not be a substantial effect. (Potential short-term erosion impacts of remnant channel segments within the middle of the marsh during the interim period as the Upper Truckee River develops one or more channel[s] downstream of the pilot channel were discussed separately in Impact 3.9-2 [Alt. 3].)

Alternative 3 also would abandon existing channel segments between RS 17+00 and RS 93+00 (about 7,600 feet). The abandoned channels would be filled with floodplain sediments generated by construction of new channel segments, existing stockpiled sediments, and imported sediments (if necessary). Lateral grade controls would be installed upstream and downstream of intersections of the backfilled abandoned channels and the newly constructed channel segments. The lateral controls would be designed to resist erosion of the backfilled channel in that vicinity at forces up to the 100-year flood event.

Following the project's proposed specifications for backfill areas would prevent uneven placement of backfill, differential compaction, or varied success of revegetation, which induce erosion of either the backfill or adjacent natural soil/sediment. Potential erosion along the backfilled abandoned channel segments would be avoided. This impact would be **less than significant**.

IMPACT 3.9-6 (Alt. 3) **Retention of Fine Sediment and Nutrients within the Study Area. (NEPA)** *Implementing Alternative 3 would redirect the Upper Truckee River to the central portion of the Upper Truckee Marsh, thus allowing the flow to spread in existing remnant channels and floodplain surfaces; make modifications to reduce streambank height in upstream subreaches; and restore connection to the Sailing Lagoon during high flows. These modifications would increase the frequency of overbanking, enlarge the area of functional active floodplain, and offset past geomorphic adjustments to historic disturbances. Overtopping of the banks during small to moderate flood peaks would result in a substantial improvement in fine sediment and nutrient retention on the floodplain (i.e., marsh surface). This impact would be* ***beneficial****.*

A major component of Alternative 3 is to redirect flow from the existing Upper Truckee River channel eastward to the central portion of the marsh via a constructed "pilot" channel. The flow would then be allowed to flow uncontrolled over the marsh surface. This condition is intended to mimic natural, uncontrolled conditions within the distal end of marsh/delta environments. The effect would be to spread flows over a large area, decreasing flow velocities and promoting the retention of sediments transported by the river. One or more channels would be expected to develop within the marsh over time, but the location of the channel(s) cannot be accurately predicted. The channel system could be dynamic and channel locations would be expected to change. Depending on variations in flow and sediment load, a particular channel may fill and new channels may form by erosion. Given the marsh's low-gradient conditions, development of relatively deep and permanent channels is unlikely and channel banks would be overtopped frequently (relative to existing conditions). The conditions would promote increased retention of sediment and associated nutrients.

The net effect on water quality of the changes to channel length, channel capacity, bank elevations, and floodplain topography proposed under Alternative 3 cannot be modeled; however, key parameters that would control the potential for sediment retention have been determined (Table 3.9-16). Alternative 3 would reduce the river channel's capacity and/or bank heights relative to the floodplain surface to reestablish overbanking and expand the area of active floodplain that receives flow during relatively small events (e.g., the two- to five-year-magnitude storms). Overbanking during frequent small flood events would spread water across the active floodplain at shallow depths. Shallow inundation on the irregular microtopography and through dense vegetation on the floodplain would reduce velocities and encourage retention of suspended sediment. Indirect benefits to soil moisture and groundwater recharge would also provide positive feedback by supporting vegetation that helps trap sediment and take up nutrients. Hydraulic modeling has demonstrated that no increase in flow velocities and shear stress within the Upper Truckee River would result from Alternative 3 under the five-year event (1,660 cfs) (Conservancy and DGS 2005:4.1-5).

With implementation of Alternative 3, the length of channel experiencing overbanking during a two-year event would increase from about 2,129 feet under existing conditions to about 17,000 feet (Table 3.9-16). The expected area of inundation during such an event would increase from 65 to 156 acres under Alternative 3.

Table 3.9-16
Floodplain Connectivity and Floodplain Process Indicators under Alternative 3

Upper Truckee Marsh Alternative	Length of Channel with Overbanking at 760 cfs[1] (feet)	Percent of Channel with Overbanking at 760 cfs[1] (%)	Area of Floodplain Inundated at 760 cfs[1] (acres)
Alternative 3[2]	17,000	82	156
Alternative 5 (No Project/No Action)	2,129	10	65

Note: cfs = cubic feet per second
[1] Based on hydraulic modeling (HEC-RAS), assuming median lake level.
[2] Alternative 3 was not modeled due to complex multiple channel flow path possibilities, but its values were estimated from the other model results and evaluation of the digital elevation model (DEM) of the micro topography.
Source: Conservancy and DGS 2005

Alternative 3 would involve removing fill and grading the west streambank of the Upper Truckee River to reconnect the existing Sailing Lagoon to the river, while isolating it from the dredged marina. Restoration of the surface water connection with the river would increase the opportunity for overbank flows to convey sediment and nutrients into the lagoon. Increased sediment retention and nutrient cycling relative to the existing condition is an additional benefit beyond active floodplain inundation.

The combined long-term effects of increasing the number of stable channel segments, forming natural distributaries, promoting more frequent overtopping events and sediment deposition on the floodplain, implementing bank protection, and creating/improving functioning lagoon and wetland environments under Alternative 3 would help to reduce transport of fine sediment to Lake Tahoe. Improved retention of sediment would return long-term littoral processes at the river-lake interface to a more natural regime. That effect could include changing geographic patterns as the mouths of the Upper Truckee River and Trout Creek potentially experience shifts in magnitude and duration as discharge points to the littoral zone. This impact would be **beneficial**.

IMPACT 3.9-7 (Alt. 3) Decreased Delivery of Coarse Sediment to Cove East and Barton Beaches. (TRPA 2) *Implementing Alternative 3 could result in a net decrease in the transport of coarse sediment by the Upper Truckee River to beach areas adjacent to its mouth. The reduction in coarse-sediment delivery could hinder beach replenishment and worsen the ongoing trend of net beach erosion. In the long term, climate change effects could either exacerbate or counteract present trends; potential effects could range from worse than the existing degraded condition to a possible improvement. Any determination regarding long-term effects of climate change on coarse-sediment transport and delivery downstream would be too speculative for a meaningful conclusion. In the short term, however, implementing Alternative 3 would directly modify transport of coarse sediment and foster deposition within various portions of the study area, which may temporarily decrease delivery of coarse sediment to the adjacent beaches. This short-term impact would be* ***potentially significant****.*

Implementing Alternative 3 would increase the potential for deposition and retention of coarse sediment within the study area. It would enlarge the active floodplain and increase opportunities for deposition and net retention of coarse sediment; potentially reactivate multiple thread distributary channels and increase opportunities for net deposition; and reconnect and increase on-site lagoon areas that might receive river-overflow water and provide net coarse-sediment retention. Implementing this alternative may interrupt all delivery of coarse sediment to the mouth before establishment of one or more continuous low-flow channels. It also may reduce or interrupt coarse-sediment delivery during below-normal runoff (and low-lake-level) conditions if flow and sediment could not pass through potential small distributary channels and/or over the beach-ridge grade control.

Alternative 3 would involve connecting the Upper Truckee River to the Sailing Lagoon (at high flows), thus increasing the potential for deposition and storage of coarse sediment transported by the river. If not controlled, the overflow of river flows into the Sailing Lagoon could result in a permanent connection of the river to the lagoon (see discussion in Impact 3.9-5 [Alt. 1]) and the potential for transporting coarse sediment into the lagoon during more frequent flows. Final project design would include a flow control feature to manage water flowing into the Sailing Lagoon during bank overtopping events when the lagoon's starting water surface would be low. The control feature (e.g., a rock-lined channel or weir structure) would be designed to control the location and minimum elevation of overflow into the lagoon. It would prevent the development of a permanent, uncontrolled erosion channel connecting the river to the lagoon at low flows.

However, as under the No-Project/No-Action Alternative, potentially offsetting factors may result from climate change in the long term. The net effect on downstream river dynamics and beach erosion is highly uncertain. Even after thorough investigation, any determination regarding climate change effects on coarse-sediment transport and delivery downstream would be speculative.

Regardless of uncertainty about long-term effects of climate change, Alternative 3 has the potential to temporarily decrease the delivery of coarse sediment to Lake Tahoe relative to existing conditions. None of the design elements or expected natural processes of Alternative 3 would require aggradation to meet the finished grade or function. However, a temporary reduction in sediment delivery could occur because natural processes operating within the marsh downstream of the constructed pilot channel may not immediately form continuous low-flow channels to provide bedload-transport continuity all the way to the beach. The long-term effects on sediment transport and input of coarse sediment to the littoral zone would restore a more natural regime.

This short-term impact would be **potentially significant**.

Mitigation Measure 3.9-7 (Alt. 3): Monitor and Adaptively Manage Delivery of Coarse Sediment to Cove East and Barton Beaches.

This mitigation measure is identical to Mitigation Measure 3.9-7 (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measure 3.9-7 (Alt. 3) as described above, the potential adverse geomorphic effects and water quality consequences of short-term interruption of coarse-sediment delivery would be **less than significant** because the coarse sediment would be supplemented if necessary to prevent additional beach erosion.

IMPACT 3.9-8 (Alt. 3) **Stormwater Drainage and Treatment. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 3 would involve incorporating site-specific measures along the margins of the study area to provide additional stormwater pretreatment and/or flow routing improvements to enhance water quality treatment before discharge to the SEZ. Implementing these measures would improve conditions and help to reduce the amount of urban pollutants discharged to surface waters. However, this alternative would also involve constructing permanent recreational facilities. The development of these facilities could potentially result in degradation of water quality. As described in Environmental Commitments 5, 6, and 11, effective permanent BMPs to protect water quality would be included in the final design of all recreation features. This impact would be* ***less than significant.***

Like Alternative 2, Alternative 3 would provide treatment areas for urban stormwater runoff flowing into the study area from developed areas to the west. Specifically, this alternative would include two "stormwater treatment areas" near the western margin of the site: one area at the existing storm drain outfall from Colorado Court, the second in the area east of East Venice Drive. The alternative designates areas to be available for the treatment of stormwater, but does not specify the method or type of treatment. The areas appear sufficiently large to accommodate a range of typical and effective urban runoff treatment options: vegetated swales, infiltration trenches or basins, wet ponds or extended detention basins, or some combination of options. These areas provide for stormwater quality treatment before discharge within the SEZ and/or directly to the surface water in the Upper Truckee River. The opportunity to provide treatment of runoff would be an improvement relative to existing conditions.

Alternative 3 also proposes new, permanent recreational facilities within the study area, including a self-service kiosk on the west margin adjacent to East Venice Drive and a trail connecting these facilities to a fishing platform on the Sailing Lagoon. Additionally, the alternative proposes viewpoints and a trail along the eastern margin and a bike path and pedestrian trail north of Springwood Drive. The facilities generally would be restricted to the margins of the SEZ to minimize the extent of encroachment in this sensitive area. Developing these features would require disturbance of floodplain areas within an SEZ, presenting potential erosion hazards. Recreational facilities with impervious cover (e.g., roofs and other structures) could also increase or concentrate runoff and increase erosion potential.

The design of these features has not been finalized. However, without proper mitigation of the effects, these features may increase the potential for the transport of sediment or other pollutants to surface water bodies, which would be a potentially significant effect. However, the Conservancy would implement ECs 5 and 6 (Table 2-6). Implementing these environmental commitments would require implementation of effective construction site management plans and compliance with federal and state permits and thus would minimize short-term construction-related impacts. The final project design and implementation would include permanent stormwater detention features or infiltration systems for runoff from areas of proposed impervious surfaces (see Impact 3.8-1 [Alt. 3] in Section 3.8, "Hydrology and Flooding," for further discussion). The Conservancy would also implement EC 11 to provide effective permanent BMPs for all recreation features. With implementation of ECs 5, 6, and 11, this impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.9-1 (Alt. 4) **Short-Term Risk of Surface Water and Groundwater Degradation During Construction. (CEQA 1, 2, 3; TRPA 1, 2, 3, 4, 5)** *Implementing Alternative 4 would involve substantial construction activities along or in the channel of the Upper Truckee River and near the shoreline of Lake Tahoe. Although temporary BMPs would be implemented, short-term risks of water quality degradation could occur in each summer construction season or over the intervening winters. Grading would result in ground disturbance within sensitive lands and increase the potential for erosion and sediment transport. Accidental releases of hazardous materials or other pollutants could affect surface or subsurface waters. Implementing Alternative 4 could result in short-term turbidity, potentially impairing noncontact recreation beneficial uses (aesthetics). Although the Conservancy would implement Environmental Commitments 5 and 6, this impact would be* ***significant.***

Construction activities under Alternative 4 would include large-scale grading operations and construction of permanent facilities during multiple construction seasons. These activities pose a similar range and magnitude of possible impacts, under the same permit conditions, and within the same conceptual level of BMPs and design certainty as discussed for Impact 3.9-1 (Alt. 1). However, constructing an "inset" floodplain would require work immediately adjacent to the low-flow channel and would not allow the revegetated areas to be isolated from potential high flows. Final design materials, methods, and revegetation specifications would anticipate this challenge and use the most effective means to create surfaces that would be stable immediately upon installation.

The Conservancy would implement ECs 5 and 6 (Table 2-6). Because effective site management plans would be prepared and implemented, the likelihood and potential magnitude of short-term water quality degradation that could persist would be minimized. These protective measures would be expected to avoid adverse effects on beneficial uses. However, this impact would be **significant**.

All feasible measures to avoid, minimize, or mitigate this impact have already been incorporated into the design of Alternative 4. However, these measures would not be sufficient to fully mitigate the potential for at least short-term violations of the Basin Plan's stringent water quality standard for turbidity. Because the potential to exceed this stringent standard would remain, this impact would be **significant and unavoidable**.

IMPACT 3.9-2 (Alt. 4) **Short-Term, Project-Related Risk of Surface Water Degradation Following Construction. (CEQA 1, 2, 3; TRPA 1, 2, 3, 4, 5)** *Implementing Alternative 4 would require completion of in-channel construction activities. The biotechnical streambank treatments and other revegetated areas, such as the inset floodplain, could be vulnerable during a flood flow within the first few years following construction. Therefore, implementing Alternative 4 could result in potential short-term exceedance of the Basin Plan's stringent turbidity standard (10 percent above background levels) after the construction phase. This impact would be* ***significant.***

Possible risks from natural channel adjustment effects (described further under Impact 3.9-2 [Alt. 1]) would be reduced under Alternative 4 because the final channel size, shape, and bed and bank materials would be installed during construction, and natural channel adjustments would not be needed to meet final design conditions. However, constructing an "inset" floodplain would require work immediately adjacent to the low-flow channel and would not allow the revegetated areas to be isolated from potential high flows. Final design materials, methods, and revegetation specifications would anticipate this challenge and would use the most effective means to create surfaces that would be stable immediately upon installation. If construction were followed by relatively normal- to low-streamflow years, the risk of disturbance to the revegetated surfaces would be lower than if construction were followed by high-streamflow water years. However, water year conditions cannot be predicted with multiyear accuracy to help schedule construction, and because the Upper Truckee River is an unregulated river, it would not be possible to manage streamflows after construction.

The modified channel bank and low-flow streambed, constructed "inset" floodplain areas, and other disturbed but revegetated surfaces would therefore be highly susceptible to erosion if a large flood were to occur within the first

few years after construction. A high risk of sediment mobilization would occur if a major flood event were to occur before the vegetation could mature. Despite efforts to minimize risks, the effects could cause a violation of Section 5.2 of the Basin Plan (i.e., the stringent turbidity standard of ten percent above background levels). This impact would be **significant**.

Mitigation Measure 3.9-2 (Alt. 4): Adaptively Manage Potential Flood Disturbance in the Interim Period after Construction.

This mitigation measure is identical to Mitigation Measure 3.9-2 (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measure 3.9-2 (Alt. 4) as described above, the short-term risk of surface-water or groundwater degradation following construction would be minimized, because potential flood damage in the interim period after construction would be adaptively managed. However, the potential for at least short-term violations of the stringent water quality standard for turbidity cannot be feasibly eliminated. Because of the potential to exceed this stringent standard, Impact 3.9-2 (Alt. 4) would be **significant and unavoidable**.

IMPACT 3.9-3 (Alt. 4) **Upper Truckee River Channel Erosion within the Study Area. (NEPA)** *Implementing Alternative 4 would involve making direct changes to the channel of the Upper Truckee River to create an inset floodplain in the upper reach and increase channel sinuosity in the straightened reach. The changes would offset past geomorphic responses to historic disturbances by constructing features to provide overbank flow opportunities and reduce streambank erosion. This would result in a long-term benefit by decreasing flow depths and velocities in low to moderate flood events and reducing the potential for erosion of the channel bed and banks. This impact would be* ***beneficial****.*

Under Alternative 4, the length of "geomorphically sized" channel within the study area would increase from about 500 feet to 6,700 feet (Exhibit 2-4). The new channel morphology would be more stable while efficiently transporting sediment under typical flows. The modified channel would likely experience less erosion than the existing oversized channel. Alternative 4 also proposes the construction of inset floodplains along the existing river from RS 0+00 to RS 67+00. The existing terrace would be lowered (one-three feet) on either side of the existing channel for widths ranging from about 20 to 220 feet. The area of inset floodplain would be approximately 12 acres. In addition, the width and capacity of the existing low-flow channel would be reduced. Creating the lowered floodplain surface would increase the area of inundation, overbanking frequency, and the width of flow during the two-year event. This condition would reduce flow velocities and active channel bank heights, reducing the potential for erosion during small to moderate flow events.

The alternative also proposes to create a more sinuous channel through the existing straightened reach (RS 67+00 to RS 93+00). Localized alternating bank cuts and fills would be used selectively to form low-amplitude meanders. Increasing sinuosity would increase channel length and decrease channel slope relative to existing conditions. These changes would be expected to reduce flow velocities in low to moderate flow conditions.

Also proposed by Alternative 4 is the installation of bank protection/stabilization for areas of the right (east) bank downstream of the U.S. 50 bridge. This protection would address existing unstable banks and areas of the bank most prone to erosion and failure.

The combined effect of creating the inset floodplain and modifying the channel would be to reduce erosion potential throughout the proposed channel/floodplain area. This would be a beneficial effect of Alternative 4.

Compilation of the TMDL streambank-erosion results (California Water Boards and NDEP 2008) for specific subreaches of the Upper Truckee River allows a quantitative estimate of the effect of the proposed alternatives on stream channel erosion (Table 3.9-17). Using the range of treatment tiers analyzed for the TMDL, the estimated reduction in fine sediment loads from streambank erosion in the study area under Alternative 4 would be about

Table 3.9-17 Estimated Stream Channel Bank Erosion on the Upper Truckee River under Alternative 4			
River Reach	Distance Upstream of Lake (feet)	Bank Erosion of Fine Sediment (cubic yards)[1]	
		Upper Truckee Marsh Alternative 4	Alternative 5 (No-Project/No-Action)
Upper Truckee Marsh study area	0–9,646	228	538
TOTAL	**79,364**	**4,002**	**4,320**

Note:
[1] Fine sediment is less than 0.063 millimeter in diameter
Source: California Water Boards and NDEP 2007 (compiled for these subreaches in Appendix I).

58 percent (reduced to 228 cubic yards from 538 cubic yards under existing conditions and the No-Project/No-Action Alternative). The study area is a small portion of the entire 15-mile-long river, and the proposed action alternatives alone would reduce the entire Upper Truckee River's fine sediment load from streambanks by about 1 percent relative to existing conditions. While small, this would be a considerable and measurable benefit relative to the degraded existing condition or No-Project/No-Action Alternative.

This impact addresses long-term benefits associated with a net reduction of erosion. However, all stream restoration projects, particularly those that incorporate geomorphic process–based adjustments as part of the design elements, may experience localized channel erosion during an interim period following construction. The potential adverse water quality impacts of such adjustments (including unexpected changes or responses to flood disturbance) were described as a significant short-term impact above in Impact 3.9-3 (Alt. 4). The mitigation for that impact, Mitigation Measure 3.9-2 (Alt. 4), requires implementation of an adaptive management plan that commits to actions that would prevent short-term water quality problems from becoming chronic, thus ensuring that the long-term improvements to Upper Truckee River conditions expected under Impact 3.9-3 (Alt. 4) can be realized. This impact would be **beneficial**.

IMPACT 3.9-4 (Alt. 4) **Trout Creek Channel Erosion within the Study Area. (CEQA 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 4 would not involve directly modifying the channel of Trout Creek or modifying the Upper Truckee River at or downstream of its confluence with Trout Creek. Therefore, no significant hydraulic change would be proposed that would change the existing conditions relative erosion potential in Trout Creek.* ***No impact*** *would occur.*

No quantitative estimate of streambank erosion loads or load reduction potential along Trout Creek was made in studies for the TMDL (California Water Boards and NDEP 2008). However, based on geomorphic principles and qualitative analysis, Alternative 4 would be expected to have the following varied effects on erosion of the Trout Creek channel within the study area.

Alternative 4 would not raise and/or stabilize the existing streambed elevation of the degraded reach of the Upper Truckee River at the mouth of Trout Creek (Exhibit 2-4), and would not substantially change the amount of flow carried by the Trout Creek main channel and distributaries under normal or flood conditions. This would produce an effect on lower Trout Creek that is neutral relative to the existing, degraded conditions.

It is possible that persistent low lake levels (potentially caused by climate change) could initiate incision of the Upper Truckee River that could migrate upstream into Trout Creek (see Impact 3.9-3 [Alt. 4]).These potential future river responses would not represent a change relative to the existing conditions or No-Project/No-Action Alternative. Therefore, **no impact** would occur.

IMPACT 3.9-5 (Alt. 4) **Erosion of Backfilled and/or Remnant Channel Segments on the Floodplain. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 4 would not involve abandoning and backfilling the existing Upper Truckee River, and would not increase the frequency with which existing remnant channel segments on the floodplain would be inundated. The risks of erosion and/or mobilization of organics and sediment within the floodplain topography would remain similar to existing risks.* ***No impact*** *would occur.*

Under Alternative 4, the entire existing Upper Truckee River channel alignment would be used as the active low-flow channel. This alternative would not involve backfilling abandoned portions to function as part of the active floodplain. Implementing Alternative 4 would not raise the streambed elevation or decrease the channel capacity; therefore, it would not substantially modify the frequency or magnitude of overbank flows (during low to moderate flows) that access the existing floodplain (terrace) surface across the study area. Therefore, implementing Alternative 4 would not increase the potential for erosion and sediment production related to increased flow in backfilled abandoned channels or remnant channels. **No impact** would occur.

IMPACT 3.9-6 (Alt. 4) **Retention of Fine Sediment and Nutrients within the Study Area. (NEPA)** *Implementing Alternative 4 would reduce the capacity of the Upper Truckee River channel. This alternative would involve constructing an inset floodplain along the river in the upstream portion of the study area and improving sinuosity in the downstream, straightened reach. These modifications would increase the frequency of overbanking, enlarge the area of functional active floodplain, and offset past geomorphic adjustments to historic disturbances. Overtopping of the banks during small to moderate flood peaks would result in an improvement in fine sediment and nutrient retention on the inset floodplain and some portions of the marsh surface. This impact would be* ***beneficial****.*

Under Alternative 4, the channel of the existing Upper Truckee River would be modified to create an inset floodplain in the reach of river from RS 0+00 to RS 67+00. Approximately 12 acres of inset floodplain would be created by lowering the existing terrace surface one-three feet. The alternative also proposes modifications to the channel between RS 67+00 and RS 93+00 that would decrease channel capacity. The proposed channel design would increase the frequency of overbanking, promoting the retention of sediment on the floodplain and a reduction in transport of fine sediment to Lake Tahoe.

Implementing Alternative 4 would increase the area of inundation during the 2-year event (assuming median lake level) from 65 to 82 acres and the length of overtopped bank from 2,129 feet to 17,633 feet. Overbanking would occur along approximately 85 percent of the length of new channel, compared to 10 percent under existing conditions (Table 3.9-18). The flows would spread out over newly created inset floodplain areas and expanded areas on the existing floodplain. As the flows spread out, the flow velocities would decrease, promoting the retention of some of the transported sediment (including fine sediment) and associated nutrients. Implementing this alternative would increase the potential for retention of fine sediment and decrease the potential for fine-sediment transport to Lake Tahoe. Neither changes to coarse-sediment discharges nor long-term changes to littoral processes would be expected to occur. This impact would be **beneficial**.

Table 3.9-18
Floodplain Connectivity and Floodplain Process Indicators under Alternative 4

Upper Truckee Marsh Alternative	Length of Channel with Overbanking at 760 cfs[1] (feet)	Percent of Channel with Overbanking at 760 cfs[1] (%)	Area of Floodplain Inundated at 760 cfs[1] (acres)
Alternative 4	17,633	85	82
Alternative 5 (No project/No Action)	2,129	10	65

Notes: cfs = cubic feet per second
[1] Based on hydraulic modeling (HEC-RAS), assuming median lake level.
Source: Conservancy and DGS 2005

IMPACT 3.9-7 (Alt. 4) **Decreased Delivery of Coarse Sediment to Cove East and Barton Beaches. (TRPA 2)** *Implementing Alternative 4 would not directly modify the streambed elevation or continuity of the Upper Truckee River's low-flow channel through the study area to Lake Tahoe, and therefore would be unlikely to modify the transport of coarse sediment to beach areas adjacent to the river's mouth. The ongoing trend of net beach erosion would continue. Any determination regarding long-term effects of climate change on coarse-sediment transport and delivery downstream would be* ***too speculative for a meaningful conclusion****. In the short term, however, implementing Alternative 4 would neither modify the streambed profile nor reconnect and increase the potential for sediment deposition in existing lagoon areas (Sailing Lagoon or East Barton Beach).* ***No impact*** *would occur in the short term.*

In the long term, climate change effects could either exacerbate or counteract present trends in the study area. Potential long-term effects could range from worse than the existing degraded condition to a possible improvement. Any determination regarding climate change effects on coarse-sediment transport and delivery downstream would be **too speculative for a meaningful conclusion**. In the short term, however, implementing Alternative 4 would not modify transport and retention of coarse sediment within various portions of the study area, and coarse-sediment delivery to the adjacent beaches would remain similar to deliveries under existing conditions. The design elements of Alternative 4 include a low-flow channel that would be complete at the time of construction, at the existing grade, and none of the features would require aggradation to meet the finished grade or function. No changes to the input of coarse sediment to the littoral zone would be expected. **No impact** would occur.

IMPACT 3.9-8 (Alt. 4) **Stormwater Drainage and Treatment. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 4 would involve constructing and operating permanent recreational features. Developing these features could potentially result in release of pollutants and degradation of water quality. As described in Environmental Commitments 5, 6, and 11, effective permanent BMPs to protect water quality would be included in the final design of all recreation features. This impact would be* ***less than significant.***

Alternative 4 proposes new, permanent recreational facilities within the study area, including a self-service kiosk on the west margin adjacent to East Venice Drive and a trail connecting these facilities to Cove East Beach. Also proposed are viewpoints and a trail along the eastern margin and a bike path north of Springwood Drive. The facilities generally would be restricted to the margins of the SEZ to minimize the extent of encroachment in this sensitive area. Developing these features would require disturbance of floodplain areas within an SEZ, presenting potential erosion hazards. Recreational facilities with impervious cover (e.g., pavements, roofs, and other structures) could also increase or concentrate runoff and increase erosion potential.

The design of these features has not been finalized. However, without proper mitigation of their effects, these features may increase the potential for the transport of sediment or other pollutants to surface water bodies, which would be a potentially significant effect. However, the Conservancy would implement ECs 5 and 6 (Table 2-6). Implementing these environmental commitments would require implementation of effective construction site management plans and compliance with federal and state permits and thus would minimize short-term construction-related impacts. The final project design and implementation would include permanent stormwater detention features or infiltration systems for runoff from areas of proposed impervious surfaces (see Impact 3.8-1 [Alt. 4] in Section 3.8, "Hydrology and Flooding," for further discussion). The Conservancy would also implement EC 11 to provide effective permanent BMPs for all recreation features. With implementation of ECs 5, 6, and 11, this impact would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.9-1 (Alt. 5) **Short-Term Risk of Surface Water and Groundwater Degradation During Construction. (CEQA 1, 2, 3; TRPA 1, 2, 3, 4, 5)** *Alternative 5 would not involve any planned or prolonged construction activities in the study area. Implementing this alternative would not result in short-term turbidity that could violate the Basin Plan's stringent turbidity standard (10 percent above background levels).* ***No impact*** *would occur.*

Under Alternative 5, the Conservancy would not conduct new or substantial construction or excavation activities within the study area. No construction would occur that could increase susceptibility to erosion and sedimentation or accidental release of other pollutants. Emergency or routine repairs to public utilities, infrastructure, or private property within the study area would be implemented, if needed, by other public and private entities. Such activities would be evaluated separately for compliance with existing laws and regulations. **No impact** would occur.

IMPACT 3.9-2 (Alt. 5) **Short-Term, Project-Related Risk of Surface Water Degradation Following Construction. (CEQA 1, 2, 3; TRPA 1, 2, 3, 4, 5)** *Alternative 5 would not require major or prolonged construction activities; it would not require a period of channel adjustments following construction to meet final design. Therefore, implementing this alternative would not make any changes to the existing condition that could increase the short-term risk of water quality degradation following construction.* ***No impact*** *would occur.*

Under Alternative 5, Conservancy would not conduct new or substantial construction or excavation activities within the study area, and no features would be installed that require geomorphic adjustments to meet final design. No disturbed areas would be created that would increase susceptibility to erosion and sedimentation during a flood after construction. Emergency or routine repairs to public utilities, infrastructure, or private property within the study area would be implemented, if needed, by other public and private entities. Such activities would be evaluated separately for compliance with existing laws and regulations. **No impact** would occur.

IMPACT 3.9-3 (Alt. 5) **Upper Truckee River Channel Erosion within the Study Area. (CEQA 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 5 would not involve making direct changes to the channel of the Upper Truckee River. However, natural geomorphic response to historic disturbances would continue, with channel instability that would erode the streambanks and streambed within the study area, releasing sediment and nutrients that would degrade the river and lake water quality relative to undisturbed natural conditions. Implementing Alternative 5 would allow the adverse conditions to persist, but this would not be a change from existing conditions. Therefore, this impact would be* ***less than significant****.*

Rates of stream channel erosion along the Upper Truckee River in the study area and along the upstream reaches have been accelerated relative to natural conditions by the geomorphic response to past direct human actions throughout the watershed and at particular locations on the river. These direct human actions typically decreased stream length and increased channel slope, width and depth, and/or bank heights. As a result, erosion occurred during or after the disturbance, generating total sediment and fine sediment loads that have exceeded natural conditions. Channel conditions in particular river reaches influenced erosion processes in other reaches, with erosion and sedimentation influences occurring both upstream and downstream of disturbances. At several sites along the Upper Truckee River, various types of streambank protection measures were installed to help limit erosion. However, the measures only addressed local sites and did not include streambed protection, so their effectiveness and life spans were limited.

The existing conditions continue to be degraded and erosion exceeds natural rates. Studies for the Lake Tahoe TMDL have documented the existing degraded condition of the Upper Truckee River from field observations (Simon et al. 2003). Calculations performed for these studies have demonstrated that the Upper Truckee River is

the largest contributor of fine sediment from streambanks to the lake (Simon 2006, California Water Boards and NDEP 2007).

Substantial direct historical modifications were also made to channels in the study area. During the Comstock era, logging and log transport and installation of road crossings and piers affected local hydraulics and scour. In the early 1900s water infrastructure (including irrigation ditches) shortened and straightened channels and constructed ditches; and in the 1950s and 1960s, as part of urban development, some channel segments were cut off, new channels were dredged, and the lower reach of the Upper Truckee River was straightened and dredged. Recent restoration efforts within the study area at the Lower West Side Restoration Area wetlands lowered bank heights and partially offset past actions that increased erosion in the lower reach of the Upper Truckee River.

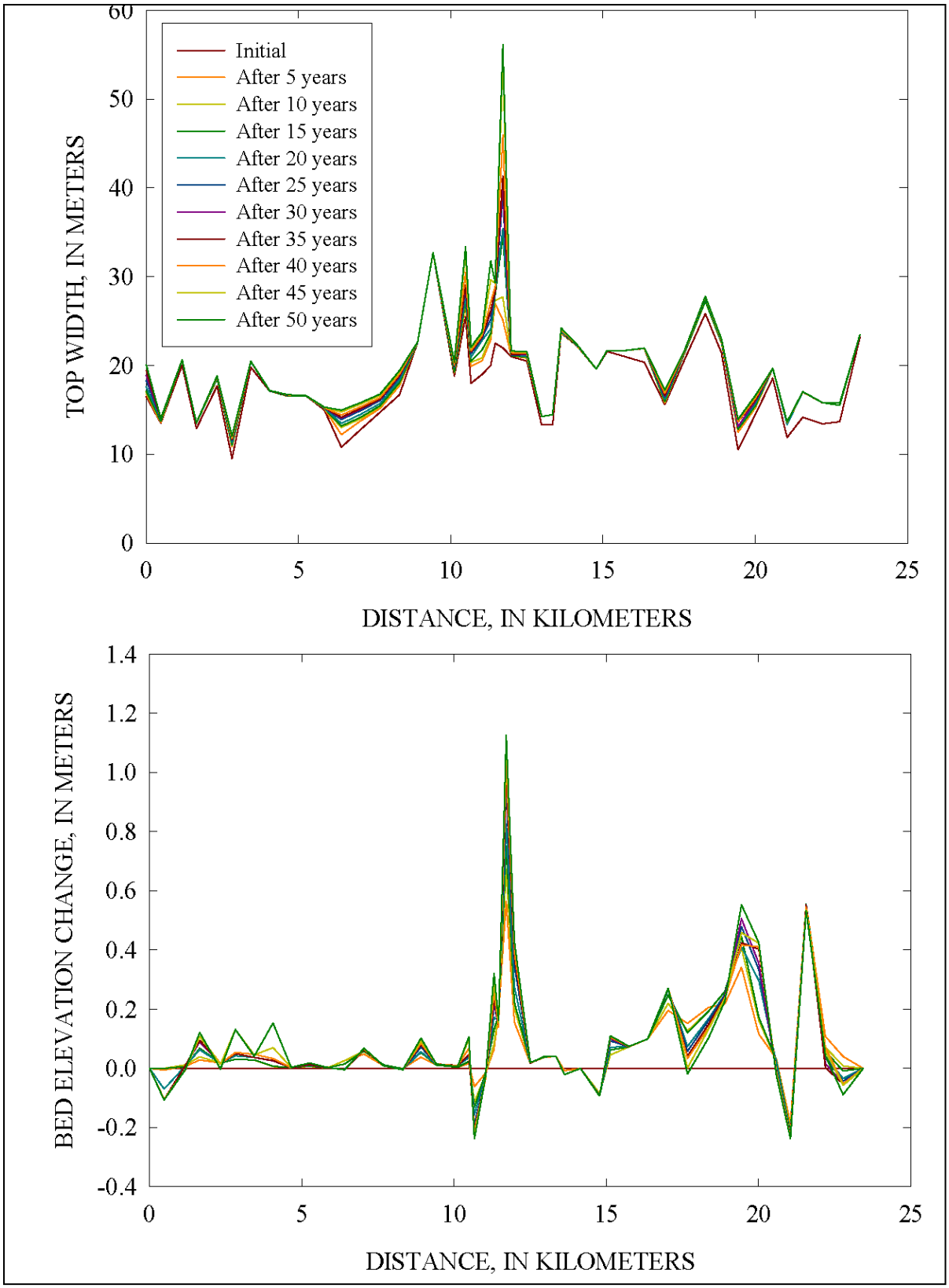
Under the No-Project/No-Action Alternative, the Upper Truckee River would continue to respond to past disturbances. The progressive geomorphic adjustment along the Upper Truckee River would occur primarily in the form of streambank erosion and widening, followed by streambed deposition in some upstream reaches. Simulations of future channel adjustments performed for the TMDL studies (Simon et al. 2003) estimate channel width and streambed elevation for the Upper Truckee River over a 50-year period (Exhibit 3.9-15). These data suggest that bank erosion and channel widening would progress rapidly over the next decade in some reaches (e.g., five kilometers upstream of the river's mouth) and slowly for decades in other areas (e.g., seven kilometers upstream). The magnitude of channel widening may be substantial, with estimates ranging from several feet in most areas to more than 20 feet in some locations. The changes in streambed elevation would be smaller, with deposition expected to occur in much of the system, ranging up to one foot in most areas and a couple of feet thick in a few locations. The simulations indicate that net streambed erosion would occur in some locations, including portions of the study area (e.g., zero - one kilometers upstream).

Future channel erosion under the No-Project/No-Action Alternative, while generally expected to follow a predictable trend based on geomorphic channel evolution models described above, could be altered by climate change. Climate change may modify future hydrology and sediment loads from the watershed. However, the effects of climate change were not specifically represented in the TMDL modeling, which assumed future hydrology similar to the historic record. Increased rainfall as a proportion of total precipitation, increased runoff during winter, decreased snow water equivalent, and decreased spring/summer runoff are climate change conditions that could limit the rate of natural recovery within the incised channel system.

There could also be offsetting effects of climate change on stream channel erosion. For example, vegetation encroachment on channels resulting from lower average annual flows may help stabilize some existing streambanks. However, the potential for severe rain or rain-on-snow floods and associated erosion effects may remain the same or even increase.

Another adverse effect of climate change on channel erosion within the study area may occur if total runoff to Lake Tahoe were to decrease and the lake level were to stay below historic elevations more often or for sustained periods. This would lower the base elevation at the mouth of the Upper Truckee River and worsen streambed erosion (i.e., incision) locally, even relative to the TMDL simulation. If incision were to occur, the effect would be likely to migrate upstream in the river (and possibly Trout Creek), resulting in channel erosion and destabilization of channel banks.

Recent restoration efforts within the study area at the Lower West Side Restoration Area lowered bank heights and partially offset past actions that increased erosion in that reach of the Upper Truckee River. Ongoing restoration efforts upstream in the Middle Reach of the Upper Truckee River (Reaches 3 and 4) are adding channel length, reducing slope, and creating new channel segments with appropriate bank heights. Implementing these improvements is expected to result in a more functional channel with natural bank erosion rates. These efforts will partially offset the effects of past actions in the respective project reaches, but are not expected to correct the accelerated channel erosion throughout the system (e.g., not directly address conditions within the study area).



Source: Simon et al. 2003

Exhibit 3.9-15 **Simulated Changes in Bank Top Width and Bed Elevation of the Upper Truckee River over a 50-Year Period**

The TMDL analysis of load reduction opportunities (California Water Boards and NDEP 2008:211–215) produced quantitative estimates of erosion of fine sediment from streambanks of the Upper Truckee River under the existing condition and for a range of treatments to reduce streambank erosion. Compilation of the results for specific subreaches of the Upper Truckee River allows a quantitative estimate of the effect of the No-Project/No-Action Alternative on stream channel erosion within the study area (Table 3.9-19).

Table 3.9-19
Estimated Stream Channel Bank Erosion on the Upper Truckee River under Alternative 5

River Reach	Distance Upstream of Lake (feet)	Alternative 5 (No-Project/No-Action) Bank Erosion of Fine Sediment[1] (cubic yards)
Upper Truckee Marsh study area	0–9,646	538.13
TOTAL	79,364	4,319.74

Note:
[1] Fine sediment is less than 0.063 millimeter in diameter.
Source: California Water Boards and NDEP 2007.

Channel erosion along the Upper Truckee River would continue to exceed natural background conditions under Alternative 5. Although this is an adverse condition that would continue, it is not a change from existing conditions. This impact would be **less than significant**.

IMPACT 3.9-4 (Alt. 5) **Trout Creek Channel Erosion within the Study Area. (CEQA 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 5 would not involve directly modifying the channel of Trout Creek. However, Trout Creek would continue responding to historic disturbances with instability that would erode its streambanks and streambed within the study area and release sediment and nutrients that would degrade water quality in the creek and lake relative to undisturbed natural conditions. Implementing Alternative 5 would allow the adverse conditions to persist, but this would not be a change from existing conditions. Therefore, this impact would be* ***less than significant.***

The Trout Creek channel(s) in the study area and upstream reaches have experienced accelerated erosion in response to watershed-wide and site-specific past actions. The direct actions and the geomorphic responses to those actions have created increased rates of streambed and streambank erosion. Some past actions on the watershed scale, such as logging and transporting logs using stream channels and ditches or water supply diversions and ditches, had direct effects on channels within the study area and along upstream reaches. Some of the direct modifications made to the Upper Truckee River channel in the study area also affected Trout Creek, particularly the straightening and dredging near the mouth of the Upper Truckee River, which also lowered the base elevation at the mouth of Trout Creek. Many of these actions reduced stream length and increased channel slope, depths, and/or bank heights, resulting in direct or subsequent increases in channel erosion that generated total sediment and fine sediment loads at rates that exceed natural conditions.

Restoration efforts over the last decade upstream within the Trout Creek system have restored upstream channel segments on Trout Creek and its tributary, Cold Creek, to have more appropriate slopes, dimensions, and bank heights than their degraded historic condition. These efforts have partially offset the effects of past actions in their respective project reaches, but have not resulted in systemwide correction to the accelerated channel erosion.

Under the No-Project/No-Action Alternative, changes would occur along Trout Creek within the study area as it would continue to respond to past disturbances. The progressive geomorphic adjustment along Trout Creek and its distributary channels would occur primarily in the form of streambed erosion in the lower reach. Channel erosion would continue at an accelerated rate for a period of time, eventually stabilizing after a period of years to decades under likely trends based on geomorphic channel-evolution models. Quantitative modeling of future

channel erosion on Trout Creek has not been performed for the TMDL; the expected trends, which are based on conceptual models, could be altered by the effects of climate change. Increased rainfall as a proportion of total precipitation, increased runoff during winter, decreased snow water equivalent, and decreased spring/summer runoff are all likely to limit the rate of natural recovery within the incised channel systems.

Offsetting indirect effects of climate change on stream channel erosion could occur. It is possible that vegetation encroachment within channels resulting from lower average annual flows may help stabilize some of the existing incised streambanks, but the potential for severe rain or rain-on-snow floods may stay the same or even increase. Another adverse potential effect of climate change on channel erosion within the study area may occur if total runoff to Lake Tahoe were to decrease and the lake level were to stay below historic median elevations more of the time or for longer durations. A lower lake level would lower the base elevation at the mouth of Trout Creek, potentially worsening ongoing and expected streambed erosion within that portion of the study area.

Under the No-Project/No-Action Alternative, continued or increased channel erosion is expected in Trout Creek as it continues to adjust to past disturbance. Channel erosion along the lower reach of Trout Creek would continue to exceed natural background conditions under Alternative 5. Although this is an adverse condition that would continue, it is not a change from existing conditions. This impact would be **less than significant**.

IMPACT 3.9-5 (Alt. 5) **Erosion of Backfilled and/or Remnant Channel Segments on the Floodplain. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 5 would not involve abandoning and backfilling the existing Upper Truckee River, and would not increase the frequency with which existing remnant channel segments on the floodplain would be inundated. The risks of erosion and/or mobilization of organics and sediment within the floodplain topography would remain similar to existing risks.* ***No impact*** *would occur.*

Alternative 5 would not involve modifying the location or capacity of the Upper Truckee River or modifying the frequency or magnitude of overbank flows that access the existing floodplain (terrace) surface across the study area. The potential for floodplain erosion to occur and mobilize organics and/or sediment that have accumulated within remnant channel features at various locations throughout the marsh would remain under Alternative 5. This would not be a change from existing conditions. **No impact** would occur.

IMPACT 3.9-6 (Alt. 5) **Retention of Fine Sediment and Nutrients within the Study Area. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 5 would not directly modify the channel capacity, elevation, frequency of overbanking, or area of functional active floodplain, although future natural geomorphic adjustments to historic disturbances would be expected to eventually form a small inset floodplain below the terrace banks. Implementing this alternative would allow the existing impaired fine sediment and nutrient retention conditions to persist. This impact would be* ***less than significant****.*

Relative to natural conditions, stream channel and floodplain connections, active floodplain areas, and overbanking processes that prompt deposition of fine sediment and retention of nutrients are degraded in the study area and along the upstream reaches of the Upper Truckee River. This degradation has resulted from past watershed-wide and site-specific direct actions and the stream's geomorphic response to those actions. The river channel is enlarged, banks are high, and fill has been placed in some floodplain areas. These conditions have reduced the frequency of overbank flow and the extent of active floodplain. These changes, in turn, have decreased the opportunity for and effectiveness of floodplain deposition of suspended sediment and/or the trapping and transformation of attached or dissolved nutrients.

The connectivity of the Upper Truckee River channel in the study area to its floodplain has been reduced by watershed-wide and site-specific past actions. Various direct actions and the geomorphic responses to those actions have enlarged the channel, increased bank heights, and placed fill within floodplain areas, and thus reduced the frequency of overbank flows and the extent of floodplain inundation. These effects have decreased

the opportunity for and effectiveness of floodplain deposition of suspended sediment and/or the trapping and transformation of attached or dissolved nutrients.

Studies for the Lake Tahoe TMDL have documented the existing degraded condition of the Upper Truckee River, reported the magnitude of total and fine sediment loads, and calculated nutrient loads delivered to Lake Tahoe based on U.S. Geological Survey records (Simon et al. 2003, Simon 2006, California Water Boards and NDEP 2007). The loads reaching the lake reflect the net effect of numerous sources and sinks (or storage) throughout the watershed and along the stream corridor, not just the floodplain processes. The TMDL studies included estimates of several of the watershed's pollutant sources and opportunities to reduce loads from those sources (California Water Boards and NDEP 2007). However, little information is available to quantify the degree of impairment of floodplain processes as a sink for sediment and nutrients along the Upper Truckee River in the study area, relative to a natural or undisturbed condition.

Conceptual models that link channel and floodplain characteristics to sediment and nutrient sources and sinks and some limited field data have been the basis of discussions of the existing versus restored conditions to date (Conservancy and DGS 2003:Chapter 12; California Water Boards and NDEP 2008:Stream Cannel Erosion Load Reduction Analysis, Appendix A). A few studies have collected field data regarding overbank flows and information about floodplain sedimentation within the study area. Postconstruction monitoring at the restored Lower West Side project included visual observation and measured the accumulation of sediment on the restored floodplain wetlands. Analysis of soil cores collected in the study area documented modern net sedimentation in the Upper Truckee Marsh even under the degraded channel conditions, but at rates that only capture a small portion of the suspended sediment in the streamflow entering the study area (Winter 2003:90).

Observations at seven sampling sites in the study area during the 2003 snowmelt season identified patterns and amounts of suspended sediment and total phosphorus retention on the Upper Truckee River versus Trout Creek portions of the study area (Stubblefield et al. 2006). These field data indicate that the more functional floodplain along Trout Creek retained 68–90 percent of the suspended sediment and 61–85 percent of the total phosphorus, while areas along the degraded Upper Truckee River retained only 26 percent of the suspended sediment and 24 percent of the total phosphorus (Stubblefield et al. 2006). Conceptual models of floodplain processes and the limited local data both suggest that improved floodplain connectivity and floodplain conditions, as well as frequent overbank flows, would increase net sedimentation and nutrient retention as water quality treatment.

Recent restoration efforts within the study area at the Lower West Side Restoration Area excavated fill that had been placed on the natural floodplain, lowered bank heights, and specifically created a low area on the west side of the existing channel. The low area increased the opportunity for river water to overflow into the restoration site despite the enlarged existing channel and common lake backwater. These measures partially offset past actions by increasing the extent of floodplain connectivity and overbanking for a small section of the Upper Truckee River in the study area, restoring 12 acres of improved floodplain. However, this would not be expected to correct the decreased floodplain connectivity, area, and function that persist in other portions of the study area.

Under the No-Project/No-Action Alternative, changes would occur along the Upper Truckee River and Trout Creek channels within the study area as these streams would continue to respond to past disturbances. The progressive geomorphic adjustment along the Upper Truckee River and Trout Creek within the study area is expected to further enlarge the channels and worsen the existing degraded floodplain connectivity. No future direct or indirect reductions of floodplain area or storage capacity are expected under the No-Project/No-Action Alternative. The channel(s) and 65.0-acre inundation area for the 2-year event in the study area would not be directly modified. The active floodplain area (Table 3.9-20) and potential for frequent overbanking would be either similar to existing conditions or potentially worse in locations where the channel capacity would continue to enlarge. These factors would reduce the frequency, area, and duration of floodplain inundation. Small increases in active floodplain area could occur in some reaches where channel incision and widening had progressed to the point of creating an inset floodplain between terrace banks. However, net retention of sediment and nutrients would not necessarily be improved substantially because these inset surfaces would be more vulnerable to

disturbance during high flows than would active floodplains on the surrounding terrace. Therefore, the opportunity for floodplain processes to provide water quality treatment in the study area and upstream would be further degraded under the No-Project/No-Action Alternative.

Table 3.9-20
Floodplain Connectivity and Floodplain Process Indicators under Alternative 5

Upper Truckee Marsh Alternative	Length of Channel with Overbanking at 760 cfs[1] (feet)	Percent of Channel with Overbanking at 760 cfs[1] (%)	Area of Floodplain Inundated at 760 cfs[1] (acres)
Alternative 5 (No Project/No Action)	2,129	10	65

Note:
[1] Based on hydraulic modeling (HEC-RAS), assuming median lake level.
Source: Conservancy and DGS 2005

Future overbanking and floodplain processes under the No-Project/No-Action Alternative could also worsen with the effects of climate change. Precipitation changes, reduced percentage of precipitation as snow, and temperature increases associated with climate change would likely reduce mean streamflows, average annual runoff, and the magnitude of peak streamflow expected frequently (i.e., every two-five years). Additionally, incision of the channels in response to lowered lake levels would be expected to exacerbate the increase in channel capacity and decrease connectivity. Therefore, climate change could exacerbate the existing degraded condition by further reducing the frequency at which the existing design overbank flow (i.e., 760 cfs for the study area) would occur.

Therefore, the opportunity for floodplain processes to provide water quality treatment would be further degraded in the study area under the No-Project/No-Action Alternative. The adverse existing conditions would not change under Alternative 5. This impact would be **less than significant**.

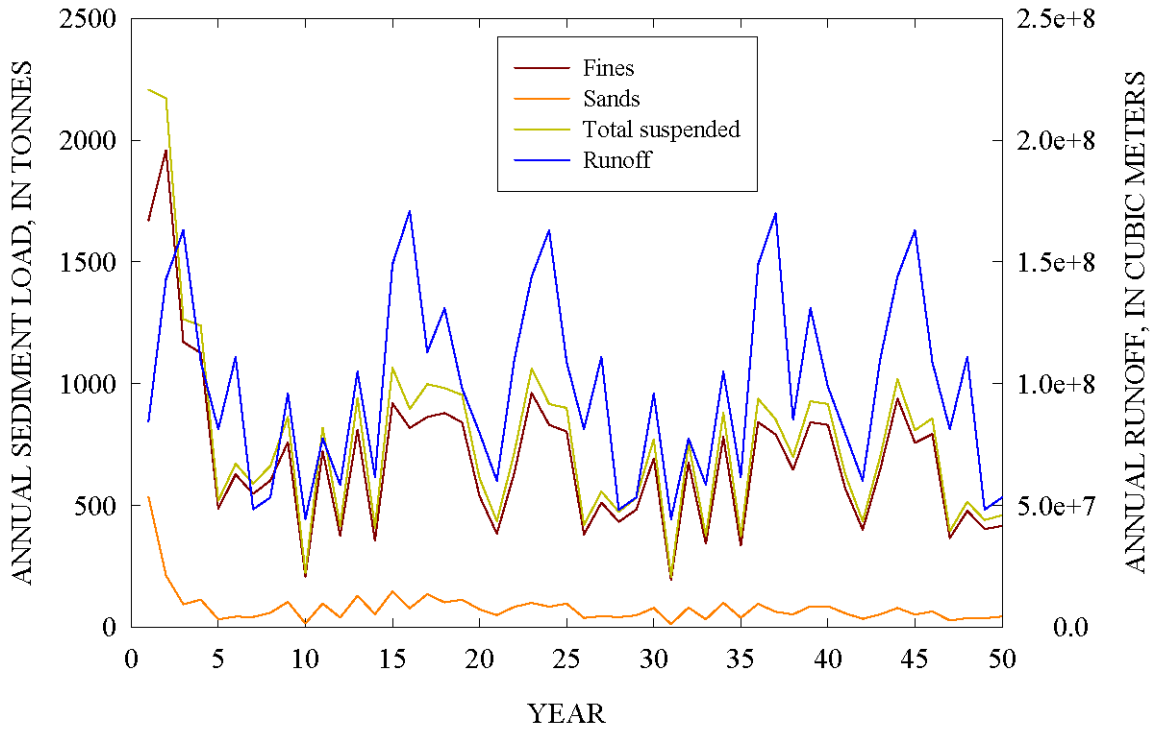
IMPACT 3.9-7 (Alt. 5) **Decreased Delivery of Coarse Sediment to Cove East and Barton Beaches. (TRPA 2)** *Implementing Alternative 5 would not directly modify the streambed elevation or continuity of the Upper Truckee River's low-flow channel through the study area to Lake Tahoe, and therefore would not modify the transport of coarse sediment to beach areas adjacent to the river's mouth. The ongoing trend of net beach erosion would continue. In the long term, climate change effects could either exacerbate or counteract present trends. Potential long-term effects could range from worse than the existing degraded condition to a possible improvement. Any determination regarding long-term effects of climate change on coarse-sediment transport and delivery downstream would be* ***too speculative for a meaningful conclusion****. In the short term, however, implementing Alternative 5 would neither modify coarse-sediment transport and deposition within various portions of the study area nor affect delivery of coarse sediment to the adjacent beaches. The short-term impact would be* ***less than significant.***

Past direct actions throughout the watersheds, at the lake outlet, and in the study area, along with the geomorphic responses to those actions, have resulted in net erosion of Cove East and Barton Beaches since the early 1900s, producing a degraded condition relative to the predevelopment shoreline. At the watershed scale, past actions such as logging in the late 1800s and urban development in the mid 1900s temporarily increased delivery of sediment to the lake, including coarse sediment that supplied local beaches.

During the last few decades, coarse sediment carried by the Upper Truckee River and Trout Creek has been insufficient to maintain the historic length, width, or thickness of beach deposits. In addition, potential wave-energy effects on all Lake Tahoe beaches have increased since the late 1800s. U.S. Bureau of Reclamation management of lake levels holds water in storage and keeps the lake at a high elevation when possible. Site-specific actions since the 1950s, most importantly the initial and maintenance dredging of the Tahoe Keys

navigation channels west of the Upper Truckee River, have directly reduced the supply of beach sediment to the study area. Dredging of navigation channels interrupts the movement of beach sand along the local shoreline and has directly resulted in net removal of all dredged sediment, including coarse sediment that would be supplied to beaches. These past actions have resulted in considerable and continued shoreline retreat in the study area. Historic beach erosion in the study area has especially affected active, largely unvegetated sand deposits, but it has also disturbed locations with dense herbaceous vegetation and mature conifers rooted in soils along the beach ridge.

Under the No-Project/No-Action Alternative, delivery of coarse sediment from upstream to the study area beaches would change as the watersheds and stream channels continued to respond to past disturbances, ongoing management, and to the influences of climate change. No quantitative projections have been made of the net effects of all these factors on future delivery of coarse sediment. Recent historic conditions, with relatively low yield of coarse sediment from the Upper Truckee River and Trout Creek watersheds, are expected to be followed by declining sand or coarser loads as channels continue to widen and the streambed stabilizes (with net deposition in certain reaches) (Exhibit 3.9-16). It is possible that flood processes from rainfall runoff could result in periodic increases in loads of coarse sediment, even if most years have reduced transport of coarse sediment compared to existing conditions. No further modifications to management of the lake outlet (Reclamation 2008) would be expected under the No-Project/No-Action Alternative. Relatively high lake elevations would continue to be maintained for water supply unless climate change–related decreases in runoff or other effects were to lower the lake level. Dredging of the navigation channel west of the study area would be expected to continue without sand replenishment.



Simulated annual runoff and loads of fines, sands, and total suspended sediments delivered to the lake for the 50-year period. Source: Simon and Others 2003

Exhibit 3.9-16 **Simulated Annual Runoff and Loads of Fines, Sands, and Total Sediments Delivered to Lake Tahoe for the 50-Year Period**

The net effect of the above factors on future beach erosion at the study area is highly uncertain and difficult to predict. There could be a continuing adverse trend of net deficit of coarse sediment. Continued or increasing beach erosion could advance landward into the soils and marsh sediments behind the beach ridge, potentially increasing environmental damage relative to the existing degraded condition. However, it is also possible that climate change could result in lowered lake levels that would reduce potential wave energy along the existing beach ridge. The net effect of these factors has not been quantified and is highly uncertain, but could range from worse than the existing degraded condition to a possible improvement in beach erosion.

Implementing Alternative 5 would not alter existing conditions. Depending on which climate change influences were to occur, they could either exacerbate or improve conditions with regard to coarse-sediment transport and delivery to the beaches. Therefore, this impact remains **too speculative for a meaningful significance conclusion**.

IMPACT 3.9-8 (Alt. 5)	**Stormwater Drainage and Treatment. (CEQA 1, 2, 3; TRPA 1, 2, 3)** *Implementing Alternative 5 would not provide additional stormwater pretreatment and/or flow routing improvements to enhance water quality treatment before discharge to the SEZ or directly to the Upper Truckee River and Trout Creek in the study area. No new recreation facilities or features would be constructed. The existing conditions would be allowed to persist.* ***No impact*** *would occur.*

Under Alternative 5, no measures would be implemented along the margins of the study area to provide additional stormwater treatment and/or flow routing improvements to enhance water quality treatment before discharge within the SEZ and/or directly to the surface water in Trout Creek or the Upper Truckee River. New recreation features would not be constructed or operated under this alternative. Therefore, the existing condition of stormwater drainage or treatment would not change. **No impact** would occur.

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Environmental Impact Report/
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Upper Truckee River and Marsh Restoration Project

Volume 2
SCH# 2007032099

Lead Agencies:

California Department of General Services

California Tahoe Conservancy

Tahoe Regional Planning Agency Lake Tahoe Environmental Improvement Program

U.S. Department of Interior Bureau of Reclamation

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F Air Quality Modeling Results

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H Wildlife Species and Associated Plant Communities and Aquatic Ecosystems at the Upper Truckee Marsh

I Stream Channel Bank Erosion Data

J Noise Modeling Results

K Photo Viewpoints

L Distribution List

3.10 LAND USE

This section describes the regulatory setting relevant to land use in the study area, existing land uses within the study area and vicinity, and impacts of Alternatives 1–5. Cumulative public services impacts are addressed in Section 3.18, "Cumulative Impacts." Consistency with TRPA goals and policies is presented in Table 3.10-1.

3.10.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Numerous federal, state, regional, and local laws, rules, regulations, plans, and policies define the framework for regulating land use in the Tahoe Basin. The following discussion focuses on land use-related requirements applicable to the proposed alternatives.

Federal

No federal plans, policies, regulations, or laws related to land use are applicable to the proposed alternatives under consideration.

State

The following state program related to land use is relevant to the proposed alternatives and is described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- California State Lands Commission management of public lands

Tahoe Regional Planning Agency

Regional Plan Goals and Policies

The Goals and Policies document for the 1987 *Regional Plan* establishes an overall framework for development and environmental conservation in the Lake Tahoe region. TRPA goals and policies are included for six elements: land use, transportation, conservation, recreation, public services and facilities, and implementation (TRPA 2006). The goals and policies relevant to the project are listed in Table 3.10-1 and are discussed in Section 3.10.2, "Environmental Consequences and Mitigation Measures," below.

Code of Ordinances

The TRPA Code of Ordinances establishes standards and regulations for implementation of the Regional Plan for the Tahoe Basin. Public agencies and organizations in the Basin must comply with TRPA provisions or may establish equivalent or higher requirements in their jurisdiction. The Code of Ordinances is a coordinated series of documents addressing environmental and land-use planning issues in the Tahoe Basin, including the Tahoe Regional Planning Compact, environmental threshold carrying capacities, Goals and Policies, the Plan Area Statements and maps, and other TRPA plans and programs. The Code of Ordinances is intended to implement the Goals and Policies while maintaining the environmental thresholds (TRPA 2011).

A September 16, 2010 federal ruling struck down updated shorezone ordinances; TRPA is currently appealing the ruling. The decision to appeal follows an assessment by the agency of the ruling over the complex environmental analysis of rules that were crafted to resolve multiple Lake Tahoe shorezone issues. The lawsuit was brought by the League to Save Lake Tahoe and the Sierra Club. The Upper Truckee River and Marsh Restoration project application was submitted prior to this ruling and will be processed under rules that were in effect prior to the October, 2008 adoption (TRPA 2010).

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
Land Use Goal 1: Restore, maintain, and improve the quality of the Lake Tahoe Region for the visitors and residents of the region.						
Policy 1: The primary function of the region shall be as a mountain recreation area with outstanding scenic and natural values.	Y	Y	Y	Y	Y	All of the action alternatives (Alternatives 1–4) would involve providing recreation opportunities and improving the natural values of the Upper Truckee River within the study area. Under Alternative 5, the No Project/No Action Alternative, the study area would remain as a habitat area and an area of informal recreation, which would continue to support natural and recreational uses.
Policy 2: The Regional Plan gives a high priority to correcting past deficiencies in land use. The Plan shall encourage a redirection strategy for substantially and adversely altered areas, wherever feasible.	Y	Y	Y	Y	NA	All of the action alternatives (Alternatives 1–4) would include enhancements that would improve effects of past land use or remove coverage of the Upper Truckee River and various other habitats in the study area. Alternative 5, the No Project/No Action Alternative, would not involve changing land uses in the study area, which would support recreational uses, but would not restore the river or redirect recreational access away from sensitive habitats.
Land Use Goal 2: Direct the amount and location of new land uses in conformance with the environmental threshold carrying capacities and other goals of the Tahoe Regional Planning Compact.						
Policy 2: Specific land use policies shall be implemented through the use of planning area statements for each of the planning areas identified in the map included in the Regional Plan. Areas of similar use and character have been mapped and categorized within one or more of the following five land use classifications: conservation, recreation, residential, commercial and public service, and tourist. These land use classifications shall dictate allowable land uses.	Y	Y	Y	Y	Y	The study area is located in six PASs 99 (Al Tahoe), 100 (Truckee Marsh), 102 (Tahoe Keys), 103 (Sierra Tract Commercial), 104 (Highland Woods), and 111 (Tahoe Island). Alternatives 1–5 would be consistent with the permissible uses in these PASs.
Policy 3: The Plan Area Statements shall also identify the management theme for each planning area by designating each area for (1) maximum regulation, (2) development with mitigation, or (3) redirection of development. These designations shall provide additional policy direction for regulating land use.	N	Y	Y	Y	Y	Implementing any of the action alternatives would result in an increase in recreational development; however, long-term environmental impacts of development would be mitigated with the exception of recreational development under Alternative 1 related to the bridge and potential effects to Tahoe yellow cress. All other components of Alternative 1 and the other action alternatives would redirect recreational access away from sensitive habitats. Implementing Alternative 5 would not result in a change in

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
						existing development.
Policy 4: The Plan Area Statements set forth special policy direction to respond to the particular need, problems, and future development of a specific area. Each Plan Area Statement may vary in detail or specificity depending on the nature of the area and the detail or specificity related to local jurisdictional plans.	Y	Y	Y	Y	Y	The study area is located in six PASs 99 (Al Tahoe), 100 (Truckee Marsh), 102 (Tahoe Keys), 103 (Sierra Tract Commercial), 104 (Highland Woods), and 111 (Tahoe Island). Alternatives 1–5 would be consistent with the permissible uses in these PASs.
Policy 5: All Plan Area Statements, community plans, or other specific plans adopted by the agency shall specify the total additional development which may be permitted within the region, not to exceed the limitations set forth in A, B, C, D, and E in the Regional Plan. Reconstruction and relocation of existing development are not considered additional development.	Y	Y	Y	Y	Y	None of the alternatives (Alternatives 1–5) would include additional residential, commercial, or public service development. Therefore, these uses would not be increased under any of the alternatives. Implementing Alternative 1, 3, or 4 would include one or two kiosks, which would not likely require the allocation of summer-day-use PAOTs, and if necessary, sufficient summer-day-use PAOTs are currently available and could be allocated to these alternatives. Implementing Alternative 2 or 5 would not include any kiosks and therefore, would not require the allocation of PAOTs.
Policy 11: Uses of the bodies of water within the region shall be limited to outdoor water-dependent uses required to satisfy the goals and policies of this plan.	Y	Y	Y	Y	Y	The portion of the Upper Truckee River within the study area would continue to be used for informal water-related recreation under all of the alternatives.
Land Use Goal 3: All new development shall conform to the coefficients of allowable land coverage as set forth in "The Land Capability Classification of the Lake Tahoe Basin, California-Nevada, a Guide for Planning, Bailey, 1974."						
Policy 1: Allowed base land coverage for all new projects and activities shall be calculated by applying the Bailey coefficients, as shown below, to the applicable area within the parcel boundary. Land Capability District — Max Allowable Coverage 1a — 1% 1b — 1% 1c — 1% 2 — 1% 3 — 5%	Y	Y	Y	Y	NA	Coverage within the study area is regulated by the Dillingham Settlement Agreement and the Bailey's Land Capability coefficients. Most existing would be removed and/or relocated to higher capability lands within the study area under Alternatives 1–4, as allowed per the Regional Plan Goals and Policies. Coverage also would be added by public access, and recreation infrastructure elements, Nonetheless, implementing any of the action alternatives would comply with the Dillingham Settlement Agreement and Bailey's Land Capability coefficients. See Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage," for additional coverage discussion.

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
4 20% 5 25% 6 30% 7 30%						
Policy 2: The allowed coverage in Policy 1 may be increased by transfer of land coverage within hydrologically related areas up to the limits as set for the in A, B, C, D, and F of this policy.	Y	Y	Y	Y	NA	See Land Use Goal 3, Policy 1 above.
Policy 3: Rehabilitation, reconstruction, and upgrading of the existing inventory of structures, or other forms of coverage in the Tahoe region, are high priorities of the Regional Plan. To encourage rehabilitation and upgrading of structures, the policies listed under this policy shall apply.	Y	Y	Y	Y	Y	See Land Use Goal 3, Policy 1 above.
Land Use Goal 4: Provide to the greatest possible extent, within the constraints of the environmental threshold carrying capacities, a distribution of land use that ensures the social, environmental, and economic well-being of the region.						
Policy 1: All persons shall have the opportunity to use and enjoy the region's natural resources and amenities.	Y	Y	Y	Y	Y	Under all of the action alternatives, the study area would be managed and available for the public to use and enjoy recreation and natural resources. All of the action alternatives would improve and redirect most recreational access away from sensitive habitats with the exception of recreational development under Alternative 1 related to the bridge and potential effects to Tahoe yellow cress. Alternative 5, the No Project/No Action Alternative, would not involve changing land uses in the study area, which would continue to support informal recreational uses.
Policy 2: No person or persons shall develop property so as to endanger the public health, safety, and welfare.	Y	Y	Y	Y	Y	Construction of the action alternatives would likely involve the use of hazardous materials, such as fuels and other materials, but this would be short term, and all materials would be used in accordance with applicable Federal, state, and local laws, including California Occupational Safety and Health Administration (Cal/OSHA) requirements and manufacturers' instructions. No alternatives would involve constructing any buildings for human occupancy, and no buildings would be demolished as part of any of the alternatives.

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
						No alternatives would increase risk of wildland fire, hazards to aviation, or mosquito vector control. For these reasons, implementing any of Alternatives 1–5 would not endanger public health, safety, or welfare.
Noise Goal 1: Single event noise standards shall be attained and maintained.						
Policy 3: Motor vehicles and motorcycles shall comply with the appropriate noise thresholds.	Y	Y	Y	Y	Y	As discussed in Section 3.11, "Noise," construction traffic under all of the alternatives would comply with appropriate noise thresholds. None of the alternatives would result significant increases in noise related to operation.
Policy 4: Off-road vehicle use is prohibited in the Lake Tahoe region except on specified roads, trails or designated areas where the impacts can be mitigated.	Y	Y	Y	Y	Y	Off-road vehicle use is not permitted under any Alternatives or under existing conditions within the study area.
Policy 6: The plan will permit uses only if they are consistent with the noise standards. Sound proofing practices may be required on all structures containing uses that would otherwise adversely impact the prescribed noise levels.	Y	Y	Y	Y	Y	Under all alternatives, noise levels created by project activities would be consistent with applicable noise standards established by the TRPA and the CSLT. No standards would be exceeded at sensitive receptors, and no new sensitive receptors would be created.
Natural Hazards Goal 1: Risks from natural hazards (e.g., flood, fire, avalanche, earthquake) will be minimized.						
Policy 2: Prohibit construction, grading, and filling of lands within the 100-year floodplain and in the area of wave run-up, except as necessary to implement the goals and policies of the plan. Require all public utilities, transportation facilities, and other necessary public uses located in the 100-year floodplain and area of wave run-up to be constructed or maintained to prevent damage from flooding and to not cause flooding.	Y	Y	Y	Y	Y	None of the action alternatives (Alternatives 1–4) propose any construction, grading, or filling of lands within the wave run-up of Lake Tahoe. The action alternatives would include short-term grading and construction within the 100-year floodplain, but they would produce long-term improvements in risks from flooding. Alternatives 1, 2, 3, and 4 would involve removing existing fill in the 100-year floodplain. Under Alternative 5, existing fill and public uses within the 100-year floodplain would remain.

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Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
Policy 3: Inform residents and visitors of the wildfire hazard associated with occupancy in the basin, encourage use of fire resistant materials and preventative techniques when constructing structures, especially in the highest fire hazard areas. Manage forest fuels to be consistent with state laws and other goals and policies of this plan.	Y	Y	Y	Y	Y	No habitable structures are proposed under any alternative. Forest management practices for reducing fire hazards in the study area would be consistent with acceptable strategies for the maintenance of forest health and diversity, prevention of fire, protection of water quality, and enhancement of wildlife habitats.
Water Quality Goal 1: Reduce loads of sediment and algal nutrients to Lake Tahoe; meet sediment and nutrient objectives for tributary streams, surface runoff, and subsurface runoff, and restore 80% of the disturbed lands.						
Policy 1: Reduce loads of sediment and algal nutrients to Lake Tahoe; meet sediment and nutrient objectives for tributary streams, surface runoff, and sub-surface runoff, and restore 80 percent of the disturbed lands.	Y	Y	Y	Y	NA	Alternatives 1–4 include river and floodplain restoration that would increase retention of sediment and algal nutrients in the floodplain of the study area, and thus reduce loads of sediment and nutrients to Lake Tahoe. Alternatives 1–4 would also restore disturbed lands. Alternative 5 (No-Project/No-Action) would not implement river restoration, and existing, disturbed conditions would continue; however, this alternative not result in new conditions that would be inconsistent with this policy.
Policy 2: All persons who own land and all public agencies that manage public lands in the Lake Tahoe region shall put BMPs in place; maintain their BMPs; protect vegetation on their land from unnecessary damage; and restore the disturbed soils on their land.	Y	Y	Y	Y	NA	Under any of the action alternatives (Alternatives 1–4), any new or modified facilities would have appropriately designed BMPs installed and maintained. Additionally, the action alternatives would restore disturbed soils and would construct additional recreation infrastructure features. Existing facilities' BMPs would be maintained under Alternative 5, but disturbed soils would not be restored, and much of the study area would remain unprotected from unnecessary damage from recreational use; however, this alternative would not result in new conditions that would be inconsistent with this policy.
Policy 3: Application of BMPs to projects shall be required as a condition of approval for all projects.	Y	Y	Y	Y	NA	All of the action alternatives (Alternatives 1–4) would require implementation of temporary and permanent BMPs as appropriate. Any future management activities under Alternative 5 would comply with potential BMP requirements.
Policy 4: Restore at least 80 percent of the disturbed lands within the region.	Y	Y	Y	Y	NA	Implementing Alternative 1, 2, 3, or 4 would require some disturbance of new lands; however, all of the action alternatives would result in restoration of floodplain and SEZ lands and most of the recreation components would be designed to direct the public away from sensitive lands within the study area with the exception of recreational development under Alternative 1

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
						related to the bridge and potential effects to Tahoe yellow cress. Under Alternative 5, disturbed lands within the study area would continue to exist in their current degraded state; however, this alternative would be a continuation of existing conditions and would not result in new conditions that would be inconsistent with this policy.
Policy 7: Off road vehicle use is prohibited in the Lake Tahoe region except on specified roads, trails, or designated areas where the impacts can be mitigated.	Y	Y	Y	Y	Y	Off-road vehicle use is prohibited within the study area and the study area would continue to be patrolled for unauthorized uses under all of the alternatives (Alternatives 1–5). Also see Noise Goal 1, Policy 3 for constriction related traffic.
Policy 8: Transportation and air quality measures aimed at reducing airborne emissions of oxides of nitrogen in the Tahoe Basin shall be carried out.	Y	Y	Y	Y	NA	As discussed in Section 3.2, "Air Quality," measures would be implemented under Alternative 1–4 that would reduce the generation of construction-related emissions of ROG, NO_X, and PM_{10} to a less-than-significant level. None of the alternatives would result in a significant increase in long-term emissions. Alternative 5 would not result in short-term or long-term increase in air quality pollutants.
Water Quality Goal 2: Reduce or eliminate the addition of other pollutants that affect, or potentially affect, water quality in the Tahoe Basin.						
Policy 9: Evaluate the feasibility and effectiveness of ponding facilities along stream corridors as a strategy for removing instream loads of sediment and nutrients.	Y	Y	Y	Y	NA	Implementing any of Alternatives 1–4 would increase the frequency and area of potential floodplain trapping of sediment and nutrients. Implementing any of Alternatives 1–4 would also stabilize the river, which also would reduce sediment and nutrient loads. Alternative 5 would not include options for treating instream loads of sediment and nutrients by off-channel ponding or settling; however, this alternative would be a continuation of existing conditions and would not result in new actions that would be inconsistent with this policy.
Community Design Goal 1: Ensure preservation and enhancement of the natural features and qualities of the region, provide public access to scenic views, and enhance the quality of the built environment.						
Policy 1: The scenic quality ratings established by the environmental thresholds shall be maintained or improved.	N	Y	Y	Y	Y	As discussed in Section 3.14, "Scenic Resources," Alternatives 2–5 would comply with scenic quality standards for TRPA, including TRPA's Scenic Resource Thresholds identified in TRPA's Code of Ordinances and TRPA's Design Review Guidelines. Construction of the bridge and boardwalk under Alternative 1 could degrade the scenic quality rating for Shoreline Travel Unit 33.

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
Policy 2: Restoration programs based on incentives will be implemented in those areas designated in need of scenic restoration to achieve the recommended rating.	Y	Y	Y	Y	Y	Two of the six PASs in the study area are designated as scenic restoration areas. As discussed in Section 3.14, "Scenic Resources," Alternatives 2–5 would maintain the scenic quality of the study area and would not substantially degrade the scenic quality of the area. Although the bridge proposed under Alternative 1 could degrade the scenic quality within PAS 100, this PAS does not have a scenic restoration area designation.
Community Design Goal 2: Regional building and community design criteria shall be established to ensure attainment of the scenic thresholds, maintenance of desired community character, compatibility of land uses, and coordinated project review.						
Policy 1: Regional design review shall include site design, building height, bulk and scale, landscaping, lighting, and signing to be used in evaluating projects throughout the region. This review may entail additional requirements or special requirements not listed above.	Y	Y	Y	Y	Y	Each of the action alternatives (Alternatives 1–4) would include the appropriate review requirements for all project improvements. If necessary, special requirements would be included. Alternative 5 would not include new design requirements; however, existing signage follows building and community design criteria.
Transportation Objective 4: Develop and encourage the use of pedestrian and bicycle facilities as a safe and viable alternative to automobile use.						
Policy A: There shall be a high priority on constructing pedestrian and bicycle facilities in urbanized areas of the Region and where reductions in congestion will result.	Y	Y	Y	Y	NA	The study area is surrounded by urban areas. Implementing Alternatives 1-4 would include foot or bicycle trails. Alternative 5 would not include any new pedestrian or bicycle facilities; however, there are currently informal pedestrian and bicycle facilities in the study area that would remain intact under this alternative.
Policy B: Pedestrian and bicycle facilities shall be constructed, or upgraded, and maintained along major travel routes.	Y	Y	Y	Y	Y	Pedestrian and bicycle facilities within the study area would be improved under Alternatives 1-4; however, none of these facilities are located along major travel routes. Alternative 5 would have no effect on existing informal pedestrian or bicycle facilities.
Policy E: Bicycle and pedestrian linkages shall be provided between residential and non-residential areas.	Y	Y	Y	Y	NA	Each of the action alternatives (Alternatives 1–4) assumes that the location of existing bicycle trails around the perimeter of the study area would remain. Alternatives 1, 3, and 4 would provide additional links to this system. For Alternative 1, these linkages would include a boardwalk trail constructed along the northern edge of the study area, between Cove East Beach and East Barton Beach, with a bridge spanning the mouth of the Upper Truckee River.

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
						Alternative 5 would not include any new pedestrian or bicycle facility linkages; however, there are currently informal pedestrian and bicycle facilities in the study area that would remain intact under this alternative.
Vegetation Goal 1: Provide for a wide mix and increased diversity of plant communities in the Tahoe Basin.						
Policy 1: Forest management practices shall be allowed when consistent with acceptable strategies for the maintenance of forest health and diversity, prevention of fire, protection of water quality, and enhancement of wildlife habitats.	Y	Y	Y	Y	Y	Alternatives 1–5 would comply with vegetation standards for TRPA, including TRPA's thresholds for vegetation identified in TRPA's Code of Ordinances, and with TRPA's Design Review Guidelines. Forest management practices described for reducing fire hazards and enhancing habitat quality in the study area would be consistent with acceptable strategies for the maintenance of forest health and diversity, prevention of fire, protection of water quality, and enhancement of wildlife habitats.
Policy 2: Opportunities to improve the age structure of the pine and fir plant communities shall be encouraged when consistent with other environmental considerations.	Y	Y	Y	Y	Y	All alternatives provide opportunities to improve the age structure of the pine and fir plant communities with tree thinning and management of forest fuel loads and forest habitat enhancement for the study area. Fir plant communities are not present within the study area.
Policy 4: Edge zones between adjacent plant communities will be maximized and treated for their special value relative to plant diversity and wildlife habitat.	Y	Y	Y	Y	Y	Implementing Alternative 1–5 would not substantially alter the extent of edge zones between adjacent plant communities. Under any of Alternatives 1–5, edge zones would be managed for their special value relative to plant diversity and wildlife habitat. Alternatives 1–4 would include most edge habitat in the study area in the core area that would be enhanced and managed for sensitive biological resources. Alternative 5 would include most edge zones in the Biological Preference management district (but would not implement any substantial enhancements).
Policy 5: Permanent disturbance or unnecessary alteration of natural vegetation associated with development activities shall not exceed the approved boundaries [or footprints] of the building, driveway, or parking structures, or that which is necessary to reduce the risk of fire or erosion.	Y	Y	Y	Y	Y	Under each of the action alternatives, permanent disturbance or unnecessary alteration of natural vegetation associated with development activities shall be minimized, and all disturbance would be short term. Under Alternative 5, no new disturbance is proposed; however, vegetation disturbance along the river banks will continue to occur.
Policy 8: Revegetation of disturbed sites shall require the use of species approved by the agency. TRPA shall prepare specific policies designed to avoid the unnecessary use of landscaping which requires long-term irrigation and fertilizer use.	Y	Y	Y	Y	NA	Alternatives 1–5 would not install landscaping with long-term irrigation and fertilizer requirements. Under Alternatives 1–4, revegetation would be with plant species native to the area, as shown on Sheet L-12, "Revegetation Section and Plant List," in Appendix C. Implementing Alternative 5 would not result in the revegetation of disturbed sites.

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
Policy 9: All proposed actions shall consider the cumulative impact of vegetation removal with respect to plant diversity and abundance, wildlife habitat and movement, soil productivity and stability, and water quality and quantity.	Y	Y	Y	Y	NA	Section 3.18, "Cumulative Impacts," considers the cumulative impacts of vegetation removal with respect to plant diversity and abundance, wildlife habitat and movement, soil productivity and stability, and water quality and quantity for Alternatives 1–5.
Vegetation Goal 2: Provide for the maintenance and restoration of such unique eco-systems as wetlands, meadows, and other riparian vegetation.						
Policy 1: Riparian plant communities shall be managed for the beneficial uses of passive recreation, groundwater recharge, and nutrient catchment, and as wildlife habitats.	Y	Y	Y	Y	Y	Alternatives 1–5 all would manage riparian plant communities for the beneficial uses of passive recreation, groundwater recharge, and nutrient catchment, and as wildlife habitats.
Policy 2: Riparian plant communities shall be restored or expanded whenever and wherever possible.	Y	Y	Y	Y	NA	Under any of Alternatives 1–4, riparian plant communities would be restored and expanded. Under Alternative 5, the riparian area would continue to exist in its current degraded state; however, this alternative would be a continuation of existing conditions and would not result in new conditions that would be inconsistent with this policy.
Vegetation Goal 3: Conserve threatened, endangered, and sensitive plant species and uncommon plant communities of the Lake Tahoe basin.						
Policy 1: Uncommon plant communities shall be identified and protected for their natural values.	N	Y	Y	Y	Y	A rare plant survey of the study area has been conducted for the project. Based on this survey, and on-going monitoring of the Tahoe yellow cress population in the study area, potential impacts on population sites and critical habitat of all sensitive plant species have been identified, and with environmental commitments and mitigation planned as part of the alternatives, the construction and operation of any of Alternatives 1–5 would avoid population sites and critical habitat of sensitive plant species with the exception of recreational development under Alternative 1 related to the bridge and potential effects to Tahoe yellow cress.
Policy 2: The population sites and critical habitat of all sensitive plant species in the Lake Tahoe Basin shall be identified and preserved.	N	Y	Y	Y	Y	See Vegetation Goal 3, Policy 1 above.
Policy 3: The conservation strategy for the Tahoe yellow cress in the Lake Tahoe Basin shall foster stewardship for the species.	Y	Y	Y	Y	Y	Under any of Alternatives 1–5, implementation of the *Tahoe Yellow Cress Management Plan* would continue. This plan was developed to support the regional conservation strategy for Tahoe yellow cress and to promote stewardship of the species. It includes monitoring, public outreach, management actions, and an adaptive management process.

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
Wildlife Goal 1: Maintain suitable habitats for all indigenous species of wildlife without preference to game or nongame species through maintenance of habitat diversity.						
Policy 1: All proposed actions shall consider impacts to wildlife.	Y	Y	Y	Y	Y	Potential direct, indirect, and cumulative impacts on common and sensitive wildlife resources related to implementation of Alternatives 1–5 were evaluated. Mitigation measures are proposed where feasible. Impacts to common and sensitive wildlife are short-term and only where necessary to construct an Alternative. Long-term benefits will improve habitat.
Policy 2: Riparian vegetation shall be protected and managed for wildlife.	Y	Y	Y	Y	Y	Alternatives 1–4 would implement recreation infrastructure elements, and would manage for its habitat values, a core habitat area that includes most riparian vegetation in the study area. The discussion for each of Alternatives 1–4 describes the long-term beneficial effects on riparian vegetation and wildlife that would result from implementing any of these alternatives. Alternative 5 would not implement the recreation infrastructure elements of Alternatives 1–4, but would continue existing management practices, that manage most riparian habitats and a large portion of the study area as a "biological preference zone" and has habitat maintenance and enhancement objectives.
Policy 3: Non-native wildlife and exotic species shall be controlled and release of such animals into the wild is forbidden.	Y	Y	Y	Y	Y	Implementing any of Alternatives 1–5 would continue management to conserve habitat values. Actions to control non-native wildlife and exotic species would be developed and implemented if non-native wildlife and/or exotic species degraded habitat values.
Policy 4: Domestic animals and pets shall be controlled and appropriately contained.	Y	Y	Y	Y	Y	Under any of Alternatives 1–5, the dog leash policy would be retained, and the Conservancy would continue to enforce and conduct outreach regarding this policy.
Wildlife Goal 2: Preserve, enhance, and, where feasible, expand habitats essential for threatened, endangered, rare, or sensitive species found in the basin						
Policy 1: Endangered, threatened, rare, and special interest species shall be protected and buffered against conflicting land uses.	N	Y	Y	Y	NA	Alternatives 1–4 include elements to protect habitat for endangered, threatened, rare, and special interest species against conflicting uses (e.g., some recreational uses) and include mitigation measures to avoid effects on endangered, threatened, and rare species during construction activities. Alternative 1 could potentially increase use in the vicinity of Tahoe yellow cress due to the proposed bridge across the Upper Truckee River. No construction activities would occur under Alternative 5, and existing disturbance of wildlife habitat would continue. However, this alternative

Table 3.10-1
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TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
						would not result in new conditions that would be inconsistent with this policy.
Fisheries Goal 1: Improve aquatic habitat essential for the growth, reproduction, and perpetuation of existing and threatened fish resources in the Lake Tahoe basin.						
Policy 2: Unnatural blockages and other impediments to fish movement will be prohibited and removed wherever appropriate.	Y	Y	Y	Y	Y	None of the alternatives would involve creating unnatural blockages to fish movement.
Policy 3: An instream maintenance program should be developed and implemented.	Y	Y	Y	Y	Y	Implementation of any of Alternatives 1–4 would include monitoring and adaptive management of instream habitat conditions. This monitoring and adaptive management would be a program that would implement instream maintenance. Under Alternative 5, existing management would continue, which includes only limited monitoring and maintenance of instream conditions. However, this alternative would not result in new conditions that would be inconsistent with this policy.
Policy 5: Habitat improvement projects are acceptable practices in streams and lakes.	Y	Y	Y	Y	NA	All of the action alternatives (Alternatives 1–4) would include river restoration elements that would improve fish habitat conditions in the Upper Truckee River within the study area. Under Alternative 5, the No-Project/No-Action Alternative, existing conditions would continue, and these conditions are degraded along portions of the Upper Truckee River channel.
Soils Goal 1: Minimize soil erosion and the loss of soil productivity.						
Policy 1: Allowable impervious land coverage shall be consistent with the threshold for impervious land coverage.	Y	Y	Y	Y	Y	The threshold for impervious land coverage (SC-1) adopted by TRPA in 1982 states that "Impervious cover shall comply with the Land Capability Classification of the Lake Tahoe Basin, California-Nevada, A Guide to Planning (Bailey 1974)." See Land Use Goal 3, Policy 1 above.
Policy 2: No new land coverage or other permanent disturbance shall be permitted in Land Capability Districts 1-3 except for those uses as noted under Soils Goal 1, Policy 2.	Y	Y	Y	Y	NA	Implementing Alternatives 1–4 would remove existing coverage from LCD 1band be consistent with Settlement Agreement and/or the Baily System. These alternatives also would create new land coverage in LCD 1b (public access and recreation infrastructure) Soils Goal 1.2.B permits such uses, where such encroachment is essential for public outdoor recreation, and precautions are taken to ensure that such lands are protected to the fullest extent possible.

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Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
Policy 6: Grading, filling, clearing of vegetation (that disturbs soil), or other disturbances of the soil are prohibited during inclement weather and for the resulting period when the site is covered with snow or is in a saturated, muddy, or unstable condition, special regulations and construction techniques will apply to all construction activities occurring from October 15 to May 1.	Y	Y	Y	Y	NA	Any of Alternatives 1–4 would comply with seasonal and weather restrictions on any construction activities. No construction would occur under Alternative 5 (No-Project/No-Action).
Policy 7: All existing natural functioning SEZs shall be retained as such and disturbed SEZs shall be restored whenever possible.	Y	Y	Y	Y	NA	Implementing any of Alternatives 1–4 would restore previously disturbed SEZ. Under Alternative 5 (No-Project/No-Action), existing channel instability and reduced connectivity of the channel and floodplain of the Upper Truckee River would continue; however, this alternative would be a continuation of existing conditions and would not result in new conditions that would be inconsistent with this policy.
Shorezone Goal 1: Provide for the appropriate shorezone uses of Lake Tahoe, Cascade Lake, and Fallen Leaf lake while preserving their natural and aesthetic qualities.						
Policy 1: All vegetation at the interface between the backshore and the foreshore zones shall remain undisturbed unless allowed by permit for uses otherwise consistent with the shorezone policies.	Y	Y	Y	Y	Y	Alternative 1 could disturb vegetation at the interface between the backshore and foreshore zones depending on the location and placement of the proposed bridge and boardwalk in the final designs. However, the bridge and boardwalk would only be constructed if permitted as a use otherwise consistent with shorezone policies. Alternatives 2–5 would not disturb vegetation at the interface between the backshore and foreshore zones.
Policy 4: Class 1 capability shorezones shall be managed consistent with the goals and policies of the stream environment zone subelement.	Y	Y	Y	Y	NA	The stream environment zone subelement consists of a single goal ("Provide for the long-term protection and restoration of stream environment zones") and seven policies. Three policies are not applicable to Alternatives 1–5; these policies address groundwater development, golf course, and revising the procedures for identifying stream environment zones. Alternatives 1–4 would be consistent with the applicable policies. Alternative 5 would not be consistent with Policy 1, which addresses restoration of disturbed SEZ. However, this alternative would be a continuation of existing conditions and would not result in new conditions that would be inconsistent with this policy. See Stream Environment Zone Goal 1, Policies 1, 2, 5, and 6.

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
Policy 8: Stream channel entrances to the lake shall be maintained to allow unobstructed access of fishes to upstream spawning sites.	Y	Y	Y	Y	Y	Implementing any of Alternatives 1–5 would maintain the entrance of the Upper Truckee River to the lake and allow access of fishes to upstream spawning sites. The mouth of the Upper Truckee River is not obstructed under existing conditions, and although implementing Alternatives 1–4 would reduce the size of the river mouth, these modifications would not create an obstruction to fish passage. Alternative 3 could potentially result in the mouth of the river closing due to natural barrier beach processes, but this would be temporary and be only during certain years. Under Alternative 5 the river mouth would remain similar to existing conditions.
Policy 13: Allow public access to the shorezone where lawful and feasible on public lands.	Y	Y	Y	Y	Y	Implementing any of Alternatives 1–5 would allow public access to the shorezone in the study area. Public access is allowed to the shorezone under existing conditions and would be retained under any of the alternatives.
Scenic Goal 1: Maintain and restore the scenic qualities of the natural appearing landscape.						
Policy 1: All proposed development shall examine impacts to the identified landscape view from roadways, bicycle paths, public recreation areas, and Lake Tahoe.	Y	Y	Y	Y	NA	Section 3.14, "Scenic Resources," analyzes the project's effects on scenic resources, including views from roadways, bicycle paths, public recreation areas, and Lake Tahoe. Implementing any of the Alternatives 2–5 would result in less-than-significant impacts on the scenic quality and views from U.S. 50, Lake Tahoe, public recreation areas, bicycle paths, and the surrounding area. No development is proposed under Alternative 5 (No Project/No Action). Construction of the bridge and boardwalk under Alternative 1 would degrade the scenic quality rating for Shoreline Travel Unit 33 and Lake Tahoe. This impact is significant and unavoidable.
Policy 2: Any development proposed in areas targeted for scenic restoration or within a unit highly sensitive to change shall demonstrate the effect of the project on the 1982 Travel Route Ratings of the Scenic Thresholds.	Y	Y	Y	Y	NA	Section 3.14, "Scenic Resources," analyzes the project's effects on scenic resources, including views from roadways and Lake Tahoe. Implementing any of the Alternatives 2–4) would result in less-than-significant impacts on the scenic quality and views from U.S. 50 and would not degrade Roadway Travel Unit 35. In addition, implementing Alternative 2, 3, or 4would have a less-than-significant impact on views from Lake Tahoe and Shoreline Travel Unit 33. No development is proposed under Alternative 5 (No Project/No Action). Construction of the bridge and boardwalk under Alternative 1 could degrade the scenic quality rating for Shoreline Travel Unit 33 and Lake Tahoe. This impact is significant and unavoidable.

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
Policy 3: The factors or conditions that contribute to scenic degradation in identified areas need to be recognized and appropriately considered in restoration programs to improve scenic quality.	N	Y	Y	Y	NA	See Scenic Goal 1, Policy 1 above.
Open Space Goal 1: Manage areas of open space to promote conservation of vegetation and protection of watersheds.						
Policy 1: Management practices in open space that provide for the long term health and protection of the resource(s) shall be permitted when consistent with the other goals and policies of this plan.	Y	Y	Y	Y	Y	Under existing conditions, the study area is managed to provide for the long-term health and protection of resources, and would continue to be managed to provide for the long-term health and protection of resources. However, some resource degradation has occurred in the study area, primarily as a result of the construction of the Tahoe Keys development (beginning in 1959) affecting the channel of the Upper Truckee River, and secondarily as a result of disturbance of habitat by recreational use. The habitat restoration and enhancement elements of Alternatives 1–4 would reduce this degradation. Alternative 5 would not include these habitat restoration and enhancement elements, and thus degraded conditions would not be restored. However, the study area would continue to be managed to provide for the long-term health and protection of the resources of the study area.
Policy 2: The beneficial uses of open space shall be protected by regulating uses and restricting access as necessary to maintain soil productivity and acceptable vegetative cover.	Y	Y	Y	Y	Y	Alternatives 1–4 include elements and management practices that would regulate uses and restrict access to enhance soil productivity and acceptable vegetative cover. Under Alternative 5, some vegetative cover and soil would continue to exist in its current degraded state; however, this alternative would not result in new conditions that would be inconsistent with this policy.
Stream Environment Zone Goal 1: Provide for the long-term preservation and restoration of stream environment zones.						
Policy 1: Restore all disturbed SEZ lands in undeveloped, unsubdivided lands, and restore 25 percent of the SEZ lands that have been disturbed, developed, or subdivided.	Y	Y	Y	Y	NA	Implementing any of the action alternatives (Alternatives 1–4) would restore disturbed SEZ land in the study area. Under Alternative 5, SEZ lands in the study area would remain in the existing disturbed state; however, this alternative would not result in new conditions that would be inconsistent with this policy.

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
Policy 2: SEZ lands shall be protected and managed for their natural values.	Y	Y	Y	Y	NA	Under Alternatives 1–4, protection of SEZ lands would be increased and current management for their natural values would continue. Under Alternative 5, SEZ lands would continue to be managed for their natural values, but additional recreation infrastructure elements would not be constructed, and existing levels of disturbance by recreation use would continue. However, this alternative would not result in new conditions that would be inconsistent with this policy.
Policy 3: Groundwater development in SEZ lands shall be discouraged when such development could possibly impact associated plant communities or instream flows.	Y	Y	Y	Y	Y	None of the alternatives (Alternatives 1–5) would require the use of groundwater. In addition, restoration of the Upper Truckee River floodplain under Alternatives 1, 2, 3, or 4 would enhance groundwater recharge in the study area.
Policy 5: No new land coverage or other permanent land disturbance shall be permitted in SEZ except for those uses as noted under Stream Environment Zone Goal 1, Policy 5.	Y	Y	Y	Y	NA	See Land Use Goal 3, Policy 1 above.
Policy 6: Replacement of existing coverage in SEZs may be permitted where the project will reduce impacts on SEZ and will not impede restoration efforts.	Y	Y	Y	Y	NA	See Land Use Goal 3, Policy 1 above.
Cultural Goal 1: Identify and preserve sites of historical, cultural, and architectural significance within the region.						
Policy 1: Historical or culturally significant landmarks in the Basin shall be identified and protected from indiscriminate damage or alteration.	Y	Y	Y	Y	NA	Section 3.3, "Archaeological and Historical Resources," analyzes the project's effects on recorded and presently undocumented cultural resources potentially stemming from proposed construction and operation. Implementation of Environmental Commitments 2 and 3 (Table 2-6) would avoid impacts on cultural sites, features, and artifacts and on human remains under all of the proposed alternatives. Alternative 5 would not affect historical or cultural resources.
Policy 2: Sites and structures designated as historically, culturally, or archaeologically significant shall be given special incentives and exemptions to promote the preservation and restoration of such structures and sites.	Y	Y	Y	Y	NA	Section 3.3, "Archaeological and Historical Resources," analyzes the project's effects on recorded and presently undocumented cultural resources potentially stemming from proposed golf course construction and operation. Implementation of Environmental Commitments 2 and 3 (Table 2-7)would avoid impacts on cultural sites, features, and artifacts and on human remains under all of the proposed alternatives. Alternative 5 would not affect historical or cultural resources.

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
Dispersed Recreation Goal 1: Encourage opportunities for dispersed recreation when consistent with environmental values and protection of the natural resources.						
Policy 1: Low density recreational experiences shall be provided along undeveloped shorelines and other natural areas, consistent with the tolerance capabilities and character of such areas.	Y	Y	Y	Y	Y	Each action alternative (Alternatives 1–4) proposes a combination of foot or bicycle trails, observation areas, a fishing platform (Alternatives 2 and 3), viewpoints, and signage. These elements would enhance public access and recreation. Public-access elements that emphasize habitat protection would not provide new access to locations within the study area; they would be intended to direct and manage continued use, discouraging access to sensitive habitats and the marsh interior, in areas already used by the public. Alternative 5 would not include new recreational facilities; however, the existing informal recreational facilities and public access to the study area would not be reduced.
Policy 2: Areas selected for nature study and wildlife observation shall be appropriately regulated to prevent unacceptable disturbance of the habitat and wildlife.	Y	Y	Y	Y	Y	Under all of the action alternatives (Alternatives 1–4), public-access elements that emphasize habitat protection would not provide new access to locations within the study area; they would be intended to direct and manage continued use, discouraging access to sensitive habitats and the marsh interior, in areas already used by the public. Alternative 5 would not include public-access elements that emphasize habitat protection. Existing informal recreational facilities and public access would continue similar to existing conditions; however, this alternative would not result in new conditions that would be inconsistent with this policy.
Policy 3: Trail systems for hiking and horseback riding shall be expanded to accommodate projected demands and provide a link with major regional or interstate trails.	Y	Y	Y	Y	NA	The study area is surrounded by urban areas. Alternative 1, 2, 3, or 4 would include foot or bicycle trails. Alternative 5 would not include any new pedestrian or bicycle facilities; however, there are currently informal pedestrian and bicycle facilities in the study area that would remain intact under this alternative.
Policy 4: Existing trails that are either underutilized or located in environmentally sensitive areas shall be relocated to enhance their use and to protect natural resources.	Y	Y	Y	Y	N	Under all of the action alternatives (Alternatives 1–4), public-access elements that emphasize habitat protection would not provide new access to locations within the study area; they would be intended to direct and manage continued use, discouraging access to sensitive habitats and the marsh interior, in areas already used by the public. Alternative 5 would not include public-access elements that emphasize habitat protection. Existing informal recreational facilities and public access would continue similar to existing conditions. However, this alternative would not result in new conditions that would be inconsistent with this policy.

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
Dispersed Recreation Goal 2: Provide high-quality recreational opportunities.						
Policy 1: Wilderness and other undeveloped and unroaded areas shall be managed for low-density use.	Y	Y	Y	Y	Y	All of the action alternatives (Alternatives 1–4) would include elements that would enhance public access and recreation as well as enhance habitat protection. Under Alternative 5, the study area would continue to be managed for low-density recreation.
Policy 2: Separate use areas shall be established for the dispersed winter activities of snowmobiling, cross-country skiing and snowshoeing when conflicts of use exist.	Y	Y	Y	Y	Y	The study area would be used for formal and informal recreation year-round under all of the alternatives. Under all of the alternatives (Alternatives 1–5) snowshoeing and cross-country skiing would be common uses in the winter.
Developed Recreation Goal 1: Provide a fair share of the total basin capacity for outdoor recreation.						
Policy 1: All existing reservations of services for outdoor recreation shall continue to be committed for such purposes.	Y	Y	Y	Y	Y	Each action alternative (Alternatives 1–4) proposes a combination of foot or bicycle trails, observation areas, a fishing platform (Alternatives 2 and 3), viewpoints, and signage. These elements would enhance public access and recreation. Public-access elements that emphasize habitat protection would not provide new access to locations within the study area; they would be intended to direct and manage continued use, discouraging access to sensitive habitats and the marsh interior, in areas already used by the public. Alternative 5 would not include new recreational facilities; however, the existing informal recreational facilities and public access to the study area would not be reduced.
Policy 3: Provisions shall be made for additional developed outdoor recreation facilities capable of accommodating 6,114 PAOT in overnight facilities and 6,761 PAOT in summer day-use facilities and 12,400 PAOT in winter day-use facilities.	Y	Y	Y	Y	NA	As shown in Section 3.10, "Land Use," Table 3.10-8, summer day uses associated with the action alternatives would require PAOT allocations. Because plan areas associated with the study area do not have available PAOTs, they would need to be obtained from the regional pool.
Developed Recreation Goal 2: Provide for the appropriate type, location, and rate of development of outdoor recreational uses.						
Policy 1: Expansion of recreational facilities and opportunities should be in response to demand.	Y	Y	Y	Y	NA	Improvements to recreational facilities under the action alternatives (Alternatives 1–4) are intended to enhance and reduce the impacts of existing dispersed recreation, and not to support new uses or substantially expand the existing facilities. Alternative 5 would not include new recreational facilities; however, the existing informal recreational facilities and public access to the study area would not be reduced.

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
Policy 2: Bicycle trails shall be expanded to provide alternatives for travel in conjunction with transportation systems.	Y	Y	Y	Y	NA	Each action alternative (Alternatives 1–4) proposes a combination of foot or bicycle trails, observation areas, a fishing platform (Alternatives 2 and 3), viewpoints, and signage. These elements would enhance public access and recreation. Public-access elements that emphasize habitat protection would not provide new access to locations within the study area; they would be intended to direct and manage continued use, discouraging access to sensitive habitats and the marsh interior, in areas already used by the public. Alternative 5 would not include new recreational facilities; however, the existing informal recreational facilities and public access to the study area would not be reduced.
Policy 3: Public boat launching facilities shall be expanded, where appropriate, and when consistent with environmental constraints.	Y	Y	Y	Y	NA	None of the alternatives would expand the existing boat launching facilities within the study area.
Policy 6: Existing recreational facilities in some sensitive areas, except those that are slope dependent such as downhill skiing, shall be encouraged, through incentives to relocate to higher capability lands.	Y	Y	Y	Y	N	See Developed Recreation Goal 2, Policy 1 above.
Policy 7: Development of day-use facilities shall be encouraged in or near established urban areas, whenever practical.	Y	Y	Y	Y	NA	The study area is surrounded by urban areas. Each action alternative (Alternatives 1–4) proposes a combination of day-use facilities such as foot or bicycle trails, observation areas, a fishing platform (Alternatives 2 and 3), viewpoints, and signage. Alternative 5 would not include new recreational facilities; however, the existing informal day-use recreational facilities and public access to the study area would not be reduced.
Policy 8: Visitor information facilities shall be located, to the extent feasible, near entry points to the basin or close to urban areas.	Y	Y	Y	Y	NA	See Developed Recreation Goal 2, Policy 7 above.
Developed Recreation Goal 3: Protect natural resources from overuse and rectify incompatibility between uses.						
Policy 1: Recreation development in the Tahoe basin shall be consistent with the special resources of the area.	Y	Y	Y	Y	NA	Recreation elements proposed under Alternatives 1–4 would enhance public access and recreation. Public-access elements that emphasize habitat protection would not provide new access to locations within the study area; they would be intended to direct and manage continued use, discouraging access to sensitive habitats and the marsh interior, in areas already used by the public. Alternative 5 would not include new recreational facilities; however,

Table 3.10-1
Consistency with Relevant TRPA Land Use Goals and Policies

TRPA Goals and Policies	Consistency					Discussion
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	
						the existing informal recreational facilities and public access to the study area would not be reduced.
Policy 2: Regulate intensity, timing, type, and location of use to protect resources and separate incompatible uses.	Y	Y	Y	Y	Y	See Developed Recreation Goal 3, Policy 1 above.
Developed Recreation Goal 4: Provide for the efficient use of outdoor recreation resources.						
Policy 2: Seasonal facilities should provide opportunities for alternative uses in the off-season, whenever appropriate.	Y	Y	Y	Y	Y	The study area would be used for formal and informal recreation year-round under all of the alternatives. Under all of the alternatives (Alternatives 1–5), walking/running, beach activities, bicycling, wildlife viewing, and dog walking, fishing, and kayaking are common uses of the study area during spring, summer, and fall, and snowshoeing and cross-country skiing are common uses in the winter.
Urban Recreation Goal 1: Provide sufficient capacity for local-oriented forms of outdoor recreation and indoor recreation in urban areas.						
Policy 2: Urban outdoor recreational facilities located in sensitive areas should be encouraged to relocate to other suitable sites.	Y	Y	Y	Y	NA	See Developed Recreation Goal 3, Policy 1 above.
Institutional Goal 1: Coordinate all planning and development review activities with the affected jurisdictions and agencies.						
Policy 1: All projects proposed in the region [other than those to be reviewed and approved under the special provisions of the Compact relating to gaming] shall obtain the review and approval of the Agency.	Y	Y	Y	Y	NA	All action alternatives will be reviewed.
Policy 2: No project may be approved unless it is found to comply with the Regional Plan and with any ordinances, rules, and regulations enacted to effectuate the Regional Plan.	Y	Y	Y	Y	NA	The action alternatives reflect implementation of Regional Plan provisions, ordinances, rules and regulations. Alternative 5 does not change the relationship of the study area to the Regional Plan.

Note: NA = not applicable.
Sources: TRPA 1996; TRPA 2004; Consistency analysis conducted by AECOM in 2010

Plan Area Statements

Chapter 11, "Plan Area Statements and Plan Area Maps," of the TRPA Code of Ordinances requires that all projects and activities be consistent with the provisions of a particular area's applicable Plan Area Statement (PAS). For each plan area, a "statement" is made describing how that particular area should be regulated to achieve regional environmental and land-use objectives and providing detailed plans and policies for specific areas of the basin.

The study area is located within six separate PASs: 99 (Al Tahoe), 100 (Truckee Marsh), 102 (Tahoe Keys), 103 (Sierra Tract Commercial), 104 (Highland Woods), and 111 (Tahoe Island). Approximately five acres of the study area extend beyond the shoreline and are not within any PASs (Exhibit 3.10-1). PAS 100 and PAS 102 together cover about 90 percent of the study area. The remaining ten percent of the study area is located within PASs 99, 103, 104, and 111. The following PAS descriptions include the land-use classification and management strategy. The permissible uses for each PAS within the study area are listed in Tables 3.10-2 through 3.10-7. The establishment of new uses not listed is prohibited within any plan area. Existing uses not listed as permissible within individual PASs are considered nonconforming uses but may be continued if legally commenced before July 1, 1987, subject to the provisions of TRPA Code of Ordinances Section 21.5.

PAS 99—Al Tahoe. Approximately 13 acres of the study area are located in PAS 99. The eastern boundary of the study area is in PAS 99 (Al Tahoe) and includes various parcels along El Dorado Avenue and the lakefront near Lakeview, Lily, and San Francisco Avenues. The land-use classification for PAS 99 is residential and the management strategy is redirection. According to the planning statement for PAS 99, "The area should remain residential with upgrading in those areas identified as substandard." Specific permissible uses for PAS 99 in general, and for Shorezone Tolerance District 4 (as listed in the PAS), are provided in Table 3.10-2.

PAS 100—Truckee Marsh. Approximately 527 acres of the study area (including the center of the marsh, the Upper Truckee River, and Trout Creek) are located within PAS 100 (Truckee Marsh) (TRPA 2005a). The land-use classification for PAS 100 is conservation and the management strategy is maximum regulation. This management strategy calls for strict regulation to ensure preservation and enhancement of the existing environment, with little or no additional development of residential, commercial, tourist, recreational, or public service uses (TRPA Code Section 11.6.2.B.1).

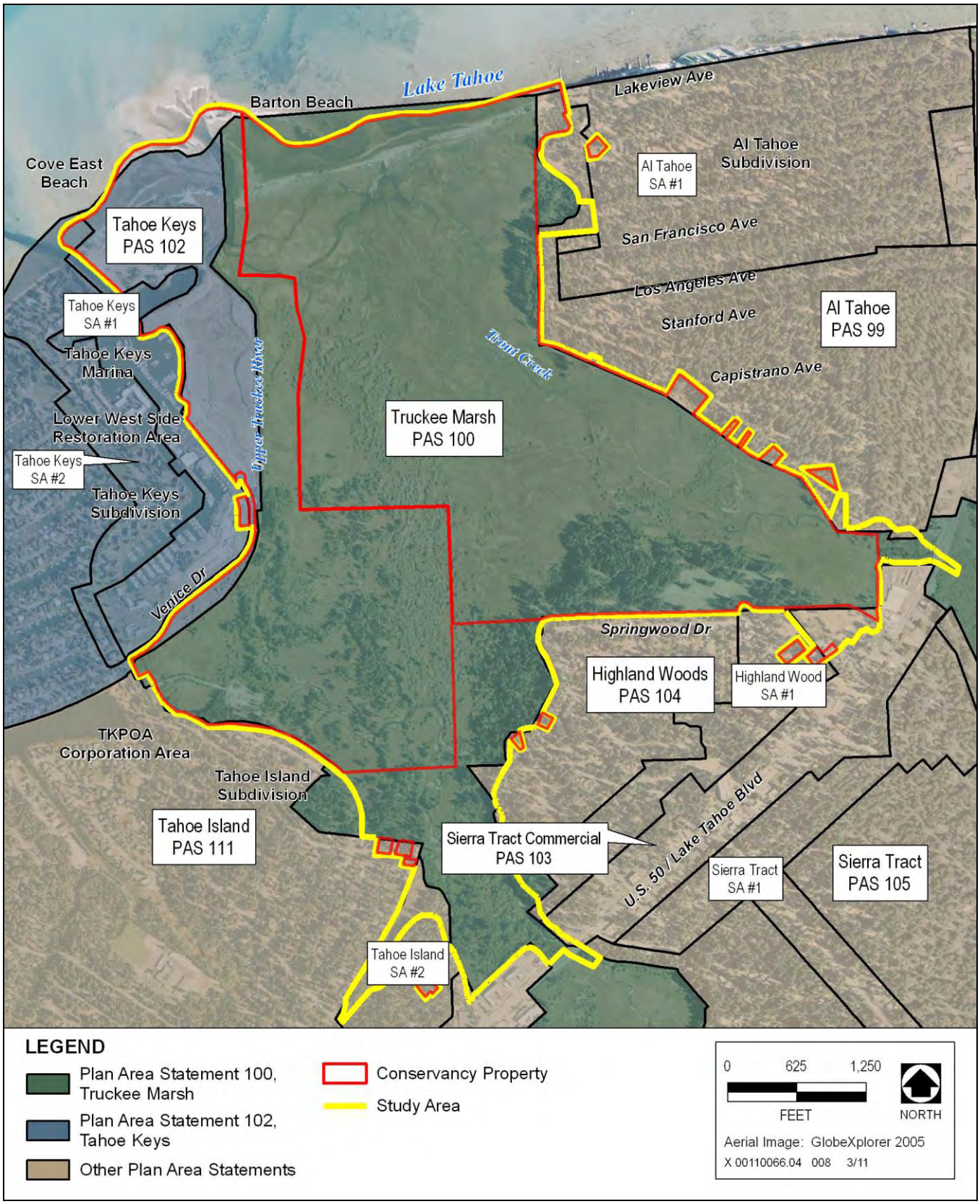
According to the planning statement for PAS 100, "This area should be managed primarily for its natural values including those management practices which contribute to the quality of fish and wildlife habitats, support dispersed recreation, and maintain the nutrient catchment capacity of the stream environment zone."

Specific permissible uses for PAS 100 in general, and for Shorezone Tolerance District 1 (as listed in the PAS), are provided in Table 3.10-3.

PAS 102—Tahoe Keys. Approximately 67 acres in the western portion of the study area is located within PAS 102 (TRPA 2005c). The portion of PAS 102 within the study area is entirely within the Cove East parcel, and includes the Lower West Side (LWS) Restoration Area, the Sailing Lagoon, and Cove East Beach. The land-use classification for PAS 102 is residential and the management strategy is mitigation.

According to the planning statement for PAS 102, "This area should continue to maintain the existing residential and commercial character of the neighborhood."

The Sailing Lagoon is located in PAS 102, Special Area (SA) 1, which is a subsection of PAS 102 that includes the open-water area of the Tahoe Keys Marina. Specific permissible uses for PAS 102 in general, and for Shorezone Tolerance District 1 (as listed in the PAS), are provided in Table 3.10-4.



Source: TRPA 2009

Exhibit 3.10-1 **Plan Area Statements in the Study Area and Vicinity**

Table 3.10-2 Permissible Uses for Plan Area Statement 99*	
GENERAL	
Recreation	Day-use areas (A), riding and hiking trails (A), beach recreation (A), participant sports facilities (S)
Resource Management	Reforestation (A), sanitation salvage cut (A), special cut (A), thinning (A), early successional stage vegetation management (A), structural and nonstructural fish/wildlife habitat management (A), fire detection and suppression (A), fuels treatment/management (A), insect and disease suppression (A), sensitive and uncommon plant management (A), erosion control (A), SEZ restoration (A), and runoff control (A)
Public Service	Local public health and safety facilities (S), transit stations and terminals (S), pipelines and power transmission (S), transmission and receiving facilities (S), transportation routes (S), public utility centers (S), churches (S), and local post offices (S)
SPECIAL AREA 1 The following uses are in addition to the general list of uses.	
Recreation	Outdoor recreation concessions (S)
Notes: SEZ = Stream Environment Zone. The list indicates whether the use is allowed (A) or must be considered under the provisions for a special use (S). Existing uses not listed are considered nonconforming uses within this plan area. *Observation areas are considered "Day-use Area" uses and require "Persons at One Time" (PAOTs). No Summer Day-Use PAOTs are available in this PAS; however, PAOTs may be obtained from the regional pool as discussed in Section 3.13, "Recreation." Source: TRPA 2005b	

Table 3.10-3 Permissible Uses for Plan Area Statement 100	
GENERAL	
Recreation	Riding and hiking trails (S) and cross country skiing courses (S)
Resource Management	Sanitation salvage cut (S), early successional stage vegetation management (S), nonstructural fish habitat management (S), nonstructural wildlife habitat management (A), structural fish habitat management (S), structural wildlife habitat management (S), farm/ranch accessory structure (S), grazing (S), range pasture management (S), range improvement (S), fire detection and suppression (A), fuels treatment (S), insect and disease suppression (A), sensitive plant management (S), uncommon plant community management (S), erosion control (S), runoff control (S), special cuts (S), and SEZ restoration (S)
Public Service	Transportation routes (S), pipelines and power transmission (S), transmission and receiving facilities (S), public utility centers (S)
SHOREZONE	
Within the specified shorezone tolerance district, the following primary uses may be permitted in the backshore, nearshore, and foreshore. Accessory structures shall be regulated pursuant to the regulations applicable to the primary use upon which they are dependent in accordance with Chapter 18. The following structures may be permitted in the shorezone as an allowed (A) or special (S) use only if they are accessory to an existing, allowed use located on the same or adjoining littoral parcel.	
Shorezone Tolerance District 1	
Primary Uses	Safety and navigation facilities (A)
Accessory Structures	Fences (S) and shoreline protective structures (S)
Notes: SEZ = Stream Environment Zone. The list indicates whether the use is allowed (A) or must be considered under the provisions for a special use (S). Existing uses not listed are considered nonconforming uses within this plan area. Source: TRPA 2005a	

Table 3.10-4 Permissible Uses for Plan Area Statement 102*	
GENERAL	
Recreation	Day-use areas (A), riding and hiking trails (S), beach recreation (A), participant sports facilities (S)
Resource Management	Reforestation (A), sanitation salvage cut (A), special cut (A), thinning (A), early successional stage vegetation management (A), structural and nonstructural fish/wildlife habitat management (A), fire detection and suppression (A), fuels treatment/management (A), insect and disease suppression (A), sensitive and uncommon plant management (A), erosion control (A), SEZ restoration (A), and runoff control (A)
Public Service	Local public health and safety facilities (S), transit stations and terminals (S), pipelines and power transmission (S), transmission and receiving facilities (S), transportation routes (S), public utility centers (S), churches (S), schools - kindergarten through secondary (S), and social service organization (S)
SPECIAL AREA 1 The following uses are in addition to the general list of uses.	
Recreation	Marinas (A), beach recreation (A), outdoor recreation concessions (A)
Resource Management	Those uses listed on the general list for this plan area
Notes: SEZ = Stream Environment Zone. The list indicates whether the use is allowed (A) or must be considered under the provisions for a special use (S). Existing uses not listed are considered nonconforming uses within this plan area. *Observation areas are considered "Day-use Area" uses and require "Persons at One Time" (PAOT). No Summer Day-Use PAOTs are available in this PAS; however, PAOTs may be obtained from the regional pool as discussed in Section 3.13, "Recreation." Source: TRPA 2005c	

Table 3.10-5 Permissible Uses for Plan Area Statement 103	
GENERAL	
Recreation	Day use areas (A), participant sports facilities (S), outdoor recreation concessions (S), riding and hiking trails (S), and visitor information center (S)
Resource Management	Reforestation (A), sanitation salvage cut (A), thinning (A), timber stand improvement (A), tree farms (A), early successional stage vegetation management (A), nonstructural fish habitat management (A), nonstructural wildlife habitat management (A), structural fish habitat management (A), structural wildlife habitat management (A), fire detection and suppression (A), fuels treatment (A), insect and disease suppression (A), sensitive plant management (A), uncommon plant community management (A), erosion control (A), runoff control (A), and SEZ restoration (A)
Public Service	Churches (A), cultural facilities (A), day care centers/pre-schools (A), government offices (A), local assembly and entertainment (A), local post office (A), local public health and safety facilities (A), membership organizations (A), public utility centers (S), schools - kindergarten through secondary (S), social service organizations (A), pipelines and power transmission (S), transit stations and terminals (S), transportation routes (S), and transmission and receiving facilities (S)
Notes: SEZ = Stream Environment Zone. The list indicates whether the use is allowed (A) or must be considered under the provisions for a special use (S). Existing uses not listed are considered nonconforming uses within this plan area. Source: TRPA 2005d	

Table 3.10-6 Permissible Uses for Plan Area Statement 104	
GENERAL	
Resource Management	Reforestation (A), sanitation salvage cut (A), management special cut (A), thinning (A), early successional stage vegetation management (A), structural and nonstructural fish/wildlife habitat management (A), fire detection and suppression (A), fuels treatment/management (A), insect and disease suppression (A), sensitive and uncommon plant management (A), erosion control (A), SEZ restoration (A), and runoff control (A)
Public Services	Local public health and safety facilities (S), transit stations and terminals (S), pipelines and power transmission (S), transmission and receiving facilities (S), transportation routes (S), public utility centers (S), and day care centers/pre-schools (S)
Recreation	Participant sports facilities (S), day use areas (A), and riding and hiking trails (A)
Notes: SEZ = Stream Environment Zone. The list indicates whether the use is allowed (A) or must be considered under the provisions for a special use (S). Existing uses not listed are considered nonconforming uses within this plan area. Source: TRPA 2005e	

Table 3.10-7 Permissible Uses for Plan Area Statement 111	
GENERAL	
Recreation	Participant sports facilities (S), day use areas (A), and riding and hiking trails (A)
Resource Management	Reforestation (A), sanitation salvage cut (A), management special cut (A), thinning (A), early successional stage vegetation management (A), structural and nonstructural fish/wildlife habitat management (A), fire detection and suppression (A), fuels treatment management (A), insect and disease suppression (A), sensitive and uncommon plant management (A), erosion control (A), SEZ restoration (A), and runoff control (A)
SPECIAL AREA 1 The following uses are in addition to the general list of uses.	
Recreation	Outdoor recreation concessions (S)
Notes: SEZ = Stream Environment Zone. The list indicates if the use is allowed (A) or must be considered under the provisions for a special use (S). Existing uses not listed are considered nonconforming uses within this Plan Area. Source: TRPA 2005g	

PAS 103—Sierra Tract Commercial. A small area (approximately five acres) in the easternmost portion of the study area that borders U.S. Highway 50 (U.S. 50) and Macinaw Road is located in PAS 103 (Sierra Tract Commercial). The land-use classification for PAS 103 is commercial/public service and the management strategy is redirection. According to the planning statement for PAS 103, "This area should continue to provide commercial services for the residents and visitors of the south shore and provide opportunities for developing mixed-use projects." Specific permissible uses (as listed in the PAS) are provided in Table 3.10-5.

PAS 104—Highland Woods. Several small portions of the study area (totaling six acres), located along the southeastern boundary of the Upper Truckee Marsh, are located within PAS 104 and SA 1 of PAS 104. The land-use classification for PAS 104 is residential and the management strategy is mitigation. According to the planning statement for PAS 104, "The area should remain residential, maintaining the existing character of the neighborhood." Specific permissible uses, as listed in the PAS, are provided in Table 3.10-6.

PAS 111—Tahoe Island. Approximately ten acres in the southwest corner of the study area (near Eloise Avenue) is located within SA 2 of PAS 111 (Tahoe Island). SA 2 is the only portion of PAS 111 within the study area. Part

of this area is within SEZ and drains to the Upper Truckee River within the study area. The land-use classification for PAS 111 is residential and the management strategy is mitigation. According to the planning statement for PAS 111, "This area should continue to be residential, maintaining the existing character of the neighborhood." Specific permissible uses, as listed in the PAS, are provided in Table 3.10-7.

Shorezone Tolerance Districts

Three of the plan areas within the study area (PASs 99, 100, and 102) are located within shorezone tolerance districts.

Shorezone tolerance districts were developed in 1971 by USFS in cooperation with TRPA to provide a relative quantification of the tolerance of land in the Tahoe Basin to human disturbance (Bailey 1974). TRPA established eight districts ranging in sensitivity, with 1.0 being the most sensitive designation. (These districts are described in the *Shorezone Ordinance for Lake Tahoe* [TRPA 1976].) The designations reflect the distribution of shorezone resources and features of varying sensitivity and importance. The purpose of the shorezone tolerance districts is to establish development standards and regulations for construction, marina operations and maintenance, pier installation, and other shorezone uses specific to the sensitivity of this transitional area.

Chapter 90, "Definitions," of the TRPA Code of Ordinances defines the shorezone as the land and water area along the shoreline of the lake consisting of the nearshore, foreshore, and backshore. Chapter 90 further defines these three components of the shorezone as follows:

- **Nearshore:** The zone extending from the low water elevation of Lake Tahoe (6,223.0 feet Lake Tahoe Datum) to a lake bottom elevation of 6,193 feet Lake Tahoe Datum, but in any case, a minimum lateral distance of 350 feet measured from the shoreline (6,229.1 feet Lake Tahoe Datum). In other lakes, the nearshore extends to a depth of 25 feet below the low water elevation.

- **Foreshore:** The zone of lake level fluctuation that is the area between the high and low water level. (For Lake Tahoe, the elevations are 6,229.1 feet Lake Tahoe Datum and 6,223.0 feet Lake Tahoe Datum, respectively.)

- **Backshore:** The land area located between the highwater line of the lake and the upland area of instability or the wave run-up area.

The study area includes approximately 4,240 linear feet of lakefront, which is located within Shorezone Tolerance Districts 1 and 4. The majority of the lakefront (3,840 linear feet) is in Shorezone Tolerance District 1, and the remaining 400 linear feet, on the eastern boundary of the study area, is within Shorezone Tolerance District 4. The following descriptions include the shorezone district's restrictions on land use applicable to the restoration study area.

Shorezone Tolerance District 1. Section 83.7.1 of the TRPA Code of Ordinances describes Shorezone Tolerance District 1 as a "low sandy barrier that separates the lake proper from marshes and wetlands" and as "ecologically fragile," and states that "any substantial use or alteration can lead to excessive sedimentation beach erosion and water turbidity" (TRPA 2011). Permissible uses include the primary uses of safety and navigation facilities, and accessory uses include fences and shoreline protective structures (see Tables 3.10-2 and 3.10-3). Regulations for and restrictions on land uses in Shorezone Tolerance District 1, outlined in Section 83.7.2 of the TRPA Code of Ordinances, are as follows (TRPA 2011):

A. Access to the shoreline shall be restricted to planned footpaths which minimize the impact to the backshore.

B. Vegetation shall not be manipulated or otherwise disturbed except when permitted under Chapter 85 (Development Standards in the Backshore).

C. No drainage or modification of backshore wetlands shall be permitted.

D. New development in the backshore of a Shorezone Tolerance District 1 shall be regulated in accordance with the regulations in this Code for stream environment zones.

E. Replacement of existing land coverage in the backshore of a Shorezone Tolerance District 1 shall be in accordance with the regulations for replacing existing land coverage in stream environment zones.

Shorezone Tolerance District 4. Section 83.9.1.A of the TRPA Code of Ordinances describes Shorezone Tolerance District 4 as "volcanic rock shorelines with moderate potential for erosion" (TRPA 2011). The permissible uses (primary and accessory) for Shorezone Tolerance District 4 within Plan Area Statement 99 are listed in Table 3.10-2. Regulations for and restrictions on land uses within Shorezone Tolerance District 4 outlined in Section 83.9.2 of the TRPA Code of Ordinances are described below (TRPA 2011).

A. Permitted development or continued use may be conditioned upon installation and maintenance of vegetation to stabilized backshore areas and protection of existing cliffs from accelerated erosion.

B. Projects shall not be permitted in the backshore unless TRPA finds that such project is unlikely to require the cliff area to be mechanically stabilized or that the project will not accelerate cliff crumbling, beach loss or erosion.

C. Access to the shoreline shall be restricted to stabilized access ways that minimize the impact to the backshore.

D. Access to buoys shall be designed to cause the least possible environmental harm to the foreshore and backshore.

E. Access to piers, floating platforms and boat ramps shall be designed to cause the least possible alteration to the natural backshore.

Environmental Improvement Program

The Environmental Improvement Program (EIP) includes a list of specific projects throughout the Basin that are needed to attain and maintain the thresholds (TRPA 1997). EIP-listed projects within the study area include 560, 650, 981, and 1002.

EIP Project #560 includes implementation of the proposed project and the Lower West Side Project to restore the mouth of the Upper Truckee River and associated floodplain and was previously funded as EIP Project #1002. EIP Project #650 calls for restoring 40 acres of SEZ on lands that have been acquired by the public, and EIP Project #981 calls for developing a protection plan and constructing protective structures, along Cove East beaches.

Tahoe Keys Marina Master Plan

A master plan has been adopted by TRPA for the Tahoe Keys Marina (TRPA 2002). The objectives of the *Tahoe Keys Marina Master Plan* are to facilitate obtaining necessary permits and environmental certifications, executing a land exchange with the Conservancy and the Tahoe Keys Property Owners Association (TKPOA), and constructing proposed projects.

City of South Lake Tahoe

General Plan

The City of South Lake Tahoe *2030 General Plan* (City General Plan) was adopted in 2011. The City General Plan designates the land use in the study area as Conservation. This designation provides for the permanent preservation of natural resources, habitat protection, watershed management, public and quasi-public uses, areas

that contain public health and safety hazards such as floodways, and areas containing environmentally sensitive features.

Lake Tahoe Airport Comprehensive Land Use Plan

The *Lake Tahoe Airport Comprehensive Land Use Plan* (CLUP) establishes planning boundaries for the Lake Tahoe Airport and defines compatible types and patterns of future land uses that might occur in the area surrounding the airport (CSLT 2007). The purpose of the CLUP is to provide the Lake Tahoe Airport area with compatibility guidelines for height, noise, and safety.

The CLUP designates airport safety zones to the land surrounding the airport to minimize the number of people exposed to aircraft crash hazards. The southeastern portion of the study area between the Highland Woods subdivision and Trout Creek is within the approach/departure zone. The approach/departure zone, which is located under the takeoff and landing slopes for each runway, extends outward for 5,000 feet from Runway 36 (with a width of 500–1,500 feet) and 10,000 feet from Runway 18 (with a width of 1,010–3,500 feet), and is less restrictive than the clear zone.

Conservation Strategy for Tahoe Yellow Cress

The *Conservation Strategy for Tahoe Yellow Cress* (*Rorippa subumbellata)* is a regional conservation strategy for Tahoe yellow cress, a state-listed endangered species that grows in the study area (Pavlik, Murphy, and TYCTAG 2002). The conservation strategy is described in Section 3.4, "Biological Resources: Vegetation and Wildlife."

ENVIRONMENTAL SETTING

Study Area

The study area for the Upper Truckee River and Marsh Restoration Project is approximately 633 acres, and includes parcels owned by the Conservancy, other public agencies, and private landowners (Exhibit 1-2 in Chapter 1). It is generally bounded by U.S. 50 and the Highland Woods subdivision on the south, the Al Tahoe subdivision on the east, and Tahoe Island/Sky Meadows and Tahoe Keys subdivisions on the west. The study area includes the downstream reaches of Trout Creek and the Upper Truckee River, adjacent wetland and uplands habitats, more than three-fourths of a mile of Lake Tahoe shoreline, and the LWS Restoration Area (located in the northwest portion of the study area, just east of the Tahoe Keys Marina). Land uses and land use policies in the study area are heavily influenced by natural resource values because of the unique habitat qualities and natural setting provided by the study area. For a complete description of the natural resource land uses in the study area see Section 3.4, "Biological Resources: Vegetation and Wildlife." The study area is very accessible and is used extensively by the public. A number of streets in adjacent neighborhoods end at the boundary of the study area, and numerous user-created trails begin at these access points and extend into the study area. In addition, an improved and Conservancy-maintained pedestrian trail connects East Venice Drive and Cove East Beach. The study area is also accessible by boat from Lake Tahoe and by canoes, kayaks, and rafts from the Upper Truckee River. Visitors use the study area for numerous informal, dispersed recreation activities, including: rafting, kayaking, canoeing, walking, jogging, dog walking, wildlife viewing, photography and sightseeing, swimming, fishing, bicycling, and beach use.

Residential Subdivisions Adjacent to the Study Area

The study area is bordered by four residential subdivisions: Al Tahoe, Highland Woods, Tahoe Island, and Tahoe Keys. These subdivisions are described below.

The Al Tahoe residential subdivision is located immediately east of and adjacent to the study area. The subdivision contains a mixture of older and newer homes (single-family and multi-family dwellings), with some commercial uses within the subdivision near U.S. 50. The subdivision is served by both Class II and Class III

bicycle trails. A Class I bicycle path also connects this subdivision to U.S. 50 and the Highland Woods subdivision.

The Highland Woods residential subdivision is located adjacent to the southern portion of the study area, between the Upper Truckee River and Trout Creek. The residential uses consist primarily of single-family dwellings with a few multi-family dwellings within the subdivision. A Class I bicycle path provides access to this subdivision from the study area at the end of Rubicon Trail. As the bicycle path continues into the subdivision, it transitions to a Class III bicycle path. A Class I bicycle path extends from this subdivision toward the Tahoe Island and Tahoe Keys subdivisions (as shown in Exhibit 2-1 in Chapter 2).

The Tahoe Island subdivision is located southwest of the study area. The residential uses consist primarily of single-family dwellings, with a few multi-family dwellings in the subdivision. A Class III bicycle path serves the subdivision, and a Class I path extends between this subdivision and Highland Woods. A Class II bicycle path on Tahoe Keys Boulevard extends into PAS 102.

The Tahoe Keys development contains multi-family and single-family houses and condominiums. This area also includes the Tahoe Keys Village commercial and professional center and the Tahoe Keys Marina. The subdivision contains Class II and Class III bicycle paths.

All of the residential subdivisions have access points leading into the study area. Some of these access points and trails are established and recognized by the Conservancy while others are user-created.

Sierra Tract Commercial / U.S. Highway 50 Corridor

A variety of commercial uses exist within the U.S. 50 corridor: restaurants, retail, gas stations, professional offices, hotels, hardware/lumber, and more. Existing commercial uses adjacent to the study area, near the U.S. 50 bridge at the Upper Truckee River, include Carrow's Restaurant, Motel 6, and Tahoe Amusement Park. Meek's Lumber and the Tahoe Center shopping center are located near the U.S. 50 bridge at Trout Creek.

Tahoe Keys Marina

The Tahoe Keys Marina includes mixed-use commercial development (restaurant, meeting rooms, retail shops), marina facilities such as boat slips, facilities for fueling vessels, a boat launching area, offices, and parking. The marina serves residents of and visitors to the Tahoe Basin. The LWS Restoration Area is located immediately west of and adjacent to the Tahoe Keys Marina parking lot.

Lake Tahoe Airport

The Lake Tahoe Airport is located approximately one mile south of the study area along U.S. 50. The Lake Tahoe Airport is owned and operated by the CSLT. The airport is equipped to serve as a commercial air carrier/general aviation airport, although it does not currently support commercial flights and there is no commercial operator at the airport. The airport has one north-south asphalt runaway, which is 8,544 feet long by 150 feet wide. The Lake Tahoe Airport is adjacent to the Upper Truckee River upstream of the study area. The southeastern portion of the study area between the Highland Woods subdivision and Trout Creek is within the approach/departure zone. (See Section 3.7, "Human Health/Risk of Upset," for additional information on the Lake Tahoe Airport and airspace safety.)

3.10.2 Environmental Consequences and Mitigation Measures

Significance Criteria

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines (Appendix G) and the TRPA Initial Environmental Checklist.

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to land use if it would:

- physically divide an established community (CEQA 1);
- conflict with any applicable land-use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect (CEQA 2); or
- conflict with any applicable habitat conservation plan or natural community conservation plan (CEQA 3).
- conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)) or timberland (as defined in Public Resources Code Section 4526) (CEQA 4).
- result in the loss of forest land or conversion of forest land to non-forest use (CEQA 5).
- involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to nonforest use (CEQA 6).

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis. NEPA requires documentation and discussion of any beneficial effects of a project in addition to its negative impacts. Where appropriate, these beneficial effects are discussed and called out specifically for the purposes of NEPA in the following impact analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative was determined to have a significant impact related to land use if it would:

- include uses that are not listed as permissible uses in the applicable PAS, adopted community plan, or master plan (TRPA 1); or
- expand or intensify an existing nonconforming use (TRPA 2).

METHODS AND ASSUMPTIONS

The focus of this analysis is on land-use impacts that would result from implementation of the proposed alternatives. Evaluation of potential impacts was based on consultation with appropriate agencies and a review of the planning documents pertaining to the study area:

- *Regional Plan for the Lake Tahoe Basin* (TRPA 2004);
- TRPA PASs, 99 (Al Tahoe), 100 (Truckee Marsh), 102 (Tahoe Keys), 103 (Sierra Tract–Commercial), 104 (Highland Woods), and 111 (Tahoe Island) (TRPA 2005a, 2005b, 2005c, 2005d, 2005e, 2005f);
- *2030 General Plan* (CSLT 2011);
- *Lake Tahoe Airport Comprehensive Land Use Plan* (CSLT 2007); and
- *Tahoe Keys Marina Master Plan* (TRPA 2002).

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Changes in zoning and forest land effects (CEQA 4, 5, 6; TRPA 1)—No environmental impacts would occur related to changes in zoning, including any that could affect forest land. The zoning of the study area is expressed by the PASs, and no changes to the PASs are proposed as part of this project.

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.10-1 (Alt. 1) **Potential to Physically Divide an Established Community. (CEQA 1; NEPA)** *Implementation of Alternative 1 would not create a physical division within an established community. The restoration features of Alternative 1 that would modify the river, floodplain, and lagoon areas would not adversely affect accessibility of the area, existing transportation, or create a barrier to access within and through the community. Some of the proposed public access and recreation infrastructure elements would benefit the neighboring community, specifically the bridge and boardwalks, would provide transportation connectivity. This would be a beneficial effect. This impact would be* ***less than significant****.*

Restoration components of Alternative 1 would modify the Upper Truckee River and associated floodplain in the study area, and restore lagoon and dune habitats. These restoration components would include raising and reconfiguring a portion of the river's main channel, reconfiguring two sections of split channel, reducing the capacity of the river mouth, and changing the hydrologic connectivity of the Sailing Lagoon. These restoration components would be modifications to an existing natural feature and would not adversely affect accessibility of the study area, nor would they hinder existing transportation or access within or through the community.

Public access and recreation infrastructure features of Alternative 1 would include kiosks, pedestrian trails and bicycle paths, viewing platforms, boardwalks, and a bridge over the Upper Truckee River. The kiosks, viewing platforms, and pedestrian trail and bicycle paths would not reduce accessibility to the study area, nor would they hinder existing transportation access within and through the community. On the contrary, the bridge and connected boardwalk features would provide new transportation connectivity within the community. These public access features would enhance passage over an existing natural physical barrier (the Upper Truckee River) and would therefore improve connection between existing neighborhoods (Al Tahoe and Tahoe Keys) via alternate modes of transportation.

In summary, neither the restoration components nor the public access and recreation infrastructure components of Alternative 1 would physically divide an established community because these components would either be modifications to existing features or would not create a barrier to connectivity to surrounding communities. In addition, some of the public access components would increase connectivity of established communities by providing additional access corridors through the study area allowing better connectivity of the surrounding community. This impact would be **less than significant**.

IMPACT 3.10-2 (Alt. 1) **Potential Conflict with Land-Use Plans, Policies, or Regulations Intended to Protect the Environment. (CEQA 2; TRPA 2)** *Implementation of Alternative 1 would not conflict with applicable plans, policies, or regulations intended to protect the environment. Land uses under Alternative 1 would either be consistent with the permissible land uses of applicable PASs or a special-use permit would be obtained prior to construction ensuring consistency. Land use under Alternative 1 would also be consistent with the goals and objectives of the City General Plan, the Tahoe Keys Marina Master Plan, the TRPA Regional Plan, EIP, and the compatible land uses identified in the CLUP for the approach/departure zone, which extends into the southeastern corner of the study area. This impact would be* ***less than significant****.*

The permissible uses within the seven applicable plan areas (as described within the corresponding PASs) are listed in Tables 3.10-2 through 3.10-7. Table 3.10-8 presents permissible uses related to the project for each of the seven PASs, SEZ restoration and a wide range of vegetation and habitat management activities are identified as permissible uses and in all plan areas riding and hiking trails are also a permissible use. The more intensive components of Alternative 1 (i.e., kiosks, boardwalks, viewing platforms) would either be constructed in a PAS that allows recreational development (PAS 102) or transportation routes (PAS 100). Because all of the proposed uses are listed as allowable uses, Alternative 1 would not conflict with the applicable PASs.

Applicable land-use regulations and restrictions in Shorezone Tolerance Districts 1 and 4 include limiting shoreline access to planned footpaths and stabilized access ways, and in District 1, replacement of existing land coverage in the backshore in accordance with the regulations for SEZs. Alternative 1 would include observation platforms, boardwalks, pedestrian trails, and bicycle paths; however, any new access would be a stabilized access way, and would provide planned pedestrian trails that would discourage and reduce public access into sensitive areas.

Alternative 1 is consistent with the conservation land use category of the City General Plan. In particular, Alternative 1 supports conservation, environmental improvements and the correction of past land-use deficiencies. Regarding specific land-use designations, the CSLT has adopted the TRPA permissible uses for each plan area. In addition, the components included as part of Alternative 1 would be consistent with the TRPA *Regional Plan* goals and policies, as discussed in Table 3.10-1.

The southeast corner of the study area is in the approach/departure zone of the Lake Tahoe Airport. Land uses designated as compatible for this zone include most recreation uses (except for camping and participant sports facilities) and the full range of resource management uses, including SEZ restoration and vegetation management. Thus, the restoration, public access and recreation infrastructure features of Alternative 1 would be considered compatible land uses by the CLUP and would not conflict with the CLUP.

In addition, Alternative 1 would not impair navigation within the Upper Truckee River that is under the jurisdiction of the CSLC, and the Conservancy would obtain a State Lands Lease, if determined necessary by CSLC, to ensure consistency with CSLC policies and regulations.

Implementation of Alternative 1 would also include implementation of EIP Projects #560, 650, 981, and 1002 described above, which would further implementation of the EIP.

In summary, Alternative 1 would not conflict with applicable land-use plans, policies, or regulations intended to protect the environment, and in some cases would further implementation of goals or policies of the land use plans. Therefore, this impact would be **less than significant**.

IMPACT 3.10-3 (Alt. 1) **Potential Conflict with Regional Conservation Strategy for Tahoe Yellow Cress. (CEQA 3)** *The regional, multi-agency, conservation strategy for Tahoe yellow cress includes specific actions to be implemented in the study area. The Conservancy has prepared a Tahoe yellow cress management plan for the study area that incorporates these applicable actions of the regional conservation strategy. Alternative 1 would implement these actions but would also construct a boardwalk and increase recreational use in Tahoe yellow cress habitat that the regional conservation strategy identifies as a core site for conservation. The actions in the Conservancy's management plan would not be sufficient to fully mitigate the effects of the increase in recreational use. Therefore, this impact would be* ***significant****.*

Alternative 1 would construct a boardwalk close to potential and occupied Tahoe yellow cress habitat east of the Upper Truckee River. Consequently, Alternative 1 would increase the number of recreational users and associated disturbance throughout this habitat, which would adversely affect Tahoe yellow cress. These effects on Tahoe yellow cress are described in greater detail in Section 3.4, "Biological Resources: Vegetation and Wildlife" in the discussion of Impacts 3.4-3, 3.4-4, and 3.4-5.

Table 3.10-8
Alternative Elements Compatibility with Permissible Uses

Elements included in Action Alternatives[1]					TRPA Use Category	Plan Area Statements						
Element	Alt. 1	Alt. 2	Alt. 3	Alt. 4		99	100	102	103	104	105	111
Restoration and Enhancement Elements						Proposed in/Permissible In Plan Area?						
Stabilization of Eroding Banks Downstream of U.S. 50 Bridge	✓	✓	✓	✓	Erosion Control	N	Y/S	N	Y/A	N/A	N	N/A
River and Floodplain Restoration[2]	✓	✓	✓	✓	SEZ Restoration	N	Y/S	Y/A	N	N/A	N	N/A
River Mouth Size Reduction	✓	✓	✓		SEZ Restoration	N	Y/S	Y/A	N	N/A	N	N/A
Removal of Existing Fill from Floodplain	✓	✓	✓		SEZ Restoration	N	Y/S	N	N	N/A	N	N/A
Reactivation of Floodplain Terrace			✓		SEZ Restoration	Y/A	Y/S	Y/A	N	N/A	N	N/A
Modification of Existing Stormwater Discharge Locations		✓	✓		Erosion Control	N	Y/S	N	N	N/A	N	N/A
Reestablishment of River Overflow Lagoon	✓	✓	✓		SEZ Restoration	N	N	Y/A	N	N/A	N	N/A
Removal of Existing Fill from Trout Creek Lagoon	✓	✓			SEZ Restoration	Y/A	Y/S	N	N	N/A	N	N/A
Beach-Dune Restoration	✓	✓			SEZ Restoration	N	N	Y/A	N	N/A	N	N/A
Forest Enhancement	✓	✓	✓	✓	Nonstructural Wildlife Habitat Management	N	Y/A	Y/A	N	N/A	N	N/A
Core Habitat Enhancement	✓	✓	✓	✓	Nonstructural Wildlife Habitat Management	Y/A	Y/A	N	N	N/A	N	N/A

Table 3.10-8
Alternative Elements Compatibility with Permissible Uses

Elements included in Action Alternatives[1]					TRPA Use Category	Plan Area Statements						
Element	Alt. 1	Alt. 2	Alt. 3	Alt. 4		99	100	102	103	104	105	111
Restoration and Enhancement Elements						Proposed in/Permissible In Plan Area?						
Recreation Public Infrastructure												
Bicycle Path(s)	✓		✓	✓	Transportation Routes	Y/S	Y/S	Y/S	N	N/A	N	N/A
Pedestrian Trail(s)	✓	✓	✓	✓	Riding and Hiking Trails	Y/A	Y/S	Y/S	N	N/A	N	N/A
Observation Areas and Viewpoints	✓		✓	✓	Day-use area (vista point)	Y/A	Y/Accessory to Transportation Routes or Riding and Hiking Trails	Y/A	N	N/A	N	N/A
Bridge and boardwalk	✓				Transportation Routes	N	Y/S	Y/S	N	N/A	N	N/A
Boardwalk(s)	✓		✓	✓	Transportation Routes	N	Y/S	Y/S	N	N/A	N	N/A
Kiosk(s)	✓		✓	✓	Accessory use	Y/Accessory to Transportation Routes or Riding and Hiking Trails or Day Use Area	Y/Accessory to Transportation Routes or Riding and Hiking Trails or Day Use Area	Y/Accessory to Transportation Routes or Riding and Hiking Trails or Day Use Area	N	N/A	N	N/A
River Access (Boat Take-Out) at East Venice Drive	✓			✓	Erosion Control	N	N	Y/A	N	N/A	N	N/A
River Access (Boat Take-Out) at River Street		✓	✓		Erosion Control	N	Y/S	N	N	N/A	Y/A	N/A
Fishing Platform		✓	✓		Day Use Area	N	N	Y/A	N	N/A	N	N/A

Notes:
[1] No-Project/No-Action Alternative does not include any of these elements.
[2] River and floodplain restoration includes river channel restoration, secondary channel reactivation, floodplain lowering, and fill of abandoned channel segments.
N = not proposed, no use determination; NOT APP = PAS 104 and 111 are in project area but no proposed permanent improvements (uses); Observation area = Viewpoints;
Y/S = Yes proposed and Special Use; Y/A = Yes proposed, Allowed Use

To attain long-term conservation of Tahoe yellow cress, the regional, multi-agency conservation strategy for Tahoe yellow cress (*Conservation Strategy for Tahoe Yellow Cress [Rorippa subumbellata]* [Pavlik, Murphy, and TYCTAG 2002]) establishes six goals, 14 objectives, and a number of specific actions. This regional plan identifies occupied and potential Tahoe yellow cress habitat east of the Upper Truckee River as a core site for conservation, and habitat west of the river as a medium-priority restoration site. For the study area, the Conservancy has prepared a Tahoe yellow cress management plan that incorporates the applicable actions of the regional conservation strategy (e.g., maintaining an exclosure and conducting monitoring) (Conservancy 2008) and would be implemented as a component of Alternative 1. However, these actions would not be sufficient to fully mitigate the effects of increased recreational use of Tahoe yellow cress habitat. (See the discussion of Impact 3.4-5 [Alt. 1].) Therefore, Alternative 1 would conflict with several goals of the regional conservation strategy for Tahoe yellow cress, including Goal 1, Protect Occupied Habitat and Potentially Suitable Habitat That Does/Could Support Natural Populations; Goal 2, Improve Tahoe Yellow Cress Populations; and Goal 3, Promote Conditions that Favor a Positive Metapopulation Dynamic.

The goals and objectives include protecting occupied and potentially suitable habitat at core and priority sites, improving Tahoe yellow cress populations, and promoting conditions that favor a positive metapopulation dynamic. Therefore, this impact would be **significant**.

All feasible measures to reduce effects on Tahoe yellow cress, and thus reduce the potential conflict with the regional conservation strategy, have been included in the Conservancy's Tahoe yellow cress management plan for the study area, which would be implemented as a component of Alternative 1. Therefore, this impact would be **significant and unavoidable**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.10-1 (Alt. 2) **Potential to Physically Divide an Established Community. (CEQA 1)** *Implementation of Alternative 2 would not create a physical division within an established community. The restoration features of Alternative 2 that would modify the river, floodplain, and lagoon areas would not adversely affect accessibility of the area, existing transportation, or access within and through the community. New public access and recreation infrastructure features also would not adversely affect accessibility of the area, existing transportation, or access within and through the community. This impact would be* ***less than significant****.*

This impact is similar to Impact 3.10-1 (Alt. 1) above. Alternative 2 would not provide the new neighborhood connections associated with the bridge and boardwalks that would improve connectivity under Alternative 1; however, Alternative 2 would include similar restoration, public access, and recreation infrastructure features as Alternative 1. Modifications to the channel and floodplain of the Upper Truckee River, lagoon and dune restoration, a fishing platform, and pedestrian trails under Alternative 2 are not expected to physically divide any established communities because these features would not create barriers that would affect accessibility through the surrounding communities. Therefore, this impact would be **less than significant**.

IMPACT 3.10-2 (Alt. 2) **Potential Conflict with Land-Use Plans, Policies, or Regulations Intended to Protect the Environment. (CEQA 2; TRPA 2)** *Implementation of Alternative 2 would not conflict with applicable plans, policies, or regulations intended to protect the environment. Land uses under Alternative 2 would be consistent with the permissible land uses of applicable PASs, including special areas, shorezone tolerance districts, and the Tahoe Keys Marina Master Plan. Land use under Alternative 2 would also be consistent with the goals and objectives of the City General Plan, CSLC policies, TRPA Regional Plan, EIP, and the compatible land uses identified in the CLUP for the approach/departure zone. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.10-2 (Alt. 1) above. Table 3.10-8 presents permissible uses related to the project for each of the seven PASs. Although the restoration, public access, and recreation infrastructure features of Alternative 2 differ from those of Alternative 1, the features of Alternative 2 would not adversely affect

applicable land-use plans, policies, or regulations intended to protect the environment for the same reasons given previously for Alternative 1. This impact would be **less than significant**.

IMPACT 3.10-3 (Alt. 2) **Potential Conflict with Regional Conservation Strategy for Tahoe Yellow Cress. (CEQA 3)** *The regional, multi-agency, conservation strategy for Tahoe yellow cress includes specific actions to be implemented in the study area. Alternative 2 has been designed to be consistent with this conservation strategy. The Conservancy has also prepared a Tahoe yellow cress management plan for the study area that incorporates the applicable actions of the regional conservation strategy. This impact would be* ***less than significant****.*

To attain long-term conservation of Tahoe yellow cress, the regional, multi-agency conservation strategy for Tahoe yellow cress (*Conservation Strategy for Tahoe Yellow Cress [Rorippa subumbellata]* [Pavlik, Murphy, and TYCTAG 2002]) establishes six goals, 14 objectives, and a number of specific actions. For the study area, the Conservancy has prepared a Tahoe yellow cress management plan that incorporates the applicable actions of this regional conservation strategy (Conservancy 2008). The actions implemented at East Barton and Barton beaches for Tahoe yellow cress would include annual monitoring and adjustment of the location and design of an exclosure to prevent trampling of Tahoe yellow cress plants by visitors and their dogs. Alternative 2 would implement all applicable actions identified by the regional conservation strategy for Tahoe yellow cress, and the other features of Alternative 2 would not conflict with the goals, objectives, or actions of the regional conservation plan. Therefore, this impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.10-1 (Alt. 3) **Potential to Physically Divide an Established Community. (CEQA 1)** *Implementation of Alternative 3 would not create a physical division within an established community. The restoration features of Alternative 3 that would modify the river, floodplain, and lagoon areas would not adversely affect accessibility of the area, existing transportation, or access within and through the community. New recreation components also would not adversely affect accessibility of the area, existing transportation, or access within and through the community. This impact would be* ***less than significant.***

This impact is similar to Impact 3.10-1 (Alt. 1) above. Alternative 3 would not provide the new neighborhood connections associated with the bridge and boardwalks that would improve access under Alternative 1; however, Alternative 3 would include similar restoration, public access, and recreation infrastructure features as Alternative 1. Although navigation along the Upper Truckee River could be adversely affected under Alternative 3, the reach of river within the study area is not a primary transportation corridor between communities and access would continue to be provided over the river. Modifications to the channel and floodplain of the Upper Truckee River, lagoon and dune restoration, a fishing platform, and pedestrian trails under Alternative 3 are not expected to physically divide any established communities because these features would not create barriers that would affect access to the surrounding communities. Therefore, this impact would be **less than significant**.

IMPACT 3.10-2 (Alt. 3) **Potential Conflict with Land-Use Plans, Policies, or Regulations Intended to Protect the Environment. (CEQA 2; TRPA 2)** *Implementation of Alternative 3 would not conflict with applicable plans, policies, or regulations intended to protect the environment. Land uses under Alternative 3 would be consistent with the permissible land uses of applicable PASs, including special areas, shorezone tolerance districts, and the Tahoe Keys Marina Master Plan. Land use under Alternative 3 would also be consistent with the goals and objectives of the City General Plan, CSLC policies, TRPA Regional Plan, EIP, and the compatible land uses identified in the CLUP for the approach/departure zone. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.10-2 (Alt. 1) above. Table 3.10-8 presents permissible uses related to the project for each of the PASs. Although the restoration, public access, and recreation infrastructure features of Alternative 3 differ from those of Alternative 2, the features of Alternative 3 would not adversely affect applicable

land-use plans, policies, or regulations intended to protect the environment for the same reasons given previously for Alternative 1. This impact would be **less than significant**.

IMPACT 3.10-3 (Alt. 3) **Potential Conflict with Regional Conservation Strategy for Tahoe Yellow Cress. (CEQA 3)** *The regional, multi-agency, conservation strategy for Tahoe yellow cress includes specific actions to be implemented in the study area. Alternative 3 has been designed to be consistent with this conservation strategy. The Conservancy has also prepared a Tahoe yellow cress management plan for the study area that incorporates the applicable actions of the regional conservation strategy. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.10-3 (Alt. 2) above. Although the restoration, public access, and recreation infrastructure features of Alternative 3 differ slightly from those of Alternative 2, the features of Alternative 3 would not conflict with the goals, objectives, or actions of the regional, multi-agency, conservation strategy for Tahoe yellow cress (*Conservation Strategy for Tahoe Yellow Cress [Rorippa subumbellata]* [Pavlik, Murphy, and TYCTAG 2002]) for the same reasons given previously for Alternative 2. This impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.10-1 (Alt. 4) **Potential to Physically Divide an Established Community. (CEQA 1)** *The restoration features of Alternative 4 that would modify the river and floodplain would not adversely affect accessibility of the area, existing transportation, or access within and through the community. New recreation components also would not adversely affect accessibility of the area, existing transportation, or access within and through the community. This impact would be* ***less than significant****.*

This impact is similar to Impact 3.10-1 (Alt. 1) above. Alternative 4 would not provide the new neighborhood connections associated with the bridge and boardwalks that would improve access under Alternative 1; however, Alternative 4 would include similar restoration, public access, and recreation infrastructure features as Alternative 1. Modifications to the channel and floodplain of the Upper Truckee River, lagoon and dune restoration, a fishing platform, and pedestrian trails under Alternative 4 are not expected to physically divide any established communities because these features would not create barriers that would affect access to the surrounding communities. Therefore, this impact would be **less than significant**.

IMPACT 3.10-2 (Alt. 4) **Potential Conflict with Land-Use Plans, Policies, or Regulations Intended to Protect the Environment. (CEQA 2; TRPA 2)** *Implementation of Alternative 4 would not conflict with applicable plans, policies, or regulations intended to protect the environment. Land uses under Alternative 4 would be consistent with the permissible land uses of applicable PASs, including special areas, shorezone tolerance districts, and the Tahoe Keys Marina Master Plan. Land use under Alternative 4 would also be consistent with the goals and objectives of the City General Plan, TRPA Regional Plan, EIP, CSLC policies, and the compatible land uses identified in the CLUP for the approach/departure zone. This impact would be* ***less than significant****.*

This impact is similar to Impact 3.10-2 (Alt. 1) above. Table 3.10-8 presents permissible uses related to the project for each of the seven PASs. Although the restoration, public access, and recreation infrastructure features of Alternative 4 differ slightly from those of Alternative 1, the features of Alternative 4 would not adversely affect applicable land-use plans, policies, or regulations intended to protect the environment for the same reasons given previously for Alternative 1. This impact would be **less than significant**.

IMPACT 3.10-3 (Alt. 4) **Potential Conflict with Regional Conservation Strategy for Tahoe Yellow Cress. (CEQA 3)** *The regional, multi-agency, conservation strategy for Tahoe yellow cress includes specific actions to be implemented in the study area. Alternative 4 has been designed to be consistent with this conservation strategy. The Conservancy has also prepared a Tahoe yellow cress management plan for the study area that incorporates the applicable actions of the regional conservation strategy. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.10-3 (Alt. 2) above. Although the restoration, public access, and recreation infrastructure features of Alternative 4 differ slightly from those of Alternative 2, the features of Alternative 4 would not conflict with the goals, objectives, or actions of the regional, multi-agency, conservation strategy for Tahoe yellow cress (*Conservation Strategy for Tahoe Yellow Cress [Rorippa subumbellata]* [Pavlik, Murphy, and TYCTAG 2002]) for the same reasons given previously for Alternative 2. This impact would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.10-1 (Alt. 5) **Potential to Physically Divide an Established Community. (CEQA 1)** *Over time, existing natural and artificial features and natural processes are not expected to create a new physical division in the study area or within adjacent established communities. Implementation of Alternative 5 would not include new facilities or substantial physical alterations of the study area. Therefore, Alternative 5 would not create a physical division within an established community.* ***No impact*** *would occur.*

In the foreseeable future, existing natural and artificial features within the study area (i.e., the existing river, marsh, and public trails) are not expected to create any new physical division within the study area or an established community in the vicinity of the study area. The existing trails would remain in their current location and, presumably, would continue to be used for the purposes for which they are used today. Implementation of Alternative 5 would not include new facilities or substantial physical alterations of the study area. Therefore, there would be no changes to public access, and implementing Alternative 5 would not create any barriers that would divide an established community. **No impact** would occur.

IMPACT 3.10-2 (Alt. 5) **Potential Conflict with Land-Use Plans, Policies, or Regulations Intended to Protect the Environment. (CEQA 2; TRPA 2)** *Implementation of Alternative 5 would not conflict with applicable plans, policies, and regulations. For the foreseeable future, restoration of the channel and floodplain of the Upper Truckee River in the study area would not occur under Alternative 5. Under Alternative 5, EIP projects (Nos. 560, 650, 981, and 1002) necessary to attain, maintain, or surpass multiple thresholds, would not be implemented. However, these are only a subset of projects identified within the EIP as potential means for attainment of the various Threshold Standards, specifically the water quality and SEZ restoration objectives. Therefore, implementation of Alternative 5 would not conflict with but would also not assist with the attainment of the goals of the TRPA Regional Plan. This impact would be* ***less than significant.***

Implementation of Alternative 5 would not alter land use in the study area, and thus would not conflict with applicable plans, policies, and regulations intended to protect the environment. Restoration of the channel and floodplain of the Upper Truckee River in the study area would not occur for the foreseeable future and restoration of the river and floodplain in the study area has been identified as an EIP project (#560) necessary to attain, maintain, or surpass multiple thresholds. In addition, implementation of EIP Projects #650, 981, and 1002 described above, would not occur under Alternative 5. Therefore, implementation of Alternative 5 would not conflict with but would also not assist in the implementation of the goals of the TRPA *Regional Plan*. This impact would be **less than significant**.

IMPACT 3.10-3 (Alt. 5) **Potential Conflict with Regional Conservation Strategy for Tahoe Yellow Cress. (CEQA 3)** *Under Alternative 5, existing land uses and management practices in the study area would continue into the foreseeable future. The Conservancy would continue to manage the study area consistent with the regional, multi-agency, conservation strategy for Tahoe yellow cress. Therefore, Alternative 5 would not conflict with this conservation strategy. The impact would be* ***less than significant****.*

This impact would be similar to Impact 3.10-3 (Alt. 1) above. Although Alternative 5 would not include the restoration, public access, and recreation infrastructure features described under Alternatives 1–4, the existing land uses in the study area would continue into the future and the Conservancy would continue to manage the study area consistent with the conservation strategy for the Tahoe yellow cress (*Conservation Strategy for Tahoe Yellow Cress [Rorippa subumbellata]* [Pavlik, Murphy, and TYCTAG 2002]). Therefore, Alternative 5 would not conflict with the goals, objectives, or actions of the regional conservation strategy for Tahoe yellow cress. This impact would be **less than significant**.

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3.11 NOISE

This section includes a description of acoustic fundamentals, existing ambient noise conditions, applicable noise regulations, and an analysis of potential short- and long-term noise impacts associated with implementation of Alternatives 1–5. Mitigation measures are not needed because potentially significant adverse noise impacts would not occur for any alternatives. Consistency with TRPA goals and policies is presented in Section 3.2, "Land Use," Table 3.2-1. The project's effects on thresholds are described in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities." Cumulative noise impacts are addressed in Section 3.18, "Cumulative Impacts."

3.11.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal, state, and local governments have established noise standards and guidelines to protect citizens from potential hearing damage and various other adverse physiological and social effects associated with noise. The federal government regulates noise levels in the workplace, near aircraft, and for certain products. The State of California regulates vehicular and freeway noise affecting sensitive land uses, sets standards to control sound transmission and occupational noise, and identifies noise insulation standards and airport noise/land use compatibility criteria. Local communities generally regulate compatibility between land uses and noise levels by establishing allowable noise levels on private property and levels associated with the use of certain types of sources. The applicable standards and guidelines for the proposed alternatives are discussed below.

Federal

To address the human response to groundborne vibration, the Federal Transit Administration (FTA) of the U.S. Department of Transportation has set forth guidelines for maximum-acceptable vibration criteria for different types of land uses. These criteria are 65 vibration decibels (VdB) referenced to 1 microinch per second (µin/sec) and based on the root mean square (RMS) velocity amplitude for land uses where low ambient vibration is essential for interior operations (e.g., hospitals, high-tech manufacturing, and laboratory facilities); 80 VdB for residential uses and buildings where people normally sleep; and 83 VdB for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, and offices) (FTA 2006:Chapters 10 and 12).

Standards have also been established to address the potential for groundborne vibration to cause structural damage to buildings. These standards were developed by the Committee of Hearing, Bio Acoustics, and Bio Mechanics (CHABA) at the request of the U.S. Environmental Protection Agency (EPA) (FTA 2006: Chapters 7 to 13). For fragile structures, CHABA recommends a maximum limit of 0.25 inch per second (in/sec) peak particle velocity (PPV) (FTA 2006).

State

The California Governor's Office of Planning and Research (OPR) published the *State of California General Plan Guidelines* (OPR 2003), which provides guidance for the acceptability of projects within specific community noise equivalent level (CNEL) contours. Table 3.11-1 summarizes acceptable and unacceptable community noise exposure limits for various land use categories based on State of California standards. Generally, residential uses are considered acceptable in areas where exterior noise levels do not exceed 60 A-weighted decibels (dBA) CNEL. (See "Sound and the Human Ear" and "Noise Descriptors" in the "Environmental Setting" section below for descriptions of the dBA and CNEL concepts, respectively.) Residential uses are normally unacceptable in areas exceeding 70 dBA CNEL and conditionally acceptable within 55–70 dBA CNEL. Schools are normally acceptable in areas up to 70 dBA CNEL and normally unacceptable in areas exceeding 70 dBA CNEL. Commercial uses are normally acceptable in areas up to 70 dBA CNEL. Between 67.5 and 77.5 dBA CNEL, commercial uses are conditionally acceptable, depending on the noise insulation features and the noise reduction requirements. The guidelines also present adjustment factors that may be used to arrive at noise-acceptability standards that reflect the particular community's noise-control goals, sensitivity to noise, and assessment of the relative importance of noise issues.

Table 3.11-1 State of California Land Use Noise Compatibility Guidelines				
Land Use Category	Community Noise Exposure (CNEL or L_{dn}, dBA)			
	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Residential—Low-Density Single-Family, Duplex, Mobile Home	< 60	55–70	70–75	75+
Residential—Multi-Family	< 65	60–70	70–75	75+
Transient Lodging—Motel, Hotel	< 65	60–70	70–80	80+
Schools, Libraries, Churches, Hospitals, Nursing Homes	< 70	60–70	70–80	80+
Auditoriums, Concert Halls, Amphitheaters		< 70	65+	
Sports Arena, Outdoor Spectator Sports		< 75	70+	
Playgrounds, Neighborhood Parks	< 70		67.5–75	72.5+
Golf Courses, Riding Stables, Water Recreation, Cemeteries	< 75		70–80	80+
Office Building, Business Commercial and Professional	< 70	67.5–77.5	75+	
Industrial, Manufacturing, Utilities, Agriculture	< 75	70–80	75+	

Notes:
CNEL = community noise equivalent level; dBA = A-weighted decibels; L_{dn} = day-night noise level
[1] Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
[2] New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
[3] New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor areas must be shielded.
[4] New construction or development should generally not be undertaken.
Source: OPR 2003

Tahoe Regional Planning Agency

Goals and Policies

The Goals and Policies document of the 1987 Regional Plan (TRPA 2006) establishes an overall framework for development and environmental conservation in the Lake Tahoe region. Chapter II (Land Use Element) of the Goals and Policies document considers seven subelements, including the Noise subelement.

The Goals and Policies document presents the overall approach to meeting TRPA's environmental carrying capacity thresholds (thresholds) (see "Thresholds" below). The following goals and policies in the Noise subelement of the Goals and Policies are relevant to the project:

- **Goal 1. Single Event Noise Standards shall be attained and maintained.** People can be annoyed by a specific noise source. Thresholds were adopted that apply to aircraft, boats, motor vehicles, off-road vehicles, and snowmobiles to reduce impacts associated with single noise events.
  - **Policy 3:** Motor vehicles and motorcycle shall comply with the appropriate noise thresholds.
  - **Policy 5:** The use of snowmobiles will be restricted to designated areas.

- **Policy 6:** The plan will permit uses only if they are consistent with the noise standards. Sound proofing practices may be required on all structures containing uses that would otherwise adversely impact the prescribed noise levels.

- **Goal 2. Community noise equivalent levels shall be attained and maintained.** CNEL thresholds were adopted to reduce the annoyance associated with cumulative noise events on people and wildlife. In the Lake Tahoe Basin, the main sources of noise are attributed to the major transportation corridors and the Lake Tahoe Airport in South Lake Tahoe. Therefore, the policies are directed towards reducing the transmission of noise from those sources. The CNEL thresholds will be attained upon implementation of the following policies.

  - **Policy 1:** Transmission of noise from transportation corridors shall be reduced. The noise associated with the transportation corridors can be decreased by reducing the number of trips and by installing mitigation measures. Trip reduction will be accomplished by the transit improvements identified in the Transportation Element. Ordinances will establish specific site design criteria for projects to help reduce the transmission of noise from the transportation corridors. The design criteria will also be incorporated into the water quality and transportation improvement programs. The mitigation measures may include setbacks, earth berms, and barriers.

  - **Policy 3:** TRPA will further define CNELs for wilderness and roadless areas, and for critical wildlife habitat areas.

The Noise subelement also establishes the following CNEL values for transportation corridors:

- U.S. Highway 50 (U.S. 50) (65 dBA)
- State Routes (SRs) 89, 207, 28, 267, and 431 (55 dBA)
- Lake Tahoe Airport (60 dBA)

The CNEL values for transportation corridors override the land use–based CNELs and are limited to an area within 300 feet from the edge of the road ("edge of pavement"). The airport CNEL value applies to areas affected by approved flight plans.

Plan Area Statements

The study area is located within six separate PASs: 099 (Al Tahoe), PAS 100 (Truckee Marsh), 102 (Tahoe Keys), PAS 103 (Sierra Tract Commercial), PAS 104 (Highland Woods), and PAS 111 (Tahoe Island) (see Exhibit 3.10-1, "Plan Area Statements in the Study Area and Vicinity," in Section 3.10, "Land Use"). The most conservative CNEL for the applicable PASs is 50 dBA CNEL in PAS 100. The maximum CNEL within the study area is 65 dBA CNEL for the U.S. 50 corridor.

Code of Ordinances

Chapter 68 (Noise Limitations) of the TRPA Code of Ordinances establishes noise limitations for single noise events from aircraft, marine craft, motor vehicles, motorcycles, off-road vehicles, and over-snow vehicles (TRPA 2011). Section 68.3 states that TRPA shall use the maximum level recorded on a noise meter, L_{max} (maximum noise level), for measuring single noise events. The noise levels set forth in Subsection 68.3.1 are the maximum permissible noise levels for the types of operations listed, unless specifically exempted under Section 68.9. Section 68.4 states that TRPA shall use CNELs to measure community noise levels, and the PASs shall set forth CNELs that shall not be exceeded by any one activity or combination of activities. In addition, community noise levels shall not exceed levels existing on August 26, 1982, where such levels are known. The CNELs set forth in the PASs are based on the land use classification, the presence of transportation corridors, and the applicable threshold.

Chapter 68 also provides guidance on the measurement of noise levels (Section 68.5), noise monitoring (Section 68.6), and performance standards (Section 68.7). The noise limitations established in Chapter 68 of the TRPA

Code of Ordinances do not apply to noise from TRPA-approved construction or maintenance projects, or the demolition of structures, provided that such activities are limited to the hours between 8:00 a.m. and 6:30 p.m.

Environmental Threshold Carrying Capacities

Noise thresholds are a combination of single-event L_{max} standards for specific sources (aircraft [Threshold N-1], motor vehicles, off-road vehicles, boats, snowmobiles [Threshold N-2]) and numerical CNEL values for various land use categories and transportation corridors [Threshold N-3]). Tables 3.11-2 and 3.11-3 summarize Thresholds N-1 and N-2 for single events (L_{max}) and Threshold N-3 for community noise events. In addition, Threshold N-3 contains the following policy statement (TRPA 2002):

> It shall be the policy of the TRPA Governing Board in the development of the Regional Plan to define, locate, and establish CNEL levels for transportation corridors.

Table 3.11-2
TRPA Environmental Threshold Carrying Capacity Noise Standards for Single Events (L_{max})[1]

Single Event	Threshold
Aircraft	*Departures (all aircraft):* – 80 dBA at 6,500 m from start to takeoff roll. – 77.1 dBA at 6,500 m from start to takeoff roll between 8:00 p.m. and 8:00 a.m. *Arrivals:* – General aviation and commuter aircraft—84 dBA at 2,000 m from the runway threshold approach. – Transport category aircraft—86 dBA at 2,000 m from the runway threshold approach. – All aircraft—77.1 dBA 2,000 m from the runway threshold approach between 8:00 p.m. and 8:00 a.m.
Watercraft	82.0 dBA at 50 feet with the engine operating at 3,000 rotations per minute
Motor Vehicles	*< 6,000 lb gross vehicle weight:* – 76.0 dBA at 50 feet (< 35 miles per hour [mph]) – 82.0 dBA at 50 feet (>35 mph) *> 6,000 lb gross vehicle weight:* – 82.0 dBA at 50 feet (< 35 mph) – 86.0 dBA at 50 feet (> 35 mph)
Motorcycles	77.0 dBA at 50 feet (< 35 mph), 86.0 dBA at 50 feet (> 35 mph)
Off-Road Vehicles	72.0 dBA at 50 feet (< 35 mph), 86.0 dBA at 50 feet (> 35 mph)
Over-Snow Vehicles (snowmobiles)	82.0 dBA at 50 feet

Notes: dBA = A-weighted decibels; lb = pounds; m = meters; mph = miles per hour
[1] Used for evaluation of Thresholds N-1 and N-2
Sources: TRPA 2002, 2007a

Table 3.11-3 TRPA Environmental Threshold Carrying Capacity Noise Standards for Community Events (CNEL)[1]	
Land Use Category	**Maximum Average Noise Level or CNEL Range (dBA) for Background Noise**
High Density Residential	55
Low Density Residential	50
Hotel	60
Commercial	60
Industrial	65
Urban Outdoor Recreation	55
Rural Outdoor Recreation	50
Wilderness and Roadless	45
Critical Wildlife Habitat	45

Notes: CNEL = community noise equivalent level; dBA = A-weighted decibels
[1] Used for evaluation of Threshold N-3
Sources: TRPA 2002, 2007a

El Dorado County

General Plan Noise Element

The following goals, objectives, policies, and criteria in the Noise Element of the *El Dorado County General Plan* (El Dorado County 2004) are relevant to the project:

- **Goal 6.5: Acceptable Noise Levels.** Ensure that County residents are not subjected to noise beyond acceptable levels.

  - **Objective 6.5.1: Protection of Noise-Sensitive Development.** Protect existing noise-sensitive developments (e.g., hospitals, schools, churches, and residential) from new uses that would generate noise levels incompatible with those uses and, conversely, discourage noise-sensitive uses from locating near sources of high noise levels.

  - **Policy 6.5.1.1:** Where noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels specified in Table 3.11-4 or the performance standards of Table 3.11-5, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design.

  - **Policy 6.5.1.2:** Where proposed non-residential land uses are likely to produce noise levels exceeding the performance standards of Table 3.11-5 at existing or planned noise-sensitive uses, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design.

  - **Policy 6.5.1.3:** Where noise mitigation measures are required to achieve the standards of Tables 3.11-4 and 3.11-5, the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered a means of achieving the noise standards only after all other practical design-related noise mitigation measures have been integrated into the project and the noise barriers are not incompatible with the surroundings.

Table 3.11-4 Maximum Allowable Noise Exposure for Transportation Noise Sources, El Dorado County			
Land Use	Outdoor Activity Areas[a] L_{dn}/CNEL, dBA	Interior Spaces	
		L_{dn}/CNEL, dBA	L_{eq}, dB[b]
Residential	60[c]	45	–
Transient Lodging	60[c]	45	–
Hospitals, Nursing Homes	60[c]	45	–
Theaters, Auditoriums, Music Halls	–	–	35
Churches, Meeting Halls, Schools	60[c]	–	40
Office Buildings	–	–	45
Libraries, Museums	–	–	45
Playgrounds, Neighborhood Parks	70	–	45

Notes: CNEL = community noise equivalent level; dB = decibels; dBA = A-weighted decibels; L_{dn} = day-night noise level; L_{eq} = equivalent noise level

[a] In Communities and Rural Centers, where the location of outdoor activity areas is not clearly defined, the exterior-noise-level standard shall be applied to the property line of the receiving land use. For residential uses with front yards facing the identified noise source, an exterior noise level criterion of 65 dB L_{dn} shall be applied at the building façade, in addition to a 60-dB L_{dn} criterion at the outdoor activity area. In Rural Regions, an exterior-noise-level criterion of 60 dB L_{dn} shall be applied at a 100-foot radius from the residence unless it is within Platted Lands where the underlying land use designation is consistent with the Community Region densities, in which case the 65-dB L_{dn} may apply. The 100-foot radius applies to properties that are 5 acres and larger; the balance will fall under the property-line requirement.

[b] As determined for a typical worst-case hour during periods of use.

[c] Where it is not possible to reduce noise in outdoor activity areas to 60 dB L_{dn} CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB L_{dn} CNEL may be allowed, provided that available exterior-noise-level reduction measures have been implemented and interior noise levels are in compliance with this table.

Source: El Dorado County 2004:Table 6-1

- **Policy 6.5.1.6:** New noise-sensitive uses shall not be allowed where the noise level, due to non-transportation noise sources, will exceed the noise level standards of Table 3.11-5 unless effective noise mitigation measures have been incorporated into the development design to achieve those standards.

- **Policy 6.5.1.7:** Noise created by new proposed nontransportation noise sources shall be mitigated so as not to exceed the noise level standards of Table 3.11-5 for noise-sensitive uses.

- **Policy 6.5.1.8:** New development of noise-sensitive land uses will not be permitted in areas exposed to existing or projected levels of noise from transportation noise sources which exceed the levels specified in Table 3.11-4 unless the project design includes effective mitigation measures to reduce exterior noise and noise levels in interior spaces to the levels specified in Table 3.11-5.

- **Policy 6.5.1.9:** Noise created by new transportation noise sources, excluding airport expansion but including roadway improvement projects, shall be mitigated so as not to exceed the levels specified in Table 3.11-4 at existing noise-sensitive land uses.

- **Policy 6.5.1.10:** To provide a comprehensive approach to noise control, the County shall:

  A. Develop and employ procedures to ensure that noise mitigation measures required pursuant to an acoustical analysis are implemented in the project review process and, as may be determined necessary, through the building permit process.

Table 3.11-5 Noise-Level Performance Protection Standards for Noise-Sensitive Land Uses Affected by Nontransportation* Sources, El Dorado County						
Noise Level Descriptor	Daytime 7:00 a.m.–7:00 p.m.		Evening 7:00 p.m.–10:00 p.m.		Night 10:00 p.m.–7:00 a.m.	
	Community	Rural	Community	Rural	Community	Rural
Hourly L_{eq}, dBA	55	50	50	45	45	40
Maximum Level, dBA	70	60	60	55	55	50

Notes: dB = decibels; dBA = A-weighted decibels; L_{eq} = equivalent noise level

Each of the noise levels specified above shall be lowered by 5 dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. These noise-level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

El Dorado County can impose noise level standards that are up to 5 dB less than those specified above based upon determination of existing low ambient noise levels in the vicinity of the project site.

In Community areas the exterior noise level standard shall be applied to the property line of the receiving property. In Rural Areas the exterior noise level standard shall be applied at a point 100 feet away from the residence. The above standards shall be measured only on property containing a noise-sensitive land use as defined in Objective 6.5.1. This measurement standard may be amended to provide for measurement at the boundary of a recorded noise easement between all effected property owners and approved by El Dorado County.

* For the purposes of the Noise Element, transportation noise sources are defined as traffic on public roadways, railroad line operations, and aircraft in flight. Control of noise from these sources is preempted by federal and state regulations. Control of noise from facilities of regulated public facilities is preempted by California Public Utilities Commission regulations. All other noise sources are subject to local regulations. Nontransportation noise sources may include industrial operations; outdoor recreation facilities; heating, ventilation, and air conditioning units; schools; hospitals; commercial land uses; and other outdoor land uses.

Source: El Dorado County 2004:Table 6-2

B. Develop and employ procedures to monitor compliance with the standards of the Noise Element after completion of projects where noise mitigation measures were required.

C. The zoning ordinance shall be amended to provide that noise standards will be applied to ministerial projects with the exception of single-family residential building permits if not in areas governed by the Airports Comprehensive Land Use Plans. (See Objective 6.5.2.)

Policy 6.5.1.11: The standards outlined in Tables 3.11-6, 3.11-7, and 3.11-8 shall apply to those activities associated with actual construction of a project as long as such construction occurs between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and 8:00 a.m. and 5:00 p.m. on weekends, and on federally recognized holidays. Exceptions are allowed if it can be shown that construction beyond these times is necessary to alleviate traffic congestion and safety hazards.

- **Policy 6.5.1.12:** When determining the significance of impacts and appropriate mitigation for new development projects, the following criteria shall be taken into consideration.

A. Where existing or projected future traffic noise levels are less than 60 dBA L_{dn} at the outdoor activity areas of residential uses, an increase of more than 5 dBA L_{dn} caused by a new transportation noise source will be considered significant;

B. Where existing or projected future traffic noise levels range between 60 and 65 dBA L_{dn} at the outdoor activity areas of residential uses, an increase of more than 3 dBA L_{dn} caused by a new transportation noise source will be considered significant; and

Table 3.11-6
Maximum Allowable Noise Exposure for Nontransportation Noise Sources in Community Regions and Adopted Plan Areas—Construction Noise, El Dorado County

Land Use Designation[1]	Time Period	Noise Level (dBA)	
		L_{eq}	L_{max}
Higher-Density Residential (MFR, HDR, MDR)	7 a.m.–7 p.m. 7 p.m.–10 p.m. 10 p.m.–7 a.m.	55 50 45	75 65 60
Commercial and Public Facilities (C, R&D, PF)	7 a.m.–7 p.m. 7 p.m.–7 a.m.	70 65	90 75
Industrial (I)	Any Time	80	90

Notes: dBA = A-weighted decibels; L_{eq} = equivalent noise level; L_{max} = maximum noise level; MFR = multi-family residential; HDR = high density residential; MDR = medium density residential; C = commercial; R&D = Research and Development; PF = public facilities; I = industrial

[1] Adopted plan areas should refer to those land use designations that most closely correspond to the similar general plan land use designations for similar development.

Source: El Dorado County 2004:Table 6-3

Table 3.11-7
Maximum Allowable Noise Exposure for Nontransportation Noise Sources in Rural Centers—Construction Noise, El Dorado County

Land Use Designation[1]	Time Period	Noise Level (dBA)	
		L_{eq}	L_{max}
Higher-Density Residential (MFR, HDR, MDR)	7 a.m.–7 p.m. 7 p.m. –10 p.m. 10 p.m.–7 a.m.	55 50 40	75 65 55
Commercial and Public Facilities (C, R&D, PF)	7 a.m.–7 p.m. 7 p.m.–7 a.m.	65 60	75 70
Industrial (I)	Any Time	70	80
Open Space (OS)	7 a.m.–7 p.m. 7 p.m.–7 a.m.	55 50	75 65

Notes: dBA = A-weighted decibels; L_{eq} = equivalent noise level; L_{max} = maximum noise level; MFR = multi-family residential; HDR = high density residential; MDR = medium density residential; C = commercial; R&D = Research and Development; PF = public facilities; I = industrial; OS = Open Space

[1] Adopted Plan areas should refer to those land use designations that most closely correspond to the similar General Plan land use designations for similar development.

Source: El Dorado County 2004:Table 6-4

Table 3.11-8 Maximum Allowable Noise Exposure for Nontransportation Noise Sources in Rural Regions—Construction Noise, El Dorado County			
Land Use Designation[1]	Time Period	Noise Level (dBA)	
		L_{eq}	L_{max}
All Residential (LDR)	7 a.m.–7 p.m. 7 p.m.–10 p.m. 10 p.m.–7 a.m.	50 45 40	60 55 50
Commercial and Public Facilities (C, R&D, PF)	7 a.m.–7 p.m. 7 p.m.–7 a.m.	65 60	75 70
Rural Land, Natural Resources, Open Space, and Agricultural Lands (RR, NR, OS, AL)	7 a.m.–7 p.m. 7 p.m.–7 a.m.	55 50	75 65

Notes: dBA = A-weighted decibels; L_{eq} = equivalent noise level; L_{max} = maximum noise level; LDR = low density residential; C = commercial; R&D = Research and Development; PF = public facilities; I = industrial; RR = Rural Residential; NR = Natural Resources; OS = Open Space; AL = Agricultural Lands

[1] Adopted Plan areas should refer to those land use designations that most closely correspond to the similar General Plan land use designations for similar development.

Source: El Dorado County 2004:Table 6-5

C. Where existing or projected future traffic noise levels are greater than 65 dBA L_{dn} at the outdoor activity areas of residential uses, an increase of more than 1.5 dBA L_{dn} caused by a new transportation noise will be considered significant.

- **Policy 6.5.1.13:** When determining the significance of impacts and appropriate mitigation to reduce those impacts for new development projects, including ministerial development, the following criteria shall be taken into consideration:

  A. In areas in which ambient noise levels are in accordance with the standards in Table [3.11-5], increases in ambient noise levels caused by new nontransportation noise sources that exceed 5 dBA shall be considered significant; and

  B. In areas in which ambient noise levels are not in accordance with the standards in Table [3.11-5], increases in ambient noise levels caused by new nontransportation noise sources that exceed 3 dBA shall be considered significant.

- **Policy 6.5.1.14:** The County will adopt a noise ordinance to resolve neighborhood conflicts and to control unnecessary noise in the County. Examples of the types of noise sources that can be controlled through the use of a quantitative noise ordinance include noisy mechanical equipment (e.g., swimming pool pumps, HVAC [heating, ventilation, air conditioning] units), and amplified music in commercial establishments.

- **Policy 6.5.1.15:** The County will establish and maintain coordination among city, county, and state agencies involved in noise abatement and other agencies to reduce noise generated from sources outside the County's jurisdiction.

El Dorado County Code of Ordinances

The following section from Chapter 9.16, "Noise," of the El Dorado County Code (El Dorado County 1988) is relevant to the project:

- **9.16.050 Loud and Raucous Noises—Prohibited.** Except as otherwise provided in this chapter, it is unlawful for any person to willfully make, emit, or transmit or cause to be made, emitted, or transmitted any loud and raucous noise upon or from any public highway or public thoroughfare or from any aircraft of any kind whatsoever, or from any public or private property to such an extent that it unreasonably interferes with the peace and quiet of another's private property. (Ord. 3189 §1 (part), 1981: prior code §7582)

City of South Lake Tahoe

Regarding noise, the CSLT has four goals with a total of seven objectives (CSLT 1999a). These goals and objectives are listed below.

- **Goal 1:** To reduce or minimize the scale of nuisance created by noise affecting residents, businesses and visitors.
    - **Objective 1:** Establish standards for ambient community noise environment.
    - **Objective 2:** Reduce levels of noise created by construction equipment.
    - **Objective 3:** Provide for early review and identification of potential noise concerns associated with development.
    - **Objective 4:** Provide as noise-free an environment within residences as possible.
- **Goal 2:** The City will support, in its role as operator of the Lake Tahoe Airport, the maximum utilization of the airport facility and its services for the benefit of the entire community, within the noise standards and environmental constraints, consistent with the Circulation Element.
    - **Objective 1:** The City will establish guidelines for the operation and future expanded utilization of the airport facilities and services within noise standards and environmental constraints, consistent the Circulation Element.
- **Goal 3:** Noise levels along major vehicular corridors should not affect the general health and welfare of residents and visitors.
    - **Objective 1:** Provide for the implementation of appropriate noise levels along major vehicular corridors.
- **Goal 4:** Minimize noise to residents in close proximity to industrially zoned areas.
    - **Objective 1:** Restrict industrial activities to appropriate PAS.

The CSLT has these goals and objectives regarding noise; however, because TRPA has jurisdictional powers over the entirety of the CSLT, CSLT has deferred some government powers to TRPA to prevent conflicts and redundancy. Noise control is one such jurisdiction that the CSLT has deferred to TRPA. In City Code S5-18, the CSLT legally defers the responsibility of noise regulation to TRPA (CSLT 1999b).

ENVIRONMENTAL SETTING

Acoustic Fundamentals

Noise is generally defined as sound that is loud, disagreeable, unexpected, or unwanted. Sound, as described in more detail below, is mechanical energy transmitted in the form of a wave, because of a disturbance or vibration, and as any pressure variation in air that the human ear can detect.

Sound Characteristics

Frequency, wavelength, and amplitude are characteristics typically used to describe sound. Sound is in the form of a sinusoidal longitudinal wave. Amplitude is defined as the maximum positive displacement from the undisturbed position of the medium to the top of the wave (crest). The amplitude of the wave determines the loudness of the sound. The frequency is determined by the number of wave cycles per second. The frequency is used to describe the pitch of the sound and is the reciprocal of the wave period, which is defined as the duration of one cycle. The wavelength is the distance between two successive crests. An inverse relationship exists between frequency and wavelength; thus, as frequency increases wavelength shortens, and vice versa (Caltrans 1998).

Sound and the Human Ear

Because of the ability of the human ear to detect a wide range of sound pressure fluctuations, sound pressure levels are expressed in logarithmic units called decibels (dB). The sound pressure level in decibels is calculated by taking the logarithm of the ratio between the actual sound pressure and the reference sound pressure squared. The reference sound pressure is considered the absolute hearing threshold (Caltrans 1998).

In addition, because the human ear is not equally sensitive to all sound frequencies, a specific frequency dependent rating scale was devised to relate noise to human sensitivity. An A-weighted decibel (dBA) scale performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. The basis for compensation is the faintest sound audible to the average ear at the frequency of maximum sensitivity. The dBA scale has been chosen by most authorities for purposes of environmental noise regulation. Exhibit 3.11-1 presents typical indoor and outdoor noise levels.

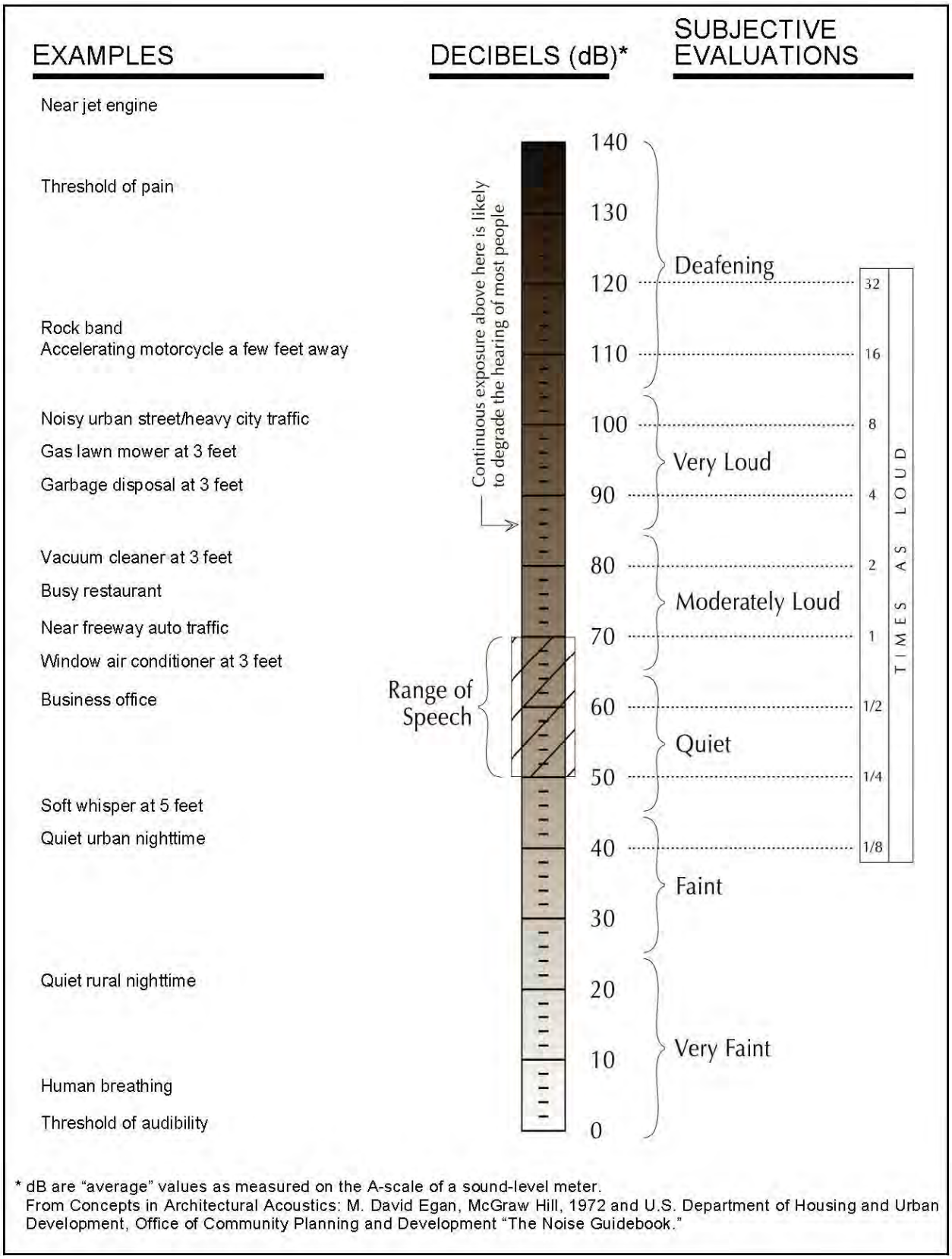
As indicated, typical sounds range from 40 dBA (very quiet) to 100 dBA (very loud). Conversation is roughly 60 dBA at a three to five-foot distance between subjects. As background noise levels exceed 60 dBA, speech intelligibility becomes increasingly difficult. Noise becomes physically discomforting at 110 dBA.

With respect to how humans perceive and react to changes in noise levels, a 1-dBA increase is imperceptible, a 3-dBA increase is barely perceptible, a 6-dBA increase is clearly noticeable, and a 10-dBA increase is subjectively perceived as approximately twice as loud (Egan 1988), as presented in Table 3.11-9. Table 3.11-9 was developed on the basis of test subjects' reactions to changes in the levels of steady-state pure tones or broadband noise and to changes in levels of a given noise source. It is probably most applicable to noise levels in the range of 50–70 dBA, as this is the usual range of voice and interior noise levels.

Table 3.11-9
Subjective Reaction to Changes in Noise Levels of Similar Sources

Change in Level (dBA)	Subjective Reaction	Factor Change in Acoustical Energy
1	Imperceptible (except for tones)	1.3
3	Just barely perceptible	2.0
6	Clearly noticeable	4.0
10	About twice (or half) as loud	10.0

Note: dBA = A-weighted decibels
Source: Egan 1988



Source: Data compiled by EDAW (now AECOM) in 2006

Exhibit 3.11-1 **Typical Noise Levels**

Sound Propagation and Attenuation

As sound (noise) propagates from the source to the receptor, the attenuation—the manner of noise reduction in relation to distance—depends on surface characteristics, atmospheric conditions, and the presence of physical barriers. The inverse-square law describes the attenuation caused by the pattern in which sound travels from the source to receptor. Sound travels uniformly outward from a point source in a spherical pattern with an attenuation rate of 6 dBA per doubling of distance (dBA/DD). However, from a line source (e.g., a road), sound travels uniformly outward in a cylindrical pattern with an attenuation rate of 3 dBA. The surface characteristics between the source and the receptor may result in additional sound absorption and/or reflection. Atmospheric conditions such as wind speed, temperature, and humidity may affect noise levels. Furthermore, the presence of a barrier between the source and the receptor may also attenuate noise levels. The actual amount of attenuation depends on the size of the barrier and the frequency of the noise. A noise barrier may be any natural or human-made feature such as a hill, tree, building, wall, or berm (Caltrans 1998).

All buildings provide some exterior-to-interior noise reduction. A building constructed with a wood frame and a stucco or wood sheathing exterior typically provides a minimum exterior-to-interior noise reduction of 25 dBA with its windows closed, whereas a building constructed of a steel or concrete frame, a curtain wall or masonry exterior wall, and fixed plate-glass windows of one-quarter-inch thickness typically provides an exterior-to-interior noise reduction of 30–40 dBA with its windows closed (Paul S. Veneklasen & Associates 1973, cited in Caltrans 2002).

Noise Descriptors

The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise are defined below (Caltrans 1998, Lipscomb and Taylor 1978):

- **L_{max} (maximum noise level):** The maximum instantaneous noise level during a specific period of time. The L_{max} may also be referred to as the "peak (noise) level."
- **L_{min} (minimum noise level):** The minimum instantaneous noise level during a specific period of time.
- **L_X (statistical descriptor):** The noise level exceeded X% of a specific period of time.
- **L_{eq} (equivalent noise level):** The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated, which is then converted back to dBA to determine the L_{eq}. In noise environments determined by major noise events, such as aircraft overflights, the L_{eq} value is heavily influenced by the magnitude and number of single events that produce the high noise levels.
- **L_{dn} (day-night noise level):** The 24-hour L_{eq} with a 10-dBA "penalty" for noise events that occur during the noise-sensitive hours between 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours, and this generates a higher reported noise level when determining compliance with noise standards. The L_{dn} attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.
- **CNEL (community noise equivalent level):** Similar to the L_{dn} described above, but with an additional 5-dBA "penalty" added to noise events that occur during the noise-sensitive hours between 7:00 p.m. and 10:00 p.m., which are typically reserved for relaxation, conversation, reading, and television. When the same 24-hour noise data are used, the reported CNEL is typically approximately 0.5 dBA higher than the L_{dn}.
- **SEL (single-event [impulsive] noise level):** A receiver's cumulative noise exposure from a single impulsive noise event, which is defined as an acoustical event that is of short duration and involves a change in sound

pressure above some reference value. SELs typically represent the noise events used to calculate the L_{eq}, L_{dn}, and CNEL.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound-level L_{eq}, which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually 1 hour). The L_{eq} is the foundation of the composite noise descriptors such as L_{dn} and CNEL, as defined above, and correlates well with community response to noise.

Negative Effects of Noise on Humans

Negative effects of noise exposure include physical damage to the human auditory system, interference, and disease. Exposure to noise may result in physical damage to the auditory system, which may lead to gradual or traumatic hearing loss. Gradual hearing loss is caused by sustained exposure to moderately high noise levels over a period of time; traumatic hearing loss is caused by sudden exposure to extremely high noise levels over a short period. Gradual and traumatic hearing loss both may result in permanent hearing damage. In addition, noise may interfere with or interrupt sleep, relaxation, recreation, and communication. Although most interference may be classified as annoying, the inability to hear a warning signal may be considered dangerous. Noise may also be a contributor to diseases associated with stress, such as hypertension, anxiety, and heart disease. The degree to which noise contributes to such diseases depends on the frequency, bandwidth, and level of the noise, and the exposure time (Caltrans 1998: N-2200).

Vibration

Vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structureborne noise. Sources of groundborne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, and landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, and construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, groundborne vibrations may be described by amplitude and frequency.

Vibration amplitudes are usually expressed in PPV or RMS, as in RMS vibration velocity; the PPV and RMS velocity are normally described in in/sec (see the description of federal regulations under “Regulatory Setting” above). PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of blasting vibration because it is related to the stresses that are experienced by buildings (FTA 2006: 7-3, Caltrans 2002: 6).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over 1 second. As with airborne sound, the RMS velocity is often expressed in decibel notation as VdB, which serves to compress the range of numbers required to describe vibration (FTA 2006: 7-4), and based on a reference value of 1 μin/sec (see the description of federal regulations under “Regulatory Setting” above).

The background vibration-velocity level in residential areas is usually approximately 50 VdB. Groundborne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels (FTA 2006: 7-8).

Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration is rarely perceptible. The range of

interest is from approximately 50 VdB, the typical background vibration-velocity level, to 100 VdB, the general threshold where minor damage can occur in fragile buildings. Construction activities can generate groundborne vibrations, which can pose a risk to nearby structures. Constant or transient vibrations can weaken structures, crack facades, and disturb occupants (FTA 2006: 7-5).

Construction vibrations can be transient, random, or continuous. Transient construction vibrations are generated by blasting, impact pile driving, and wrecking balls. Continuous vibrations result from vibratory pile drivers, large pumps, horizontal directional drilling, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment. Table 3.11-10 describes the general human response to different levels of groundborne vibration-velocity levels.

Table 3.11-10
Human Response to Groundborne Vibration Levels

Vibration Velocity (VdB)	Human Response
65	Approximate threshold of perception for many humans.
75	Approximate dividing line between barely perceptible and distinctly perceptible.
85	Vibration acceptable only if there are an infrequent number of events per day.

Note: VdB = vibration decibels
Source: FTA 2006

Existing Noise Environment

The study area is located along the south shore of Lake Tahoe, bounded generally by U.S. 50 and the Highland Woods neighborhood on the south, the Al Tahoe neighborhood on the east, and Tahoe Islands/Sky Meadows and Tahoe Keys neighborhoods on the west. The study area is approximately 592 acres and includes parcels owned by the California Tahoe Conservancy and other public and private entities. It includes the downstream reaches of Trout Creek and the Upper Truckee River, adjacent wetland and upland habitats, and the Lower West Side Wetlands Restoration Project site (see Exhibit 1-2 in Chapter 1, “Introduction and Statement of Purpose and Need”).

Existing ambient noise levels across the majority of the site, except for those areas closest to U.S. 50, are relatively quiet. The predominant noise sources in the study area consist of natural area-source sounds, such as wind, water moving, and birds. Other noise sources include urban sounds, such as dogs barking, people working (e.g., hammering or chopping wood) or recreating outdoors, occasional aircraft overflights, use of motorized watercraft on Lake Tahoe, activity at the Tahoe Keys Marina, and traffic noise associated with vehicles traveling on U.S. 50 and on local residential streets (e.g., Colorado Avenue/Colorado Court, Tahoe Keys Boulevard, East Venice Drive, El Dorado Avenue, and Springwood Drive).

Ambient noise levels in the study area are affected primarily by vehicular traffic on nearby roadways. Roadways in the vicinity of the study area, including U.S. 50, frequently experience moderate to high levels of traffic on a seasonal basis, particularly in summer and winter when the Tahoe Basin draws the most visitors.

Ambient noise measurements were conducted by EDAW (now AECOM) on October 1, 2007, to document the existing ambient noise levels at various locations within the study area. Short-term noise-level measurements were taken in accordance with the American National Standards Institute acoustic standards at four locations using a Larson Davis Model 820 sound-level meter. The short-term L_{eq}, L_{max}, and L_{min} values for each ambient-noise-level measurement location are presented in Table 3.11-11.

Table 3.11-11 Summary of Measurements of Ambient Noise Levels				
Measurement Location[1]	Date and Time (on October 1, 2007)	A-Weighted Sound Level (dBA)		
		L_{eq}	L_{max}	L_{min}
1	10:55 a.m.–11:10 a.m.	47.6	69.5	40.7
2	11:40 a.m.–11:55 p.m.	50.2	63.7	40.2
3	12:15 p.m.–12:30 p.m.	45.2	55.6	39.9
4	12:40 p.m.–12:55 p.m.	45.3	53.5	39.8

Notes: dBA = A-weighted decibels; L_{eq} = equivalent noise level; L_{max} = maximum noise level; L_{min} = minimum noise level

[1] Locations of ambient-noise-level measurements correspond to those shown in Exhibit 3.11-2.

Source: Data collected by EDAW (now AECOM) in 2007

Based on the measurements conducted, average daytime noise levels (in dBA L_{eq}) at all measurement locations generally ranged from the mid-40s to low 50s. All locations are in attainment with the most stringent PAS standards (50 dBA CNEL). Observations made during AECOM's field visit indicate that natural sources, such as bird calls or wind rustling trees account for much of the noise recorded by the sound-level meters, and sound generated by these sources is not typically considered undesirable. It is also important to note that because noise measurement locations were on the perimeter of the study area and off-site unnatural noise sources (such as vehicle traffic) were included in the overall measurement, existing sound levels across the interior of the site are expected to be lower.

As stated above, one of the key noise sources within the study area and the vicinity is vehicle traffic on area roadways. For the purposes of this analysis, existing traffic noise levels were modeled for affected roadway segments of U.S. 50 using the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (see Table 3.11-12), based on data obtained from the traffic analysis prepared for this project (see Section 3.16, "Transportation, Parking, and Circulation"). Additional input data included day/night percentages of autos, medium- and heavy-duty trucks, vehicle speeds, ground attenuation factors, and roadway widths. As discussed above in "Regulatory Setting," the average noise level standard for the U.S. 50 corridor is 65 dBA CNEL.

Table 3.11-12 Summary of Modeled Existing Traffic Noise Levels											
Roadway Segment	Modeling Assumptions					Distance (feet) from Roadway Edge to CNEL/ L_{dn} (dBA)[1]				CNEL/ L_{dn} (dBA) from Roadway Edge	
	Average Daily Traffic Volume	Speed (mph)	Grade (%)	Traffic Distribution Percentages (%)		70 CNEL	65 CNEL	60 CNEL	55 CNEL	50 feet	300 feet
				Auto/Medium Truck/Heavy Truck	Day/ Evening/ Night						
U.S. 50 at the CSLT Upper Truckee River Bridge	33,000	35	0	96/3/1	79/ 12.5/ 9.5	57.7	119.4	255.0	548.1	68.2	58.2

Note: CNEL = community noise equivalent level; dBA = A-weighted decibels; L_{dn} = day-night noise level; mph = miles per hour; U.S. 50 = U.S. Highway 50. Traffic noise modeling assumes no natural or human-made shielding (e.g., vegetation, berms, wall, or buildings).

[1] See Appendix J for complete modeling results and input parameters.

Source: Modeling performed by EDAW (now AECOM) in 2007

Source: Data provided by kdAnderson and Associates and EDAW (now AECOM) in 2007

Exhibit 3.11-2 **Ambient Noise Measurement Locations**

Currently traffic noise levels in the project vicinity are in attainment within the 300-foot, 65-dBA CNEL corridor of U.S. 50.

Noise-Sensitive Receptors

Noise sensitive receptors adjacent to the study area include the residential neighborhoods of Highland Woods to the south, Tahoe Keys and Tahoe Islands/Sky Meadows to the west, and Al Tahoe to the east. The closest sensitive receptors in these neighborhoods would be those located on East Venice Drive, Springwood Drive, Michael Drive, Colorado Avenue/Colorado Court, and El Dorado Avenue, all of which are located directly adjacent to the study area.

3.11.2 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; the TRPA Initial Environmental Checklist; and regulatory standards of federal, state, and local agencies, specifically standards established by El Dorado County. Federal law defers to state and local regulations for the purposes of assessing noise impacts, and TRPA has not set any criteria for vibration, so the state standards are applied. These criteria also encompass the factors taken into account under NEPA to determine the significance of an action in terms of the context and intensity of its effects.

CEQA Criteria

A noise impact is considered significant if implementation of the proposed project would result in any of the following:

- short-term construction-generated noise levels that exceed the relevant El Dorado County standards or a substantial increase (greater than 3 dBA) in ambient noise at nearby existing noise-sensitive receptors during the more sensitive early morning, evening, and nighttime hours of the day (i.e., outside the hours considered exempt by the Noise Element of the *El Dorado County General Plan*—7:00 a.m. and 7:00 p.m., Monday through Friday, and 8:00 a.m. and 5:00 p.m. on weekends, and on federally recognized holidays) (CEQA 1);

- long-term (operational) stationary- or area-source noise levels that exceed applicable noise standards or a substantial increase (greater than 3 dBA) in ambient noise at nearby existing noise-sensitive receptors (CEQA 2);

- short- or long-term (operational) traffic-generated noise levels that exceed the relevant El Dorado County noise standards for transportation noise sources or a substantial increase (greater than 3 dBA) in ambient noise levels at nearby existing noise-sensitive receptors (CEQA 3);

- increases in existing CNELs beyond those permitted in the applicable PAS, community plan, or master plan (CEQA 4); or

- exposure of persons to or generation of excessive groundborne vibration or noise levels that exceed Caltrans's recommended standard with respect to the prevention of structural building damage (0.2 in/sec PPV and 0.08 in/sec PPV, respectively, for normal and historical buildings) or FTA's maximum-acceptable vibration standard with respect to human response (80 VdB for residential structures) at nearby existing or proposed vibration-sensitive land uses (e.g., residences) (CEQA 5).

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative would result in a significant impact on noise if it would result in any of the following:

- increases in existing CNELs beyond those permitted in the applicable PAS, community plan, or master plan (TRPA 1);
- the exposure of people to severe noise levels (TRPA 2); or
- single-event noise levels greater than those set forth in the TRPA Noise Environmental Threshold (TRPA 3).

METHODS AND ASSUMPTIONS

To assess potential noise impacts from construction, stationary sources, and area sources, noise-sensitive receptors and their relative exposure levels were identified. Noise (and vibration) levels of specific equipment anticipated to be used in project construction or operation were determined and resultant noise levels at sensitive receptors were modeled assuming documented noise (vibration) attenuation rates.

The FHWA Traffic Noise Prediction Model was used to model traffic noise levels along affected roadways, based on daily volumes and the distribution thereof from the traffic analysis prepared for this project (which is described in Section 3.16, "Transportation, Parking, and Circulation"). The project's contribution to the existing traffic-source noise levels along area roadways was determined by comparing the modeled noise levels at 50 feet from the roadway edge under no-project and plus-project conditions. The project's land use compatibility with future (2030) traffic source noise levels was determined by comparing modeled noise levels at proposed noise-sensitive receptors under plus-project conditions.

The significance criteria applied in this analysis address the exterior noise standards established by El Dorado County. Unless otherwise stated, standards for interior noise levels would not be exceeded if exterior noise-level standards are achieved because buildings would commonly provide sufficient exterior-to-interior noise reduction.

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Exceedance of Single-Event Noise Level Thresholds (TRPA 3)—No alternative would result in increasing or creating single-event noise level sources (aircraft, watercraft, motor vehicles, motorcycles, off-road vehicles, and over-snow vehicles) regulated by TRPA. Haul trucks related to construction under all action alternatives would not exceed single-event noise standards; and they would operate only during exempted hours and therefore would not violate single-event noise standards when applicable. None of the alternatives would create significant single-event noise impacts.

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.11-1 (Alt. 1) **Short-Term Project Construction Noise Levels Exceeding Applicable Thresholds. (CEQA 1, TRPA 2)**
Short-term construction activities could exceed applicable noise thresholds if they would occur outside hours exempted by TRPA and El Dorado County. However, noise-generating construction activities related to implementation of Alternative 1 would be limited to the hours during which construction noise is exempt from the provisions of the applicable standards. Therefore, this impact would be ***less than significant****.*

The construction activities required for Alternative 1 would include excavating, grading, removing vegetation, clearing, cut-and-fill earthmoving, trenching, erecting frames, installing equipment, cleaning up the construction site, transporting materials, winterizing the site, paving, and installing bicycle trails, pedestrian paths, and signage. The closest existing noise-sensitive receptors (residences along El Dorado Avenue) are a minimum of 100 feet from the nearest proposed construction activities along the boundary of the study area.

The specific construction equipment required for the above-mentioned activities is not available at this time, but would likely include the equipment outlined in Table 3.11-13. According to FTA and FHWA, and as shown in Table 3.11-13, maximum noise levels for these types of equipment can range from 74 to 101 dBA L_{max} at 50 feet when used without feasible noise control. These noise levels and equipment would equate to a maximum combined noise level of 95.4 dBA L_{eq} at 50 feet (FHWA 2006: 12–6, 7). Based on 95.4 dBA L_{eq}, a typical noise-attenuation rate of 6 dBA/DD, and no intervening shielding or topographic interference, exterior noise levels at noise-sensitive receptors located within 4,500 feet could exceed the local PAS standard, 55 dBA.

Table 3.11-13
Typical Equipment Noise Levels

Type of Equipment	Noise Level (dBA) at 50 feet	
	Manufacturer's Specifications (L_{max})	Actual (L_{max})
Backhoe	80	77.6
Boring Jack Power Unit	80	83
Horizontal Boring Hydraulic Jack	80	82
Grader	85	NA
Dozer	85	81.7
Backhoe	80	77.6
Flatbed Truck	84	74.3
Pickup Truck	55	75
Dump Truck	84	76.5
Excavator	85	80.7
Pumps	77	80.9
Trenching Machine	82	80.4
Impact Pile Driver	95	101.3
Compactor (ground)	80	83.2
Paver	85	77.2
Pavement Scarifier	85	89.5

Notes: dBA = A-weighted decibels; L_{max} = maximum noise level; NA = not available
Sources: FTA 2006:Table 12-1, FHWA 2006

In addition, project construction under Alternative 1 would result in a short-term increase in traffic on the local area's roadway network, but this increase would not be sufficient to substantially increase traffic noise levels. It is expected that up to 176 daily trips (consisting of four haul-truck trips, 152 employee commute trips, and 20 miscellaneous trips) would occur during the periods of maximum construction activity. (This would be more trips than under Alternative 3 [up to 158 daily trips, respectively] and fewer than under Alternatives 2 and 4 [up to 192 and 306 daily trips, respectively].) Construction-related traffic would be distributed over the roadway network identified in Section 3.16, "Transportation, Parking, and Circulation" (e.g., San Francisco Avenue, Lakeview Avenue, East Venice Drive, Silver Dollar Avenue, and Sunset Drive). The daily haul-truck trips would traverse the haul routes designated in Section 3.16. Typically, traffic must double to create a perceptible increase in overall traffic noise (Caltrans 1998:N-96). Because all affected roadways (except Sunset Drive, as described below) have a peak-month minimum of 1,000 average daily trips (ADT), an increase of 176 trips would not double the current traffic level. Therefore, the additional construction-related traffic would not increase overall traffic noise levels.

Sunset Drive has an existing peak-month ADT of 85 trips. During the phase of construction when Sunset Drive would be in use, ten construction-related trips per day would occur on that street (see Section 3.16). This is less than the doubling of trips required to create an increase in traffic noise levels (Caltrans 1998:N-96). Thus, the additional construction-related traffic on Sunset Drive would not increase overall traffic noise levels.

Noise from construction activity that occurs between 8:00 a.m. and 6:30 p.m. each day is exempt from the provisions of the applicable TRPA regulations. Noise from construction activity that occurs between 7:00 a.m. and 7:00 p.m. on weekdays (or between 8:00 a.m. and 5:00 p.m. on weekends and federal holidays) is exempt from the provisions of the applicable El Dorado County regulations. In addition, construction activities would be temporary, and as described in Chapter 2, "Project Alternatives," noise-generating construction activities would not occur during the more noise-sensitive hours (i.e., before 8:00 a.m. and after 6:30 p.m. on weekdays, or after 5:00 p.m. on weekends or holidays). Additionally, project-generated construction traffic would not create a substantial increase in local traffic-noise levels. (There would not be a perceptible increase in overall traffic noise, and noise from single events [e.g., a truck driving along a haul route] would not exceed TRPA noise standards for single events [Table 3.11-2].) Because noise from project construction sources would be exempt, would not exceed the applicable standards, and would not increase overall local traffic-noise levels, this direct impact would be **less than significant**.

IMPACT 3.11-2 (Alt. 1) **Long-Term, Project-Related Generation of Stationary- and Area-Source Noise. (CEQA 2, TRPA 2)**
Alternative 1 does not include any new long-term stationary or area noise sources. The additional recreation facilities would not create perceptible increases in vehicle or recreation-activity noise above existing levels in the study area. This impact would be ***less than significant****.*

In addition to restoration features, Alternative 1 includes construction of self-service kiosks, bicycle paths, pedestrian trails, a pedestrian bridge and boardwalks around the perimeter of the study area. Current noise sources within and in the vicinity of the study area are the Tahoe Keys Marina and Maintenance Facility, Fresh Ketch Restaurant, the channel from Tahoe Keys to Lake Tahoe, the existing user-created trail network, a boat launch with parking lot, and adjacent residential properties. Alternative 1 would provide for a potential "maximum" level of public access and recreation infrastructure that would include two kiosks, a 27-space parking lot, three observation areas, boardwalks and pedestrian trails, bicycle paths, and path bridges.

Noise levels in the study area are within the 50-dBA CNEL standard of PAS 100 (which contains most of the study area), and are within the 55-dBA CNEL standards of the surrounding PAS areas. (See Table 3.11-11.) Typically, the activity level would need to double before a noticeable increase in noise would occur (Caltrans 1998:N-96). As discussed in Section 3.16, "Transportation, Parking, and Circulation," the volume of visitors recreating in the study area could be doubled as a result of the added recreation features of Alternative 1. However, activities in the adjacent commercial and residential land uses are major components of existing noise and would not be considerably increased by Alternative 1. Because biking, walking, fishing, and use of kiosks normally generate lower noise levels than adjacent land uses (e.g., maintenance yards and boating activities, and

use of landscape maintenance equipment), the change in noise levels from adding more recreational activity to the current ambient noise environment would, therefore, be imperceptible and would not cause PAS standards to be exceeded both in the study area and at the surrounding land uses.

In summary, no change in the ambient noise environment would occur, nor would applicable thresholds for the surrounding noise-sensitive receptors and study area be exceeded. Therefore, this impact would be **less than significant**.

IMPACT 3.11-3 (Alt. 1) **Long-Term Generation of Project-Related Traffic Noise. (CEQA 3)** *Long-term project-generated traffic would not result in a perceptible increase in ambient noise levels on nearby local roadways or highways. This impact would be* ***less than significant****.*

Operation of Alternative 1 is expected to result in fewer than 100 vehicle trips per day (see Section 3.16, "Transportation, Parking, and Circulation"). These trips would be distributed over the local street network identified in Section 3.16.

The FHWA model was used to calculate traffic-source noise levels along the affected local street network for existing (baseline) traffic conditions with and without implementation of Alternative 1, based on the predicted ADT volumes and their distribution over the roadway network. (See Section 3.16 for a detailed discussion of traffic projections.) Other modeling parameters include fleet mixes (i.e., percentages of automobiles, medium-duty trucks, and heavy-duty trucks during daytime, evening, and nighttime hours), vehicle speeds, ground attenuation factors, roadway grades, and roadway widths. The alternative's contribution to the existing traffic noise levels along area roadways was determined by comparing predicted existing roadside noise levels with and without traffic associated with project operation under Alternative 1.

Table 3.11-14 summarizes the net change in ADT volumes and in modeled traffic noise levels from existing no-project to plus-project conditions. A map of the local roads and highway segments is shown in Section 3.16. According to the traffic analysis prepared for this project, implementation of Alternative 1 would result in an increase of fewer than 100 trips in the total ADT volumes on the affected roadway segments. Such traffic increases would result in noise-level increases of less than 0.1 dBA CNEL along East Venice Drive, Lakeview Drive, and San Francisco Avenue; 0.2 dBA CNEL along Sunset Drive; and 0.1 dBA CNEL along Silver Dollar Avenue (refer to Table 3.11-14), which would be imperceptible to the human ear.

Table 3.11-14
Summary of Net Change in Average Daily Traffic Volumes and Modeled Traffic Noise Levels for Alternative 1

Roadway Segment	Existing Traffic Volumes	Average Daily Traffic Volume		Net Change in Traffic Noise Levels (CNEL [dBA])
		Existing + Alternative 1	Net Change, Alternative 1	
San Francisco Avenue	1,000	1,020	20	0.1
Lakeview Avenue	2,100	2,125	25	0.1
East Venice Drive	1,500	1,540	40	0.1
Silver Dollar Avenue	1,250	1,260	10	0.1
Sunset Drive	85	90	5	0.2

Notes: CNEL = community noise equivalent level; dBA = A-weighted decibels. Traffic noise levels were modeled using the Federal Highway Administration model based on traffic information from data generated by kdAnderson for the Peak Month of traffic (see Section 3.16, "Transportation, Parking, and Circulation") and assuming no natural or human-made shielding (e.g., vegetation, berms, walls, buildings). Refer to Appendix J for modeling input assumptions and output results.
Source: Modeling performed by EDAW (now AECOM) in 2008

Thus, traffic associated with the long-term operation of Alternative 1 would not result in a perceptible (3-dBA or greater) increase in daily noise levels along affected local roadways or highways. Therefore, this impact would be **less than significant**.

IMPACT 3.11-4 (Alt. 1) **Land Use Compatibility of Study Area Noise Levels and Surrounding Land Uses. (CEQA 4, TRPA 1)** *Noise generated by surrounding land uses would not cause noise levels within the study area to exceed applicable standards, and Alternative 1 would not create any new noise sources that would increase noise levels above applicable standards at surrounding land uses. Therefore, both Alternative 1 and surrounding land uses would be compatible. This impact would be* ***less than significant****.*

After project completion the study area would return to use as a managed natural area and recreation area, similar to its existing condition. No sensitive receptors are located within the study area, and no major sound sources would be created by the project under Alternative 1. Noise levels in the study area and surrounding neighborhoods would be influenced by activities at surrounding land uses and traffic noise on nearby roadways (e.g., U.S. 50, Venice Boulevard, El Dorado Avenue, Springwood Drive), at Tahoe Keys Marina, at Fresh Ketch Restaurant, and from boating activities. However, based on noise measurements taken on-site, noise levels are in compliance with the applicable standards, 55 dBA CNEL for residential neighborhoods surrounding the study area and 50 dBA CNEL within the study area (see Table 3.11-11). Additionally, no substantial increase in traffic is expected to occur. Therefore, traffic noise levels would remain similar to current levels.

After completion of construction, noise levels would return to their preproject levels. Because no exceedance or increase in noise would occur within the study area or at nearby sensitive receptors as a result of Alternative 1, this direct impact would be **less than significant**.

IMPACT 3.11-5 (Alt. 1) **Short- and Long-Term Increases in Groundborne Vibration Levels. (CEQA 5)** *Project-generated groundborne vibration would not disrupt humans' activities, including sleep, or damage structures. This impact would be* ***less than significant****.*

Long-term project operation under Alternative 1 would not include any major sources of vibration. However, construction activities could result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and operations involved. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Table 3.11-15 displays vibration levels for typical construction equipment.

Table 3.11-15
Vibration Levels for Typical Construction Equipment

Equipment	PPV at 25 feet (in/sec)	Approximate L_v at 25 feet
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58
Construction Blasting	NA	109[a]

Notes: in/sec = inches per second; L_V = velocity level in decibels, based on the root mean square velocity amplitude; NA = not available; PPV = peak particle velocity

[a] Calculated from a reference level of 100 VdB at 50 feet.

Source: FTA 2006

According to FTA, vibration levels associated with the use of such equipment would be approximately 87 VdB (referenced to 1 µin/sec and based on the RMS velocity amplitude) at 25 feet, as shown in Table 3.11-15. Using FTA's recommended procedure (see subsection "Vibration" above, FTA 2006: 12-11 to 12-13) for applying a propagation adjustment to these reference levels, predicted worst-case vibration levels would exceed 80 VdB (FTA's maximum-acceptable vibration standard with respect to human annoyance for residential uses) within 60 feet of vibration-sensitive receptors. The closest existing vibration-sensitive receptors (residences along El Dorado Avenue) are a minimum of 100 feet from the nearest proposed construction activities along the boundary of the study area.

As stated in Impact 3.11-1 (Alt. 1), noise-generating construction activities would not occur during the more noise-sensitive hours (i.e., before 8:00 a.m. and after 6:30 p.m. weekdays, or after 5:00 p.m. on weekends and holidays). Thus, vibration from construction sources would not disrupt the sleep of occupants of vibration-sensitive land uses.

Excessive vibration levels associated with project construction would be limited to the daytime hours of 8:00 a.m. to 6:30 p.m. on weekdays and 8:00 a.m. to 5:00 p.m. on weekends/holidays, as required by TRPA and El Dorado County regulations. Additionally, no existing sensitive receptors are within 60 feet of the affected study area. This direct impact would be **less than significant**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.11-1 (Alt. 2)	**Short-Term Project Construction Noise Levels Exceeding Applicable Thresholds. (CEQA 1, TRPA 2)** *Short-term construction activities could exceed applicable noise thresholds if they would occur outside hours exempted by TRPA and El Dorado County. However, noise-generating construction activities related to implementation of Alternative 2 would be limited to the hours during which construction noise is exempt from the provisions of the applicable standards. Therefore, this impact would be* ***less than significant****.*

Construction activities under Alternative 2 would be similar to those under Alternative 1, but would not include any new structures.

The construction equipment required in Alternative 2 would likely include loaders, dozers/tractors, cranes, scrapers, excavators, backhoes, graders, generators, and trucks. According to EPA and FHWA, maximum noise levels for these types of equipment can range from 78 to 85 dBA at 50 feet when used without feasible noise control (Table 3.11-13). Based on these noise levels and a typical noise-attenuation rate of 6 dBA/DD, exterior noise levels at noise-sensitive receptors located within 2,500 feet could exceed the local PAS standard, 55 dBA CNEL.

In addition, project construction under Alternative 2 would result in a short-term increase in traffic on the local area's roadway network. It is expected that up to 192 daily trips (consisting of 10 haul-truck trips, 154 employee commute trips, and 28 miscellaneous trips) would occur during the periods of maximum construction activity. (This would be more trips than under Alternatives 1 and 3 [up to 176 and 158 daily trips, respectively] and fewer than under Alternative 4 [up to 306 daily trips].) As under Alternative 1, construction-related traffic would be distributed over the roadway network identified in Section 3.16, "Transportation, Parking, and Circulation" (e.g., San Francisco Avenue, Lakeview Avenue, East Venice Drive, Silver Dollar Avenue, and Sunset Drive). The daily haul-truck trips would traverse haul routes designated in Section 3.16. Typically, traffic must double to create an increase in perceptible traffic noise (Caltrans 1998: N-96). Because all affected roadways (except Sunset Drive) have a peak-month minimum of 1,000 ADT, an increase of 192 trips would not double the current traffic level. Therefore, the additional construction-related traffic would not increase traffic noise levels. In addition, for the same reasons as described under Impact 3.11-1 (Alt. 1), the additional construction-related traffic on Sunset Drive would not increase traffic noise levels.

Noise from construction activity that occurs between 8:00 a.m. and 6:30 p.m. each day is exempt from the provisions of the applicable TRPA regulations. Noise from construction activity that occurs between 7:00 a.m. and 7:00 p.m. on weekdays (or between 8:00 a.m. and 5:00 p.m. on weekends and federal holidays) is exempt from the provisions of the applicable El Dorado County regulations. In addition, construction activities would be temporary, and as described in Chapter 2, "Project Alternatives," noise-generating construction activities would not occur during the more noise-sensitive hours (i.e., before 8:00 a.m. and after 6:30 p.m. on weekdays, or after 5:00 p.m. on weekends or holidays). Additionally, project-generated construction traffic would not create an increase in local traffic-noise levels. (There would not be a perceptible increase in overall traffic noise, and noise from single events [e.g., a truck driving along a haul route] would not exceed TRPA noise standards for single events [Table 3.11-2].) Because noise from project construction sources would be exempt, would not exceed the applicable standards, and would not increase local traffic-noise levels, this direct impact would be **less than significant**.

IMPACT 3.11-2 (Alt. 2) **Long-Term Project-Related Generation of Stationary- and Area-Source Noise. (CEQA 2, TRPA 2)** *Alternative 2 does not include any new long-term stationary or area noise sources. The additional recreation facilities would not create perceptible increases in vehicle noise or pedestrian activity above existing levels in the study area. This impact would be* ***less than significant****.*

Alternative 2 would include restoration elements described in Chapter 2, "Project Alternatives." Unlike under Alternative 1, no new buildings would be constructed. Limited trail upgrades would occur along with installation of new signage and an interpretive program.

Alternative 2 would provide a "minimum" level of infrastructure that would include signage, a pedestrian trail to Cove East Beach (which would replace the existing pedestrian trail), five viewpoints, and a fishing platform. Because Alternative 2 is a minimum infrastructure alternative, fewer new users would be generated by Alternative 2 than by the maximum recreation alternative, Alternative 1. Because existing recreation numbers are approximately 20 visitors per hour and both current and potential new users would be dispersed throughout the study area, and because Alternative 2 would generate only a slight increase in use of the study area, the additional new users accessing the study area from multiple entry points would not generate a substantial increase in area noise levels or cause PAS standards to be exceeded in the study area or at the surrounding land uses.

Alternative 2 would not create or increase area-source noise. Thus, no change in the ambient noise environment would occur, nor would applicable thresholds for the surrounding noise-sensitive receptors and study area be exceeded. Therefore, this indirect impact would be **less than significant**.

IMPACT 3.11-3 (Alt. 2) **Long-Term Generation of Project-Related Traffic Noise. (CEQA 3)** *Long-term project-generated traffic would not result in a perceptible increase in ambient noise levels on the affected roadway network. This impact would be* ***less than significant****.*

Impact 3.11-3 (Alt. 2) would be similar to Impact 3.11-3 (Alt. 1). Alternative 2 would add fewer than 100 trips per day to the existing roadway network (see Table 3.11-14). Refer to Impact 3.11-3 (Alt. 1) and Table 3.11-14 for a more detailed discussion of long-term, project-generated traffic noise levels in the study area and surrounding areas. This direct impact would be **less than significant**.

IMPACT 3.11-4 (Alt. 2) **Land Use Compatibility of Study Area Noise Levels and Surrounding Land Uses. (CEQA 4, TRPA 1)** *Noise generated by surrounding land uses would not cause noise levels within the study area to exceed applicable standards, and Alternative 2 would not create any new noise sources that would increase noise levels above applicable standards at surrounding land uses. Therefore, both Alternative 2 and surrounding land uses would be compatible. This impact would be* ***less than significant****.*

Impact 3.11-4 (Alt. 2) would be similar to Impact 3.11-4 (Alt. 1). No standards would be exceeded and no new sources would be created. Refer to Impact 3.11-4 (Alt. 1) for a more detailed discussion of land use compatibility of the study area and surrounding areas. This direct impact would be **less than significant**.

IMPACT 3.11-5 (Alt. 2)	**Short- and Long-Term Increases in Groundborne Vibration Levels. (CEQA 5)** *Project-generated groundborne vibration would not disrupt humans' activities, including sleep, or damage structures. This impact would be* ***less than significant****.*

Impact 3.11-5 (Alt. 2) would be similar to Impact 3.11-5 (Alt. 1). No long-term vibration sources would be created and construction activities would be restricted to 8:00 a.m. to 6:30 p.m. on weekdays (and to 5:00 p.m. on weekends and holidays). Refer to Impact 3.11-5 (Alt. 1) for a more detailed discussion of project-generated groundborne vibration. This direct impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.11-1 (Alt. 3)	**Short-Term Project Construction Noise Levels Exceeding Applicable Thresholds. (CEQA 1, TRPA 2)** *Short-term construction activities could exceed applicable noise thresholds if they would occur outside hours exempted by TRPA and El Dorado County. However, noise-generating construction activities related to implementation of Alternative 1 would be limited to the hours during which construction noise is exempt from the provisions of the applicable standards. Therefore, this impact would be* ***less than significant****.*

Construction activities under Alternative 3 would be similar to those under Alternative 1.

The construction equipment required in Alternative 3 would likely include a loader, dozer/tractor, crane, scraper, excavator, backhoe, grader, generator, and trucks. According to EPA and FHWA, maximum noise levels for these types of equipment can range from 78 to 85 dBA at 50 feet when used without feasible noise control (Table 3.11-13). Based on these noise levels and a typical noise-attenuation rate of 6 dBA/DD, exterior noise levels at noise-sensitive receptors located within 2,500 feet could exceed local PAS standards (50 or 55 dBA CNEL).

In addition, project construction under Alternative 3 would result in a short-term increase in traffic on the local area's roadway network. It is expected that up to 158 daily trips (consisting of four haul-truck trips, 136 employee commute trips, and 14 miscellaneous trips) would occur during the periods of maximum construction activity. (This would be fewer trips than under Alternatives 1, 2, and 4 [up to 176, 192, and 306 daily trips, respectively].) Construction-related traffic would be distributed over the roadway network identified in Section 3.16 (e.g., San Francisco Avenue, Lakeview Avenue, East Venice Drive, Silver Dollar Avenue, and Sunset Drive). The daily truck haul trips would occur through haul routes designated in Section 3.16. Typically, it requires a doubling of traffic to create an increase in perceptible traffic noise (Caltrans 1998: N-96). Because all affected roadways (except Sunset Drive) have a peak-month minimum of 1,000 ADT, an increase of 158 trips would not double the current traffic level. Therefore, the additional construction-related traffic would not increase the traffic noise levels. In addition, for the same reasons as described under Impact 3.11-1 (Alt. 1), the additional construction-related traffic on Sunset Drive would not increase traffic noise levels.

Noise from construction activity that occurs between 8:00 a.m. and 6:30 p.m. each day is exempt from the provisions of the applicable TRPA regulations. Noise from construction activity that occurs between 7:00 a.m. and 7:00p.m. on weekdays (or between 8:00 a.m. and 5:00 p.m. on weekends and federal holidays) is exempt from the provisions of the applicable El Dorado County regulations. In addition, construction activities would be temporary, and as described in Chapter 2, "Project Alternatives," noise-generating construction activities would not occur during the more noise-sensitive hours (i.e., before 8:00 a.m. and after 6:30 p.m. on weekdays, or after 5:00 p.m. on weekends or holidays). Additionally, project-generated construction traffic would not create an increase in local traffic noise levels. (There would not be a perceptible increase in overall traffic noise, and noise from single events [e.g., a truck driving along a haul route] would not exceed TRPA noise standards for single events [Table 3.11-2].)

Because noise from project construction sources would be exempt, would not exceed the applicable standards, and would not increase local traffic noise levels, this direct impact would be **less than significant**.

IMPACT 3.11-2 (Alt. 3) **Long-Term Project-Related Generation of Stationary- and Area-Source Noise. (CEQA 2, TRPA 2)** *Alternative 3 does not include any new long-term stationary or area noise sources. The increased recreation facilities would not create perceptible increases in vehicle noise or pedestrian activity above existing levels in the study area. This impact would be* ***less than significant****.*

Alternative 3 includes restoration elements described in Chapter 2, "Project Alternatives," and a new self-service kiosk. User-created trails along the perimeter of the site would be upgraded with boardwalks and bicycle paths, pedestrian trails, and new signage and an interpretative program added.

Alternative 3 would provide a "moderate" level of infrastructure that would include three pedestrian trails (two segments of which would be boardwalks), a kiosk, one observation area, six viewpoints, a fishing platform, and signage at multiple locations. Because Alternative 3 is a moderate infrastructure alternative, fewer new users would be generated by Alternative 3 than by the maximum recreation alternative, Alternative 1, but more than the minimum recreation alternative, Alternative 2. Because existing recreation numbers are approximately 20 visitors per hour and both current and potential new users would be dispersed throughout the study area, and because Alternative 3 would generate only a small increase in use of the study area, the additional new users accessing the study area from multiple entry points would not generate a substantial increase in area noise levels or cause PAS standards to be exceeded both in the study area and at the surrounding land uses.

Implementing the project would not create or increase area-source noise. Thus, no change in the ambient noise environment would occur, nor would applicable thresholds for the surrounding noise-sensitive receptors and study area be exceeded. Therefore, this indirect impact would be **less than significant**.

IMPACT 3.11-3 (Alt. 3) **Long-Term Generation of Project-Related Traffic Noise. (CEQA 3)** *Long-term project-generated traffic would not result in a perceptible increase in ambient noise levels on nearby local roadways or highways. This impact would be* ***less than significant****.*

Impact 3.11-3 (Alt. 3) would be similar to Impact 3.11-3 (Alt. 3). Alternative 3 would add fewer than 100 trips per day to the existing roadway network (see Table 3.11-14). Refer to Impact 3.11-3 (Alt. 1) and Table 3.11-14 for a more detailed discussion of long-term project-generated traffic noise levels of the study area and surrounding areas. This direct impact would be **less than significant**.

IMPACT 3.11-4 (Alt. 3) **Land Use Compatibility of Study Area Noise Levels and Surrounding Land Uses. (CEQA 4, TRPA 1)** *Noise generated by surrounding land uses would not cause noise levels within the study area to exceed applicable standards, and Alternative 3 would not create any new noise sources that would increase noise levels above applicable standards at surrounding land uses. Therefore, both Alternative 3 and surrounding land uses would be compatible. This impact would be* ***less than significant****.*

Impact 3.11-4 (Alt. 3) would be similar to Impact 3.11-4 (Alt. 1). No standards would be exceeded and no new sources would be created. Refer to Impact 3.11-4 (Alt. 1) for a more detailed discussion of land use compatibility of the study area and surrounding areas. This direct impact would be **less than significant**.

IMPACT 3.11-5 (Alt. 3) **Short- and Long-Term Increases in Groundborne Vibration Levels. (CEQA 5)** *Project-generated groundborne vibration would not disrupt humans' activities, including sleep, or damage structures. This impact would be* ***less than significant****.*

Impact 3.11-5 (Alt. 3) would be similar to Impact 3.11-5 (Alt. 1). No long-term vibration sources would be created and construction activities would be restricted to 8:00 a.m. to 6:30 p.m. weekdays (and to 5:00 p.m. on

weekends and holidays). Refer to Impact 3.11.1-5 for a more detailed discussion of project-generated groundborne vibration. This direct impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.11-1 (Alt. 4)	**Short-Term Project Construction Noise Levels Exceeding Applicable Thresholds. (CEQA 1, TRPA 2)** *Short-term construction activities could exceed applicable noise thresholds if they occur outside hours exempted by TRPA and El Dorado County. However, noise-generating construction activities related to implementation of Alternative 1 would be limited to the hours during which construction noise is exempt from the provisions of the applicable standards. Therefore, this impact would be* ***less than significant***

Construction activities under Alternative 4 would be similar to those under Alternative 1.

The construction equipment required in Alternative 4 would likely include a loader, dozer/tractor, crane, scraper, excavator, backhoe, grader, generator, and trucks. According to EPA and FHWA, maximum noise levels for these types of equipment can range from 78 to 85 dBA at 50 feet when used without feasible noise control (Table 4.11-13). Based on these noise levels and a typical noise-attenuation rate of 6 dBA/DD, exterior noise levels at noise-sensitive receptors located within 2,500 feet could exceed local PAS standards (50 or 55 dBA CNEL).

In addition, project construction under Alternative 4 would result in a short-term increase in traffic on the local area's roadway network. It is expected that up to 306 daily trips (consisting of 106 haul-truck trips, 66 employee commute trips, and 22 miscellaneous trips) would occur during the periods of maximum construction activity. (This would be more trips than under Alternatives 1, 2, and 3 [up to 176, 192, and 158 daily trips, respectively].) Construction-related traffic would be distributed over the roadway network identified in Section 3.16, "Transportation, Parking, and Circulation" (e.g., San Francisco Avenue, Lakeview Avenue, East Venice Drive, Silver Dollar Avenue, and Sunset Drive). The daily truck haul trips would traverse haul routes designated in Section 3.16. Typically, traffic must double to create a perceptible increase in traffic noise (Caltrans 1998:N-96). Because all affected roadways (except Sunset Drive) have a peak-month minimum of 1,000 ADT, an increase of 306 trips would not double the current traffic level. Therefore, the additional construction-related traffic would not result in a perceptible increase overall traffic noise levels. In addition, for the same reasons as described under Impact 3.11-1 (Alt. 1), the additional construction-related traffic on Sunset Drive would not increase traffic noise levels.

Noise from construction activity that occurs between 8:00 a.m. and 6:30 p.m. each day is exempt from the provisions of the applicable TRPA regulations. Noise from construction activity that occurs between 7:00 a.m. and 7:00 p.m. on weekdays (or between 8:00 a.m. and 5:00 p.m. on weekends and federal holidays) is exempt from the provisions of the applicable El Dorado County regulations. In addition, construction activities would be temporary, and as described in Chapter 2, "Project Alternatives," noise-generating construction activities would not occur during the more noise-sensitive hours (i.e., before 8:00 a.m. and after 6:30 p.m. on weekdays, or after 5:00 p.m. on weekends or holidays). Additionally, project-generated construction traffic would not create an increase in local traffic noise levels. (There would not be a perceptible increase in overall traffic noise, and noise from single events [e.g., a truck driving along a haul route] would not exceed TRPA noise standards for single events [Table 3.11-2].) Because noise from project construction sources would be exempt, would not exceed the applicable standards, and would increase local traffic noise levels, this direct impact would be **less than significant**.

IMPACT 3.11-2 (Alt. 4)	**Long-Term Project-Related Generation of Stationary- and Area-Source Noise. (CEQA 2, TRPA 2)** *Alternative 4 does not include any new long-term stationary and area noise sources. The increased recreation facilities would not create perceptible increases in vehicle noise or pedestrian activity above existing levels in the study area. This impact would be* ***less than significant.***

Alternative 4 includes restoration elements described in Chapter 2, "Project Alternatives," and a new self-service kiosk. User-created trails along the perimeter of the site would be upgraded with boardwalks and bicycle access, and new signage would be installed and an interpretative program added.

The new recreational infrastructure proposed in Alternative 4 would be similar to Alternative 3 (see Impact 3.11-2 [Alt. 1] and Impact 3.11-2 [Alt. 3]), and as in Alternative 3, activity levels would not double. Therefore, a perceptible increase in noise would not occur, nor would noise standards be exceeded.

Alternative 4 would provide a "moderate" level of infrastructure that would include three pedestrian trails, a kiosk, two observation areas, five viewpoints, and signage at multiple locations. Because Alternative 4 is a moderate infrastructure alternative, Alternative 4 would generate fewer new users than the maximum recreation alternative, Alternative 1, and comparable increase to Alternative 3, and more new users than the minimum recreation alternative, Alternative 2. Because existing recreation numbers are approximately 20 users per hour and both current and potential new users would be dispersed throughout the study area, and because Alternative 4 would generate only a small increase in use of the study area, the additional new users accessing the study area from multiple entry points would not generate a substantial increase in area noise levels or cause PAS standards to be exceeded both in the study area and at the surrounding land uses.

Alternative 4 would not create or increase area-source noise. Thus, no change in the ambient noise environment would occur, nor would applicable thresholds for the surrounding noise-sensitive receptors and study area be exceeded. Therefore, this indirect impact would be **less than significant**.

IMPACT 3.11-3 (Alt. 4) **Long-Term Generation of Project-Related Traffic Noise. (CEQA 3)** *Long-term project-generated traffic would not result in a perceptible increase in ambient noise levels on nearby local roadways or highways. This impact would be* ***less than significant****.*

Impact 3.11-3 (Alt. 4) would be similar to Impact 3.11-3 (Alt. 1). Like Alternative 1, Alternative 4 would add fewer than 100 trips per day to the existing roadway network (see Table 3.11-14), and as in Alternative 1, the additional long-term traffic would not double existing levels and therefore would not increase traffic noise on the affected roadways. Refer to Impact 3.11-3 (Alt. 1) and Table 3.11-14 for a more detailed discussion of long-term project-generated traffic noise levels of the study area and surrounding areas. This direct impact would be **less than significant**.

IMPACT 3.11-4 (Alt. 4) **Land Use Compatibility of Study Area Noise Levels and Surrounding Land Uses. (CEQA 4, TRPA 1)** *Noise generated by surrounding land uses would not cause noise levels within the study area to exceed applicable standards, and Alternative 4 would not create any new noise sources that would increase noise levels above applicable standards at surrounding land uses. Therefore, both Alternative 4 and surrounding land uses would be compatible. This impact would be* ***less than significant****.*

Impact 3.11-4 (Alt. 4) would be similar to Impact 3.11-4 (Alt. 1). There would likely be some differences in the timing and magnitude of noise in the long term because different features would be constructed than under Alternative 1, and future use of those features would differ; however, these differences would be small because the general locations and nature of restoration and recreation features would be similar to those for Alternative 1, and as under Alt. 1, use of these features would not cause applicable noise standards to be exceeded. Refer to Impact 3.11-4 (Alt. 1) for a more detailed discussion of land use compatibility of the study area and surrounding areas. This direct impact would be **less than significant**.

IMPACT 3.11-5 (Alt. 4) **Short- and Long-Term Increases in Groundborne Vibration Levels (CEQA 5).** *Project-generated groundborne vibration would not disrupt humans' activities, including sleep, or damage structures. This impact would be* ***less than significant****.*

Impact 3.11-5 (Alt. 4) would be similar to Impact 3.11-5 (Alt. 1). As in Alternative 1, no long-term vibration sources would be created and construction activities that may cause vibration would be restricted to between 8:00 a.m. and 6:30 p.m. on weekdays, and 8:00 a.m. and 5:00 p.m. on weekends and holidays. Refer to Impact 3.11-5 (Alt. 1) for a more detailed discussion of project-generated groundborne vibration. This direct impact would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.11-1 (Alt. 5) **Short-Term Project Construction Noise Levels Exceeding Applicable Thresholds. (CEQA 1, TRPA 2)** *Short-term construction activities would not occur under Alternative 5.* ***No impact*** *would occur.*

Under Alternative 5, thresholds for construction noise would not be exceeded because no short-term construction activities would occur. Noise levels would remain comparable to current conditions. **No impact** would occur.

IMPACT 3.11-2 (Alt. 5) **Long-Term Project-Related Generation of Stationary- and Area-Source Noise. (CEQA 2, TRPA 2)** *Alternative 5 does not include any new long-term stationary and area noise sources and thus would not generate additional noise from such sources.* ***No impact*** *would occur.*

As the No-Project/No-Action Alternative, Alternative 5 does not include any new long-term stationary and area-noise sources. Use of the study area would remain comparable to existing use, and thus, vehicle noise and noise from pedestrian activity would remain at existing levels. **No impact** would occur.

IMPACT 3.11-3 (Alt. 5) **Long-Term Generation of Project-Related Traffic Noise. (CEQA 2, TRPA 2)** *There would be no long-term change in traffic caused by activities in the study area; therefore, Alternative 5 would not increase ambient noise levels on nearby local roadways or highways.* ***No impact*** *would occur.*

As the No-Project/No-Action Alternative, Alternative 5 would not result in a long-term change in traffic caused by activities in the study area. As a result, this alternative would not increase ambient noise levels on nearby local roadways or highways. Therefore, **no impact** would occur.

IMPACT 3.11-4 (Alt. 5) **Land Use Compatibility of Study Area Noise Levels and Surrounding Land Uses. (CEQA 3)** *Noise from surrounding land uses would not cause applicable standards to be exceeded within the study area, and Alternative 5 would not create any new sources that would increase noise levels at surrounding land uses.* ***No impact*** *would occur.*

Because the project would not be constructed under Alternative 5, noise from surrounding land uses would not cause applicable standards to be exceeded or change within the study area, and no new sources would be created under this alternative that would increase noise levels at surrounding land uses. **No impact** would occur.

IMPACT 3.11-5 (Alt. 5) **Short- and Long-Term Increases in Groundborne Vibration Levels. (CEQA 5)** *Alternative 5 would not generate groundborne vibration that could cause disrupt humans' activities, including sleep, or damage structures.* ***No impact*** *would occur.*

Under Alternative 5, no construction would occur. As a result, this alternative would not generate groundborne vibration that could cause disruption to humans or damage to structures. Therefore, **no impact** would occur.

3.12 PUBLIC SERVICES

This section describes existing public services, presents an analysis of potential impacts resulting from Alternatives 1–5, and identifies mitigation measures for those impacts determined to be significant. Specifically, it addresses potential project impacts on law enforcement, fire and emergency services, and animal control services. Potential impacts of the proposed alternatives on recreation and recreation facilities are addressed in Section 3.13, "Recreation," and potential impacts on utilities are described in Section 3.17, "Utilities." Cumulative public services impacts are addressed in Section 3.18, "Cumulative Impacts." Consistency with TRPA goals and policies is presented in Section 3.10, "Land Use," Table 3.10-1.

3.12.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

No federal plans, policies, regulations, or laws regarding the provision of public services in the study area are related to the potential effects of the proposed alternatives.

State

No state plans, policies, regulations, or laws regarding the provision of public services are related to the potential effects of the proposed alternatives.

Tahoe Regional Planning Agency

Goals and Policies

The following policies related to public services in Chapter VI (Public Services and Facilities Element) of *Regional Plan for the Lake Tahoe Basin Goals and Policies* (TRPA 2006) are applicable:

- **Goal 1:** Public services should be allowed to upgrade and expand to support existing and new development consistent with the Regional Plan.
  - **Policy 1:** Public services and facilities should be allowed to upgrade and expand consistent with the land use element of the Regional Plan and federal, state, and local standards.
  - **Policy 2:** Expansion of public services and facilities should be phased in to meet the needs of new development without creating inefficiencies from overexpansion or under-expansion.
- **Goal 4:** To ensure protection of the public health, safety and general welfare of the region, educational and public safety services should be sized to be consistent with projected growth levels in this plan.
  - **Policy 1:** The impact on educational and public safety services shall be considered when reviewing projects and plan amendments proposed within the region. To the extent feasible, adverse impacts should be mitigated as part of the review process.
  - **Policy 2:** Educational and emergency service organizations should anticipate and plan for projected demands and needs consistent with the Regional Plan and are encouraged to advise the agency when development potentials exceed current or anticipated service capabilities or capacities.

Code of Ordinances

Although the TRPA Code of Ordinances contains numerous ordinances applicable to the design, construction, and operation of facilities providing public services, it does not contain ordinances related to public services that are applicable to the project.

City of South Lake Tahoe

Law Enforcement

Enforcement of several sections of the municipal code of the CSLT could be affected by the project. These sections include:

- **Chapter 16, Article 36. Prohibited parking, stopping or standing areas – Generally.** No operator of any vehicle shall stop, stand, park or leave standing such vehicle in any of the following places, except when necessary to avoid conflict with other traffic or in compliance with the direction of a police officer or other authorized officer or traffic sign or signal:

  A. On either side of any street between the projected property lines of any public walk, public steps, street or thoroughfare terminating at such street, when such area is indicated by appropriate signs or by red paint upon the curb surface.

  B. In any area where the city traffic engineer determines that the parking or stopping of a vehicle would constitute a traffic hazard or would endanger life or property, when such area is indicated by appropriate signs or by red paint upon the curb surface.

  C. In any area established by resolution of the city council as a no parking area, when such area is indicated by appropriate signs or by red paint upon the curb surface.

  D. In any area where the parking or stopping of any vehicle would constitute a traffic hazard or would endanger life or property.

  E. On any street or highway where the use of such street or highway or a portion thereof is necessary for snow removal, the cleaning, repair or construction of the street or highway or the installation of underground utilities or where the use of the street or highway or any portion thereof is authorized for a purpose other than the normal flow of traffic or where the use of the street or highway or any portion thereof is necessary for the movement of equipment, articles or structures of unusual size and the parking of such vehicle would prohibit or interfere with such use or movement; provided, that signs giving notice of such no parking are erected or placed at least 24 hours prior to the effective time of such no parking.

  F. Within 20 feet of the approach to any traffic signal, boulevard stop sign or official electric flashing device.

  G. In any area or space established by resolution of the city council as parking area or space limited to and designated specifically for handicapped persons; provided that such area or space is posted by an appropriate sign so defining its purpose.

- **Chapter 18A, Article II. Protection of Property, Section 18A-6 Operating Vehicles – Generally.** No person shall drive or operate any vehicles, including bicycles, in a park other than on a paved vehicular road or path provided for that purpose; provided, however, that a bicyclist shall be permitted to wheel or push a bicycle in any area in which pedestrian traffic is permitted. (Ord. 174 § 1; Ord. 834 § 1)

- **Chapter 18A, Article II. Protection of Property, Section 18A-11 Miscellaneous Regulations.** It shall be unlawful and an infraction for any person to do any of the following in any park:

  A. Hunting and Firearms. Hunt, trap or pursue wildlife at any time. No person shall use, carry, or possess firearms of any descriptions, or air-rifles, spring-guns, bow and arrows (except in areas which may be set aside as archery ranges), slings or any other forms of weapons potentially inimical to wildlife and dangerous to human safety, or any instrument that can be loaded with and fire blank cartridges, or any kind of trapping device. Shooting into park areas from beyond park boundaries is forbidden.

  B. Camping in other than designated area. No person shall camp in any public space, public street, or private property without evidence of consent of the property owner, except in areas specifically designated for such use. "Camp" shall mean residing in or using a park or other public space for living accommodation purposes, such as sleeping activities, or making preparations to sleep (including the laying down of bedding for the purpose of sleeping), or storing personal belongings, (including but not limited to clothing, sleeping bags, bedrolls, blankets, sheets, luggage, backpacks, kitchen utensils, cookware, and regularly cooking meals, or living in a parked vehicle. These activities constitute camping when it reasonably appears, in light of all the circumstances, that a person(s) is using a park or other public space as a living accommodation regardless of his/her intent or the nature of any other activities in which he/she might also be engaging.

     For purposes of this section, the following terms shall have the meaning below prescribed:

     1. "Public space" means any public park, public beach or any open space area including meadows and forested areas within the city limits.

     2. "Public street" means any public right-of-way or public sidewalk including public benches.

     3. "Private property" means any property owned by a private individual or entity.

  F. Fireworks and Explosives. Bought, or have in his possession, or set off or otherwise cause to explode or discharge or burn, any firecrackers, torpedo, rocket, or other fireworks or explosives of flammable material, or discharge them or throw them into any such area from land or highway adjacent thereto. This prohibition includes any substance, compound, mixture, or article that in conjunction with any other substance or compound would be dangerous from any of the foregoing standpoints.

- **Chapter 18A. Parks and Beaches, Article III. Use Regulations, Section 18A-11. Miscellaneous Regulations.** It shall be unlawful and an infraction for any person to do any of the following in any park:

  G. Closed Areas. Enter an area posted as "Closed to the Public", nor shall any person use, or abet the use of an area in violation of posted notices.

- **Chapter 18A. Parks and Beaches, Article IV. Operating Policy, Section 18A-13 Closed Areas.** Any section or part of any park may be declared closed to the public by the director at any time and for any interval of time, either temporarily or at regular and stated intervals (daily or otherwise) and either entirely or merely to certain uses, as the director shall find reasonably necessary. (Ord. 174 § 1; Ord. 834 § 1)

Fire Protection and Emergency Services

The following goals and objectives related to public services in the Safety Element of the *City of South Lake Tahoe General Plan* (CSLT 1999) are applicable:

- **Goal 2:** To ensure the adequacy of fire protection within the City limits.

- **Objective 1:** Develop and maintain a fire protection program which provides adequate water supply and utilizes the most efficient procedures to minimize loss of life, injury, and property damage.

- **Goal 3:** To ensure the adequacy of wildland fire protection within the City and surrounding areas.

  - **Objective 1:** Develop and maintain a program which effectively addresses fire protection in forest areas, meadows, and other unpopulated areas.

The City's General Plan is currently being updated, and this update is anticipated to be completed in November 2009 (CSLT 2008).

Animal Control

According to Section 6-22 of the CSLT Municipal Code:

> It shall be unlawful for any person owning or having charge of any stray dog, as defined herein, to cause, permit or allow such dogs, whether licensed or unlicensed, to stray, wander or otherwise be at loose or at large upon any public street, alley, park, beach, way or other public property within the city, or upon any private property within the city other than private property of which the owner of the dog has ownership or control, unless such dog is kept securely confined by a leash, rope, cord or chain not over 10 feet in length held by some person or securely attached to some stationary object. Nothing contained in this section shall be deemed to prevent a dog from being used without a leash to herd, guard or gather domestic animals or fowls in the normal and customary manner of "working dogs." Nor shall this section be deemed to prohibit participation in obedience trials or dog shows without a leash so long as the dog is under the charge and control of a person competent to control such dog and the dog does not harm or damage, or threaten to harm or damage, any person or public or private property. (Ordinance. 515 § 7; Ordinance 548 § 2)

ENVIRONMENTAL SETTING

Law Enforcement

South Lake Tahoe Police Department

Police service in the study area is provided by the South Lake Tahoe Police Department (SLTPD). SLTPD is located within the government complex at the intersection of Al Tahoe and Johnson Boulevards. This complex also houses the El Dorado County Superior Court, Sheriff-Coroner, and Sheriff's Department, among others.

SLTPD is allocated 41 sworn officers for an estimated 1.7 officers per 1,000 residents (based on the current population of approximately 24,000 residents). These staffing numbers may vary slightly, based on availability of grant-funded positions and increases from seasonal work force employment. The population of South Lake Tahoe can reach 75,000 during the summer months. Because of this fluctuation, SLTPD does not use staffing ratios to determine human resource needs. SLTPD's response-time goal is to arrive in less than 3 minutes for priority one calls (rape, robbery, or crimes in progress), none of which has generally been an issue in the study area. Only priority one calls are tracked; thus, response-time goals are not set for other calls (Daniels, pers. comm., 2007).

SLTPD has informal mutual aid agreements with the El Dorado County Sheriff's Department and the Douglas County Sheriff's Department for response during critical incidents. While the study area is state land, it is within a local response area, not a state response area (PRC Section 4125-4128).

El Dorado County Sheriff's Department

The Conservancy contracts with the El Dorado County Sheriff's Department to provide patrols of the project area. Although the study area is not the primary jurisdiction of the Sheriff's Department, the Conservancy utilizes its services to supplement management of the property.

Fire Protection and Emergency Services

The study area is serviced by the South Lake Tahoe Fire Department (SLTFD). SLTFD serves a land area of 18 square miles along Lake Tahoe's South Shore, and the study area is in the northwestern portion. The department responds to events including structural fires, vegetation fires, hazardous materials spills, water and ice rescue incidents, emergency medical incidents, and aircraft incidents. SLTFD maintains a minimum daily staff of 11 and currently employs 41 fire suppression personnel. The ratio of on-duty firefighters per 1,000 residents is 1.7 personnel per 1,000 residents (based on the current estimated population of 24,000 residents). The ratio of total force to population is 2.2 personnel per 1,000 residents (Gigliotti, pers. comm., 2007).

SLTFD manages three fire stations, all within the city limits:

- Fire Station #1, located at 1252 Ski Run Boulevard, includes Engine 1 (staffed by one captain and one engineer) and Medic 1 (staffed by one firefighter paramedic and one firefighter);
- Fire Station #2, located at 2951 Lake Tahoe Boulevard, includes Engine 2 (staffed by one captain and one engineer), and Truck 2 (can be staffed by the Engine 2 crew for extrication or commercial fires); and
- Fire Station #3, located at 2101 Lake Tahoe Boulevard, includes Engine 3 (staffed by one captain and one engineer), Medic 3 (staffed by one firefighter paramedic and one firefighter), and SLTFD administrative offices.

Fire Station 3 provides first response to the study area. This station is located near the junction of U.S. Highway 50 (U.S. 50) and U.S. 89, approximately 0.75 mile from the southwest corner of the study area (near the junction of Tahoe Keys Boulevard and Sky Meadows Court). The average response time by the entire department (including all three fire stations) is approximately 3.5 minutes. The average response time by Fire Station 3 for any service call is approximately 5 minutes (Gigliotti, pers. comm., 2007).

Animal Control

The South Lake Tahoe operations of El Dorado County Animal Control (EDCAC) provide services in the Tahoe Basin portion of El Dorado County, from Tahoma on the West Shore to Stateline on the South Shore and west along U.S. 50 to the community of Kyburz, California. EDCAC also provides limited animal control services to Alpine County. The animal shelter (located at 1120 Shakori Drive in South Lake Tahoe [Meyers], just off SR 89) has six staff members: one supervising animal control officer, one senior animal control officer, two animal control officers, one public services assistant, and one kennel attendant. Response time varies, depending on officer location in the field and prioritization of pending calls. Typical response time is 5–15 minutes (Gerat, pers. comm., 2007).

Officers also respond to requests for service to investigate complaints about barking dogs, dogs running loose, animal neglect or cruelty, and potentially dangerous or vicious animals. Such service is provided Monday–Saturday, from 8:00 a.m. to 5:00 p.m. In addition, EDCAC provides 24-hour emergency response to reports of injured animals, animal bites, and impounds pursuant to an arrest of the animal's owner. The animal shelter, houses stray animals and provides adoption services. Even though EDCAC is an El Dorado County agency, it enforces CSLT ordinances.

SIGNIFICANCE CRITERIA

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; the TRPA Initial Environmental Checklist; factual or scientific information and data; and regulatory standards of federal, state, and local agencies. These criteria also encompass the factors taken into account under NEPA to determine the significance of an action in terms of the context and intensity of its effects.

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to public services if it would:

- create a need for the development of new service facilities (e.g., fire, police, schools), the construction of which could result in significant environmental impacts (CEQA 1);
- create circumstances where existing services and facilities could not meet established performance standards (CEQA 2); or
- substantially impede existing services (CEQA 3).

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis.

TRPA Criteria

TRPA's Initial Environmental Checklist indicates that a public services impact would be considered significant if it had an unplanned effect on, or resulted in a need for, new or altered governmental services—specifically:

- fire protection (TRPA 1);
- police protection (TRPA 2);
- schools (TRPA 3);
- parks or other recreation facilities (TRPA 4); or
- maintenance of public facilities, including roads (TRPA 5).

METHODS AND ASSUMPTIONS

Impacts on public services that could result from the proposed alternatives were identified by considering whether and how existing services or future demand for services would be affected by project implementation. Evaluation of potential public service impacts was based on a review of documents pertaining to the study area, including the TRPA Regional Plan, the TRPA Code of Ordinances, the *TRPA Community Wildfire Protection Plan for the California Portion of the Lake Tahoe Basin* (TRPA 2004b), the TRPA *Fuel Reduction and Forest Restoration Plan for the Lake Tahoe Basin Wildland Urban Interface* (TRPA 2007), the *City of South Lake Tahoe General Plan* (CSLT 1999), and the CSLT Municipal Code. Additional background information on current services, staffing, and equipment for law enforcement, fire and emergency services, and animal control was obtained through consultation with the SLTPD, SLTFD, and EDCAC, as well as with the HSP private security company.

Population growth in the Tahoe Basin is anticipated to cause a proportionate increase in demand for public services and in use of the study area.

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Increased Demand on Schools (CEQA 1, 2, 3 in part; TRPA 3)—No impacts on school demands are anticipated to result from any of the project alternatives. There are no schools within the study area, and none of the alternatives would contribute to population growth or the number of students in the community.

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.12-1 (Alt. 1) **Potential for Longer Emergency-Vehicle Response Times Caused by Roadway Obstruction during Construction. (CEQA 2, 3; TRPA 1, 2)** *Implementation of Alternative 1 could obstruct roadways in the project vicinity, and thus could slow or stop emergency vehicles. However, as described in Environmental Commitment 12, the Conservancy, the project contractor(s), or both would prepare and implement traffic control plans for construction activities that may affect a road right-of-way. Therefore, this impact would be* ***less than significant****.*

Alternative 1 would include various construction activities over approximately four years. Although a majority of project construction activities would occur on site, nearby roadways including East Venice Drive, Washington Avenue, Tahoe Keys Boulevard, and U.S. 50 would be affected (see Section 3.16, "Transportation, Parking, and Circulation"). Ongoing construction activities could result in temporary lane closures, increased truck traffic, and other roadway effects that could slow or temporarily stop emergency vehicles, temporarily increasing response times and impeding existing service. However, as described in Environmental Commitment 12, "Prepare and Implement Traffic Control Plans" (Table 2-6), the Conservancy, the project contractor(s), or both would prepare and implement traffic control plans for construction activities that may affect road right-of-way. The traffic control plans would follow standards of the agency responsible for the affected roadway and would be signed by a professional engineer. Measures typically used in traffic control plans include advertising of planned lane closures, warning signage, a flag person to direct traffic flows when needed, and methods to ensure continued access by emergency vehicles. These measures would substantially reduce any potential effects on response times and existing service. Therefore, this impact would be **less than significant**.

IMPACT 3.12-2 (Alt. 1) **Potential Need for Additional Public Services or Facilities as a Result of Increased Demand for Public Services. (CEQA 1–3; TRPA 1, 2, 4, 5)** *Alternative 1 would create additional recreation facilities and could attract additional visitors to the study area. Therefore, it could increase the demand for fire protection, police, and animal control services. However, Alternative 1 is not expected to attract enough visitors to require a substantial increase in fire protection, police protection, or animal control services or facilities. Therefore, this impact would be* ***less than significant****.*

Features of Alternative 1 that might attract additional visitors would include kiosks, interconnected bicycle paths, pedestrian trails, boardwalks, a bridge over the Upper Truckee River, and observation platforms and viewpoints. (The proposed bridge and boardwalk over the Upper Truckee River would be a new public-access element in the study area.)

The proposed public access and recreational facilities would be similar and related to existing uses. The study area already includes user-created trails and attracts visitors to the site and the beach. Some of these features would reduce the effects of existing uses on natural resources by directing use to less environmentally sensitive locations, rather than support substantial additional use. Therefore, an increase in the number of visitors would not be substantial; the resulting increase in demand for public services would also not be substantial, and would not create the need for additional services or new facilities.

SLTFD foresees no added fire protection concerns with Alternative 1, including fire protection service to the proposed visitor centers (Zachau, pers. comm., 2007).

Therefore, this impact would be **less than significant**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.12-1 (Alt. 2) **Potential for Longer Emergency-Vehicle Response Times Caused by Roadway Obstruction during Construction. (CEQA 2, 3; TRPA 1, 2)** *Implementation of Alternative 2 could obstruct roadways in the project vicinity, and thus could slow or stop emergency vehicles. However, as described in Environmental Commitment 12, the Conservancy, the project contractor(s), or both would prepare and implement traffic control plans for construction activities that may affect road right-of-way. Therefore, this impact would be* ***less than significant****.*

Impact 3.12-1 (Alt. 2) would be similar to Impact 3.12-1 (Alt. 1). Although slightly smaller in scale than Alternative 1, construction of Alternative 2 would have similar effects on roadways, and thus could slow or stop emergency vehicles. For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.12-2 (Alt. 2) **Potential Need for Additional Public Services or Facilities as a Result of Increased Demand for Public Services. (CEQA 1–3; TRPA 1, 2, 4, 5)** *Alternative 2 would create additional recreation facilities and could attract additional visitors to the study area. Therefore, it could increase the demand for fire protection, police, and animal control services. However, Alternative 2 is not expected to attract enough visitors to require a significant increase in fire protection, police protection, or animal control services or facilities. Therefore, this impact would be* ***less than significant****.*

This impact would be similar to Impact 3.12-2 (Alt. 1), but smaller in magnitude because Alternative 2 would add fewer recreation facilities to the study area. For the same reasons as described for Alternative 1 above, this impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.12-1 (Alt. 3) **Potential for Longer Emergency-Vehicle Response Times Caused by Roadway Obstruction during Construction. (CEQA 2, 3; TRPA 1, 2)** *Implementation of Alternative 3 could obstruct roadways in the project vicinity, and thus could slow or stop emergency vehicles. However, as described in Environmental Commitment 12, the Conservancy, the project contractor(s), or both would prepare and implement traffic control plans for construction activities that may affect road right-of-way. Therefore, this impact would be* ***less than significant****.*

Impact 3.12-1 (Alt. 3) would be similar to Impact 3.12-1 (Alt. 1). Although slightly smaller in scale than Alternative 1, construction of Alternative 3 would have similar effects on roadways, and thus could slow or stop emergency vehicles. For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.12-2 (Alt. 3) **Potential Need for Additional Public Services or Facilities as a Result of Increased Demand for Public Services. (CEQA 1–3; TRPA 1, 2, 4, 5)** *Alternative 2 would create additional recreation facilities and could attract additional visitors to the study area. Therefore, it could increase the demand for fire protection, police, and animal control services. However, Alternative 3 is not expected to attract enough visitors to require a significant increase in fire protection, police protection, or animal control services or facilities. Therefore, this impact would be* ***less than significant****.*

This impact would be similar to Impact 3.12-2 (Alt. 1), but smaller in magnitude because Alternative 3 would add fewer recreation facilities to the study area. For the same reasons as described for Alternative 1 above, this impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.12-1 (Alt. 4) **Potential for Longer Emergency-Vehicle Response Times Caused by Roadway Obstruction during Construction. (CEQA 2, 3; TRPA 1, 2)** *Implementation of Alternative 4 could obstruct roadways in the project vicinity, and thus could slow or stop emergency vehicles. However, as described in Environmental Commitment 12, the Conservancy, the project contractor(s), or both would prepare and implement traffic control plans for construction activities that may affect road right-of-way. Therefore, this impact would be* ***less than significant****.*

Impact 3.12-1 (Alt. 4) would be similar to Impact 3.12-1 (Alt. 1). Although slightly smaller in scale than Alternative 1, construction of Alternative 4 would have similar effects on roadways, and thus could slow or stop emergency vehicles. For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.12-2 (Alt. 4) **Potential Need for Additional Public Services or Facilities as a Result of Increased Demand for Public Services. (CEQA 1–3; TRPA 1, 2, 4, 5)** *Alternative 4 would create additional recreation facilities and could attract additional visitors to the study area. Therefore, it could increase the demand for fire protection, police, and animal control services. However, Alternative 4 is not expected to attract enough visitors to require a significant increase in fire protection, police protection, or animal control services or facilities. Therefore, this impact would be* ***less than significant****.*

This impact would be similar to Impact 3.12-2 (Alt. 1), but smaller in magnitude because Alternative 4 would add fewer recreation facilities to the study area. For the same reasons as described for Alternative 1 above, this impact would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.12-1 (Alt. 5) **Potential for Longer Emergency-Vehicle Response Times Caused by Roadway Obstruction during Construction. (CEQA 2, 3; TRPA 1, 2)** *Because no construction activities would occur, no roadways in the project vicinity would be obstructed, resulting in no effect on emergency response.* ***No impact*** *would occur.*

Alternative 5 would not result in any construction activities in the study area. As a result, it would not obstruct roadways in the project vicinity. Therefore, this alternative would not slow or stop emergency vehicles, resulting in no effect on emergency-response times. **No impact** would occur.

IMPACT 3.12-2 (Alt. 5) **Potential Need for Additional Public Services or Facilities as a Result of Increased Demand for Public Services. (CEQA 1–3; TRPA 1, 2, 4, 5)** *Because no additional recreation facilities would be created, no additional visitors would be attracted to the study area, resulting in no effect on demand for fire protection, police, and animal control services.* ***No impact*** *would occur.*

Alternative 5 would not create additional recreation facilities in the study area. Therefore, this alternative would not attract additional visitors to the study area. As a result, it would not cause the demand for fire protection, police, and animal control services to increase. **No impact** would occur.

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3.13 RECREATION

This section summarizes the regulations that address recreation in the study area, describes existing recreation facilities and uses in the project vicinity, presents an analysis of potential impacts of Alternatives 1–5 on those facilities and uses, and identifies mitigation measures for those impacts determined to be significant. Cumulative recreation impacts are addressed in Section 3.18, "Cumulative Impacts." Consistency with TRPA goals and policies is presented in Section 3.10, "Land Use," Table 3.10-1. The project's effects on thresholds are described in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities."

3.13.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

No federal plans, policies, ordinances, laws, or regulations specific to recreation are applicable.

State

The California State Lands Commission (CSLC) regulates an established public-trust easement for navigable waterways and for lateral access between the high and low-water lines along navigable waterways. The regulation of this public-trust easement is described in detail in Chapter 5, "Compliance, Consultation, and Coordination."

Tahoe Regional Planning Agency

Goals and Policies

The Goals and Policies portion of the Regional Plan (TRPA 2006) establishes an overall framework for development and environmental conservation in the Lake Tahoe region. Chapter V (Recreation Element) of TRPA's Goals and Policies consists of three subelements: dispersed recreation, developed recreation, and urban recreation. Existing and proposed recreation activities in the study area are dispersed in nature; however, under the various alternatives, these activities would shift from dispersed closer to developed recreation when viewed within the context of the Recreation Opportunity Spectrum (an organizing concept that relates the level of recreation infrastructure with their common activities). Dispersed recreation involves outdoor recreation activities that are not concentrated at a specific facility location, but are dispersed around the study area, such as hiking, jogging, primitive camping, nature study, fishing, cross-country skiing, rafting/kayaking, and swimming. The following goals related to dispersed recreation are applicable to existing and proposed recreation in the study area:

- **Goal 1:** Encourage opportunities for dispersed recreation when consistent with environmental values and protection of the natural resources.
- **Goal 2:** Provide high-quality recreational opportunities.

The following goals related to developed recreation are applicable to existing and proposed recreation in the study area:

- **Goal 1:** Provide a fair share of the total basin capacity for outdoor recreation.
- **Goal 2:** Provide for the appropriate type, location, and rate of development of outdoor recreational uses.
- **Goal 3:** Protect natural resources from overuse and rectify incompatibility between uses.

- **Goal 4:** Provide for the efficient use of outdoor recreation resources.

Code of Ordinances

As described in Chapter 50 of the TRPA Code of Ordinances, TRPA regulates the rate of expansion and the distribution of recreation use in the Lake Tahoe region by identifying targets for recreation use and regulating development to maintain them. Targets measured in persons-at-one-time (PAOTs) have been identified for outdoor recreation at overnight, summer day-use, and winter day-use facilities.

TRPA allocates PAOTs to plan area statements (PASs) and community plans and to a regional pool in which PAOTs are held in reserve for overnight and summer day-use facilities (Shaw, pers. comm., 2008). If a proposed expansion of recreation facilities meets TRPA criteria, the project will be approved, and the numerical target for PAOTs necessary to accommodate the increased level of activity associated with the project will be set for the project as part of the TRPA permitting process. The PAOTs required for the permitted activity will be allocated from the PAOTs designated for the relevant PAS, community plan, or reserve pool. Through this process, TRPA essentially grants permission for the project to increase use of the recreational facility by a particular number of people. PAOT allocation allows agencies to quantitatively measure development of recreation facilities and to determine how well that development is keeping pace with pressures for other urban development, such as residential and commercial development.

A PAOT allocation would be necessary only if recreation capacity were increasing or if new facilities were created that would be likely to attract new visitors to the Lake Tahoe region. Dispersed outdoor recreation activities—hiking, jogging, primitive camping, nature study, fishing, cross-country skiing, rafting/kayaking, and swimming—are not subject to PAOT allocations because these activities do not constitute "additional recreation" as defined in the TRPA Code of Ordinances.

Unlike dispersed recreation, developed recreation facilities are likely to increase recreation capacity and require TRPA to allocate PAOTs. Developed recreation involves activities enhanced by the use of built facilities, such as campgrounds, marinas, and ski resorts. Some of the recreation uses proposed under the action alternatives are classified as day-use facilities and would require day-use PAOT allocation from either the PAS in which they are located or from the regional pool where PAOTs are not available from within the PAS.

Lake Tahoe Bicycle and Pedestrian Plan

The *Lake Tahoe Bicycle and Pedestrian Plan* (BPP) (TRPA 2010) was prepared by TRPA and the Tahoe Metropolitan Planning Organization as a guide for planning, constructing, and maintaining a regional network of bicycle paths and pedestrian trails, and supporting facilities and programs throughout the Lake Tahoe region. The plan contains goals and policies, an analysis of demand (including a model for estimating bicycle path use along major transportation corridors), conceptual alignments for various areas throughout the Tahoe Basin, a prioritized list of projects, and conceptual construction cost estimates.

The following goals and policies of the BPP apply to the project:

Goal 1. Complete a bicycle and pedestrian network that provides convenient access to Basin destinations and destinations outside the Basin.

- **Policy 1.1.** To the extent possible, accommodate all users, encompassing a wide range of abilities and travel objectives, in the bicycle and pedestrian network.

Goal 3. Provide environmental, economic, and social benefits to the region through increased bicycling and walking.

- **Policy 3.2.** Seek partnerships and opportunities for environmental restoration in conjunction with Bicycle and Pedestrian Plan facility implementation.

- **Policy 3.3.** Include design features, landscaping, signage, or barriers on shared-use paths through sensitive environmental areas to discourage pets and humans from leaving the path.

City of South Lake Tahoe

Although the project area is located within the city limits of South Lake Tahoe, as a state agency, the Conservancy is not subject to the CSLT's municipal code. Nonetheless, the Conservancy's management of the study area conforms to the CSLT's municipal code, and the Conservancy also contracts with the CSLT to provide security patrols within the study area and to enforce CSLT regulations for parks. Regulations governing activities in public parks and beaches are contained in Chapter 18A of the municipal code. The following sections of the CSLT code require dogs to be on leashes:

- **Chapter 6, Animal Control. Article IV. General Regulations—Dog Controls, Section 6-22: Stray dogs generally.** It shall be unlawful for any person owning or having charge of any stray dog, as defined herein [not under restraint by a leash], to cause, permit or allow such dogs, whether licensed or unlicensed, to stray, wander or otherwise be at loose or at large upon any public street, alley, park, beach, way or other public property within the city, or upon any private property within the city other than private property of which the owner of the dog has ownership or control, unless such dog is kept securely confined by a leash, rope, cord or chain not over 10 feet in length held by some person or securely attached to some stationary object.

- **Chapter 18A, Parks and Beaches. Article II. Protection of Property, Section 18A-11: Use of park and beaches regulated.** It shall be unlawful and an infraction for any person to do any of the following in any park:

  J. Domestic Animals. Have been responsible for the entry of a dog or other domestic animal into areas other automobile parking concourses and walks immediately adjacent thereto, and in such other areas as may be clearly marked by signs bearing the words "Domestic Animals Permitted in This Area". Nothing herein shall be construed as permitting the running of dogs at large. All dogs in those areas where such animals are permitted shall be restrained at all times on adequate leashes not greater than six feet in length.

Unless specifically permitted, the CSLT's municipal code also prohibits camping in public spaces, the use of fireworks or firearms within the city limits, and the operation of off-road vehicles on public property. None of these activities are permitted within the study area. The following sections of the municipal code address these activities:

- **Chapter 18A, Parks and Beaches. Article II. Protection of Property, Section 18A-6: Operating vehicles—Generally.** No person shall drive or operate any vehicles, including bicycles, in a park other than on a paved vehicular road or path provided for that purpose; provided, however, that a bicyclist shall be permitted to wheel or push a bicycle in any area in which pedestrian traffic is permitted. (Ord. 174 §1; Ord. 834 §1)

- **Chapter 18A, Parks and Beaches. Article II. Protection of Property, Section 18A-11: Use of park and beaches regulated.** It shall be unlawful and an infraction for any person to do any of the following in any park:

  A. Hunting and Firearms. Hunt, trap or pursue wildlife at any time. No person shall use, carry, or possess firearms of any descriptions, or air-rifles, spring-guns, bow and arrows (except in areas which may be set aside as archery ranges), slings or any other forms of weapons potentially inimical to wildlife and dangerous to human safety, or any instrument that can be loaded with and fire blank cartridges, or any kind of trapping device. Shooting into park areas from beyond park boundaries is forbidden.

B. Camping. Camping in other than designated area. No person shall camp in any public space, public street, or private property without evidence of consent of the property owner, except in areas specifically designated for such use. "Camp" shall mean residing in or using a park or other public space for living accommodation purposes, such as sleeping activities, or making preparations to sleep (including the laying down of bedding for the purpose of sleeping), or storing personal belongings, (including but not limited to clothing, sleeping bags, bedrolls, blankets, sheets, luggage, backpacks, kitchen utensils, cookware, and regularly cooking meals, or living in a parked vehicle. These activities constitute camping when it reasonably appears, in light of all the circumstances, that a person(s) is using a park or other public space as a living accommodation regardless of his/her intent or the nature of any other activities in which he/she might also be engaging.

For purposes of this section, the following terms shall have the meaning below prescribed:

1. "Public space" means any public park, public beach or any open space area including meadows and forested areas within the city limits.

2. "Public street" means any public right-of-way or public sidewalk including public benches.

3. "Private property" means any property owned by a private individual or entity.

F. Fireworks and Explosives. Bought, or have in his possession, or set off or otherwise cause to explode or discharge or burn, any firecrackers, torpedo, rocket, or other fireworks or explosives of flammable material, or discharge them or throw them into any such area from land or highway adjacent thereto. This prohibition includes any substance, compound, mixture, or article that in conjunction with any other substance or compound would be dangerous from any of the foregoing standpoints.

The municipal code also prohibits entering areas marked as closed:

- **Chapter 18A, Parks and Beaches. Article III. Use Regulations, Section 18A-11: Use of park and beaches regulated.** It shall be unlawful and an infraction for any person to do any of the following in any park:

  G. Closed Areas. Enter an area posted as "Closed to the Public", nor shall any person use, or abet the use of an area in violation of posted notices.

- **Chapter 18A, Parks and Beaches. Article IV. Operating Policy, Section 18A-13: Closed areas.** Any section or part of any park may be declared closed to the public by the director at any time and for any interval of time, either temporarily or at regular and stated intervals (daily or otherwise) and either entirely or merely to certain uses, as the director shall find reasonably necessary. (Ord. 174 §1; Ord. 834 §1)

ENVIRONMENTAL SETTING

Recreation Facilities and Opportunities in the Study Area

Overview of Recreation Use

Recreation within the study area is dispersed and does not currently include developed facilities, except for one trail, constructed as part of the Lower West Side Wetland Restoration Project in 2001. With the exception of this trail, which connects East Venice Drive to Cove East Beach, the study area does not contain officially designated trails or other facilities for recreation use. However, a network of user-created trails provides access to the study area from adjoining neighborhoods. Similarly, user-created boat take-outs exist along the Upper Truckee River. The study area is commonly used for walking, running, beach activities, bicycling, wildlife viewing, fishing, and dog walking. These uses occur primarily during late spring, summer, and early fall, and in that period are greatest

during summer weekends and holidays. During summer weekends and holidays, use of the study area can exceed 100 to 300 visitors per day, but during other days, the number of visitors is much smaller. Winter outdoor recreation use also includes cross-country skiing, snow play, and snow shoeing. Most visitors use the portion of the study area west of the Upper Truckee River. Thus, the eastern portion of the study area provides dispersed recreation opportunities characterized by solitude and a lack of formal facilities or infrastructure. Recreational use of off-road vehicles is prohibited in the study area.

A report prepared for the Conservancy summarizing findings of the Upper Truckee Marsh Land Steward program (Rozance 2007) indicates that running, walking, and dog walking are the most popular forms of recreation in the study area, followed by beach use and bicycle riding. The policy for dog walking within the study area is for dogs to be on leashes, except during the waterfowl breeding season (May 1 through July 31), when the area east of the Upper Truckee River is closed to dogs. The LWS portion of the study area remains open to leashed dogs during waterfowl breeding season. Although many dog owners do not comply with this policy, the Conservancy has engaged in outreach and education efforts to ensure that dog owners are aware of leash laws in the area.

There are several resource management issues associated with existing recreational use of the study area. These issues include degradation of the banks of the Upper Truckee River and Trout Creek, disturbance of beach and dune habitat occupied by Tahoe yellow cress, and disruption of wildlife use of the study area. These resource management issues are discussed further in Section 3.4, “Biological Resources: Vegetation and Wildlife.”

Beaches and the Sailing Lagoon

The beaches within the study area (i.e., Cove East Beach, Barton Beach, and East Barton Beach) have only a limited area for recreational activities compared with other public beaches on the West Shore south of Emerald Bay and on the South Shore (e.g., Baldwin, Kiva, Pope, and El Dorado Beaches).

Cove East Beach is located in the western portion of the study area adjacent to and east of the Tahoe Keys Marina (Exhibit 1-2). The multipurpose trail on the Lower West Side Wetland Restoration Project site begins at the end of the East Venice Drive cul-de-sac, heads north toward Lake Tahoe, and loops around the perimeter of Cove East Beach. From this trail, recreationists can access the lake, Cove East Beach, and the Sailing Lagoon adjacent to the Tahoe Keys Marina. Users also access the beach by boat. Although the multipurpose trail and trash receptacles are the only facilities, Cove East Beach is considered a developed beach. Cove East Beach is accessible without an entrance fee. Visitors driving cars to the beach and study area typically park on East Venice Drive.

The Sailing Lagoon has approximately 144,000 square feet of water surface area and is connected to the Tahoe Keys Marina. It is used for small-craft sailing and recreational fishing.

Barton Beach is an undeveloped beach between the mouth of the Upper Truckee River and East Barton Beach. The beach is accessed from the east by way of East Barton Beach, as well as by boat. There are no facilities on the beach, but there is a user-created trail south of the beach that runs parallel to it.

A user-created network of trails provides access to East Barton Beach. Some trails have been established across private property; however, it is possible to access East Barton Beach via trails located on public property owned by the State of California and managed by the Conservancy. These trails are accessed via connections to the Al Tahoe and Highland Woods residential subdivisions adjacent to this portion of the marsh. The closest access point to East Barton Beach that is entirely on public land is at the end of San Francisco Avenue in the Al Tahoe neighborhood.

Approximately half of East Barton Beach is excluded from public access by a fenced exclosure that is maintained for the protection of Tahoe yellow cress. However, outside of the exclosure, a network of user-created trails exists in this area.

River and Marsh

The Upper Truckee River is used seasonally, primarily during spring runoff periods and summer, for nonmotorized watercraft activities, including kayaking, canoeing, tubing, and boat fishing. Other river uses in the warmer months include swimming, shore fishing, and relaxing along the banks of the river. There are no formal or designated access points to the river within the study area. Recreationists most often access this section of the river by entering the river at various locations upstream of the U.S. 50 bridge, such as floating the river from Elks Club Drive. The East Venice Drive cul-de-sac is used as a user-created put in/take out point for kayaks, canoes, and tubes.

A user-created trail network provides access to the marsh area from the Al Tahoe neighborhood to the east and Tahoe Keys to the west. There are several access points for the trail system from these neighborhoods, many of which are on private property. Recreational activities in this portion of the study area include dog walking, hiking, jogging, and nature viewing.

During the late fall, winter, and spring when the snow reaches sufficient depths, visitors to the marsh travel on snowshoes or cross-country skis. CSLT regulations, discussed above, prohibit the use of snowmobiles within the marsh.

Dogs are allowed in the publicly owned portions of the study area, but are required by CSLT ordinances to be leashed. Signage encouraging users to keep dogs on leashes, including mention of relevant ordinances, is posted at various official entrances to the site, including those located at Cove East Beach, Tahoe Island/Sky Meadows, and Al Tahoe. “Mutt mitts” for dog-waste collection and trash cans are also located at these locations. Unleashed dogs are a recognized issue for recreation use management in the study area.

Recreation Facilities and Opportunities in the Vicinity of the Study Area

Recreation opportunities in the vicinity of the study area (i.e., in the southwestern portion of the Tahoe Basin) are abundant and diverse. These activities include those associated with the lake’s open water (e.g., swimming, boating, use of personal watercraft, fishing), shoreline (e.g., sunbathing, camping, bicycling, sightseeing), river recreation (e.g., fishing, paddling, swimming), and the terrain surrounding the lake (e.g., hiking, wilderness camping, mountain biking, skiing, snowboarding). A substantial amount of public land is available for outdoor recreation in the vicinity, including National Forest System land, state parks, and other state and local-government lands.

Parks, Beaches, and Campgrounds

Several parks, beaches, and campgrounds exist near the study area, in the southwestern portion of the Tahoe Basin. South Shore beaches are listed in Table 3.13-1. Regan Beach is adjacent to the Al Tahoe neighborhood and east of the study area. This beach includes parking, lake access, a snack bar, picnic area, volleyball court, and a grassy area for picnicking and lounging.

The El Dorado Recreation Area is a CSLT recreation facility that includes El Dorado Beach and a boat ramp north of U.S. 50 and a camping area south of U.S. 50. A Class I bicycle path is adjacent to El Dorado Beach, providing bicyclists and pedestrians from surrounding areas a convenient way to access this beach. Farther south, off Al Tahoe Boulevard, is Bijou Community Park and an area designated by the CSLT for use as a dog park.

Pope Beach is a U.S. Forest Service (USFS) facility located west of the Tahoe Keys subdivision and has parking, picnic areas, and beach access. Farther west are other USFS facilities: Kiva Beach, Camp Richardson, and Baldwin Beach. Camp Richardson is a fully developed campground with beach access, camping, and commercial venues. A Class I bicycle path serves the area from Pope Beach to Baldwin Beach from the 15th Street bicycle path and bridge on the westernmost boundary of the incorporated City limits.

Table 3.13-1 Public Beaches in the Study Area Vicinity		
Name	**Owner**	**Facilities**
Baldwin Beach	USFS	Restrooms, picnic tables, and barbeques
Camp Richardson	USFS*	Restrooms, picnic area, playground, marina, camping, store, and restaurants
El Dorado Beach	CSLT	Restrooms, picnic area, boat launch and dock, swim area, camping, and kayak and water toy concession
Emerald Bay	CSP	Restrooms, picnic area, pier, and camping
Fallen Leaf Lake	USFS	Picnic tables and barbeques
Kiva Beach	USFS	Restrooms, picnic tables, and barbeques
Nevada Beach	USFS	Restrooms, picnic tables, and barbeques
Pope Beach	USFS	Restrooms, picnic tables, and barbeques
Regan Beach	CSLT	Restrooms, picnic tables, barbeques, snack bar, and volleyball court
Zephyr Cove	USFS*	Restrooms, picnic area, pier, store, and restaurants

*Owned by USFS and operated by a contracted concessionaire
Sources: USFS 2011, CSLT 2011a,b

Open Space and Trails

Abundant open space exists in the project vicinity, primarily on USFS land southwest of the study area in the vicinity of Fallen Leaf Lake and on the south side of Pioneer Trail. There are numerous hiking trails and paths for bicycling located throughout the USFS lands. Another publicly-owned open space area with a trail system is located between the Upper Truckee River and Trout Creek, south of Pioneer Trail.

A system of bicycle paths serves the perimeter of the study area. On the east side of the study area, a Class II bicycle lane on Lakeview Avenue connects to a Class III bicycle route that follows Bellevue Avenue and El Dorado Avenue, ending at Oakland Avenue. The west side of the study area is served by a Class II bicycle lane on Tahoe Keys Boulevard and a Class II bicycle route on East Venice Drive. On the south side of the study area, a combination of Class I bicycle path and Class III bicycle route segments connects to El Dorado Beach to the east and the “wye” (the intersection of U.S. 50 and Highway 89) and Camp Richardson to the west. These path segments south of the study area are in the “South Y to Al Tahoe” corridor, which is one of the 22 major corridors for bicycle and pedestrian travel in the Tahoe Basin identified in the BPP (TRPA 2010).

Tahoe Keys Marina

Tahoe Keys Marina is a privately-owned, full-service marina and boat-launching facility adjacent to the study area. The Marina is the largest marina on the lake and is open year-round, offering indoor and outdoor, wet and dry dock storage with over 280 slips, including a double inland concrete launch ramp (TRPA 2002). The launch ramp is open to the public for a launch fee. The Marina also provides a restaurant, chandlery/mini-mart, restrooms, gas dock, a certified Marine Service Department, and boat-lifting facilities. In addition to boating-related services, the Tahoe Keys Marina offers other recreational services through the Sport Fishing and Charter Fleet. These services include balloon rides, fishing and sailing charters, and sailing lessons (TRPA 2002). During the summer, boaters using the launch ramp park their vehicles and trailers both inside the marina parking lot and on the street along East Venice Drive. The channel connecting the Tahoe Keys Marina to the lake is along the northeastern boundary of the study area. The Sailing Lagoon is currently connected to this channel. The Tahoe Keys Master Plan (2002) proposes to expand parking and boat storage facilities, relocate smaller boat slips, and upgrade channel markers, signage, and restraints.

3.13.2 Environmental Consequences and Mitigation Measures

Significance Criteria

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to recreation if it would:

- increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated (CEQA 1),
- include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment (CEQA 2), or
- preclude existing recreation activities within the project study area (CEQA 3).

These criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines.

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative would result in significant recreation impact if it would:

- result in conflicts with regional PAOT objectives (TRPA 1);
- result in conflicts between recreation uses, either existing or proposed (TRPA 2); or
- result in a decrease or loss of public access to any lake, waterway, or public lands (TRPA 3).

In development of mitigation measures for significant impacts of the project, effects on environmental threshold carrying capacities (thresholds) of the Tahoe Regional Planning Compact were considered. The project's effects on thresholds are described in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities."

Methods and Assumptions

The alternatives could cause short-term and long-term effects on recreation resources and activities. Short term construction activities would involve loading and unloading of haul trucks, operation of earth-moving equipment, and other types of noise and disturbance that could reduce public access or recreational opportunities during the construction season (May 1–October 15) over a four-year construction schedule.

Long-term effects on recreation resources and activities would result from providing infrastructure that changes the spectrum of recreation settings from dispersed to more developed and from altering accessibility throughout the site to varying degrees, depending on the alternative, which may lead to an increase in visitors within the project study area. As described in Chapter 2, "Project Alternatives," the action alternatives were developed to balance recreation and public access with ecosystem restoration and habitat protection. This balance would be attained by providing

well-designed public access and recreation facilities in nonsensitive areas and habitat protective elements and environmental education to direct use away from sensitive areas.

The evaluation of long-term effects of the alternatives must consider the potential increase of recreational visitors to the study area. The study area would not be advertised by the Conservancy as a destination and would include no commercial activities. However, recreation use could increase proportionally to the change in the amount and connectivity of public access- and recreation-related infrastructure, because the proposed infrastructure would affect (increase) the accessibility of the project study area to recreational users. A record of precise counts of visitors does not exist for the study area, although the Conservancy has a comprehensive qualitative understanding of recreation use from staff observations and the activities of a site steward during summer months. Without a quantified inventory record of visitors, it is not feasible to develop precise quantitative estimates of changes in recreation users for each alternative. However, qualitative assessment is feasible based on the relative degree of proposed recreation and access infrastructure for each alternative. Based on this qualitative assessment of the alternatives relative to each other, implementing Alternative 2 (minimal recreation infrastructure) is expected to result in the least increase in visitation. Implementing Alternative 1 (maximum recreation infrastructure) would result in the greatest increase in visitation, and implementing Alternative 3 or 4 (moderate recreation infrastructure) would result in an intermediate increase, between Alternatives 1 and 2 in magnitude, but negligibly different between Alternatives 3 and 4. The potential increase in the number of visitors is not considered to be substantial enough to create new or unmitigable impacts on recreation resources (impacts on other resource areas notwithstanding) for the following reasons:

(1) The recreation and public access elements of the alternatives are related to reducing the impacts on natural resources of the existing use of the study area.

(2) The most popular recreational uses of the study area are dispersed outdoor recreation. The Tahoe Basin has an abundance of locations where people can engage in the same recreation activities on public lands; thus, there is not a substantial unmet demand for such recreational opportunities.

(3) Even though the action alternatives would move recreational uses from dispersed toward developed outdoor recreation (with Alternative 1 having the most change), the recreation uses proposed are not categorically fully-developed facilities (e.g., campgrounds, marinas), and the increase in the number of visitors would not be similar to the increase associated with those uses.

(4) Adjacent neighborhoods account for a substantial portion of visitors to the study area, and implementing the project would not alter the number of residents in adjacent neighborhoods or substantially alter access to the study area from adjacent neighborhoods.

Nonetheless, several aspects of the proposed public access infrastructure could increase the number of visitors to the study area. For example, several existing trail surfaces may be modified with pavement, boardwalk, or other hardscape materials that would result in a greater level of accessibility to a broader spectrum of potential users and therefore could increase trail use and thus visitation to the study area (in a manner analogous to the "maintenance" factor in the Tahoe Bike Trail User Model [LSC Transportation Consultants 2009]). Information related to the existing and anticipated numbers of visitors is provided in Section 3.16, "Transportation, Parking, and Circulation."

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.13-1 (Alt. 1) **Short-Term Increase in Use of Surrounding Neighborhood and Regional Parks and Recreation Facilities during Construction. (CEQA 1)** *Construction activities associated with Alternative 1 would require portions of the study area to be closed temporarily at various times during the four-year-long construction period. As described in Environmental Commitment 13, the Conservancy would prepare a Public Outreach Plan. The plan would identify strategies to inform the general public and partnering agencies of access restrictions and their anticipated timelines, alternate locations for passive recreation activities, and site access information. Recreation activities in portions of the study area would be temporarily disrupted as a result of construction. However, all of those recreation activities could be accommodated on the surrounding beaches, parks, and public open spaces without causing or accelerating any substantial physical deterioration of the existing facilities. Therefore, construction of Alternative 1 is not expected to increase the use of surrounding parks or other recreation facilities enough to either result in substantial physical deterioration of those facilities or accelerate such deterioration. This impact would be* ***less than significant****.*

Construction activities associated with Alternative 1 would require short-term closure of portions of the study area at various times. Although the study area is not considered an existing park or recreation facility, dispersed recreation activities do occur throughout the study area, and those activities would be displaced during project construction. Although there is a four-year-long construction schedule, construction phasing would be designed so that recreation access would be made available where and when safe access is available. As described in Environmental Commitment (EC) 13, "Prepare and Implement a Public Outreach Plan" (Table 2-6), the Conservancy would prepare a Public Outreach Plan that identifies strategies to inform the general public and partnering agencies of access restrictions and their anticipated timelines, alternate locations for passive recreation activities, and site access information. Communication of this information may be through signage at access points, messages posted to the Conservancy website, public service announcements, and news articles in the local and regional newspapers.

The study area is near other public beaches on the south and west shores of Lake Tahoe, and is close to public lands that provide similar dispersed recreation opportunities (see "Environmental Setting" in Section 3.13.1). Data collected by the Conservancy's Upper Truckee Marsh Land Steward program (UTMLS) indicate that the primary recreational uses of the marsh are walking, running, dog walking, beach use, and bicycle riding (Rozance 2007). All of these uses can be accommodated on the surrounding beaches, parks, and public open spaces. Data collected by the Conservancy indicate that during peak use (i.e., summer weekends and holidays), 100 to 300 people per day have visited the marsh, but that the number of visitors is much less at other times. It is reasonable to expect that visitors would use several alternative locations if the marsh were not available during construction of Alternative 1; thus, only a small increase in users would be experienced at surrounding facilities and only during the construction period. Given the low-impact nature of dispersed recreation activities and the small number of recreationists who would be displaced during construction, it is not anticipated that this would cause or accelerate any substantial physical deterioration of surrounding facilities. Because the Conservancy will provide outreach and recreation access information for the study area and because alternate locations for dispersed recreation can support existing study area recreationists during construction, this impact would be **less than significant**.

IMPACT 3.13-2 (Alt. 1) **Short-Term Construction Impacts of Recreation Facilities That May Have an Adverse Physical Effect on the Environment. (CEQA 2)** *The short-term impacts of constructing the project's recreation facilities are analyzed in the various resource sections of this DEIR/DEIS/DEIS. Alternative 1 has short-term construction impacts on wildlife, and water quality, as discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife and Section 3.9, "Geomorphology and Water Quality." Therefore, the physical effect of constructing recreation facilities under Alternative 1 would be* ***potentially significant****.*

The short-term impacts of constructing the project's recreation facilities are analyzed in the various resource sections of this DEIR/DEIS/DEIS. Construction of recreational facilities in Alternative 1 has short-term construction impacts on wildlife and water quality, as discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife and Section 3.9, "Geomorphology and Water Quality." Environmental Commitments (Table 2-6) and mitigation measures have been established to lessen these impacts to the extent feasible. These impacts would be **potentially significant**.

Beyond Environmental Commitments described in Table 2-6, the following mitigation measures for the relevant impacts would be implemented:

Mitigation Measure 3.4-8A (Alt. 1): Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl) and Implement Buffers If Necessary.

Described in Section 3.4.

Mitigation Measure 3.4-8B (Alt. 1): Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary**.**

Described in Section 3.4.

Significance after Mitigation: With implementation of the measures described above, the short term construction impacts of recreation facilities on the environment would be minimized; however, all impacts could not be fully mitigated. Therefore, the impact of constructing recreation facilities would be **significant and unavoidable**.

IMPACT 3.13-3 (Alt. 1)	Short-Term Decrease or Loss of Public Access and Recreation Opportunities within Lakes, Waterways, or Public Land during Construction. (CEQA 3; TRPA 2, 3) *Closure of portions of the study area during construction would have a short-term effect on recreation opportunities and access to the Upper Truckee River and marsh in the study area. However, alternate opportunities for dispersed recreation are abundant in the project vicinity and elsewhere in the Tahoe Basin. Many opportunities are located near the marsh, such as at Regan Beach, at El Dorado Recreation Area, and on other public lands. The east channel of the Tahoe Keys Marina would be affected by removal of the Sailing Lagoon; however, as described in Environmental Commitments 13 and 14, the Conservancy would prepare a Public Outreach Plan and Waterway Traffic Control Plan to address boater and other recreation access conflicts. Because construction would be short-term, waterway conflicts would be managed, and multiple dispersed recreation facilities would be available in the vicinity, implementation of Alternative 1 is not expected to substantially reduce or preclude existing recreation opportunities or access to lakes, waterways, or public lands. This impact would be* ***less than significant****.*

Closure of portions of the study area including closure to boating of sections of the Upper Truckee River and restricted access in the east channel of the Tahoe Keys Marina at the Sailing Lagoon would have a short-term impact on recreation opportunities and access locally. However, because of the considerable amount of publicly-held land in the Tahoe Basin, including areas adjacent to rivers and lakes, regional recreation facilities could absorb the displacement of recreational activity from the study area. The primary recreation activities that would be temporarily displaced by construction activities for Alternative 1 would be walking, bicycling, fishing, dog walking, sunbathing, swimming, and boating; these activities would be compatible with existing recreational activities at other public lands in the Tahoe Basin. To the extent feasible and without compromising health and safety, portions of the study area could remain accessible to members of the public on a very limited basis. The accessibility of the area would vary depending on the stages of active construction, hauling of materials, and revegetation efforts that may require closure of areas until plantings are established. As described in EC 13, "Prepare and Implement a Public Outreach Plan," and EC 14, "Prepare and Implement a Waterway Traffic Control Plan for Alternatives That Affect the Sailing Lagoon" (Table 2-6), the Conservancy would prepare a

Public Outreach Plan and Water Traffic Control Plan to address safety, accessibility, and other recreation opportunities. Because the Conservancy will provide outreach and recreation access information for the study area and alternate locations for dispersed recreation can support existing study area recreationists during construction, this impact would be **less than significant**.

IMPACT 3.13-4 (Alt. 1) Long-Term Change in Use of Surrounding Neighborhood and Regional Parks and Recreation Facilities. (CEQA 1) *Implementation of Alternative 1 is not expected to increase the use of existing parks or other recreation facilities enough to either result in substantial physical deterioration of the facility or accelerate such deterioration. Once the facilities are constructed under this alternative, there would likely be an increase in the number of visitors to the study area because bridge, boardwalk, bike path, and ADA pedestrian trail improvements would attract a more diverse group of visitors. Alternative 1 would provide sufficient facilities for visitors to prevent physical deterioration of facilities surrounding the study area. Thus, the potential increase in use of the study area would not result in substantial physical deterioration of surrounding facilities. In addition, disconnecting the Sailing Lagoon from the east channel of the Tahoe Keys as proposed under Alternative 1 would not substantially affect the movement of boat traffic into and out of the marina because the channel would not be narrowed and boats could continue to move into and out of the channel. This impact would be* ***less than significant****.*

The features of Alternative 1 that would modify the Upper Truckee River, its floodplain, and the marsh (i.e., raising and reconfiguring a portion of the main channel, reconfiguring two sections of split channel, and reducing the capacity of the river mouth) would not have any substantial, long-term impacts on surrounding recreation facilities or parks.

Alternative 1 proposes the “maximum” recreation infrastructure (compared to the other alternatives), including kiosks, stabilization of an existing river boat take-out, observation platforms, bridges across the Upper Truckee River and Trout Creek, boardwalks and trails, and bicycle paths. Design of public access and recreation infrastructure under Alternative 1 focuses on maintaining existing recreation opportunities, and reducing effects of recreational use on sensitive resources. However, these improvements, including ADA trail improvements, could attract a more diverse group of visitors, and Alternative 1 moves more toward developed recreation than the other alternatives.

Although the number of visitors to the study area would likely increase as a result of the project, neither a considerable increase in visitors to the Tahoe Basin nor an associated increase in use of other existing parks and recreation facilities outside the study area would be likely because Alternative 1 proposes infrastructure to support these uses. Therefore, any increase in visitors is not expected to cause physical deterioration of surrounding recreation facilities.

Although disconnecting the Sailing Lagoon from the east channel of the Tahoe Keys could potentially affect boat traffic into and out of the marina, the effect on passage would not be substantial. Under existing conditions, the Sailing Lagoon offers boaters with small watercraft the option to use a sheltered area for boating. Additionally, the Sailing Lagoon provides a location for small boats to pull out of the marina channel to allow larger boats to pass. However, the placement of the bulkhead isolating the Sailing Lagoon would not narrow the east channel of the marina; rather, it would be 30 feet east of the existing bulkhead, so most boats could continue to pass each other in the existing channel. The east channel extends both south and west of its existing connection to the Sailing Lagoon and provides the option for boats to move out of the path of other boats in the absence of the Sailing Lagoon. Therefore, disconnecting the Sailing Lagoon from the east channel of the Tahoe Keys would not substantially affect boat traffic into and out of the marina. This impact would be **less than significant**.

IMPACT 3.13-5 (Alt. 1) **Long-Term Operation and Expansion of Recreation Facilities That May Have an Adverse Physical Effect on the Environment. (CEQA 2)** *The recreation facilities associated with Alternative 1 may result in adverse physical effects on the environment. The recreation facilities associated with Alternative 1 are designed to preserve the natural resources in the study area while providing compatible recreational opportunities, public access, and recreational infrastructure intended to reduce adverse physical effects on the environment by redirecting use from sensitive to less sensitive areas. However, the boardwalk and bridge would likely attract more visitors than the other alternatives, potentially becoming an attraction, and may lead to negative impacts on the Tahoe yellow cress population because visitors might leave the boardwalk and walk on the beach. Thus, this effect would be* ***potentially significant.***

The locations of the recreation facilities under Alternative 1 have been designed to minimize adverse physical effects on the environment by removing user-created trails in the core habitat area and focusing recreation opportunities in less sensitive areas. The proposed kiosks and parking area would be located near other compatible uses and outside of sensitive habitat areas. Other proposed recreation facilities would be located primarily along the perimeter of the study area outside of the core habitat area. In the eastern and southern portions of the study area, bicycle paths, observation areas, and signage should discourage foot and bicycle traffic in sensitive areas and thus reduce the environmental impacts of existing recreational use.

In the northern portion of the study area, however, the boardwalk and bridge included in Alternative 1 would adversely affect the population of Tahoe yellow cress, a species state listed as endangered, that occupies Barton Beach. Alternative 1 includes a proposed new multi-use trail connection across the northern end of the marsh just behind the study area's beaches with a raised boardwalk and bridge over the Upper Truckee River. The proposed bridge would be elevated sufficiently to be prominently visible from the lake. The trail link is not a major regional trail connection feature; the link is not included in the Lake Tahoe Bicycle and Pedestrian Plan (TRPA 2010). This trail would be the first and only boardwalk and bridge on the edge of the south shore of Lake Tahoe—a possible attraction in and of itself, regardless of poor connectivity to the regional trail network, because 75% of summertime Tahoe visitors engage in beach activities (TRPA 2001). This new access to Barton Beach would create negative impacts on the population of Tahoe yellow cress by disturbing habitat and trampling Tahoe yellow cress plants. The Conservancy's Tahoe yellow cress management plan for the study area includes management measures to reduce the adverse effects of recreational use and would be implemented as a component of Alternative 1, but these measures would not be sufficient to prevent a substantial effect on Tahoe yellow cress. Given the anticipated attraction of additional recreational users by this boardwalk and bridge, coupled with its co-location with a Tahoe yellow cress population and scenic lake views, this impact would be **significant**.

All feasible management measures to reduce effects on Tahoe yellow cress have been included in the Conservancy's Tahoe yellow cress management plan for the study area and would be implemented as a component of Alternative 1. Alternative designs may be able to keep a substantial number of persons on the boardwalk (e.g., a higher railing or trail elevated higher off the ground). Such design features, however, would further exacerbate the already unmitigable scenic resource impacts of the current conceptual design. It is not possible to quantify the increased visitation to the study area associated with this infrastructure, nor can the number of visitors that attempt to leave the boardwalk be determined. Because no feasible mitigation exists, this impact would remain **significant and unavoidable**.

IMPACT 3.13-6 (Alt. 1) **Long-Term Decrease or Loss of Public Access and Recreation Opportunities within Lakes, Waterways, or Public Lands. (CEQA 3; TRPA 2, 3)** *Under Alternative 1, some user-created trails would be decommissioned to redirect visitors out of the core habitat area. This change would limit access in the core area adjacent to the Upper Truckee River; however, a bridge, boardwalk, and trails would provide additional access over the river, providing a connection that was not previously available. Implementation of Alternative 1 would not substantially reduce dispersed recreation opportunities or access in the long term, but the additional infrastructure would create more developed recreation opportunities. In addition, disconnecting the Sailing Lagoon from the east channel of the Tahoe Keys as proposed under Alternative 1 would not substantially affect the movement of boat traffic into and out of the Marina. This impact would be* ***less than significant.***

Under Alternative 1, some user-created trails would be decommissioned (see Exhibit 3.6-2 for their locations) to redirect visitors out of the core habitat area. This change would limit access in the core habitat area adjacent to the Upper Truckee River. The study area would continue to provide opportunities for dispersed recreation, and, a bridge, boardwalk, and trails would provide additional access over the river, providing a connection that was not previously available. Furthermore, amenities provided under Alternative 1—kiosks, parking, stabilized existing boat take-out, viewpoints, observation areas, improved trail and bicycle path surfaces and a boardwalk, bridges over Trout Creek and the Upper Truckee River, and interpretive signage—would increase the access of visitors to existing recreation opportunities in the study area. The recreation uses proposed for the study area are not expected to change from existing uses, which typically include hiking, biking, fishing, sunbathing, boating, swimming, picnicking, cross-country skiing, wildlife viewing, and dog walking. Additional recreation infrastructure includes clear directions to available facilities (signage), scenic viewpoints and observation areas, and interpretive opportunities to learn about sensitive wildlife and habitats. The bridge and boardwalk together are considered a public access feature, and this feature would provide new visual access to Barton Beach, the Upper Truckee River and Lake Tahoe for trail users. Therefore, under Alternative 1, the study area would continue to provide recreational opportunities and access to lakes, waterways, and public lands. As described in Impact 3.13-3 (Alt. 1) above, although disconnecting the Sailing Lagoon from the east channel of the Tahoe Keys could potentially affect boat traffic into and out of the marina, the effect on boat passage would not be substantial. This impact would be **less than significant**.

IMPACT 3.13-7 (Alt. 1) **Conflicts with Regional PAOT Allocations. (TRPA 1)** *Implementation of Alternative 1 would include bridges across the Upper Truckee River and Trout Creek, designated trails, bicycle paths, boardwalks, observation areas, and a fishing platform. As shown in Section 3.10, "Land Use," Table 3.10-8, summer day uses associated with Alternative 1 would require PAOT allocations. Because plan areas associated with the study area do not have available PAOTs, they would need to be obtained from the regional pool. Because Alternative 1 is an Environmental Improvement Program (EIP) project and uses would be consistent with the Regional Plan and Code of Ordinances, PAOTs could be allocated from the regional pool. This impact would be* ***less than significant****.*

Implementation of Alternative 1 would include bridges across the Upper Truckee River and Trout Creek, designated trails, bicycle paths, boardwalks, observation areas, and a fishing platform. As shown in Section 3.10, "Land Use," Table 3.10-8 summer day uses associated with Alternative 1 would require PAOT allocations. The summer day-use facilities proposed under Alternative 1 include the fishing platform, observation areas, and viewpoints. Because plan areas associated with the study area do not have available PAOTs, they would need to be obtained from the regional pool. Because Alternative 1 is an EIP and uses would be consistent with the Regional Plan and Code of Ordinances, PAOTs could be allocated from the regional pool. This impact would be **less than significant**.

ALTERNATIVE 2: NEW CHANNEL—WEST MEADOW (MINIMUM RECREATION INFRASTRUCTURE)

IMPACT 3.13-1 (Alt. 2) **Short-Term Increase in Use of Surrounding Neighborhood and Regional Parks and Recreation Facilities during Construction. (CEQA 1)** *Construction activities associated with Alternative 2 would require portions of the study area to be closed temporarily at various times during the four-year-long construction period. As described in Environmental Commitment 13, the Conservancy would prepare a Public Outreach Plan. The plan would identify strategies to inform the general public and partnering agencies of access restrictions and their anticipated timelines, alternate locations for passive recreation activities, and site access information. Recreation activities in portions of the study area would be temporarily disrupted as a result of construction. However, all of those recreation activities could be accommodated on the surrounding beaches, parks, and public open spaces without causing or accelerating any substantial physical deterioration of the existing facilities. Therefore, construction of Alternative 2 is not expected to increase the use of surrounding parks or other recreation facilities enough to either result in substantial physical deterioration of those facilities or accelerate such deterioration. This impact would be* ***less than significant.***

This impact is similar to, but less than, Impact 3.13-1 (Alt. 1) above. The types of construction activities and the duration of construction under Alternative 2 would be similar to those under Alternative 1 but less extensive outside of the corridor along the Upper Truckee River (e.g., no boardwalk, no bicycle paths, and only one vertical grade control). As described in EC 13 (Table 2-6), the Conservancy would prepare a Public Outreach Plan. The plan would identify strategies to inform the general public and partnering agencies of access restrictions and their anticipated timelines, alternate locations for passive recreation activities, and site access information. Because the Conservancy would provide outreach and recreation access information for the study area, and because alternate locations for dispersed recreation could support existing study area recreationists during construction, this impact would be **less than significant**.

IMPACT 3.13-2 (Alt. 2) **Short-Term Construction Impacts of Recreation Facilities That May Have an Adverse Physical Effect on the Environment. (CEQA 2)** *The short-term impacts of constructing the project's recreation facilities are analyzed in the various resource sections of this DEIR/DEIS/DEIS. Alternative 2 has short-term construction impacts on wildlife and water quality, as discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife and Section 3.9, "Geomorphology and Water Quality." Therefore, the physical effect of constructing recreation facilities under Alternative 2 would be* ***significant and unavoidable****.*

This impact is similar to but less than Impact 3.13-2 (Alt. 1) above. Alternative 2 is a minimum recreation infrastructure alternative and has considerably fewer recreation facilities than Alternative 1 (maximum recreation).The short-term impacts of constructing the project's recreation facilities are analyzed in the various resource sections of this DEIR/DEIS/DEIS. Alternative 2 has short-term construction impacts on wildlife and water quality, as discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife and Section 3.9, "Geomorphology and Water Quality."

Environmental Commitments (Table 2-6) and mitigation measures have been established to lessen these impacts to the extent feasible. These impacts would be **potentially significant**.

Beyond Environmental Commitments described in Table 2-6, the following mitigation measures for the relevant impacts would be implemented:

Mitigation Measure 3.4-8A (Alt. 2): Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers If Necessary.

Described in Section 3.4.

Mitigation Measure 3.4-8B (Alt. 2): Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary.

Described in Section 3.4.

Significance after Mitigation: With implementation of the measures described above the short term construction impacts of recreation facilities on the environment would be minimized, however, all impacts could not be fully mitigated, therefore the impact would be **significant and unavoidable.**

IMPACT 3.13-3 (Alt. 2) **Short-Term Decrease or Loss of Public Access and Recreation Opportunities within Lakes, Waterways, or Public Land during Construction. (CEQA 3; TRPA 2, 3)** *Closure of portions of the study area during construction would have a short-term effect on recreation opportunities and access to the Upper Truckee River and marsh in the study area. However, alternate opportunities for dispersed recreation are abundant in the project vicinity and elsewhere in the Tahoe Basin. Many opportunities are located near the marsh, such as at Regan Beach, at El Dorado Recreation Area, and on other public lands. The east channel of the Tahoe Keys Marina would be affected by removal of the Sailing Lagoon; however, as described in Environmental Commitments 13 and 14, the Conservancy would prepare a Public Outreach Plan and Waterway Traffic Control Plan to address boater and other recreation access conflicts. Because construction would be short-term, waterway conflicts would be managed, and multiple dispersed recreation facilities would be available in the vicinity, implementation of Alternative 2 is not expected to substantially reduce or preclude existing recreation opportunities or access to lakes, waterways, or public lands. This impact would be* ***less than significant.***

This impact is similar to but less than Impact 3.13-3 (Alt. 1) above. The types of construction activities and the duration of construction under Alternative 2 would be similar to those under Alternative 1, but recreation-related construction activities would be less extensive outside of the corridor along the Upper Truckee River. The east channel of the Tahoe Keys Marina would be affected by removal of the Sailing Lagoon, and river access to Lake Tahoe would not be available in the study area during construction. Construction phasing would be designed so that recreation access would be made available where and when safe access is available. As described in ECs 13 and 14 (Table 2-6), the Conservancy would prepare a Public Outreach Plan and Waterway Traffic Control Plan to address boater conflicts, trail closures, and other recreation opportunities. Because the Conservancy would provide traffic control for the marina, it would provide outreach and recreation access information for the study area, and alternate locations for dispersed recreation could support existing study area recreationists during construction, this impact would be **less than significant**.

IMPACT 3.13-4 (Alt. 2) **Long-Term Change in Use of Surrounding Neighborhood and Regional Parks and Recreation Facilities. (CEQA 1)** *Implementation of Alternative 2 is not expected to increase the use of existing parks or other recreation facilities enough to either result in substantial physical deterioration of the facility or accelerate such deterioration. The minimal recreation infrastructure of Alternative 2 would attract fewer new visitors to the study area as compared to Alternative 1 because Alternative 2 proposes fewer infrastructure improvements. The increase in use would primarily result from the redistribution of some visitors from existing facilities to the study area. The potential increase in use of the study area would not result in substantial physical deterioration of surrounding facilities because proposed facilities are intended to support those uses. Also, disconnecting the Sailing Lagoon from the east channel of the Tahoe Keys as proposed under Alternative 2 would not substantially affect the movement of boat traffic into and out of the Marina. This impact would be* ***less than significant.***

This impact is similar to but less than Impact 3.13-6 (Alt. 1). Recreation components of Alternative 2 include rerouting of an existing recreational trail over a new bulkhead at the Sailing Lagoon, construction of a fishing platform, viewpoints, and development of an interpretive program and signage. This minimal recreation infrastructure would attract few new visitors to the study area because the types of recreational opportunities would remain similar to existing conditions, and the elements of Alternative 2 would provide few attractions compared to existing facilities. The increase in use would primarily result from a small redistribution of recreational use from existing facilities to the study area, and thus, an increased use of existing neighborhood and

regional parks or recreation facilities is not a likely outcome. Also, as described for Alternative 1, disconnecting the Sailing Lagoon from the east channel of the Tahoe Keys would not substantially affect boat traffic into and out of the marina because the channel would not be narrowed by the new bulkhead, and options for a boat to idle and wait or to move out of the path of other boats would continue to exist in the absence of the Sailing Lagoon. This impact would be **less than significant**.

IMPACT 3.13-5 (Alt. 2) **Long-Term Operation and Expansion of Recreation Facilities That May Have an Adverse Physical Effect on the Environment. (CEQA 2)** *The recreation facilities associated with Alternative 2 are not expected to result in adverse physical effects on the environment. The recreation facilities associated with Alternative 2 are designed to preserve the natural resources in the study area while providing dispersed recreational opportunities. Public access and recreation infrastructure would reduce adverse physical effects on the environment by redirecting use from sensitive to less sensitive areas. This impact would be* ***less than significant.***

This effect is substantially less than the effect anticipated under Impact 3.13-5 (Alt. 1) above because Alternative 2 contains fewer public access and recreation infrastructure elements than Alternative 1. Specifically, the bridge and boardwalk are not proposed under Alternative 2; therefore, a new beach attraction would not be established. As described throughout this DEIR/DEIS/DEIS, all potential impacts associated with long-term use of the study area under Alternative 2 would be mitigated to a less-than-significant level. This effect would be **less than significant**.

IMPACT 3.13-6 (Alt. 2) **Long-Term Decrease or Loss of Public Access and Recreation Opportunities within Lakes, Waterways, or Public Lands. (CEQA 3; TRPA 2, 3)** *Under Alternative 2, some user-created trails would be decommissioned to redirect visitors out of the core habitat area. However, dispersed recreation opportunities would continue elsewhere within the study area. Furthermore, additional access to some types of dispersed recreation opportunities would result from the provision of designated facilities and recreation-related infrastructure. This impact would be* ***less than significant.***

For the same reasons as described for Impact 3.13-6 (Alt. 1), Alternative 2 would continue to provide dispersed recreation opportunities outside of the core habitat area and provide new access to some recreation opportunities relative to existing conditions. The infrastructure installed (which is related to the extent of the alternative's recreation infrastructure and public access elements) would be less than under Alternative 1. As described in Impact 3.13-4 (Alt. 2) above, disconnecting the Sailing Lagoon from the east channel of the Tahoe Keys would not substantially affect boat traffic into and out of the marina, and safe movement into and out of the marina would continue. Because dispersed recreation opportunities and access and safe movement of boats would continue under Alternative 2, this impact would be **less than significant**.

IMPACT 3.13-7 (Alt. 2) **Conflicts with Regional PAOT Allocations. (TRPA 1)** *Implementation of Alternative 2 would include designated trails, viewpoints, and a fishing platform. As shown in Section 3.10, "Land Use," Table 3.10-8, summer day uses associated with Alternative 2 would require PAOT allocations. Because plan areas associated with the study area do not have available PAOTs, they would need to be obtained from the regional pool. Because Alternative 2 is an EIP and uses would be consistent with the Regional Plan and Code of Ordinances, PAOTs could be allocated from the regional pool. This impact would be* ***less than significant****.*

Implementation of Alternative 2 would include designated trails, bicycle paths, boardwalks, viewpoints, and a fishing platform. As shown in Section 3.10, "Land Use," Table 3.10-8, summer day uses associated with Alternative 2 would require PAOT allocations. The fishing platform is the only summer day use associated with Alternative 2. Because plan areas associated with the study area do not have available PAOTs, they would need to be obtained from the regional pool. Because Alternative 2 is an EIP and uses would be consistent with the Regional Plan and Code of Ordinances, PAOTs could be allocated from the regional pool. This impact would be **less than significant**.

ALTERNATIVE 3: MIDDLE MARSH CORRIDOR (MODERATE RECREATION INFRASTRUCTURE)

IMPACT 3.13-1 (Alt. 3) **Short-Term Increase in Use of Surrounding Neighborhood and Regional Parks and Recreational Facilities during Construction. (CEQA 1)** *Construction activities associated with Alternative 3 would require portions of the study area to be closed temporarily at various times through the 4-year-long construction period. As described in Environmental Commitment 13, the Conservancy would prepare a Public Outreach Plan. The plan would identify strategies to inform the general public and partnering agencies of access restrictions and their anticipated timelines, alternate locations for passive recreation activities, and site access information. Recreation activities in portions of the study area would be temporarily disrupted as a result of construction. However, all of those recreation activities could be accommodated on the surrounding beaches, parks, and public open spaces without causing or accelerating any substantial physical deterioration of the existing facilities because the uses would be dispersed and not centrally located at one site. Because the Conservancy would provide outreach and recreation access information for the study area and because alternate locations for dispersed recreation could support existing study area recreationists during construction, this impact would be* ***less than significant.***

This impact is similar to, but less than, Impact 3.13-1 (Alt. 1) and greater than Impact 3.13-1 (Alt. 2). The types of construction activities and duration of construction would be similar to Alternatives 1 and 2. The extent of construction would be similar to Alternative 1, but unlike Alternative 1, Alternative 3 does not include construction of a bridge or boardwalk over the Upper Truckee River or a bridge across Trout Creek. As described in EC 13 (Table 2-6), the Conservancy would prepare a Public Outreach Plan. The plan would identify strategies to inform the general public and partnering agencies of access restrictions and their anticipated timelines, alternate locations for passive recreation activities, and site access information. Because the Conservancy would provide outreach and recreation access information for the study area and because alternate locations for dispersed recreation could support existing study area recreationists during construction, this impact would be **less than significant**.

IMPACT 3.13-2 (Alt. 3) **Short-Term Construction Impacts of Recreation Facilities That May Have an Adverse Physical Effect on the Environment. (CEQA 2)** *The short-term impacts of constructing the project's recreation facilities are analyzed in the various resource sections of this DEIR/DEIS/DEIS. Alternative 3 has short-term construction impacts on wildlife and water quality, as discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife and Section 3.9, "Geomorphology and Water Quality." Therefore, the physical effect of constructing recreation facilities under Alternative 3 would be* ***potentially significant****.*

This impact is similar to but less than Impact 3.13-2 (Alt. 1) above. Alternative 3 is a moderate recreation infrastructure alternative and has fewer recreation facilities than Alternative 1 (maximum recreation) and more than Alternative 2.The short-term impacts of constructing the project's recreation facilities are analyzed in the various resource sections of this DEIR/DEIS/DEIS. Alternative 3 has short-term construction significant and unavoidable impacts on wildlife and water quality, as discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife" and Section 3.9, "Geomorphology and Water Quality." Environmental Commitments (Table 2-6) and mitigation measures have been established to lessen these impacts to the extent feasible. These impacts would be **potentially significant**.

Beyond Environmental Commitments described in Table 2-6, the following mitigation measures for the relevant impacts would be implemented:

Mitigation Measure 3.4-8A (Alt. 3): Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers If Necessary.

Described in Section 3.4.

Mitigation Measure 3.4-8B (Alt. 3): Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary.

Described in Section 3.4.

Significance after Mitigation: With implementation of the measures described above the short term construction impacts of recreation facilities on the environment would be minimized, however, all impacts could not be fully mitigated, therefore the impact would be **significant and unavoidable.**

IMPACT 3.13-3 (Alt. 3) **Short-Term Decrease or Loss of Public Access and Recreation Opportunities within Lakes, Waterways, or Public Land during Construction. (CEQA 3; TRPA 2, 3)** *Closure of portions of the study area during construction would have a short-term effect on recreation opportunities and access to the Upper Truckee River and marsh in the study area. However, alternate opportunities for dispersed recreation are abundant in the project vicinity and elsewhere in the Tahoe Basin. Many opportunities are located near the marsh, such as at Regan Beach, at El Dorado Recreation Area, and on other public lands. The east channel of the Tahoe Keys Marina would be affected by removal of the Sailing Lagoon; however, as described in Environmental Commitments 13 and 14, the Conservancy would prepare a Public Outreach Plan and Waterway Traffic Control Plan to address boater and other recreation access conflicts. Because the Conservancy would provide outreach and recreation access information for the study area and because alternate locations for dispersed recreation could support existing study area recreationists during construction, this impact would be* ***less than significant****.*

This impact is similar to but less than Impact 3.13-3 (Alt. 1) and greater than Impact 3.13-3 (Alt. 2). The types of construction activities and the duration of construction for Alternative 3 would be similar to those for Alternatives 1 and 2. The extent of construction would be similar to that of Alternative 1 with closure of portions of the study area, including closure to boating of sections of the Upper Truckee River and restricted access in the east channel of the Tahoe Keys Marina at the Sailing Lagoon, but unlike Alternative 1, Alternative 3 does not include construction of a bridge or boardwalk over the Upper Truckee River or a bridge across Trout Creek. As described in ECs 13 and 14 (Table 2-6), the Conservancy would prepare a Public Outreach Plan and Water Traffic Control Plan to address safety, accessibility, and other recreation opportunities. Because the Conservancy would provide outreach and recreation access information for the study area and because alternate locations for dispersed recreation could support existing study area recreationists during construction, this impact would be **less than significant**.

IMPACT 3.13-4 (Alt. 3) **Long-Term Change in Use of Surrounding Neighborhood and Regional Parks and Recreation Facilities. (CEQA 1)** *Implementation of Alternative 3 is not expected to increase the use of existing parks or other recreation facilities enough to either result in substantial physical deterioration of the facility or accelerate such deterioration. Once the facilities are constructed under this alternative, there could be an increase in the number of visitors because Alternative 3 would provide additional recreation-related infrastructure that facilitates access. This increase would primarily result from a small redistribution of recreational use from existing facilities to the study area, and thus, an increased use of surrounding neighborhood, regional parks and recreation facilities is not a likely outcome. Furthermore, Alternative 3 would provide sufficient facilities for the anticipated volume of visitors to the study area. Thus, the potential increase in use would not result in substantial physical deterioration of existing facilities. Also, disconnecting the Sailing Lagoon from the east channel of the Tahoe Keys as proposed under Alternative 3 would not substantially affect the movement of boat traffic into and out of the marina because the channel would not be narrowed and options for a boat to stay out of the path of other boats would continue to exist. This impact would be* ***less than significant****.*

This impact is similar to, but less than, Impact 3.13-4 (Alt. 1), and greater than Impact 3.13-4 (Alt. 2). Recreation-related components of Alternative 3 would include a kiosk, pedestrian and bicycle paths, boardwalks, viewing platforms, an interpretive program, and signage. These components of Alternative 3 would attract some additional visitors to the study area by providing additional recreation-related infrastructure that facilitates access, providing

clear direction to available facilities, and opportunities to learn about sensitive wildlife and habitats. The recreation-related components of Alternative 3 are greater than those of Alternative 2 and less than those of Alternative 1; thus, the increase in visitors would also be greater than under Alternative 2 and less than under Alternative 1. This increase would result primarily from a redistribution of recreational use from existing facilities to the study area, and thus, an increased use of existing facilities outside of the study area is not a likely outcome. Furthermore, sufficient recreation facilities would exist in the study area to accommodate this increase in visitors to the area. Also, as described for Alternatives 1 and 2, disconnecting the Sailing Lagoon from the east channel of the Tahoe Keys would not substantially affect boat traffic into and out of the marina because the channel would not be narrowed by the new bulkhead and because options for boats to idle and wait or to move out of the path of other boats would continue to exist in the absence of the Sailing Lagoon. This impact would be **less than significant**.

IMPACT 3.13-5 (Alt. 3) **Long-Term Operation and Expansion of Recreation Facilities That May Have an Adverse Physical Effect on the Environment. (CEQA 2)** *The use of recreation facilities associated with Alternative 3 is not expected to result in long-term adverse physical effects on the environment. The recreation facilities associated with Alternative 3 are designed to preserve the natural resources in the study area while providing dispersed recreational opportunities and public access and recreation infrastructure intended to reduce adverse physical effects on the environment by redirecting use from sensitive to less sensitive areas. This effect would be* ***less than significant.***

This effect is similar to Impact 3.13-5 (Alt. 2) but less than under Alternative 1 because the impact is related to the amount of public access and recreation infrastructure are less. All potential long-term impacts associated with use of the study area under Alternative 3 would be mitigated to a less-than-significant level. For the same reasons as described for Alternative 2, this effect would be **less than significant**.

IMPACT 3.13-6 (Alt. 3) **Long-Term Decrease or Loss of Public Access and Recreation Opportunities within Lakes, Waterways, or Public Lands. (CEQA 3; TRPA 2, 3)** *Under Alternative 3, some user-created trails would be decommissioned to redirect visitors out of the core habitat area. This change would limit access in the core area adjacent to the Upper Truckee River; however, implementation of Alternative 3 would not preclude dispersed recreation opportunities in the long term relative to existing conditions. Additional recreation opportunities may result from the provision of designated facilities and recreation-related infrastructure that would move recreation opportunities more toward the developed end of the recreation opportunities spectrum. Access to the study area via nonmotorized water craft would change because of the new distributary channel design but would still be possible depending on hydrologic conditions. Furthermore, there are abundant nonmotorized boating opportunities in Lake Tahoe and along the Upper Truckee River outside of the study area. This impact would be* ***less than significant.***

For the same reasons as described for Impact 3.13-6 (Alt. 1), Alternative 3 would continue to provide dispersed recreation opportunities and access relative to existing conditions. The extent of the alternative's recreation infrastructure and public access elements would be less than under Alternative 1 but greater than under Alternative 2. Similar to Alternative 1, recreation opportunities would move toward the developed end of the spectrum, but not to the extent of a fully developed site (e.g., a marina or campground). Land-based recreation opportunities would not be precluded after project implementation. However, the ability for nonmotorized watercraft to travel into and through the study area would change because of the new distributary channel design. The intent and purpose of Alternative 3 are to take the flows of the Upper Truckee River and spread them over the entire study area. The dispersed flows would change the timing in which boats could access the study area. It is possible that this change would reduce the amount of time the study area could be accessed compared to existing conditions. Although the timing for boat access to the study area would change, boating would not be precluded. Furthermore, there are abundant nonmotorized boating opportunities within the Tahoe Basin and along the Upper Truckee River. This impact would be **less than significant**.

IMPACT 3.13-7 (Alt. 3) **Conflicts with Regional PAOT Allocations. (TRPA 1)** *Implementation of Alternative 3 would include designated trails, bicycle paths, boardwalks, viewpoints, observation areas, and a fishing platform. As shown in Section 3.10, "Land Use," Table 3.10-9, summer day uses associated with Alternative 3 would require PAOT allocations. Because plan areas associated with the study area do not have available PAOTs, they would need to be obtained from the regional pool. Because Alternative 3 is an EIP and uses would be consistent with the Regional Plan and Code of Ordinances, PAOTs could be allocated from the regional pool. This impact would be* ***less than significant****.*

Implementation of Alternative 3 would include designated trails, bicycle paths, boardwalks, viewpoints, observation areas, and a fishing platform. As shown in Section 3.10, "Land Use," Table 3.10-9, summer day uses associated with Alternative 3 would require PAOT allocations. Summer day uses associated with Alternative 3 include viewpoints, observation areas, and a fishing platform. Because plan areas associated with the study area do not have available PAOTs, they would need to be obtained from the regional pool. Because Alternative 2 is an EIP and uses would be consistent with the Regional Plan and Code of Ordinances, PAOTs could be allocated from the regional pool. This impact would be **less than significant**.

ALTERNATIVE 4: INSET FLOODPLAIN (MODERATE RECREATION INFRASTRUCTURE)

IMPACT 3.13-1 (Alt. 4) **Short-Term Increase in Use of Surrounding Neighborhood and Regional Parks and Recreation Facilities during Construction. (CEQA 1)** *Construction activities associated with Alternative 4 would require portions of the study area to be closed temporarily at various times during the 4-year-long construction period. As described in Environmental Commitment 13, the Conservancy would prepare a Public Outreach Plan. The plan would identify strategies to inform the general public and partnering agencies of access restrictions and their anticipated timelines, alternate locations for passive recreation activities, and site access information. Recreation activities in portions of the study area would be temporarily disrupted as a result of construction. However, all of those recreation activities could be accommodated on the surrounding beaches, parks, and public open spaces without causing or accelerating any substantial physical deterioration of the existing facilities because uses would be dispersed throughout various locations. Because the Conservancy would provide outreach and recreation access information for the study area and because alternate locations for dispersed recreation could support existing study area recreationists during construction, this impact would be* ***less than significant.***

This impact is similar to Impact 3.13-1 for Alternatives 1–3, but less than Impact 3.13-1 (Alt. 1), greater than Impact 3.13-1 (Alt. 2), and comparable to Impact 3.13-1 (Alt. 3) above. The types of construction activities and duration of construction would be similar to Alternatives 1–3. Less acreage would be disturbed along the Upper Truckee River than under Alternatives 1–3, but construction activities in the eastern portion of the study area would be greater than under Alternative 2. As described in EC 13 (Table 2-6), the Conservancy would prepare a Public Outreach Plan. The plan would identify strategies to inform the general public and partnering agencies of access restrictions and their anticipated timelines, alternate locations for passive recreation activities, and site access information. Because the Conservancy would provide outreach and recreation access information for the study area and because alternate locations for dispersed recreation could support existing study area recreationists during construction, this impact would be **less than significant**.

IMPACT 3.13-2 (Alt. 4) **Short-Term Construction Impacts of Recreation Facilities That May Have an Adverse Physical Effect on the Environment. (CEQA 2)** *The short-term impacts of constructing the project's recreation facilities are analyzed in the various resource sections of this DEIR/DEIS/DEIS. Alternative 4 has short-term construction impacts on wildlife and water quality, as discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife" and Section 3.9, "Geomorphology and Water Quality." Therefore, the physical effect of constructing recreation facilities under Alternative 4 would be* ***potentially significant****..*

This impact is similar to but less than Impact 3.13-2 (Alt. 1) above. Alternative 4 is a moderate recreation infrastructure alternative and has fewer recreation facilities than Alternative 1 (maximum recreation), more than

Alternative 2 and approximately the same as Alternative 3.The short-term impacts of constructing the project's recreation facilities are analyzed in the various resource sections of this DEIR/DEIS/DEIS. Alternative 4 has short-term construction significant and unavoidable impacts on wildlife and water quality, as discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife" and Section 3.9, "Geomorphology and Water Quality."

Environmental Commitments (Table 2-6) and mitigation measures have been established to lessen these impacts to the extent feasible. These impacts would be **potentially significant**.

Beyond Environmental Commitments described in Table 2-6, the following mitigation measures for the relevant impacts would be implemented:

Mitigation Measure 3.4-8A (Alt. 4): Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers If Necessary.

Described in Section 3.4

Mitigation Measure 3.4-8B (Alt. 4): Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary.

Described in Section 3.4.

Significance after Mitigation: With implementation of the measures described above the short term construction impacts of recreation facilities on the environment would be minimized, however, all impacts could not be fully mitigated, therefore the impact would be **significant and unavoidable**.

IMPACT 3.13-3 (Alt. 4)	**Short-Term Decrease or Loss of Public Access and Recreation Opportunities within Lakes, Waterways, or Public Land during Construction. (CEQA 3; TRPA 2, 3)** *Closure of portions of the study area during construction would have a short-term effect on recreation opportunities and access to the Upper Truckee River and marsh within the study area. However, alternate opportunities for dispersed recreation are abundant in the project vicinity and elsewhere in the Tahoe Basin. Many opportunities are located near the marsh, such as at Regan Beach, El Dorado Recreation Area, and other public lands. The east channel of the Tahoe Keys Marina would not be affected by Alternative 4. As described in Environmental Commitments 13 and 14, the Conservancy would prepare a Public Outreach Plan and Waterway Traffic Control Plan to address boater and other recreation access conflicts. Because the Conservancy would provide outreach and recreation access information for the study area and because alternate locations for dispersed recreation could support existing study area recreationists during construction, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.13-3 for Alternatives 1–3, but less than Impact 3.13-3 (Alt. 1), greater than Impact 3.13-3 (Alt. 2), and comparable to Impact 3.13-3 (Alt. 3) above. Under all of the action alternatives, construction activities would be similar in type and duration, and construction would occur at Cove East Beach and be extensive along the Upper Truckee River. However, the extent of construction activities in other locations would differ among alternatives. Unlike Alternative 1, Alternative 4 would not include the bridges, boardwalks, or trails at the Lake Tahoe shoreline and would not include modifications to the Sailing Lagoon. Thus, construction activities would not disturb these areas. Construction activities would be more widely distributed than under Alternative 2 and thus would have a greater effect on recreation. For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.13-4 (Alt. 4) **Long-Term Change in Use of Surrounding Neighborhood and Regional Parks and Recreation Facilities. (CEQA 1)** *Implementation of Alternative 4 is not expected to increase the use of existing parks or other recreation facilities enough to either result in substantial physical deterioration of the facility or accelerate such deterioration. Once the facilities are constructed under this alternative, there would likely be an increase in the number of visitors to the study area because Alternative 4 would provide additional recreation-related infrastructure. This increase would primarily result from a small redistribution of recreational use from existing facilities to the study area, and thus, an increased use of existing facilities outside of the study area is not a likely outcome. Furthermore, Alternative 4 would provide sufficient facilities for the anticipated volume of visitors to prevent physical deterioration of surrounding facilities. This impact would be* ***less than significant.***

This impact is similar to Impact 3.13-4 (Alts. 1–3) above. Unlike Alternatives 1–3, however, Alternative 4 does not include modifications to the Sailing Lagoon and thus would have no effect on the east channel of the Tahoe Keys Marina. For the same reasons described above, this impact would be **less than significant**.

IMPACT 3.13-5 (Alt. 4) **Long-Term Operation and Expansion of Recreation Facilities That May Have an Adverse Physical Effect on the Environment. (CEQA 2)** *The recreation facilities associated with Alternative 4 are not expected to result in long-term adverse physical effects on the environment. The recreation facilities associated with Alternative 4 are designed to preserve the natural resources in the study area while providing recreational opportunities, and public access and recreation infrastructure would reduce adverse physical effects on the environment by redirecting use from sensitive to less sensitive areas. This effect would be* ***less than significant.***

This impact is similar to Impact 3.13-5 (Alts. 2–3), but less than under Alternative 2 or 3 because the impact is related to the amount of public access and recreation infrastructure. For the same reasons as described for Alternatives 2 and 3, this effect would be **less than significant**.

IMPACT 3.13-6 (Alt. 4) **Long-Term Decrease or Loss of Public Access and Recreation Opportunities within Lakes, Waterways, or Public Lands. (CEQA 3; TRPA 2, 3)** *Under Alternative 4, some user-created trails would be decommissioned to redirect visitors out of the core habitat area. However, dispersed recreation opportunities would continue elsewhere within the study area in the long term. Furthermore, some dispersed recreation opportunities and experiences would result from provision of designated facilities and recreation-related infrastructure, and some opportunities would be more developed, although not to the extent of a fully developed site (e.g., marina or campground). This impact would be* ***less than significant****.*

For the same reasons as described for Impact 3.13-6 (Alts. 1–2), Alternative 4 would continue to provide dispersed recreation opportunities and would improve public access relative to existing conditions. The extent of the alternative's recreation and public access infrastructure would be less than under Alternative 1, greater than under Alternative 2, and similar to but less than under Alternative 1. Recreation opportunities would be more developed, but not to the extent of a fully developed site (e.g., a marina or campground). This impact would be **less than significant**.

IMPACT 3.13-7 (Alt. 4) **Conflicts with Regional PAOT Allocations. (TRPA 1)** *Implementation of Alternative 4 would include designated trails, bicycle paths, boardwalks, viewpoints, observation areas, and a fishing platform. As shown in Section 3.10, "Land Use," Table 3.10-8, summer day uses associated with Alternative 4 would require PAOT allocations. Because plan areas associated with the study area do not have available PAOTs, they would need to be obtained from the regional pool. Because Alternative 4 is an EIP and uses would be consistent with the Regional Plan and Code of Ordinances, PAOTs could be allocated from the regional pool. This impact would be* ***less than significant****.*

Implementation of Alternative 4 would include designated trails, bicycle paths, boardwalks, viewpoints, observation areas, and a fishing platform. As shown in Section 3.10, "Land Use," Table 3.10-1, summer day uses associated with Alternative 4 would require PAOT allocations. Summer day uses associated with Alternative 4 include viewpoints, observation areas, and a fishing platform. Because plan areas associated with the study area do not have available PAOTs, they would need to be obtained from the regional pool. Because Alternative 4 is an EIP and uses would be consistent with the Regional Plan and Code of Ordinances, PAOTs could be allocated from the regional pool. This impact would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.13-1 (Alt. 5) **Short-Term Increase in Use of Surrounding Neighborhood and Regional Parks and Recreation Facilities during Construction. (CEQA 1)** *No construction would occur in the study area; therefore, Alternative 5 would not result in a construction-related increase in use of surrounding parks or other recreation facilities.* ***No impact*** *would occur.*

Under Alternative 5, the No-Project/No-Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished in the study area. Therefore, Alternative 5 would not result in a construction-related increase in use of surrounding neighborhood or regional parks, or recreation facilities. **No impact** would occur.

IMPACT 3.13-2 (Alt. 5) **Short-Term Construction Impacts of Recreation Facilities That May Have an Adverse Physical Effect on the Environment. (CEQA 2)** *No construction would occur in the study area; therefore, Alternative 5 would not result in construction or expansion of additional recreation facilities that may have an adverse physical effect on the environment.* ***No impact*** *would occur.*

Under Alternative 5, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished in the study area. Therefore, Alternative 5 would not result in construction or expansion of additional recreation facilities that may have an adverse physical effect on the environment. **No impact** would occur.

IMPACT 3.13-3 (Alt. 5) **Short-Term Decrease or Loss of Public Access and Recreation Opportunities within Lakes, Waterways, or Public Land during Construction. (CEQA 3; TRPA 2, 3)** *No construction would occur in the study area; therefore, Alternative 5 would not result in any construction-related reduction in recreation opportunities or access within lakes, waterways, or public lands.* ***No impact*** *would occur.*

Under Alternative 5, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished in the study area. Therefore, Alternative 5 would not result in any construction-related reduction in recreation opportunities. **No impact** would occur.

IMPACT 3.13-4 (Alt. 5) **Long-Term Change in Use of Surrounding Neighborhood and Regional Parks and Recreation Facilities. (CEQA 1)** *No project would be implemented under this alternative; therefore, Alternative 5 would not result in any increase in use of surrounding neighborhood or regional parks or recreation facilities.* ***No impact*** *would occur.*

Under Alternative 5, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished in the study area. Operation of other existing facilities also would not be altered. Therefore, Alternative 5 would not result in any increase in use of surrounding neighborhood or regional parks or recreation facilities. **No impact** would occur.

IMPACT 3.13-5 (Alt. 5) **Long-Term Operation and Expansion of Recreation Facilities That May Have an Adverse Physical Effect on the Environment. (CEQA 2)** *No project would be implemented under this alternative; therefore, Alternative 5 would not result in construction or expansion of recreation facilities that may have an adverse physical effect on the environment. However, the existing adverse conditions created by user-created trails into sensitive habitats would continue as under existing conditions. This impact would be* ***less than significant****.*

Under Alternative 5, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished in the study area. Operation of existing facilities also would not be altered. Therefore, Alternative 5 would not result in construction or expansion of recreation facilities that may have an adverse physical effect on the environment. However, the existing adverse conditions created by user-created trails into sensitive habitats would continue as under existing conditions. This impact would be **less than significant**.

IMPACT 3.13-6 (Alt. 5) **Long-Term Decrease or Loss of Public Access and Recreation Opportunities within Lakes, Waterways, or Public Lands. (CEQA 3; TRPA 2, 3)** *No project would be implemented under this alternative; therefore, Alternative 5 would not result in long-term preclusion of recreation opportunities or access to lakes, waterways, or public lands.* ***No impact*** *would occur.*

Under Alternative 5, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished in the study area. Operation of existing facilities also would not be altered. Therefore, Alternative 5 would not result in the preclusion of recreation opportunities or access to lakes, waterways, or public lands. **No impact** would occur.

IMPACT 3.13-7 (Alt. 5) **Conflicts with Regional PAOT Allocations. (TRPA 1)** *No project would be implemented under this alternative; therefore, Alternative 5 would not result in the need for PAOT allocation.* ***No impact*** *would occur.*

Under Alternative 5, no new facilities would be constructed and no existing facilities would be altered or expanded in the study area. Operation of existing facilities also would not be altered. Therefore, Alternative 5 would not result the need for PAOT allocation. **No impact** would occur.

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3.14 SCENIC RESOURCES

This section describes the visual setting and scenic resources of the study area, identifies impacts on scenic quality that would result from Alternatives 1–5, and recommends mitigation measures intended to preserve scenic quality. A small portion of the study area is visible from U.S. 50 (Roadway Travel Unit 35), which is designated as a state scenic highway. The study area is also visible from Lake Tahoe. Therefore, a TRPA scenic analysis involving views related to the lake is required for the proposed project. Consistency with TRPA goals and policies is presented in Section 3.10, "Land Use," Table 3.10-1. Cumulative scenic impacts are addressed in Section 3.18, "Cumulative Impacts." The project's effects on thresholds are described in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities."

3.14.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

No federal plans, policies, or regulations apply to scenic resources within the study area.

State

The following state program related to scenic resources is relevant to the proposed alternatives and is described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- California Scenic Highway Program

Tahoe Regional Planning Agency

Goals and Policies

The Goals and Policies document of the 1987 Regional Plan establishes an overall framework for development and environmental conservation in the Lake Tahoe region. Chapter IV (Conservation Element) of the Goals and Policies document considers ten subelements, including the Scenic subelement. The Scenic subelement states:

> Scenic quality is perhaps the most often identified natural resource of the Lake Tahoe Basin. The Basin affords views of a magnificent lake setting within a forested mountainous environment. The unique combination of visual elements provides for exceptionally high aesthetic values. The maintenance of the Basin's scenic quality largely depends on careful regulation of the type, location, and intensity of land uses.

The Scenic subelement contains a goal to maintain and restore the scenic qualities of the natural landscape of the Basin. It also contains policies that require all development to examine impacts on landscape views (i.e., roadways, bikeways, public recreation areas, Lake Tahoe), require development in areas identified for scenic restoration shall demonstrate effects on the 1982 travel route ratings, and consideration of factors or conditions that contribute to scenic degradation.

Code of Ordinances

The applicable provisions of the TRPA Code of Ordinances regarding scenic standards are summarized below.

Design Standards

Chapter 36 of the TRPA Code of Ordinances contains design standards, including standards for scenic quality. The TRPA Design Review Guidelines summarize the code requirements and guidelines and provide suggestions for attaining the standards (TRPA 1989b:30-5–30-6). The following standards in the Design Review Guidelines are particularly relevant:

- **(2) Lighting Levels.** Avoid consistent overall lighting and overly bright lighting. The location of lighting should respond to the anticipated use and should not exceed the amount of light actually required by users. Lighting for pedestrian movement should illuminate entrances, changes in grade, path intersections, and other areas along paths which, if left unlit, would cause the user to feel insecure. As a general rule of thumb, one foot candle per square foot over the entire project area is adequate.

- **(5) Lighting Height.** As a rule, the light source should be kept as low to the ground as possible while ensuring safe and functional levels of illumination. Area lighting should be directed downward with no splay of lighting directed offsite. The height of light fixtures or standards must meet the height limitations in Chapter 37 [of the TRPA Code of Ordinances]. Direct light downward in order to avoid sky lighting. Any light source over 10 feet high should incorporate a cut-off shield to prevent the light source from being directly visible from areas offsite. The height of luminaries should be in scale with the setting and generally should not exceed 10–12 feet.

Scenic Standards

Section 66.1, "Scenic Quality Standards," of the TRPA Code of Ordinances contains standards pertaining to scenic quality. Section 66.1 establishes a process for analyzing projects for scenic quality and defines those circumstances that require preparation of scenic assessments and/or other documents. It also requires a security deposit equal to the cost of scenic mitigation measures for projects visible from nonattainment areas, and a five-year review for continued presence and maintenance (described in more detail below). Sections 66.1.3, 66.1.4, and 66.1.5 describe scenic quality standards for roadway and shoreline units, and for public recreation areas and bicycle trails. Relevant subsections from Section 66.1 are listed below.

- **Section 66.1 <u>Scenic Quality Standards</u>**

  - **Subsection 66.1.2 <u>Applicability</u>:** All projects shall comply with the standards of this section.

  - **Subsection 66.1.3 <u>Roadway and Shoreline Unit Scenic Quality:</u>** The project shall not cause a decrease in the numerical ratings assigned to roadway or shoreline units, including the scenic quality rating of the individual resources within each unit, as recorded in the 1982 Scenic Resources Inventory and shown in Tables 13-3, 13-5, 13-8, and 13-9 of the *Study Report for the Establishment of Environmental Threshold Carrying Capacities*, October 1982. The criteria for rating scenic quality as identified in the study report cited herein shall be used to determine if a project will cause a decrease in the numerical rating.

  - **Subsection 66.3.2 <u>Review Process:</u>** <u>The applicant shall complete a scenic assessment when applying for any activity requiring a TRPA permit. An applicant may apply for a scenic assessment at any time to document the baseline condition. Review and mitigation of scenic impacts shall be based on subsection 66.3.3 below.</u>

    A. <u>Scenic Assessment:</u> A scenic assessment shall be required prior to submittal of a project application for Levels 3, 4, 5, and 6 projects. The scenic assessment will establish a baseline scenic condition for all following scenic impact analyses. The baseline shall be the existing condition at the time of the first scenic assessment, unless the site is the subject of an existing TRPA approval, by litigation settlement or otherwise, that contains a scenic analysis, in which case the approved scenic analysis

shall be the baseline. For purposes of this Section, unbuilt projects with an active permit shall be considered as existing.

1. Description of existing scenic conditions in the project area including, but not limited to, structure color and height, existing visible mass from the Lake, types and areas of materials of existing structures, and identification of needed scenic BMPs;

2. Identification of existing vegetation types and their location, size, and height; and

3. Photographic inventory of the project area from 300 feet and one quarter mile offshore, with at least one photo from center and perpendicular to the project area, and photos of onsite existing conditions.

- **Subsection 66.3.3 <u>Levels of Scenic Mitigation</u>:** There are six levels of mitigation provided in the Code of Ordinances. The proposed project falls under Level 6. This level consists of all projects involving new or existing structures in the shoreland that are visible from the Lake and that qualify as public health and safety projects or Environmental Improvement Program projects. The mitigation requirements for this level shall be established on a case-by-case basis. Projects whose primary purpose is implementation of water quality or scenic BMPs that do not increase the lake front façade and show an improvement in the contrast rating score are exempt from mitigation requirements.

Height Standards

Chapter 37 of the TRPA Code of Ordinances establishes height standards to ensure attractive and compatible development as required under Goal #2, Policy 1.B. of the Community Design Subelement, Land Use Element of the Goals and Policies. The relevant subsections from Chapter 37 are listed below.

- **Section 37.6 <u>Height Standards for Structures Other than Buildings</u>**

  - **37.6.1 <u>Maximum Structure Height</u>:** Except as provided for in subsection 37.6.2, no structure, other than a building, shall have a maximum height greater than 26 feet.

  - **37.6.2 <u>Additional Height for Certain Structures</u>:** The maximum height specified in subsection 37.6.1 may be increased for communication towers, antennas, utility poles, special features of public safety facilities, ski lift towers, and other similar projects, excluding buildings and signs, up to the minimum height necessary to feasibly implement such projects. Additional height may be approved under the provisions of this subsection if TRPA makes findings 4 and 7 as set forth in Section 37.7.

Plan Area Statements

The study area is located within six separate PASs: 99 (Al Tahoe), 100 (Truckee Marsh), 102 (Tahoe Keys), 103 (Sierra Tract Commercial), 104 (Highland Woods), and 111(Tahoe Island). Approximately 90 percent of the study area lies within PASs 100 and 102, including the portion of the study area within Shoreline Travel Unit 33 (PAS 100 and PAS 102) and Roadway Travel Unit 35 (PAS 100).

One special policy includes a reference to scenic quality. Special Policy 11 in PAS 100 (TRPA 1986) states:

11. No new uses should be approved that would degrade the high scenic quality of Shoreline Unit No. 33 or contribute to the further degradation of Roadway Unit No. 35.

Scenic Quality Improvement Program/Environmental Improvement Program

The SQIP was adopted to provide a program for implementing physical improvements to the built environment in the Tahoe Basin (TRPA 1989a:1). The SQIP is intended to contribute to the attainment of the scenic resources thresholds in the TRPA Goals and Policies (see above) and serves as an implementation guide for the Regional Plan. The SQIP is an overall action plan to specifically improve the scenic quality of 23 roadway and four shoreline travel routes that do not meet the scenic resources thresholds (TRPA 1989a:1).

The SQIP (TRPA 1989a:26) states:

> As a general rule, individual projects can be considered not to be contributing to threshold degradation when the project's individual design elements conform to or exceed adopted design standards, or the guidelines set forth in the Design Review Guidelines.

Design standards and design review guidelines are listed under the "Scenic Standards" and "Design Review Guidelines/Contrast Rating System" subsections, respectively, above.

The Environmental Improvement Program (EIP) adopted in 1998 incorporates elements of the SQIP. The EIP includes a list of specific projects throughout the basin that are needed to attain and maintain the thresholds (TRPA 1997). Although the study area does not contain any EIP-listed projects under scenic resources, EIP Project #99, which called for scenic improvements (e.g., building upgrades, visual screening) along a portion of Roadway Unit #35, runs through the southern tip of the study area.

City of South Lake Tahoe

The *City of South Lake Tahoe General Plan* (CSLT 1999) does not contain a section specific to scenic resources; however, the goals, objectives, and actions listed below, related to scenic resources and located within the Conservation, Open Space, and Land Use Elements, are relevant to the project.

Conservation

- **Goal 1:** Conserve and enhance the scenic and other natural resources within the boundaries of the City [of South Lake Tahoe].

Open Space

The following actions are associated with Goal 1, Objective 1:

  - **Action 2:** In conjunction with the Land Use Action Plan to create a Scenic Plan for the edges of the City, those portions of A1 Tahoe Boulevard (outside of the Bijou/Al Tahoe Community Plan) and Pioneer Trail (southwest from the intersection of A1 Tahoe Boulevard to El Dorado County and northeast to approximately Ralph Drive) include in the PAS a minimum of 500 foot setback of the natural forest edge to maintain the rural scenic experience viewed from the roadways. No buildings or structures or signage shall be visible from these roadways.

  - **Action 3:** Enhance the scenic quality of the meadow and SEZ [Stream Environment Zone] area (northwest of the A1 Tahoe/Pioneer Trail intersection) by opening it for view through the elimination of (or partial elimination by creating vistas through) the evergreen screen adjacent to the roadways.

Land Use

The following objective and actions are associated with Goal 1:

- **Objective 2:** The Scenic Quality of the built and natural environment be improved, enhanced and protected on a project by project basis.
  - **Action 1:** Implement the TRPA Scenic Quality Improvement Plan.
  - **Action 2:** Implement the City Design and the Community Plan Design Standards.
  - **Action 4:** Continue the long range public utility underground program in close coordination with the utility companies.
  - **Action 5:** Continue to maintain and enhance that portion of Highway 50/89 designated as a scenic corridor and further evaluate the designation of the remainder.
  - **Action 6:** Develop a Scenic Plan to enhance the entry ways into the urban portions of the city, to include U.S. 50/89, Lake Tahoe Boulevard (from El Dorado County), A1 Tahoe Boulevard (from Pioneer Trail) and Martin Avenue (from El Dorado County). This plan would include those areas within and outside of community plans and would include such improvements as native landscaping, fences, walks and other improvements to establish a "sense of community" for the City. This scenic plan may include the establishment of incentives to relocate incompatible land uses into PAS more appropriately suited for the use, For example, the relocation of the cement batch plant and contractors storage yard on U.S. 50 into the Wye industrial area.

ENVIRONMENTAL SETTING

Scenic Character of the Study Area

The study area is largely undeveloped and its scenic character is defined primarily by its adjacency to the lake, presence of the Upper Truckee River and Trout Creek in the landscape, and existing habitat features (willow scrub–wet meadow, montane meadow, and lodgepole pine forest). The river and creek provide perennial water features visible in the landscape, adding interest, variety, and vividness. Habitat areas include views of open wet meadow intermixed with low-lying shrubs over much of the middle of the study area and stands of large lodgepole and Jeffrey pines in the southeast and western portions of the study area. There are also areas of open water with aquatic vegetation in the middle of the study area, varying in extent depending on lake level and river flows.

The northern portion of the study area is characterized by sandy beach and views of the mouth of the Upper Truckee River draining into the lake. The western portion of the study area contains the Lower West Side Wetland Restoration Area and the Tahoe Keys Property Owners Association (TKPOA) Corporation Yard. The reaches of the Upper Truckee River that run through the study area are characterized by open water with eroding banks and some low-lying vegetation along the edges of the river. The study area also contains volunteer native surface trails that cross various portions of the property, existing corral structures are located in the middle, and fences that are visible from the edges of the study area. There are no sources of light and glare within the study area.

Views of the study area from the community are provided primarily at the ends of public, mostly residential streets that abut the property. The public visual access with the highest number of viewers is from the end of East Venice Drive near the trailhead into the Lower West Side Wetland Restoration Project. The area is also viewed by boaters from the lake in Shoreline Travel Unit 33. Only a very small portion of the study area along a short reach of the Upper Truckee River is visible from U.S. 50 (Roadway Travel Unit 35), looking north where it crosses the river.

The study area is in a unique location that provides views that are rarely all visible from one location within the Tahoe Basin. The study area provides 360-degree views of the Tahoe Basin with the closest mountain views to the south and west; direct views of Lake Tahoe to the north, including views of public beaches; and views of the Upper Truckee River corridor, Trout Creek, and open marsh from within the study area. The number and variety of scenic views provided by the study area contribute to the high visual quality of the area (Exhibit 3.14-1).

Visual Character of the Surrounding Environment

A map showing representative existing viewpoints with views of the study area is shown in Exhibit 3.14-1. Photographs from these viewpoints are shown in Exhibits 3.14-2 through 3.14-7 and are described below. These photographs are a representative subset of the viewpoints that provide views of the study area. For a complete index of viewpoints and associated photographs, see Appendix K.

North of the Study Area

Lake Tahoe is adjacent to and immediately north of the study area. Small craft can land at the study area, so boaters can gain close-up views of the beach and mouth of the Upper Truckee River. Views of the mouth of the Upper Truckee River from the lake are framed by four tall pine trees to the right and primarily meadow throughout the area, with a series of mountains framing background views (Exhibit 3.14-2). The picturesque waters of Lake Tahoe and the surrounding mountainsides north of the study area have a high visual quality. In fact, Shoreline Travel Unit 33 is the highest rated shoreline unit around the lake (at 14 of 15 points) because of the intactness and variety of the natural background view and the relative lack of visible structures as seen from the lake.

West of the Study Area

The Tahoe Keys Marina, Tahoe Keys subdivision, and Tahoe Island subdivision are west of the study area. These residential areas provide viewers who can look over the river and wetland from multiple private viewpoints along the western boundary of the study area. Views to the west are of approximately 200 single-family residences amid existing pine trees. Views from the west include low-lying marsh vegetation and distant views of forest and mountains.

Condominiums that border Lake Tahoe to the north and the outlet to the Tahoe Keys Marina to the east have elevated views of the study area. Views are broad and open across part of the study area with relatively sparse vegetation. Views of the study area are available from the parking area and many viewpoints within the marina.

Approximately 470 feet west of the East Venice Drive cul-de-sac, which is along the western border of the study area, three or four condominiums have distant views of the west side of the study area (Exhibit 3.14-3). The TKPOA Corporation Yard and the Tahoe Island subdivision have views of the Upper Truckee River and distant views of the open marsh and forest (Exhibit 3.14-4).

South of the Study Area

Views to the south include the northernmost row of several hundred single-family residences mixed among existing evergreen trees. While U.S. 50 is located southeast of the subdivision, it is only visible from a short reach of the river just north of the highway and is screened from view from the rest of the study area (Exhibit 3.14-5).

Most of the river and nearly all of the study area as a whole are not visible to passing motorists on U.S. 50.

Source: Adapted by EDAW (now AECOM) in 2008

Exhibit 3.14-1 **Photograph Viewpoints**

Source: Photograph taken by EDAW (now AECOM) in 2007

Exhibit 3.14-2 View from Lake to the South at the Mouth of the Upper Truckee River, 300 Feet from the Shoreline (Viewpoint 1)

Source: Photograph taken by EDAW (now AECOM) in 2007

Exhibit 3.14-3 View to the East toward the Study Area (in Middle-Ground) from Condominiums along the Tahoe Keys Marina (Viewpoint 2)

Source: Photograph taken by EDAW (now AECOM) in 2008

Exhibit 3.14-4 **View to the Southeast toward the Upper Truckee River from East of the Tahoe Island Subdivision (Viewpoint 3)**

Source: Photograph taken by EDAW (now AECOM) in 2008

Exhibit 3.14-5 **View to the Northwest of the Short Reach of the Upper Truckee River Visible from U.S. 50 (Viewpoint 4)**

Source: Photograph taken by EDAW (now AECOM) in 2008

Exhibit 3.14-6 **View to the West toward the Study Area and Trout Creek from Stanford Avenue (Viewpoint 5)**

Source: Photograph taken by EDAW (now AECOM) in 2008

Exhibit 3.14-7 **View to the West toward Barton Beach from East Barton Beach (Viewpoint 6)**

East and Northeast of the Study Area

Overall, the richly dense pine trees surrounding the consistent but visually varied residences east of the study area contribute to a high visual quality (Exhibit 3.14-6). East Barton Beach, which is a public beach, is also located to the northeast (Exhibit 3.14-7).

Scenic Ratings of the Study Area and Vicinity

Roadway Travel Unit Ratings

Roadway Travel Unit 35 includes the approximately 2.8-mile-long view corridor along U.S. 50 that extends less than 0.5 mile south of the U.S. 50/SR 89 intersection southwest of the study area, to less than 0.5 mile from the shores of Lake Tahoe east of the study area and the Al Tahoe subdivision. Views of the study area are available for approximately 0.6 mile of Roadway Travel Unit 35. This unit has a rating of 8 and is not currently in threshold attainment according to TRPA's *2006 Threshold Evaluation Report* (TRPA 2007). Restoration is recommended for roadway travel units rated at 15 or below. Table 3.14-1 shows the roadway travel unit ratings and the threshold criteria for Roadway Travel Unit 35.

Table 3.14-1
Travel Route Ratings: Adopted and Existing

Categories	Rating [1]				
	1982	1991	1996	2001	2006
Roadway Travel Unit 35					
Man-made Features	2	2.5	2.5	2.5	3
Roadway Distractions	1	1	1	1	1
Road Structure	1	1	1	1	1
Lake Views	1	1	1	1	1
Landscape Views	1	1	1	1	1
Variety	1	1	1	1	1
Roadway Unit Total [2]	**7**	**7.5**	**7.5**	**7.5**	**8**

Notes:
[1] Visual quality ratings: 1 = low, 3 = moderate, 5 = high
[2] Roadway units need a score of 15 to be in attainment.
Source: TRPA 2007

Shoreline Unit Ratings

TRPA's Shoreline Unit 33, Truckee Marsh, extends approximately 1.35 miles from the east channel entrance to the Tahoe Keys Resort just west of the study area to the shoreline on the eastern border of the study area. Views of this unit from Lake Tahoe include Freel and Job's Peaks in the background, with some lower ridges and bare summits along the panorama view. The view of the shoreline from the lake is distinctive in its variety of vegetation, such as willows in riparian corridors, wetland and meadow in the middle ground, and pine forest on the flanks and in the background. Very little development is visible in this shoreline unit. The scenic quality Upper Truckee Marsh has been degraded slightly by views of utility poles. This unit has a rating of 14 out of a possible 15 and is currently in threshold attainment according to the *2006 Threshold Evaluation Report* (TRPA 2007). This unit has the highest rating of any shoreline unit around the lake and has sustained this high rating since the initial evaluation in 1982. Restoration is recommended for shoreline units rated at 7 or below. Table 3.14-2 shows the shoreline unit ratings and the threshold criteria for Shoreline Unit 33.

Table 3.14-2 Shoreline Unit Ratings: Adopted and Existing				
Categories	Rating [1]			
	1982	1991	1996	2001[3]
Shoreline Unit 33				
Man-made Features	4	4	4	4
Background Views	5	5	5	5
Variety	5	5	5	5
Shoreline Unit Total [2]	**14**	**14**	**14**	**14**

Notes:
[1] Visual quality ratings: 1 = low, 3 = moderate, 5 = high
[2] Shoreline units need a score of 7 to be in attainment.
[3] 2006 ratings were not available for Shoreline Unit 33.
Source: TRPA 2007

Mapped Scenic Resources

Mapped scenic resources include Shoreline View 33-1 (view of low shore with distinctive vegetation) and Shoreline Visual Feature 33-2 (cluster of willows and pines that mark the river mouth). Both of these features have a scenic quality rating of 3, which is considered high scenic quality. Unique visual features of this shoreline unit include the river mouth and clusters of willows and pines marking its location. Additionally, a small portion of the project would be visible within Roadway Visual Feature 35-2 (Truckee River stream zone) and 35-4 (Front Creek stream zone). Both have a scenic rating of 2, which is considered moderate scenic quality.

Public Recreation Areas

TRPA's *1993 Lake Tahoe Scenic Resource Evaluation* did not identify any TRPA-designated public recreation areas with direct views of the study area (TRPA 1993).

3.14.2 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; the TRPA Initial Environmental Checklist; factual or scientific information and data; and regulatory standards of Federal, State, and local agencies. These criteria also encompass the factors taken into account under NEPA to determine the significance of an action in terms of the context and intensity of its effects.

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to scenic resources if it would:

- have a substantial adverse effect on a scenic vista (CEQA-1);
- substantially damage scenic resources, including but not limited to scenic waterways, trees, rock outcroppings, and historic buildings in a state scenic highway (CEQA-2);
- substantially degrade the existing visual character or quality of the site and its surroundings (CEQA-3); or

- create a new source of substantial light or glare that would adversely affect day or nighttime views in the area (CEQA-4).

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative was determined to result in a significant effect related to scenic resources if it would:

- reduce scenic quality from mapped resources (TRPA-1); or
- reduce threshold ratings from roadway or shoreline units (TRPA-2).

METHODS AND ASSUMPTIONS

The scenic quality of an area is determined through the variety and contrasts of the area's visual features, the character of those features, and the scope and scale of the scene. This analysis uses a qualitative descriptive method to characterize and evaluate the visual resources of the areas that could be affected by the project using the criteria listed above. Project features were considered to have a substantial effect on visual resources if they would be visually prominent, threaten the attainment of a TRPA threshold, or be incompatible with the natural landscape. The impact analysis is based on a qualitative evaluation of consistency with the CEQA and TRPA criteria above, and a quantitative analysis for views from the lake.

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Effects related to all significance criteria listed above are discussed further in the EIR/EIS/EIS.

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.14-1 (Alt. 1)	**Potential for Short-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33, Roadway Travel Unit 35, or the Visual Character or Quality of the Study Area. (CEQA 1, 2, 3, TRPA 2)** *The study area is within Shoreline Travel Unit 33 and Roadway Travel Unit 35. Alternative 1 would include construction of restoration and recreation infrastructure that includes staging of construction equipment and materials (e.g., rock, vegetation, backhoes) that could be visible from these areas over a period of approximately four years. Construction activities could degrade the scenic quality of the shoreline travel unit, roadway travel unit, and within the study area; however, construction activities would be temporary and would not result in substantial changes. Therefore, this impact would be* ***less than significant****.*

During construction, heavy equipment and associated vehicles, construction workers, staging areas, and construction activities would be visible or partially visible from surrounding areas, primarily the southeast and northwest portions of the study area. Construction activities associated with placement of bank protection along the Upper Truckee River and construction of the kiosk would occur near U.S. 50.

The most extensive construction (excavation, grading, and hauling) would be performed along the Upper Truckee River near the west side of the study area. Most views of the construction by residents would generally be from several hundred feet away; for other viewers, such as employees of a boat-wrapping business who would have the most direct line of sight, the view would be across three rows of vehicle parking. Residents and recreationists near the storage/staging areas shown in Exhibit 2-5 in Chapter 2, "Project Alternatives," would also experience short-term changes to their views.

Although there would be changes in views associated with construction, these changes would be temporary and would not substantially degrade the visual character of the study area or reduce the threshold ratings from any shoreline or travel units. This impact would be **less than significant**.

IMPACT 3.14-2 (Alt. 1) **Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Boardwalk and Observation Platforms. (CEQA 1, 2, 3; TRPA 1, 2)** *The study area is within Shoreline Travel Unit 33, a unit with a high scenic rating, including Shoreline View 33-1 and Shoreline Visual Feature 33-2. A boardwalk and two observation platforms would be placed behind the beach (as viewed from Lake Tahoe) under Alternative 1, but would be sufficiently low-lying that they would not be visible from the lake because of screening by the beach ridge and vegetation. Therefore, these features would not substantially degrade or reduce the threshold rating for Shoreline Travel Unit 33 or the mapped scenic resources. This impact would be* ***less than significant****.*

An observation platform is proposed for the northeast portion of the study area near East Barton Beach, and a second observation platform is also proposed west of the Upper Truckee River. A boardwalk would be constructed just south of the barrier beach. It would connect paths on the east side of the study area's marsh next to Al Tahoe with the existing trail on the west side of the marsh behind Cove East Beach (next to Tahoe Keys Marina). Under Alternative 1, the proposed observation platforms would introduce a 25-foot-long by 25-foot-wide deck with a wood and cable railing. The boardwalk would be elevated approximately two feet above existing grade and would be 12 feet wide with a three-foot-tall railing on the lake side. The boardwalk would be constructed of powder-coated metal or wood. As seen from the lake, the decks of the boardwalk and the observation platforms would be placed at an elevation that would be obscured behind the beach ridge, existing vegetation, and trees.

Nearby views currently encompass the undisturbed marsh, but also an existing pier extending out from the west edge of the condominium complex. Although the horizontal lines of the railing along the expanse of the shoreline would introduce a human-made feature to what is otherwise a natural view from Lake Tahoe, the wood-and-cable railing would be screened by vegetation or largely transparent, especially at the distance boaters are likely to view the shoreline (i.e., 300 feet, as required by TRPA scenic quality evaluation standards). The rails of the low-lying boardwalk and observation platforms would be very narrow features, using natural colors to blend into the background. The railings would be barely visible within the landscape, as seen from the lake and they would not introduce significantly contrasting elements to these views. Consequently, a visual contrast rating of the boardwalk and observation platforms is not necessary. Alternative 1 would not substantially degrade the visual quality of or reduce the threshold rating from Shoreline Travel Unit 33 or the mapped scenic resources within this travel unit. Therefore, this impact would be **less than significant**.

IMPACT 3.14-3 (Alt. 1) **Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Upper Truckee River Bridge and Ramps. (CEQA 1, 2, 3; TRPA 1, 2)**

A bridge would be constructed over the Upper Truckee River approximately ten feet above the river as part of the pedestrian/bicycle path provided across the marsh. Ramps would connect the elevated bridge to the low-lying boardwalk. Both the bridge and ramps would be elevated sufficiently to be prominently visible from the lake. While color choices and vegetative screening would reduce visibility of the bridge and ramps, the additional structural façade in views from the lake would degrade the scenic quality of the shoreline travel unit. This impact would be ***significant****.*

The boardwalk path across the Upper Truckee Marsh proposed in Alternative 1 would include a bridge crossing of the Upper Truckee River. The proposed bridge would be approximately ten feet above the water line to allow room for paddling access to the river mouth beneath it. It would extend 225 feet across the river. To connect to the low-lying boardwalk, the bridge would include 62.5-foot-long ramps on either end. These project features are not expected to degrade views of mapped scenic resources and 33-1 and 33-2 because these features would not obstruct views of the pine trees at the mouth of the river or vegetation along the shoreline. Boaters would experience changes in views of the Upper Truckee Marsh with the addition of visible structure from the elevated, 225-foot span of pedestrian/bicycle bridge. Boaters would see the platform, support columns, and railings of the elevated bridge and ramps high enough above the existing shoreline vegetation to be prominent. Views of the proposed bridge and ramps from west of the mouth of the Upper Truckee River would be blocked by four tall pine trees and thick willow scrub, but the bridge and ramps to the bridge would be clearly visible from directly off shore in the lake.

As shown in Exhibit 3.14-2, boaters would have clear views of the proposed bridge from the lake (this view is 300 feet away, as required by TRPA scenic quality evaluation standards). Thus, a contrast rating and visual magnitude assessment has been prepared in accordance with Chapter 36 of the TRPA Code of Ordinances. A summary of the assessment results is described below.

TRPA Contrast Rating Analysis of the Bridge and Ramps

The following contrast rating analysis with the four primary parts (color score, glass score, perimeter score, and surface/texture score) was used to evaluate these project elements within the Lake Tahoe shoreline.

Color Score

The optimal color for the highest TRPA color score would typically be dark brown for a color score of 17. However, a color analysis for the bridge and ramps indicate the optimal bridge color appears to be more bluish gray with grayish tan support columns.

For the purposes of this analysis, bluish grey is considered equivalent to the optimal color score for the bridge and ramps because of its ability to blend in with the background. The grayish tan support columns would receive a score of 11, and the bridge and ramps would receive a 17. Assuming two façade planes for the bridge and ramps and support columns, these color values produce a color score of 16.7 out of a possible 17.

Glass Score

Because no glass is proposed for along the shoreline, this value does not apply.

Surface Plane and Texture Score

The surface plane and texture score is calculated by determining the number of visible planes and the texture of each of those planes. Two planes are assumed for the bridge and ramps and support columns and these features

would be constructed of metal, wood, and concrete, which would be considered a heavy texture. According to the Surface Plane and Texture matrix, features with two planes and heavy texture, would receive a texture rating of 5.

Perimeter Score

The perimeter score is derived from the percentage of façade perimeter that is visible with screening vegetation. The optimal score would be 10, where 0 to 10 percent of the perimeter would be visible. The total perimeter of the façade of the bridge, ramps, and support columns would be 780 feet, where 540 feet (or 69 percent) of that perimeter would be over water and could not be mitigated with screening vegetation. Based on the TRPA perimeter matrix, structures that have between 61 and 70 percent perimeter visible, would yield a score of 4 for the visible perimeter.

Composite Score

The composite score for the bridge, ramps, and support columns, which is calculated by summing the color and reflectance score, surface plane and texture score, and perimeter score, assuming optimal vegetative screening, would be 25. This score of 25 with vegetative screening on the ramps would not meet the normally required score of 28. Therefore, because Alternative 1 would reduce the threshold rating of Shoreline Travel Unit 33 and degrade the mapped scenic resources within this travel unit, this impact would be **significant**.

Mitigation: Because the composite score was calculated based on use of optimal colors and vegetative screening for the bridge, ramps, and support columns, no additional mitigation is feasible to further reduce the visual impact of these features.

Significance after Mitigation: Because no feasible mitigation exists, this impact would remain **significant and unavoidable**. According to a special policy for PAS 100, no new uses should be approved that would degrade the high scenic quality of Shoreline Unit No. 33. The proposed bridge would be in conflict with this policy.

IMPACT 3.14-4 (Alt. 1) **Potential for Long-Term Degradation of a Scenic Highway or the Scenic Quality of Roadway Travel Unit 35 and Mapped Scenic Resources. (CEQA 1, 2; TRPA 1, 2)** *The study area is within view from U.S. 50, which is not designated as a state scenic highway but is within Roadway Travel Unit 35, including Roadway Visual Features 35-2 and 35-4. The proposed kiosk in the southern portion of the study area is the only permanent facility that would be located near U.S. 50. Views of this facility from U.S. 50 would be obscured by other buildings and existing development. Because no scenic resources within a scenic highway would be damaged substantially and the threshold rating for the roadway travel unit would not be reduced including the mapped scenic resources, this impact would be* ***less than significant****.*

The study area is within view from U.S. 50; however, this section of the highway is not designated as a State scenic highway. U.S. 50 is also within Roadway Travel Unit 35, which is currently not in attainment. One of the proposed kiosks would be located in the southwest portion of the study area near U.S. 50; however, views of this kiosk would be obscured by existing buildings along U.S. 50. Because no scenic resources within a scenic highway would be damaged and the threshold rating for Travel Unit 35 or the mapped scenic resources would not be reduced, this impact would be **less than significant**.

IMPACT 3.14-5 (Alt. 1) **Potential for Long-Term Degradation in Existing Visual Character or Quality of the Study Area. (CEQA 3)** *Alternative 1 would include some elements that would be visible after construction. Nearby residents and recreationists could experience changes in views related to these project elements. However, few permanent facilities are proposed and the scenic quality of the study area would not be substantially degraded. Therefore, this impact would be* ***less than significant****.*

Alternative 1 would include two kiosks, stabilization of the existing river access for boat take-out, observation areas, boardwalks and pedestrian trails, and bicycle paths. Viewers that may have views of these project elements would be recreationists, residents in surrounding neighborhoods, and travelers on U.S. 50.

One kiosk is proposed near an existing regional bike trail near U.S. 50, in the southeastern portion of the study area and another is proposed adjacent to the parking lot near Tahoe Keys Marina. These features would introduce views of small scale human-made structures roughly five feet long by 12 feet wide and tall enough to provide protection for standing trail users. Natural materials and colors would also be used for the kiosks.

In addition to the kiosks, several residences and recreationists would have views of new bike paths that would be constructed or existing trails that would be paved under Alternative 1. Constructing new paths or paving existing native surface paths would introduce human-made features into the landscape; however, pedestrian trails and bike paths would be small-scale and dispersed throughout the study area. The paths would also be largely be screened by surrounding vegetation.

Views of the natural surroundings within the study area would also change to encompass a boardwalk elevated approximately two feet above the ground, with a ten-foot-wide powder-coated metal or wood surface and a three-foot-tall railing on the lake side. The change in views of the existing well-delineated gravel trail to views of pavement and a few hundred feet of new boardwalk would not be substantial because existing and future uses would be similar and views would remain largely natural. Natural materials and colors would be used for the boardwalk, and because it would be low-lying and small-scale, it would not become a dominant feature in the views of the study area.

Riparian vegetation surrounding the Upper Truckee River would effectively block views of the proposed observation platform from the west side of the study area and the platform would be constructed with natural materials and colors. Thus, the proposed observation platform would not substantially affect scenic vistas for viewers or substantially degrade the visual quality of the study area.

Introducing public access facilities and recreation infrastructure into approximately 633 acres of primarily natural meadows and riparian vegetation would add human-made elements into the study area landscape. However, because project elements would be small-scale, would use natural materials and colors, and the study area would remain largely undeveloped and natural in character, these changes would not substantially degrade the visual quality of the study area. This impact would be **less than significant**.

IMPACT 3.14-6 (Alt. 1) **Potential for Increases in Light or Glare. (CEQA 4)** *The project would introduce heavy construction vehicles and equipment that may create some glare over a period of approximately four years; however, construction would not take place during months that would require lighting to be used. A parking area near the west side of the study area would increase light and glare in the long term, but this increase in lighting would be minimal. This impact would be* ***less than significant****.*

The project would introduce heavy construction vehicles and equipment that may create some glare over a period of approximately four years, primarily during daylight hours and, during the grading season (May 1 through October 15). Even so, it is unlikely that construction would take place during months that would require lighting to be used because of inclement weather. In addition, light and glare impacts related to construction would be temporary and would not be substantial.

The parking area proposed for the west side of the study area would be the only permanent project element that would have lighting. According to the CSLT's exterior lighting standards, parking lot, walkway, and building lights shall be directed downward and shall not exceed 26 feet in height. Because the new lighting would be near an existing parking lot and lighting at the Tahoe Keys Marina to the immediate west, and because the proposed lighting would be minimal and would be consistent with the CSLT's lighting design criteria, the project would not create substantial light and glare impacts in the long term. Therefore, this impact would be **less than significant**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.14-1 (Alt. 2) **Potential for Short-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33, Roadway Travel Unit 35, or the Visual Character or Quality of the Study Area. (CEQA 1, 2, 3, TRPA 2)** *Construction activities associated with Alternative 2 may be visible from viewpoints outside of the study area. Construction restoration and recreation infrastructure that includes staging of construction equipment and materials (e.g., rock, vegetation, backhoes) that would temporarily change views, primarily of and from the southeast and northwest portions of the study area, over a period of approximately four years. Construction activities could degrade the scenic quality of the shoreline travel unit, roadway travel unit, and within the study area; however, construction activities would be temporary and would not be substantial. This impact would be* ***less than significant****.*

This impact is similar to but less than Impact 3.14-1 (Alt. 1), which would be less than significant. Alternative 2 would not include kiosks, a bridge, boardwalk, or other public access/recreation facilities that are included under Alternative 1; thus, this alternative would result in less construction activity than Alternative 1. In addition, construction activities associated with Alternative 2 would be temporary and would not substantially degrade the visual character of the study area or reduce the threshold ratings from any shoreline or travel units. Therefore, this impact would be **less than significant**.

IMPACT 3.14-2 (Alt. 2) **Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Boardwalk and Observation Platforms. (CEQA 1, 2, 3; TRPA 1, 2)** *Alternative 2 would not include the boardwalk or observation platforms that could be visible from this Shoreline Travel Unit 33 or the associated mapped resources. Thus, Alternative 2 would not substantially degrade the scenic quality or reduce the threshold rating of this shoreline travel unit or mapped scenic resources.* ***No impact*** *would occur.*

Because Alternative 2 would not include any facilities that would be visible from Lake Tahoe or Shoreline Travel Unit 33, no TRPA contrast rating analysis was prepared for this alternative. Alternative 2 would not include construction of facilities associated with the boardwalk or observation platforms that would be constructed as part of Alternative 1. Therefore, Alternative 2 would not substantially degrade the visual quality of or reduce the threshold rating from Shoreline Travel Unit 33 or the mapped scenic resources within this travel unit. **No impact** would occur.

IMPACT 3.14-3 (Alt. 2) **Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Upper Truckee River Bridge and Ramps. (CEQA 1, 2, 3; TRPA 1, 2)** *Alternative 2 would not include the bridge over the Upper Truckee River that is proposed under Alternative 1. In addition, Alternative 2 would not include ramps to connect the elevated bridge to the low-lying boardwalk. Because Alternative 2 would not include any facilities that would be visible from Lake Tahoe or Shoreline Travel Unit 33,* ***no impact*** *would occur.*

Because Alternative 2 would not include any facilities that would be visible from Lake Tahoe or Shoreline Travel Unit 33, no TRPA contrast rating analysis was prepared for this alternative. Alternative 2 would not include construction the bridge or ramps that would be constructed as part of Alternative 1. Therefore, Alternative 2 would not substantially degrade the visual quality of or reduce the threshold rating from Shoreline Travel Unit 33 or the mapped scenic resources within this travel unit. **No impact** would occur.

IMPACT 3.14-4 (Alt. 2) **Potential for Long-Term Degradation of the Scenic Quality of a Scenic Highway or Roadway Travel Unit 35 and Mapped Scenic Resources. (CEQA 1, 2; TRPA 1, 2)** *Under Alternative 2, no permanent facilities would be located near U.S. 50; however, placement of bank protection along the Upper Truckee River may be visible from the highway. This would be a minor change in views; therefore, this impact would be* ***less than significant****.*

Placement of bank protection along the Upper Truckee River may be visible from U.S. 50; however, this would be a minimal change in views for travelers on U.S. 50. In addition, Alternative 2 would not include construction of the kiosk near U.S. 50 that is included under Alternative 1. No other facilities—temporary or permanent—would be constructed within the viewshed of U.S. 50. Because no scenic resources of a scenic highway would be damaged and the threshold rating for Travel Unit 35 and the mapped scenic resources within the travel unit would not be reduced, this impact would be **less than significant**.

IMPACT 3.14-5 (Alt. 2) **Potential for Long-Term Degradation in Existing Visual Character or Quality of the Study Area. (CEQA 3)** *Alternative 2 would include some elements in the southeast and northwest portions of the study area that would be visible after construction. Nearby residents and recreationists could experience changes in views related to these facilities. However, very few permanent facilities are proposed and the scenic quality of the study area would not be substantially degraded. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.14-5 (Alt. 1); however, fewer permanent facilities would be constructed under Alternative 2 than under Alternative 1, resulting in fewer changes to the existing visual character of the study area. Unlike Alternative 1, Alternative 2 would include a fishing platform within approximately 440 feet of a residence in the Tahoe Keys Marina. The fishing platform would be made of wood and metal and would be approximately 300 square feet. Because the proposed fishing platform would have a relatively low profile and would be constructed with natural materials and colors, visual impacts related to the fishing platform would not be substantial. Given that all other project elements in Alternative 2 are similar to those of Alternative 1 in their attributes but are fewer in number, Alternative 2 would create fewer visual changes than Alternative 1. Therefore, for this reason and the reasons given in the discussion of Impact 3.14-5 (Alt. 1), these features would not substantially degrade the visual quality of the study area. Therefore, this impact would be **less than significant**.

IMPACT 3.14-6 (Alt. 2) **Potential for Increases in Light or Glare. (CEQA 4)** *Alternative 2 would introduce heavy construction vehicles and equipment that may create some glare over a period of approximately four years; however, it is unlikely that construction would take place during months that would require lighting to be used, and this alternative would not include long-term sources of light or glare. Therefore, this impact would be* ***less than significant****.*

This impact is similar to but less than Impact 3.14-6 (Alt. 1), which would be less than significant. Short-term increases in light and glare under Alternative 2 would be the same as under Alternative 1. Alternative 2 would not include long-term sources of light or glare. Because there would be no substantial increases in light or glare, this impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.14-1 (Alt. 3) **Potential for Short-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33, Roadway Travel Unit 35, or the Visual Character or Quality of the Study Area. (CEQA 1, 2, 3, TRPA 2)** *Construction activities may be visible from viewpoints outside of the study area. Construction of restoration and recreation infrastructure that includes staging of construction equipment and materials (e.g., rock, vegetation, backhoes) that would temporarily change views, primarily of and from the southeast and northwest portions of the study area, over a period of approximately four years. Construction activities could degrade the scenic quality of the shoreline travel unit, roadway travel unit, and within the study area; however, construction activities would be temporary and would not be substantial. This impact would be* ***less than significant****.*

This impact is similar to but less than Impact 3.14-1 (Alt. 1), which would be less than significant. Alternative 3 would not include the bridge included under Alternative 1, and would have one less observation platform and kiosk, and less extensive pedestrian trails and bike paths than Alternative 1; thus this alternative would result in less construction activity than Alternative 1, but more activity than Alternative 2. Construction activities associated with Alternative 3 would be temporary and would not substantially degrade the visual character of the study area or reduce the threshold ratings from any shoreline or travel units. Therefore, this impact would be **less than significant**.

IMPACT 3.14-2 (Alt. 3) **Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Boardwalk and Observation Platforms. (CEQA 1, 2, 3; TRPA 1, 2)** *Alternative 3 would include a boardwalk; however, it would be sufficiently low-lying that it would not be visible from the lake because of screening by the beach ridge and vegetation. Therefore, this impact would be* ***less than significant.***

This impact is similar to but less than Impact 3.14-2 (Alt. 1), which would be less than significant. Alternative 3 would include a boardwalk near Shoreline Travel Unit 33 similar to Alternative 1; however, the boardwalk would be shorter (2,273 linear feet) than the boardwalk proposed under Alternative 1 (4,000 linear feet) and Alternative 3 would not include observation platforms near the shoreline. Alternative 3 would include a fishing platform made of wood or composite material and metal that would be approximately 500 square feet. As described under Impact 3.14-2 (Alt. 2), the visual changes associated with the fishing platform would not be substantial. Therefore, Alternative 3 would not substantially degrade the visual quality of or reduce the threshold rating from Shoreline Travel Unit 33 or the mapped scenic resources within the travel unit. This impact would be **less than significant**.

IMPACT 3.14-3 (Alt. 3) **Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Upper Truckee River Bridge and Ramps. (CEQA 1, 2, 3; TRPA 1, 2)** *Because Alternative 3 would not include a bridge and ramps, or any other project element that would degrade the scenic quality of this shoreline travel unit,* ***no impact*** *would occur.*

Because Alternative 3 would not include a bridge and ramps, or any other element that would be visible from Lake Tahoe or Shoreline Travel Unit 33, no TRPA contrast rating analysis was prepared for this alternative. Therefore, Alternative 3 would not substantially degrade the visual quality of or reduce the threshold rating from Shoreline Travel Unit 33 or the mapped scenic resources within the travel unit. **No impact** would occur.

IMPACT 3.14-4 (Alt. 3) **Potential for Long-Term Degradation of the Scenic Quality of a Scenic Highway or Roadway Travel Unit 35 and Mapped Scenic Resources. (CEQA 1, 2; TRPA 1, 2)** *Under Alternative 3, no permanent facilities would be located near U.S. 50; however, placement of bank protection along the Upper Truckee River may be visible from the highway. This would be a minor change in views; therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.14-4 (Alt. 2), which would be **less than significant**.

IMPACT 3.14-5 (Alt. 3) **Potential for Long-Term Degradation in Existing Visual Character or Quality of the Study Area. (CEQA 3)** *Alternative 3 would include some elements in the southeast and northwest portions of the study area that would be visible after construction. Nearby residents and recreationists could experience changes in views related to these facilities; however, no officially designated scenic vistas would be affected. In addition, very few permanent facilities are proposed and the visual quality of the study area would not be substantially degraded. This impact would be* ***less than significant****.*

This impact is identical to Impact 3.14-5 (Alt. 2), which would be **less than significant**.

IMPACT 3.14-6 (Alt. 3) **Potential for Increases in Light or Glare. (CEQA 4)** *Alternative 3 would introduce heavy construction vehicles and equipment that may create some glare over a period of approximately 4 years; however, it is unlikely that construction would take place during months that would require lighting to be used. In addition, this alternative would not include long-term sources of light or glare. This impact would be* ***less than significant****.*

This impact is similar to but less than Impact 3.14-6 (Alt. 1). Alternative 3 would include fewer facilities and less construction than Alternative 1 and would therefore result in less short-term light and glare than Alternative 1. Alternative 3 would not include long-term sources of light or glare. Because there would not be a substantial increase in light or glare, this impact would be less **than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.14-1 (Alt. 4) **Potential for Short-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33, Roadway Travel Unit 35, or the Visual Character or Quality of the Study Area. (CEQA 1, 2, 3, TRPA 2)** *Construction of restoration and recreation infrastructure that includes staging of construction equipment and materials (e.g., rock, vegetation, backhoes) may be visible from viewpoints outside of the study area. Construction activities and the facilities themselves could degrade the scenic quality of the shoreline travel unit, roadway travel unit, and within the study area; however, construction activities would be temporary and would not be substantial. This impact would be* ***less than significant****.*

This impact is similar to but less than Impact 3.14-1 (Alt. 1), which would be less than significant. Although Alternative 4 would entail more extensive excavation along the Upper Truckee River, it would not include the bridge included under Alternative 1, and would have one less kiosk and a less extensive pedestrian and bike path system than under Alternative 1. Thus, this alternative would result in less visible construction activity than Alternative 1, but more than Alternative 2; visible construction activity would be comparable to Alternative 3. Construction activities associated with Alternative 4 would be temporary and would not substantially degrade the visual character of the study area or reduce the threshold ratings from any shoreline or travel units. Therefore, this impact would be **less than significant**.

IMPACT 3.14-2 (Alt. 4) **Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Boardwalk and Observation Platforms. (CEQA 1, 2, 3; TRPA 1, 2)** *Alternative 4 would include a boardwalk; however, it would be sufficiently low-lying that it would not be visible from the lake, because of screening by the beach ridge and vegetation. Therefore, Alternative 4 would not substantially reduce the visual quality or threshold rating from a travel unit or mapped scenic resources. This impact would be* ***less than significant****.*

This impact is similar to but less than Impact 3.14-2 (Alt. 1), which would be less than significant. Alternative 4 would include a boardwalk near Shoreline Travel Unit 33 similar to Alternative 1; however, the boardwalk would be much shorter (1,040 linear feet) than the boardwalk proposed under Alternative 1 (4,000 linear feet), and Alternative 4 would not include observation platforms near the shoreline. Therefore, Alternative 4 would not substantially degrade the visual quality of or reduce the threshold rating from Shoreline Travel Unit 33 or the mapped scenic resources within this travel unit. This impact would be **less than significant**.

IMPACT 3.14-3 (Alt. 4) **Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Bridge and Ramps. (CEQA 1, 2, 3; TRPA 1, 2)** *Because Alternative 4 would not include a bridge or ramps, or any other structure that would substantially degrade the scenic quality or reduce the threshold rating of this shoreline travel unit or mapped scenic resources,* ***no impact*** *would occur.*

Because Alternative 4 would not include any facilities that would be visible from Lake Tahoe or Shoreline Travel Unit 33, no TRPA contrast rating analysis was prepared for this alternative. Alternative 4 would not include construction of the facilities associated with the bridge or ramps that would be constructed as part of Alternative 1. Therefore, Alternative 4 would not substantially degrade the visual quality of or reduce the threshold rating from Shoreline Travel Unit 33 or the mapped scenic resources within the travel unit. **No impact** would occur.

IMPACT 3.14-4 (Alt. 4) **Potential for Long-Term Degradation of the Scenic Quality of a Scenic Highway or Roadway Travel Unit 35 and Mapped Scenic Resources. (CEQA 1, 2; TRPA 1, 2)** *Under Alternative 4, no permanent facilities would be located near U.S. 50; however, placement of bank protection along the Upper Truckee River may be visible from the highway. This would be a minor change in views and would not substantially damage a resource from a scenic highway or reduce the threshold rating of a travel unit or mapped scenic resources. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.14-4 (Alt. 2), which would be **less than significant**.

IMPACT 3.14-5 (Alt. 4) **Potential for Long-Term Degradation in Existing Visual Character or Quality of the Study Area. (CEQA 3)** *Alternative 4 would include some elements in the southeast and northwest portions of the study area that would be visible after construction. Nearby residents and recreationists could experience changes in views related to these elements. However, very few permanent facilities are proposed and the visual quality of the study area would not be substantially degraded. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.14-5 (Alt. 1); however, fewer permanent facilities would be constructed under Alternative 4 than under Alternative 1, resulting in fewer changes to the existing visual character of the study area. Because all other project elements in Alternative 4 would create similar or fewer visual changes than those in Alternative 1, and would not substantially degrade the visual character of the study area, this impact would be **less than significant**.

IMPACT 3.14-6 (Alt. 4) **Potential for Increase in Light or Glare. (CEQA 4)** *Alternative 4 would introduce heavy construction vehicles and equipment that may create some glare over a period of approximately four years; however, it is unlikely that construction would take place during months that would require lighting to be used. In addition, this alternative would not include any long-term sources of light or glare. This impact would be* ***less than significant****.*

This impact is similar to but less than Impact 3.14-6 (Alt. 1). Alternative 4 would include fewer facilities and less construction than Alternative 1 and would therefore result in less short-term light and glare than Alternative 1. Like Alternatives 2 and 3, Alternative 4 would not include long-term sources of light and glare. Because this alternative would not create any new substantial sources of light or glare, this impact would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.14-1 (Alt. 5) **Potential for Short-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33, Roadway Travel Unit 35, or the Visual Character or Quality of the Study Area. (CEQA 1, 2, 3, TRPA 2)** *Alternative 5 would not include construction activities associated with construction of facilities proposed under the action alternatives. Therefore, there would be no changes in views from the shoreline travel unit, roadway travel unit, or other areas of the study area associated with construction that would degrade the visual character of the study area or reduce any threshold ratings.* ***No impact*** *would occur.*

Alternative 5 would not include construction of public access and recreation facilities that are proposed under the action alternatives; thus this alternative would not result in temporary changes in views associated with heavy equipment and construction activity that would degrade views of the study area or reduce threshold ratings from any shoreline or travel units. Therefore, **no impact** would occur.

IMPACT 3.14-2 (Alt. 5) **Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Boardwalk and Observation Platforms. (CEQA 1, 2, 3; TRPA 1, 2)** *The study area is within Shoreline Travel Unit 33; however, Alternative 5 would not include a boardwalk or observation platforms that would be visible from this shoreline travel unit. Thus, Alternative 5 would not degrade the scenic quality or reduce the threshold rating of this shoreline travel unit or mapped scenic resources.* ***No impact*** *would occur.*

Because Alternative 5 would not include any facilities that would be visible from Lake Tahoe or Shoreline Travel Unit 33, no TRPA contrast rating analysis was prepared for this alternative. Alternative 5 would not include the boardwalk or observation platforms that would be constructed as part of Alternative 1 and would not include any construction activities in the study area. No change in views for boaters on the lake or from any surrounding view points would occur. Therefore, Alternative 5 would not degrade the visual quality of or reduce the threshold rating from Shoreline Travel Unit 33 or the mapped scenic resources within the travel unit. **No impact** would occur.

IMPACT 3.14-3 (Alt. 5) **Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Upper Truckee River Bridge and Ramps. (CEQA 1, 2, 3; TRPA 1, 2)** *Alternative 5 would not include the bridge and associated ramps over the Upper Truckee River that is proposed under Alternative 1. Because Alternative 5 would not include a bridge or ramps, or any other facilities that would degrade the scenic quality or reduce the threshold rating of this shoreline travel unit or mapped scenic resources,* ***no impact*** *would occur.*

Because Alternative 5 would not include any facilities that would be visible from Lake Tahoe or Shoreline Travel Unit 33, no TRPA contrast rating analysis was prepared for this alternative. Alternative 5 would not include

construction activities or the facilities associated with the bridge or ramps that would be constructed as part of Alternative 1. Therefore, no change in views for boaters on the lake or from any surrounding viewpoints would occur, and Alternative 5 would not degrade the visual quality of or reduce the threshold rating from Shoreline Travel Unit 33 or the mapped scenic resources within the travel unit. **No impact** would occur.

IMPACT 3.14-4 (Alt. 5) **Potential for Long-Term Degradation of the Scenic Quality of a Scenic Highway or Roadway Travel Unit 35 and Mapped Scenic Resources. (CEQA 1, 2; TRPA 1, 2)** *No permanent facilities would be located near U.S. 50 that would damage a scenic resource of a highway or reduce the threshold rating of the travel unit or mapped scenic resources. Therefore,* ***no impact*** *would occur.*

There would be no temporary or permanent facilities constructed under Alternative 5 that would change views from U.S. 50 or Roadway Travel Unit 35. Because no scenic resources of a scenic highway would be damaged and the threshold rating for Travel Unit 35 and the mapped scenic resources within the travel unit would not be reduced, **no impact** would occur.

IMPACT 3.14-5 (Alt. 5) **Potential for Long-Term Degradation in Existing Visual Character or Quality of the Study Area. (CEQA 3)** *No permanent facilities are included under this alternative. Therefore, Alternative 5 would not result in degradation of the visual quality of the study area.* ***No impact*** *would occur.*

As the No-Project/No-Action Alternative, Alternative 5 would not involve any construction of any permanent facilities. Thus, the visual quality of the study area would not be degraded. **No impact** would occur.

IMPACT 3.14-6 (Alt. 5) **Potential for Increases in Light or Glare. (CEQA 4)** *No sources of light or glare would be introduced as part of Alternative 5.* ***No impact*** *would occur.*

As the No-Project/No-Action Alternative, Alternative 5 would not introduce any new long-term sources of light and glare. Thus, no new sources of light and glare would be created as a result of Alternative 5. **No impact** would occur.

3.15 SOCIOECONOMICS, POPULATION AND HOUSING, AND ENVIRONMENTAL JUSTICE

This section describes the demographic and socioeconomic characteristics of the City of South Lake Tahoe and El Dorado County. It analyzes the possibility of changes in population, housing, and employment that could result from implementation of the Upper Truckee River and Marsh Restoration Project, including those that could trigger adverse physical effects in the city or the region. Also, this section addresses environmental justice issues associated with the project's implementation.

3.15.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

Socioeconomics

National Environmental Policy Act, Section 1502

Provisions in NEPA found in Section 1502.16(c) of the Code of Federal Regulations (40 CFR 1502.16[c]) require federal agencies to identify potential conflicts between a proposed action and the related plans and policies of federal, state, and local agencies and Indian tribes. This requirement helps federal agencies identify potential conflicts that may cause adverse effects on the social and economic environment of a study area because many agencies' and tribes' plans and policies are designed to protect the people residing within their jurisdictions and/or the local economy they depend upon for their economic livelihoods (CEQ 2008).

Council on Environmental Quality

The Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500–1508) provide guidance related to social and economic impact assessments by noting that the "human environment" assessed under NEPA is to be "interpreted comprehensively" to include "the natural and physical environment and the relationship of people with that environment" (40 CFR 1508.14). Furthermore, these regulations require agencies to assess "aesthetic, historic, cultural, economic, social, or health" effects, whether direct, indirect, or cumulative (40 CFR 1508.8).

Environmental Justice

In 1994, President Bill Clinton issued Executive Order (EO) 12898 regarding environmental justice. This order requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States. Two documents provide some measure of guidance to agencies required to implement this executive order: *Environmental Justice: Guidance under the National Environmental Policy Act* (CEQ 1997) and *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis* (EPA 1998). Both serve as guides for incorporating environmental justice goals into preparation of environmental impact statements under NEPA. These documents provide specific guidelines for determining whether there are any environmental justice issues associated with a proposed federal project.

State

The California Environmental Protection Agency (Cal/EPA) adopted an environmental justice policy in 2004 (Cal/EPA 2004). Pursuant to California Public Resources Code Sections 71110–71113, Cal/EPA developed this policy to provide guidance to its resource boards, departments, and offices. The policy is intended to support the

State's goal of "achieving fair treatment of people of all races, cultures and incomes with respect to the development, adoption, implementation and enforcement of environmental laws and policies."

Tahoe Regional Planning Agency

TRPA recognizes a relationship between the health of the natural environment and the social and economic health of the region. The following declaration from the TRPA Compact (1980) states:

> **Article 1, Finding 6:** Maintenance of the social and economic health of the region depends on maintaining the significant scenic, recreational, educational, scientific, natural public health values provided by the Lake Tahoe Basin.

Goals and Policies

The following policy regarding socioeconomics from TRPA's Regional Plan (1987), listed under Goal 1 of the Land Use Element, is applicable to the project:

- **Policy 3:** The Regional Plan shall seek to maintain a balance between economic health and the environment.

ENVIRONMENTAL SETTING

Population

Population Growth

The City of South Lake Tahoe experienced its most dramatic population growth between 1970 and 1980, when its population grew from 12,921 to 20,681, or 4.82 percent per year. From 1990 to 2000, the population increased from 21,586 to 23,609, or 0.94 percent per year (CSLT 2008a:3-2). The city's year-round population reached a peak in 2002, and declined slightly between 2002 and 2006. As of January 1, 2008, the California Department of Finance (DOF) estimated that South Lake Tahoe's population was approximately 23,725 (DOF 2008a).

Approximately 15 percent of El Dorado County's population lives in South Lake Tahoe. The remaining population of the county resides in the incorporated city of Placerville (10,237 or 6 percent of the county's population) and unincorporated areas, including El Dorado Hills, Cameron Park, Shingle Springs, Meyers, and Pollock Pines (DOF 2008a).

El Dorado County has experienced a higher rate of population growth than South Lake Tahoe, primarily in the western part of the county. Although the city's population increased approximately 4.82 percent per year between 1970 and 1980, the county's population increased approximately 6.95 percent per year during the same period (CSLT 2008a:3-3). From 1990 to 2000, the population of El Dorado County increased from 125,955 to 156,299, or an average annual growth rate of 2.18 percent per year (CSLT 2008a:3-3). As of January 2008, DOF estimated that the county's population was 179,722 (DOF 2008a).

Racial Composition and Poverty Status

Table 3.15-1 shows the racial composition of the populations of South Lake Tahoe and El Dorado County. The city's population is shown to be predominantly white, accounting for 85.7 percent of the population in 1990, and 75.7 percent in 2000. However, the city has a proportionally smaller white population than the county. El Dorado County's white population accounted for 94.5 percent of the total population in 1990, and 89.7 percent in 2000. The white population increased in the county between 1990 and 2000, but South Lake Tahoe's white population decreased by 3.3 percent in the same period.

Table 3.15-1 Population Distribution by Race and Ethnicity for the City of South Lake Tahoe and El Dorado County					
Race/Ethnicity [1]	1990		2000		Percent of Change 1990–2000
	Population	Percent of Total	Population	Percent of Total	
City of South Lake Tahoe					
White	18,496	85.7	17,878	75.7	-3.3
Black or African American	223	1.0	178	0.8	-20.2
American Indian or Alaskan Native	226	1.0	228	1.0	0.9
Asian	1,367	6.3	1,419	6.0	3.8
Hispanic or Latino [2]	4,003	18.5	6,294	26.7	57.2
Total Population [3]	21,586	NA	23,609	NA	9.4
El Dorado County					
White	119,118	94.5	140,209	89.7	17.7
Black or African American	606	0.5	813	0.5	34.2
American Indian or Alaskan Native	1,351	1.1	1,566	1.0	15.9
Asian	2,456	1.9	3,328	2.1	35.5
Hispanic or Latino [2]	8,777	7.0	14,566	9.3	66.0
Total Population [3]	125,995	NA	156,299	NA	24.1

Notes:

[1] The "other" and "two or more races" categories are not included in the table because of changes in descriptive measures between the 1990 and 2000 U.S. Census.

[2] The U.S. Census Bureau considers Hispanic and Latino as an ethnicity, not a race. Consequently, a person of Hispanic or Latino descent could identify racially as White, Black/African American, Native American, Asian, or other.

[3] As a result of the circumstances identified in footnotes 1 and 2, the column data do not add to the total populations, and the percentages do not add to 100 (and the latter is therefore noted as "NA," or not applicable).

Sources: U.S. Census Bureau 2000, CSLT 2008a:3-8

The Black/African American population in South Lake Tahoe decreased 20.2 percent between 1990 and 2000. El Dorado County had a larger population of Black/African American residents than South Lake Tahoe, and its Black/African American population increased by 34.2 percent during the same period.

For both the city and county, the American Indian/Alaskan Native population generally remained the same between 1990 and 2000, comprising 1 percent of the total population in each location.

The Asian population in South Lake Tahoe increased by 3.8 percent between 1990 and 2000, accounting for 6 percent of the total population in 2000. In comparison, El Dorado County's Asian population increased by 35. percent between 1990 and 2000.

South Lake Tahoe's Hispanic/Latino population grew significantly between 1990 and 2000, increasing by 57.2 percent and accounting for more than a quarter of the city's total population in 2000. Between 1990 and 2000, E Dorado County also experienced significant growth in the number of its Hispanic/Latino residents, which increased by 66 percent. (Please note that the U.S. Census considers Hispanic/Latino individuals to be an ethnicity, rather than a race, so they are "double counted" in other racial categories.)

Table 3.15-2 shows the 1999 median household income, per capita income, and the percent of persons below poverty level in South Lake Tahoe and El Dorado County. The city's median household income and per capita income were lower than those of the county. The city's median income was $34,707 and its per capita income was $18,452, compared to a median income of $51,484 and a per capita income of $25,560 for the county. Approximately 12.5 percent of city residents were below poverty level, and 7.1 percent of county residents were below poverty level. This difference can be accounted for, in part, because South Lake Tahoe had a relatively high cost of living. In addition, people employed in the seasonal service industry and retail workforce generally worked in lower-wage jobs as casino workers, ski instructors, and restaurant workers.

Table 3.15-2
1999 Median Income, Per Capita Income, and Below Poverty Level Residents for City of South Lake Tahoe and El Dorado County

	Median Income	Per Capita Income [1]	Percent of Persons Below Poverty Level
South Lake Tahoe	$34,707	$18,452	12.5
El Dorado County	$51,484	$25,560	7.1

Note:
[1] Per capita income is the mean income computed for every man, woman, and child residing in South Lake Tahoe and El Dorado County, respectively.
Sources: U.S. Census Bureau 2000, CSLT 2008a:3-13, 3-16

Housing

The number of housing units in South Lake Tahoe decreased from 14,066 in 1990, to 14,005 in 2000, a decrease of less than 0.01 percent (CSLT 2008b:4-17). Although the housing statistics do not show a net increase in housing units, the city has seen an increase in residential development in recent years. Some of this housing development has occurred in places where existing units were demolished or rehabilitated, thus they are not reflected in the net housing growth (CSLT 2008b:4-18). The number of housing units, as of January 1, 2008, was estimated to be 14,355 (DOF 2008b). Median home prices in South Lake Tahoe declined by 6.2 percent during a one-year period (November 2006 to November 2007), from $453,000 to $425,000 (CSLT 2008b:4-52).

Vacancy trends in housing are analyzed using a vacancy rate to establish the relationship between housing supply and demand. If the demand for housing units is greater than the available supply, then the vacancy rate is low and the price of housing will most likely increase. According to the California Department of Housing and Community Development (HCD), a housing vacancy rate of 5 percent is considered normal (HCD 2000). Vacancy rates below 5 percent indicate a housing shortage in a community. The city had a vacancy rate of 2.0 percent for owner-occupied units and 8.3 percent for rental units in 2000 (CSLT 2008b:4-28).

As in any tourist destination, a large portion of the housing units in South Lake Tahoe are seasonal, second homes. Because the U.S. Census is collected in April during the city's low tourist season, most of these units are measured as vacant. Of the 14,005 housing units in the city in 2000, 4,595 housing units (32.8 percent) were reported to be vacant at the time of the U.S. Census (U.S. Census Bureau 2000). The majority of these vacant units (26.3 percent of the total housing stock) were for seasonal, recreational, or occasional use (CSLT 2008a:3-11).

Employment

The Lake Tahoe region, including South Lake Tahoe, has a primarily tourist-based economy. The impact of visitors to Lake Tahoe on the economy of the Lake Tahoe region was studied in the *2001 Threshold Evaluation* (TRPA 2002). Estimates generated by the report indicated that visitors to the region spent more than $1.5 billion on travel-related goods and services in 2000. Businesses that depend primarily on travel and tourism, such as

lodging establishments, gaming, restaurants, and recreation services, provide a major source of employment and payroll in the Lake Tahoe region (TRPA 2002).

Table 3.15-3 shows the total number of those employed by major industries who resided in the South Lake Tahoe in 2005. Employed citizens totaled 14,559. Of these, approximately 8,089 (55.6 percent) worked in the services industry, including 3,889 hotel and lodging workers, 648 entertainment and recreation workers, and 1,221 health and medical services workers. Retail trade was the second largest industry, with 3,833 workers (26.3 percent), including 1,139 restaurant workers. Many companies in the service industry and retail trade employ a seasonal workforce that is often composed of younger or college-aged workers (CSLT 2008b:4-24).

Table 3.15-3
2005 Employment by Major Industry

	Total	Percent
Agricultural, Forestry, Fishing	190	1.3
Mining	3	0.0
Construction	306	2.1
Manufacturing	60	0.4
Transportation and Communications	475	3.3
Wholesale Trade	171	1.2
Retail Trade	3,833	26.3
Finance, Insurance, and Real Estate	692	4.8
Services	8,089	55.6
Public Administration	740	5.1
Total	**14,559**	**100**

Source: CSLT 2008b:4-25

3.15.2 Environmental Consequences and Mitigation Measures

Significance Criteria

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; the TRPA Initial Environmental Checklist; factual or scientific information and data; and regulatory standards of federal, state, and local agencies. Additional criteria related to socioeconomics (and presented as NEPA criteria) are based on other recent environmental documents prepared by Reclamation in Northern California (Reclamation 2008). Together these CEQA, TRPA, and additional NEPA criteria encompass factors taken into account under NEPA to determine the significance of an action in terms of the context and intensity of its effects. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared.

Because socioeconomic topics are organized differently in NEPA, CEQA, and TRPA environmental provisions, the criteria are presented in a combined list, unlike other sections of the environmental document.

An alternative was determined to result in a significant effect related to socioeconomics or population and housing if it would:

- induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure) (CEQA 1);
- generate a substantial demand for new housing, the construction of which could cause significant environmental impacts (CEQA 2);
- displace substantial numbers of people or existing housing, necessitating the construction of replacement housing elsewhere (CEQA 3);
- alter the location, distribution, density, or growth rate of the human population planned for the Lake Tahoe region (TRPA 1);
- include or result in the temporary or permanent displacement of residents (TRPA 2);
- result in the loss of affordable housing (TRPA 3);
- affect existing housing, or create a demand for additional housing (TRPA 4);
- require numbers of new workers in a particular industrial sector from outside the local area during construction or operation for effective implementation (NEPA 1);
- cause a substantial decrease in the number of opportunities for short-term or long-term direct employment (NEPA 2);
- displace, relocate, or increase area businesses associated with an increase in recreational users (NEPA 3);
- compete with established industries for workers within the labor force or associated resources to the extent that there would be a shortage of workers available to related businesses (NEPA 4);
- cause a substantial decrease in the number of opportunities for temporary or long-term increases in personal and/or disposable incomes (NEPA 5); or
- considerably decrease the sales and/or incomes of businesses (NEPA 6).

Disproportionately High and Adverse Criteria

Based on CEQ and EPA guidelines (CEQ 1997, EPA 1998), an alternative was determined to result in an environmental justice issue if the project would cause impacts to low-income or minority populations that are disproportionately high and adverse, either directly, indirectly, or cumulatively. To make a finding that disproportionately high and adverse impacts would likely fall on a minority or low-income population, all three of the following conditions must be met:

- a minority or low-income population must reside in the affected area,
- a substantial and adverse impact must exist, and
- the impact on the minority or low-income population must be disproportionately high and adverse.

The CEQ guidance indicates that, when determining whether the effects are high and adverse, agencies are to consider whether the risks or rates of impact are significant (as defined by NEPA) or above generally accepted norms.

No TRPA significance criteria are applicable to the socioeconomic or environmental justice impacts of the project.

METHODS AND ASSUMPTIONS

The examination of demographic and socioeconomic characteristics in this section is based on information obtained from review of existing conditions and available projections, including those in the *City of Lake Tahoe General Plan Update Background Report* (CSLT 2008a) the draft Housing Element of the *City of Lake Tahoe General Plan* (CSLT 2008b), and projections made by the U.S. Census Bureau (2000), DOF (2008a, 2008b), and other sources.

According to CEQ and EPA guidelines, a minority population is present in an affected area if the minority population of the affected area exceeds 50 percent, or if the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. Under the same guidelines, a low-income population exists if the affected area is composed of 50 percent or more people living below the poverty threshold, as defined by the U.S. Census Bureau, or if the percentage of people living below the poverty threshold in the area is significantly greater than the poverty percentage of the general population or other appropriate unit of geographic analysis. For the purposes of an environmental justice screening, race, ethnic origin, and poverty status were obtained for South Lake Tahoe and El Dorado County. The city and county boundaries represent an area that is appropriate for consideration of environmental justice issues pursuant to EPA guidelines.

Implementation of Alternatives 1–4 would involve construction activities and associated employment opportunities, housing demand, and commercial activity. The estimated number of workers required for these activities are summarized in Appendix D, "Construction Workers and Equipment for Action Alternatives." For this analysis, it was assumed that each year the total number of construction workers would not exceed the sum of the workers estimated for all activities that year.

IMPACTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Socioeconomics, Populations, and Housing

Displace substantial numbers of people or existing housing (CEQA 3; TRPA 2, 3)—No residences are located in the project's study area. Therefore, the project would not directly displace substantial numbers of people or existing housing.

Decrease opportunities for employment or income increases, or considerably decrease the sales and/or incomes of businesses (NEPA 2, 5, 6)—No businesses are located within the study area and minimal commercial activity occurs in the study area. Furthermore, both construction of any project alternative and subsequent increases in recreational visitors to the study area would increase opportunities for employment or income increase, and sales and/or incomes of businesses. Therefore, the project would not decrease opportunities for employment or income increases, or sales and/or incomes of businesses.

Environmental Justice Issues

As discussed above and shown in Tables 3.15-1 and 3.15-2, no minority and low-income populations exceed 50 percent in South Lake Tahoe or El Dorado County. The city's slightly higher poverty rate is not meaningfully greater than the county's rate, and both the city and county poverty rates are proportionally less than the statewide rate of 18.6 percent. Therefore, no disproportionately high and adverse impacts on minority or low-income populations would occur and this topic is not discussed further.

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.15-1 (Alt. 1) **Short-Term Increase in Population and Housing Demand Resulting from Construction-Related Activities. (NEPA 1, 4; CEQA 1, 2; TRPA 1, 4)** *Alternative 1 would generate a temporary increase in employment in South Lake Tahoe from construction-related activities. However, the number of existing construction workers in the city and region is considered sufficient to meet the demands associated with Alternative 1; therefore, this temporary increase in employment is not expected to generate any substantial population growth in the study area or generate the need for additional housing for construction workers. This impact would be* ***less than significant****.*

Project construction would occur over a four-year period, and the number of construction jobs would vary by year. Construction activities would require up to an estimated 41 construction workers during both Year 1 and Year 2, 84 construction workers during Year 3, and 12 construction workers during Year 4. Compared to the other alternatives, Alternative 1 would require a similar number of workers during Years 1 and 2 (Alternatives 2–4 would require 34–46 workers during Years 1–2). During Year 3, Alternative 1 would require a similar number of workers to Alternative 2, somewhat more than Alternative 3, and more than Alternative 4 during Year 3 (Alternatives 2–4 would require 85, 68, and 35 workers, respectively, during Year 3). During Year 4, this alternative would require the same number of workers as Alternatives 2–4.

According to the latest labor data available from the U.S. Census Bureau (2000), 306 city residents are employed in the construction industry (Table 3.15-3). This number would likely be sufficient to meet the demands associated with Alternative 1. It is also possible that construction workers may come from nearby communities such as Sacramento, Carson City, and Reno. Because of the short-term nature of the construction season in the Tahoe Basin, it is common for workers to commute from these nearby communities. Consequently, neither substantial population growth nor an increase in housing demand in the region is anticipated. Therefore, the project would not be expected to generate the need for substantial additional housing in South Lake Tahoe during construction. Because of these conditions, the impact of a temporary increase in population growth and housing demand associated with project construction would be **less than significant**.

IMPACT 3.15-2 (Alt. 1) **Potential Long-Term Effect on Sales or Incomes of Local Businesses Resulting from Additional Visitors to the Study Area. (NEPA 3)** *Alternative 1 includes improved recreation facilities that could attract additional visitors to the study area, potentially increasing commercial activity at local businesses in South Lake Tahoe. However, minimal commercial activity would be associated with this increase in use because it would primarily result from residents of adjacent neighborhoods responding to greater connectivity between the Tahoe Keys and Al Tahoe neighborhoods, and these residents already use local businesses. Therefore, Alternative 1 would not negatively affect sales or incomes of local businesses. This impact would be* ***less than significant****.*

Alternative 1 would modify or add recreation facilities to the study area that could attract visitors, potentially increasing commercial activity at local businesses in South Lake Tahoe. These facilities would include kiosks, bicycle paths and pedestrian trails, two boardwalks, observation platforms and viewpoints, and a boardwalk and bridge across the Upper Truckee River. The proposed bridge and boardwalk over the Upper Truckee River would be a new public access element in the study area.

However, based on observations of recreation use of the study area, the improved recreation infrastructure is expected, in large part, to serve the existing residents of neighborhoods adjacent to the study area who already use local businesses. (Potential effects on recreational use of the study area are described in detail in Section 3.13, "Recreation.") Thus, any increase in commercial activity from the attraction of additional visitors would be minimal. Also, minimal commercial activity would be directly associated with the use of facilities constructed and

operated under this alternative. Therefore, Alternative 1 would not adversely affect sales or incomes of local businesses, and the long-term impact would be **less than significant**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.15-1 (Alt. 2) **Short-Term Increase in Population and Housing Demand Resulting from Construction-Related Activities. (NEPA 1, 4; CEQA 1, 2; TRPA 1, 4)** *Alternative 2 would generate a temporary increase in employment in South Lake Tahoe from construction-related activities. However, the number of existing construction workers in the city and region is considered sufficient to meet the demands associated with Alternative 2; therefore, this temporary increase in employment is not expected to generate any substantial population growth in the study area or generate the need for additional housing for construction workers. This impact would be* ***less than significant.***

This impact is similar to Impact 3.15-1 (Alt. 1). Construction activities would require up to an estimated 35 construction workers during both Year 1 and Year 2, 85 construction workers during Year 3, and 12 construction workers during Year 4. Compared to the other alternatives, Alternative 1 would require a similar number of workers during Years 1 and 2 (Alternatives 1, 3, and 4 would require 34–46 workers during Years 1–2). During Year 3, Alternative 2 would require a similar number of workers to Alternative 1 and more than Alternatives 3 and 4 (Alternatives 1, 3 and 4 would require 84, 68, and 35 workers, respectively, during Year 3). During Year 4, this alternative would require the same number of workers as Alternatives 1, 3, and 4.

Alternative 2 would generate a temporary increase in employment in South Lake Tahoe from construction-related activities. The present number of construction workers in the city and surrounding region is considered sufficient to meet the demands associated with Alternative 2; therefore, this temporary increase in employment is not expected to generate any substantial population growth in the study area or generate the need for additional housing for construction workers. This impact would be **less than significant**.

IMPACT 3.15-2 (Alt. 2) **Potential Long-Term Effect on Sales or Incomes of Local Businesses Resulting from Additional Visitors to the Study Area. (NEPA 3)** *Alternative 2 includes improved recreation facilities that could attract additional visitors to the study area. However, the additional recreational facilities would be limited, and the increase in use would be expected to be primarily by residents of adjacent neighborhoods. Therefore, Alternative 2 would not substantially increase the number of visitors, and thus would not considerably affect the sales or incomes of local businesses. This impact would be* ***less than significant****.*

Of all of the alternatives, Alternative 2 would modify or create the least public access and recreation infrastructure (but would include a fishing platform, a pedestrian trail, and viewpoints). (Potential effects on recreational use of the study area are described in detail in Section 3.13, "Recreation.")

Because these few additional features would be related to existing recreational activities in the study area, it is expected that users would be primarily from adjacent neighborhoods, as occurs under existing conditions. Alternative 2 would not likely attract a substantial number of additional visitors. Thus, any increase in commercial activity from the attraction of additional visitors would be minimal. Also, minimal commercial activity would be directly associated with the use of facilities constructed and operated under this alternative. Therefore, Alternative 2 would not considerably affect the sales or incomes of local businesses. This impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.15-1 (Alt. 3) **Temporary Increase in Population and Housing Demand Resulting from Construction-Related Activities. (NEPA 1, 4; CEQA 1, 2; TRPA 1, 4)** *Alternative 3 would generate a temporary increase in employment in South Lake Tahoe from construction-related activities. However, the number of existing construction workers in the city and region is considered sufficient to meet the demands associated with Alternative 3; therefore, this temporary increase in employment is not expected to generate any substantial population growth in the study area or generate the need for additional housing for construction workers. This impact would be* ***less than significant****.*

This impact is similar to Impact 3.15-1 (Alt. 1). Construction activities would require up to an estimated 38 construction workers during Year 1, 46 construction workers during Year 2, 68 construction workers in Year 3, and 12 construction workers in Year 4. Compared to the other alternatives, Alternative 3 would require a similar number of workers during Years 1 and 2 (Alternatives 1, 2, and 4 would require 34–41 workers during Years 1–2). During Year 3, Alternative 3 would require fewer workers than Alternatives 1 and 2, but more than Alternative 4 (Alternatives 1, 2, and 4 would require 84, 85, and 35 workers, respectively, during Year 3). During Year 4, this alternative would require the same number of workers as Alternatives 1, 2, and 4.

Alternative 3 would generate a temporary increase in employment in South Lake Tahoe from construction-related activities. However, the present number of construction workers in the city and region is considered sufficient to meet the demands associated with Alternative 3; therefore, this temporary increase in employment is not expected to generate any substantial population growth in the study area or generate the need for additional housing for construction workers. This impact would be **less than significant**.

IMPACT 3.15-2 (Alt. 3) **Potential Long-Term Effect on Sales or Incomes of Local Businesses Resulting from Additional Visitors to the Study Area. (NEPA 3)** *Alternative 3 includes improved recreation facilities that could attract additional visitors to the study area, potentially increasing commercial activity at local businesses in South Lake Tahoe. However, this increase in use is expected to be primarily by residents of adjacent neighborhoods who already use local businesses. Overall, the number of additional visitors would not be substantial, and minimal commercial activity would be associated with this alternative. Therefore, Alternative 3 would not considerably affect the sales or incomes of local businesses. This impact would be* ***less than significant****.*

Relative to the other alternatives, Alternative 3 would modify or create an intermediate level of public access and recreation infrastructure (including a kiosk, pedestrian trails, fishing access, viewpoints, and an observation platform). These features could attract additional visitors to the study area, which could increase commercial activity at local businesses. (Potential effects on recreational use of the study area are described in detail in Section 3.13, "Recreation.")

Because additional features are limited and would be related to existing recreational activities in the study area, it is expected that users would be primarily from adjacent neighborhoods, as occurs under existing conditions. Thus, Alternative 3 would not likely cause a substantial number of additional visitors. Thus, any increase in commercial activity from the attraction of additional visitors would be minimal. Also, minimal commercial activity would be directly associated with the use of facilities constructed and operated under this alternative. Therefore, Alternative 3 would not considerably affect the sales or incomes of local businesses. This impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.15-1 (Alt. 4) **Temporary Increase in Population and Housing Demand Resulting from Construction-Related Activities. (NEPA 1, 4; CEQA 1, 2; TRPA 1, 4)** *Alternative 4 would generate a temporary increase in employment in South Lake Tahoe from construction-related activities. The number of existing construction workers in the city and region is considered sufficient to meet demands associated with Alternative 4; therefore, this temporary increase in employment is not expected to generate any substantial population growth in the study area or generate the need for additional housing for construction workers. This impact would be* ***less than significant****.*

This impact is similar to Impact 3.15-1 (Alt. 1). Construction activities would require up to an estimated 34 construction workers during Year 1, 41 construction workers during Year 2, 35 construction workers during Year 3, and 12 construction workers during Year 4. Compared to the other alternatives, Alternative 4 would require a similar number of workers during Years 1 and 2 (Alternatives 1–3 would require 35–46 workers during Years 1–2). During Year 3, Alternative 4 would require fewer workers than Alternatives 1–3 (Alternatives 1–3 would require 84, 85, and 68 workers, respectively, during Year 3). During Year 4, this alternative would require the same number of workers as Alternatives 1–3.

Alternative 4 would generate a temporary increase in employment in South Lake Tahoe from construction-related activities. However, the present number of construction personnel in the city and region is considered sufficient to meet the demands associated with Alternative 4; therefore, this temporary increase in employment is not expected to generate any substantial population growth in the study area or generate the need for additional housing for construction workers. This impact would be **less than significant**.

IMPACT 3.15-2 (Alt. 4) **Potential Long-Term Effect on Sales or Incomes of Local Businesses Resulting from Additional Visitors to the Study Area. (NEPA 3)** *Alternative 4 includes improved recreation facilities that could attract additional visitors to the study area, potentially increasing commercial activity at local businesses in South Lake Tahoe. However, this increase in use is expected to be primarily by residents of adjacent neighborhoods who already use local businesses. Overall, the number of additional visitors would not be substantial, and minimal commercial activity would be associated with this alternative. Therefore, Alternative 4 would not considerably affect the sales or incomes of local businesses. This impact would be* ***less than significant****.*

Relative to the other alternatives, Alternative 4 would modify or create an intermediate level of public access and recreation infrastructure (including a kiosk, pedestrian trails, viewpoints, and observation platforms). These features could attract additional visitors to the study area, which could increase commercial activity at local businesses. (Potential effects on recreational use of the study area are described in detail in Section 3.13, "Recreation.")

Because additional features are limited and would be related to existing recreational activities in the study area, it is expected that users would be primarily from adjacent neighborhoods, as occurs under existing conditions. Thus, Alternative 4 would not likely cause a substantial number of additional visitors. Thus, any increase in commercial activity from the attraction of additional visitors would be minimal. Also, minimal commercial activity would be directly associated with the use of facilities constructed and operated under this alternative. Therefore, Alternative 4 would not considerably affect the sales or incomes of local businesses. This impact would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.15-1 (Alt. 5) **Temporary Increase in Population and Housing Demand Resulting from Construction-Related Activities. (NEPA 1, 4; CEQA 1, 2; TRPA 1, 4)** *Alternative 5 would not include any construction activities; therefore, it would not cause a temporary increase in population and housing demand resulting from construction-related activities.* ***No impact*** *would occur.*

As the No-Project/No-Action Alternative, Alternative 5 would not include any construction activities. No construction workers would be employed to build recreation facilities or other elements of the project. Therefore, this alternative would not cause a temporary increase in population and housing demand resulting from construction-related activities. **No impact** would occur.

IMPACT 3.15-2 (Alt. 5) **Potential Long-Term Effect on Sales or Incomes of Local Businesses Resulting from Additional Visitors to the Study Area. (NEPA 3)** *No additional recreation facilities would be constructed, and existing facilities would not be expanded. Therefore, Alternative 5 would not result in additional visitors to the study area, and thus would not affect sales or incomes of local businesses.* ***No impact*** *would occur.*

Under Alternative 5, no additional recreation facilities would be constructed, and existing facilities would not be expanded. Levels of recreation use would be expected to remain similar to current levels. Because Alternative 5 would not result in additional visitors to the study area, it would not affect sales levels or incomes of local businesses. **No impact** would occur.

3.16 TRANSPORTATION, PARKING, AND CIRCULATION

This section describes the regulations related to transportation, parking, and circulation, along with the existing transportation infrastructure in the study area; identifies significance criteria for potential impacts on transportation facilities; and evaluates the significance of potential impacts associated with implementing the project alternatives, including possible effects on parking capacity and traffic circulation. Section 3.12, "Public Services," discusses effects resulting from roadway obstruction during construction and associated mitigation.

3.16.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

This section describes the federal, state, and regional and local transportation-related standards and criteria that may apply to the project.

Federal

A number of statutes and regulations exist that include provisions specific to the interstate system in California and transportation projects in general. Title 23 of the U.S. Code (USC) and Title 23 of the Code of Federal Regulations (CFR) are the laws governing highways, and 23 USC and CFR 49 are the laws governing transportation.

The following federal legislative statutes also may apply to surface transportation and other transportation aspects of the project:

- Federal Clean Air Act;
- Federal Transit Act;
- Americans with Disabilities Act;
- Civil Rights Act; and
- Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users.

Federal statutes specify the procedures that the U.S. Department of Transportation must follow in setting policy regarding the placement of utility facilities within the rights-of-way of roadways that received federal funding. These include expressways, most state highways, and certain local roads. Federal Highway Administration (FHWA) regulations require that each state develop its own policy regarding the accommodation of utility facilities within the rights-of-way of such roads. After FHWA has approved a state's policy, the state can approve any proposed utility installation without referral to FHWA, unless utility installation does not conform to the policy.

Federal law does not directly control how states accommodate utilities within highway rights-of-way; however, in determining whether a right-of-way on a federally-funded highway should be used for accommodating a utility facility, the Secretary of Transportation must (1) ascertain the effect that accommodating utilities would have on highway and traffic safety because no use may be authorized or permitted that would adversely affect safety, (2) evaluate the direct and indirect environmental and economic effects of any loss of productive agricultural land or any impairment of its productivity that would result from disapproving accommodation of the utility facility, and (3) consider the environmental and economic effects together with any interference with or impairment of the use of the highway that would result from accommodation of the utility facility (23 USC Section 109[l]). In addition, 23 USC Section 116 requires state highway agencies to ensure proper maintenance of highway facilities, which implies adequate control over nonhighway facilities, such as utility facilities. Finally, 23 USC Section 123 specifies when federal funds can be used to pay for the costs of relocating utility facilities in connection with highway construction projects (McCarthy 2004).

State

The California Department of Transportation (Caltrans) plans, designs, constructs, and maintains state-owned roadways. Under agreement with the federal government, Caltrans sites, designs, constructs, and maintains federal highways, including the highways in the Interstate Highway System. Caltrans's Standard Specifications (Caltrans 2006) establish uniform design and construction procedures for California and federal highways. The specifications are used by local departments of transportation for local roads. The highway design criteria and policies in the Standard Specifications ensure minimum design, contract, and construction standards for road projects. U.S. Highway 50 (U.S. 50), a portion of which is located in the study area, is maintained by Caltrans District 3, headquartered in Marysville, California.

Tahoe Regional Planning Agency

Standards and performance targets identified by the Tahoe Regional Planning Agency (TRPA) are presented in the Transportation Element of the *Regional Plan for the Lake Tahoe Basin: Goals and Policies* (TRPA 2006), the TRPA threshold evaluation reports (TRPA 2002, 2007), and *Lake Tahoe Regional Transportation Plan – Mobility 2030* (RTP) (Tahoe Metropolitan Planning Organization and TRPA 2008). Table 3.16-1 summarizes the applicable standards or criteria of each of the plans and policies. TRPA policies and standards related to bicycle and pedestrian pathway facilities are described in Section 3.13, "Recreation."

Table 3.16-1
Transportation and Circulation Standards

Plan/Policy	Standard/Criteria
Tahoe Regional Planning Compact (1980)	Transportation planning in the region is required (1) to reduce dependency on the automobile by making more effective use of existing transportation modes and of public transit to move people and goods in the region and (2) to reduce to the extent feasible air pollution caused by motor vehicles.
TRPA thresholds (2007)	The thresholds that involve transportation issues are intended to reduce air quality problems as follows: *Air Quality: Subregional Visibility & Nitrate Deposition* Reduce Vehicle Miles of Travel in the basin by 10% of the 1981 base year values.
TRPA Regional Plan Goals and Policies (2006)	The Transportation Element of the Goals and Policies establishes general goals to be further defined by the RTP. This section sets the following level of service standards: LOS D for urban roads and LOS D, with brief periods (no more than four hours) of LOS E, for signalized intersections. There are no standards for unsignalized intersections.
Lake Tahoe Regional Transportation Plan (2008)	*Desired Condition 2: Environmental Impacts*: The transportation system is integrated with environmental goals in conjunction with the TRPA threshold areas as part of the TRPA RTP. Environmental performance indicators are vehicle miles traveled and traffic volumes.
TRPA Air Quality Plan (1995)	The TRPA Air Quality Plan provides more detail than the RTP on strategies required to meet the air quality–related goals.
TRPA Code of Ordinances (adopted 2011, effective 2012)	Adherence to Section 12.4.3.B requirements for traffic considerations, including vehicle trip reduction targets, and Section 65.2.4.B requirements for traffic analyses; the code sections require reducing significant impacts to a less-than-significant level.

Notes: LOS = level of service; RTP = Lake Tahoe Regional Transportation Plan; TRPA = Tahoe Regional Planning Agency.
Source: Data provided by KD Anderson & Associates and compiled by AECOM in 2009.

Regional Plan Goals and Policies

The formulation of regional transportation goals and policies is a fundamental step in the transportation planning process. The Goals and Policies reflect the consideration of environmental, social, and economic factors in making transportation-related decisions.

Regional Transportation Goals

1. It is the goal of the Regional Transportation Plan to attain and maintain the Environmental Threshold Carrying Capacities and federal, state, and local transportation standards.

2. It is the goal of the Regional Transportation Plan to establish a safe, efficient, and integrated transportation system which reduces reliance on the private automobile, provides for alternative modes of transportation, and serves the basic transportation needs of the citizens of the Tahoe Region, supports the economic base of the Region in the movement of goods and people, and minimizes adverse impacts on man and the environment.

Regional Transportation Policies and Objectives

1. Plan for and promote land use changes and development patterns which will encourage the use of alternative transportation modes and minimize impacts on the existing transportation system.

   A. Community Plans shall promote land use development patterns and designs which will increase the ability to use public transportation, waterborne, bicycle and pedestrian facilities.

   B. New, expanded or revised developments and land uses shall fully mitigate their regional and cumulative traffic impacts.

   C. Parking for non-residential uses shall be the minimum/maximum required to meet the demand for parking generated by the use, except as may be offset by reducing parking demand through parking management and trip reduction programs.

   D. Driveways shall be designed and sited to minimize impacts on public transportation, adjacent roadways and intersections, bicycle and pedestrian facilities.

2. Develop and encourage the use of pedestrian and bicycle facilities as a safe and viable alternative to automobile use.

   A. Pedestrian and bicycle facilities shall be constructed, or upgraded, and maintained along major travel routes.

   B. Bicycle and pedestrian facilities in urbanized areas and along transportation routes used for commuting should be maintained to allow year-around use of the facilities.

3. Transportation System Management (TSM) measures shall be used to improve the efficiency of the existing transportation system.

   A. Traffic conflicts should be reduced by limiting or controlling access to major regional travel routes and major local road ways.

   B. Intersection improvements required to upgrade existing levels of service including lane restriping, turn lanes, channelization and traffic signals should be implemented when warranted.

C. Roadway designs shall accommodate bicycle lanes and transit stops and reduce conflicts between vehicles and bicycle and pedestrians.

D. Left-turn lanes and right-turn lanes shall be provided to reduce turning conflicts along major travel routes.

4. Limit improvements to the regional highway system to those necessary to meet the Goals and Policies of the Regional Plan.

   Level of service (LOS) criteria for the Region's highway system and signalized intersections during peak periods shall be:

   - Level of service "C" on rural recreational/scenic roads.
   - Level of service "D" on rural developed area roads.
   - Level of service "D" on urban developed area roads.
   - Level of service "D" for signalized intersections.
   - Level of service "E" may be acceptable during peak periods in urban areas, not to exceed four hours per day.

Lake Tahoe Regional Transportation Plan—Mobility 2030 (Goals and Policies, Action Element)

Of the plans summarized in Table 3.16-1, the RTP provides the most detailed direction for transportation program development in the study area. The Tahoe Regional Planning Compact (the Compact) states that the goals of transportation planning shall be to reduce to the extent feasible air pollution caused by motor vehicles and to reduce dependency on the automobile by making more effective use of existing transportation modes and public transit to move people and goods in the region. The purpose of the RTP is to attain and maintain the environmental threshold carrying capacities (thresholds) established by TRPA in 1982 and all applicable federal, state, and local standards established for transportation and air quality.

The TRPA transportation thresholds address carbon monoxide, ozone, regional and subregional visibility, and nitrate deposition. There are numerical standards for each of these parameters, in addition to management standards that are intended to assist in attaining the thresholds. The management standards include the reduction of wood smoke, maintenance of oxides of nitrogen levels, reduction of U.S. 50 traffic volumes, and reduction of vehicle miles traveled (VMT). The Compact also states that the RTP shall provide for attaining and maintaining federal, state, or local air quality standards, whichever are strictest, in the respective portions of the region for which the standards are applicable.

The RTP establishes goals, policies, and actions that would be implemented over the planning horizon (i.e., up to 2030). Environmental indicators of reduced VMT and traffic delays would be achieved through land use and transportation decision making. The plan does not apply to short-term construction-related effects. The goal most applicable to the project is to "[d]esign an atmosphere that encourages bicycle and pedestrian usage as a viable and significant mode of transportation at Lake Tahoe." The following policies to achieve this goal are applicable to the project:

A. The RTP and Lake Tahoe Region Bicycle and Pedestrian Master Plan (Bike/Ped Plan) shall contain a list of existing and proposed bicycle and pedestrian facilities and policies for the development of any new bicycle/pedestrian facilities in the Lake Tahoe Region.

B. Pedestrian and bicycle facilities consistent with the RTP and Bike/Ped Plan shall be constructed, upgraded and maintained.

C. There shall be a high priority on constructing pedestrian and bicycle facilities in urbanized areas and in areas that increase connectivity of the bicycle network.

G. Projects funded all or in part with TMPO [Tahoe Metropolitan Planning Organization] administered funding shall include the accommodation of bicycle and pedestrian facilities in the earliest stages of project development. The TMPO shall not release funds for projects that do not show accommodation of bicycle and pedestrian needs.

H. Bicycle and pedestrian linkages shall be provided between residential and non-residential areas.

I. Maintenance policies for bicycle and pedestrian facilities should reflect usage and consider maintaining routes to allow for year-round use of the facilities where appropriate.

K. Safety awareness signage, road markings and educational programs, as well as programs that encourage bicycling and walking, shall be implemented where appropriate.

ENVIRONMENTAL SETTING

This section identifies the existing transportation facilities and describes traffic conditions for the roadway network in the study area. Exhibit 3.16-1 presents the roadway network in the study area.

Roadway System

The major internal road system in the study area includes the following roadways.

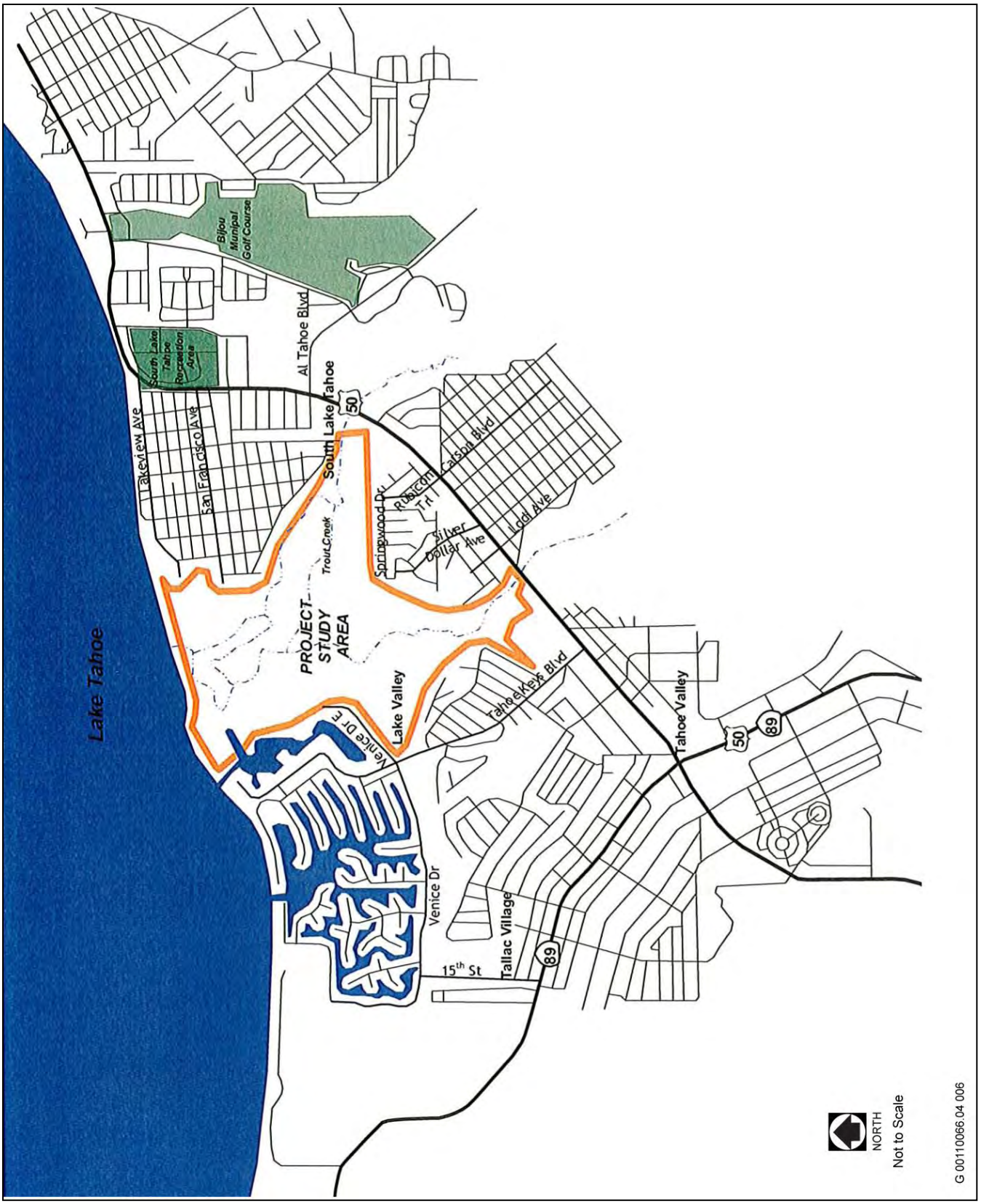
U.S. 50, the first California highway, is the primary route providing access to and through the city of South Lake Tahoe. U.S. 50 connects the city with Sacramento, California, to the west via Echo Summit and with Carson City, Nevada, to the east via Spooner Summit. From the signalized U.S. 50/State Route (SR) 89 intersection with Lake Tahoe Boulevard (the "Y"), SR 89 continues north/northwest and is also designated as Emerald Bay Road. Southeast and northeast of the Y, U.S. 50 is designated as Lake Tahoe Boulevard as it heads east through the city toward Stateline, Nevada, and south into the county area.

The physical characteristics of U.S. 50 vary in the Tahoe Basin. As the highway enters the Tahoe Basin from the south, U.S. 50 is a two-lane roadway. The posted speed along the two-lane segment ranges from 40 to 50 miles per hour (mph). At approximately F Street in the city of South Lake Tahoe, U.S. 50 becomes a four-lane highway with a continuous center left-turn lane and a posted speed of 50 mph (although the speed limit drops from 50 to 40 mph at H Street and to 35 mph near D Street). U.S. 50 continues east through the city as a four-lane roadway with a continuous center turn lane and a speed limit of 35 mph.

SR 89 merges with U.S. 50 in the community of Meyers, south of the city of South Lake Tahoe. From the Y, SR 89/Emerald Bay Road diverges from U.S. 50 and continues north/northwest. SR 89 is a two-lane road in the basin, except for a four-lane segment between F Street and West Way. Speed limits on SR 89 range from 40–50 mph south of the city to 35 mph in town. SR 89 continues north around the west shore of Lake Tahoe to Tahoe City, then heads northwest to the Town of Truckee, Interstate 80, and beyond to the north/northwest of Truckee.

Tahoe Keys Boulevard provides access to the west side of the study area via East Venice Drive (see below) from a signalized T-intersection at Lake Tahoe Boulevard (U.S. 50). Tahoe Keys Boulevard is a two-lane road with a posted speed of 30 mph. As it enters the Tahoe Keys development (Tahoe Keys), it has a landscaped center median and striped on-street bicycle lanes. Tahoe Keys Boulevard terminates in Tahoe Keys in a cul-de-sac adjacent to the lake.

East Venice Drive is a two-lane road that provides direct access to the west side of the study area and to the Tahoe Keys Marina, east of Tahoe Keys Boulevard. It becomes Venice Drive where it crosses Tahoe Keys Boulevard, and it extends through a portion of Tahoe Keys. The speed limit on Venice Drive and East Venice Drive is 25 mph.



Source: Data provided by KD Anderson & Associates in 2007

Exhibit 3.16-1 **Project Area Location and Roadway Map**

Fifteenth Street is a two-lane local street that links Venice Drive with SR 89 at the west end of Tahoe Keys. The posted speed limit on Fifteenth Street is 25 mph.

Rubicon Trail is one of several two-lane roads that provide access to the Highland Woods neighborhood, which abuts the southeast end of the study area. Rubicon Trail originates at a signalized intersection at U.S. 50 and continues north to Springwood Drive. The posted speed limit on Rubicon Trail is 25 mph.

Springwood Drive is a two-lane roadway that provides direct access to the homes adjacent to a portion of the southern boundary of the study area. The posted speed limit on Springwood Drive is 25 mph.

Silver Dollar Avenue is a local two-lane roadway that extends generally north from an unsignalized intersection on U.S. 50 to Springwood Drive. The posted speed limit on Silver Dollar Avenue is 25 mph.

Lodi Avenue is a two-lane roadway that extends north and south from an unsignalized intersection on U.S. 50. It provides access to the study area via Ponderosa Street and Conestoga Street. There are no speed limit signs on this section of Lodi Avenue.

Lakeview Avenue is a two-lane roadway that is one of numerous routes that link the Al Tahoe neighborhood, which is adjacent to the east side of the study area, with U.S. 50. It extends for more than 0.5 mile from the project boundary to a signalized intersection on U.S. 50. The posted speed limit on Lakeview Avenue is 25 mph.

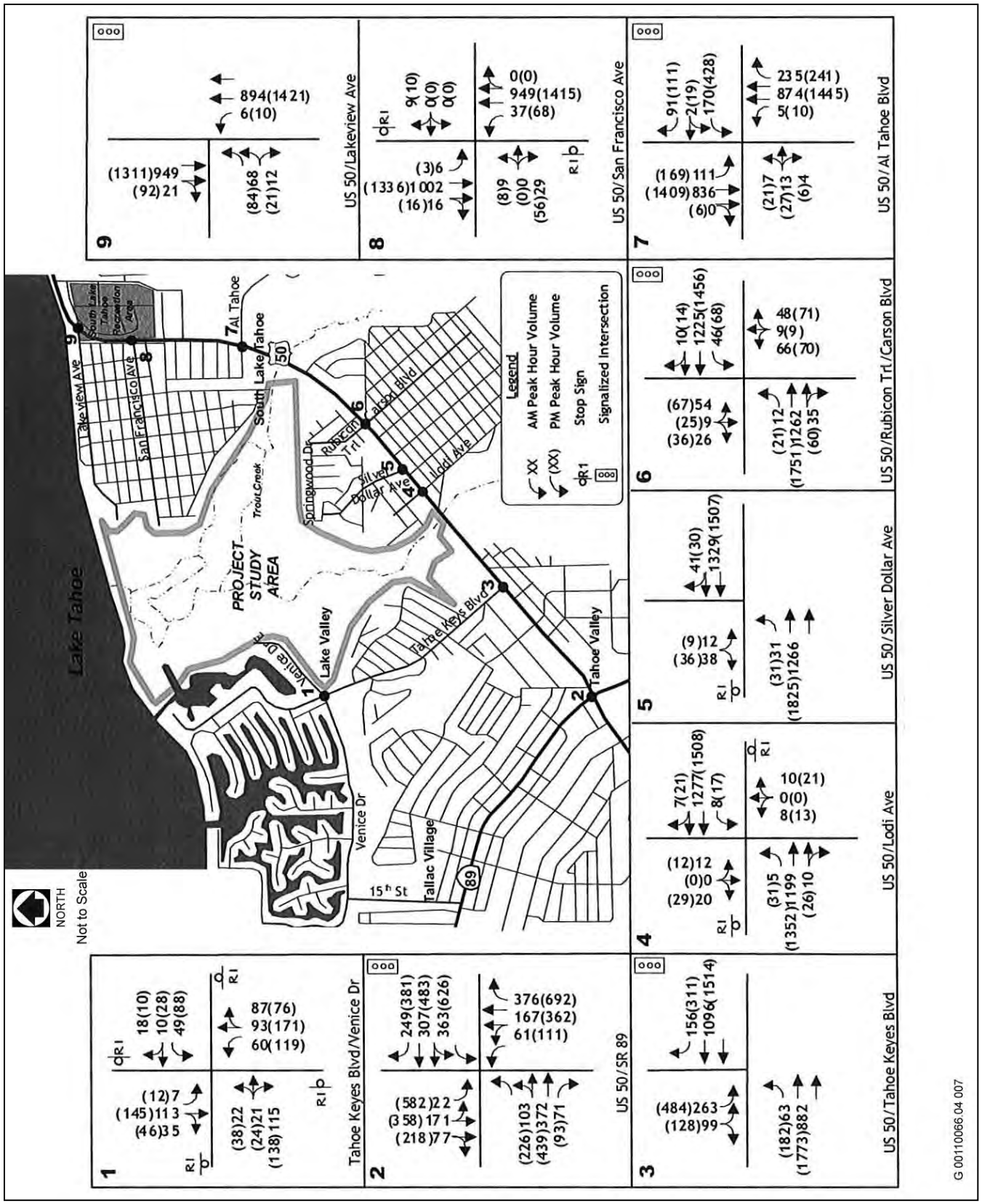
San Francisco Avenue is a two-lane roadway that extends from the eastern boundary of the study area to an unsignalized intersection on U.S. 50. There are no speed limit signs on this section of San Francisco Avenue.

Existing Traffic Volumes

Weekday peak-hour turning movement counts were performed by KD Anderson & Associates, Inc. in September 2007 (from 7 to 9 a.m. and from 4 to 6 p.m.) at key intersections to supplement 1999 data assembled for the Lower West Side Wetland Restoration Project and traffic counts conducted in August 2000 by CSS Planning and Engineering. The intersections selected for analysis are critical intersections for existing traffic. Some or all of these intersections are expected to incur the highest volume of project-related construction traffic, depending on the alternative being evaluated. The September 2007 counts were factored to peak month (August) values based on seasonal factors provided by TRPA. Counts were conducted at the following intersections:

- Tahoe Keys Boulevard/East Venice Drive,
- SR 89/U.S. 50 (the Y),
- U.S. 50/Tahoe Keys Boulevard,
- U.S. 50/Lodi Avenue,
- U.S. 50/Rubicon Trail,
- U.S. 50/Al Tahoe Boulevard,
- U.S. 50/San Francisco Avenue, and
- U.S. 50/Lakeview Avenue.

The lane configurations, existing turning movement counts, and traffic control devices are illustrated in Exhibit 3.16-2. To provide additional perspective on current traffic conditions, 24-hour traffic volume counts were conducted in September 2007 on roadways that could provide access, including construction access, to the study area. These counts were also factored to weekday peak-month levels based on seasonal factors provided by TRPA. The seasonal factors were calibrated by TMPO (Tahoe Metropolitan Planning Organization) using a graphic information system (GIS)–based traffic model package (TransCAD) developed by Parsons Brinckerhoff Quade & Douglas Inc. Additional information concerning the TransCAD model development and calibration efforts are referenced in Lake Tahoe Resident and Visitor Model; Model Description and Final Results; Parsons Brinckerhoff Quade & Douglas Inc., August 2007. Table 3.16-2 shows actual daily counts and estimated weekday peak-month levels.



Source: Data provided by KD Anderson & Associates in 2007

Exhibit 3.16-2 **Existing Traffic Volumes and Lane Configurations**

Table 3.16-2 Existing Daily Traffic Volumes				
Location			Daily Volume	
Road/Street	From	To	September 2007	Peak Month*
San Francisco Avenue	Riverside Avenue	U.S. 50	877	1,000
Lakeview Avenue	Riverside Avenue	U.S. 50	1,795	2,100
East Venice Drive	Tahoe Keys Boulevard	Terminal End (near Tahoe Keys Marina)	1,304	1,500
Silver Dollar Avenue	Ponderosa Street	U.S. 50	1,079	1,250
Sunset Drive	Ponderosa Street	Conestoga Street	74	85

Notes: U.S. 50 = U.S. Highway 50
*Peak month numbers are estimated from September 2007 counts based on seasonal factors modeled using TransCAD.
Source: KD Anderson and Associates 2007

Intersection Level of Service

Intersections are evaluated in terms of level of service (LOS), which is a measure of driving conditions and vehicle delay. LOS ranges from A (best) to F (poorest) (Table 3.16-3). LOS A, B, or C indicates conditions where traffic can move relatively freely. LOS D describes conditions where delay is more noticeable. LOS E describes conditions where traffic volumes are at or close to capacity, resulting in significant delays and average speeds that are one-third the uncongested speed or lower. LOS F characterizes conditions where traffic demand exceeds available capacity, with very slow speeds (stop-and-go traffic) and long delays (more than a minute) and queuing at signalized intersections.

Table 3.16-3 Level of Service Definitions			
Level of Service	Signalized Intersection	Unsignalized Intersection	Roadway (Daily)
A	Uncongested operations, all queues clear in a single-signal cycle. Delay ≤ 10.0 sec	Little or no delay. Delay ≤ 10.0 sec/veh	Completely free flow.
B	Uncongested operations, all queues clear in a single cycle. Delay > 10.0 sec and ≤ 20.0 sec	Short traffic delays. Delay > 10 sec/veh and ≤ 15 sec/veh	Free flow, presence of other vehicles noticeable.
C	Light congestion, occasional backups on critical approaches. Delay > 20.0 sec and ≤ 35.0 sec	Average traffic delays. Delay > 15 sec/veh and ≤ 25 sec/veh	Ability to maneuver and select operating speed affected.
D	Significant congestions of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. Delay > 35.0 sec and ≤ 55.0 sec	Long traffic delays. Delay > 25 sec/veh and ≤ 35 sec/veh	Unstable flow, speeds and ability to maneuver restricted.
E	Severe congestion with some long-standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). Delay > 55.0 sec and ≤ 80.0 sec	Very long traffic delays, failure, extreme congestion. Delay > 35 sec/veh and ≤ 50 sec/veh	At or near capacity, flow quite unstable.
F	Total breakdown, stop-and-go operation. Delay > 60.0 sec	Intersection blocked by external causes. Delay > 50 sec/veh	Forced flow, breakdown.

Notes: sec = seconds; sec/veh = seconds per vehicle.
Sources: TRB 1994, 2000

Signalized intersections are evaluated consistent with the operations method from the *2000 Highway Capacity Manual* using TRAFFIX software (TRB 2000). This method is used to evaluate the amount of green signal time available to each traffic approach and the total intersection capacity used by the traffic demand, and to assign a level of service based on the average delay that drivers would experience at the intersection during the peak hour.

The unsignalized intersections were evaluated using the methodology from Chapter 9 of the *Highway Capacity Manual* (TRB 2000). At these intersections, each turning movement that yields to an opposing movement is evaluated separately and assigned a level of service based on the relative ability of turning traffic to find adequate gaps in conflicting traffic flows.

Existing levels of service were calculated for each study intersection (Table 3.16-4). All the signalized study intersections operate at LOS A, B, or C with relatively free-flowing movement. Motorists attempting to enter U.S. 50 (Lake Tahoe Boulevard) at unsignalized intersections experience delays that are generally indicative of LOS D or better conditions, except at the U.S. 50/Lodi Avenue intersection. At that intersection, motorists experience delays that are representative of LOS E and F conditions in the p.m. peak hour.

Table 3.16-4
Existing Weekday Peak-Hour Levels of Service

Location	Control	Weekday Peak-Hour Levels of Service			
		A.M. Peak Hour		P.M. Peak Hour	
		Average Delay (seconds)	LOS	Average Delay (seconds)	LOS
Tahoe Keys Boulevard/East Venice Drive	All-way stop	9.8	A	11.6	B
SR 89/U.S. 50 (the Y)	Signal	26.9	C	33.8	C
U.S. 50/Tahoe Keys Boulevard	Signal	14.0	B	30.5	C
U.S. 50/Lodi Avenue	NB/SB stop				
(Overall)[1]		(0.6)	(A)	(1.3)	(A)
EB left turn		12.7	B	14.7	B
WB left turn		12.2	B	18.3	C
NB left+through+right turn		26.8	D	72.0	F
SB left+through+right turn		28.5	D	38.8	E
U.S. 50/Silver Dollar Avenue					
(Overall)		(0.6)	(A)	(0.5)	(A)
EB left turn		14.0	B	14.8	B
SB left+right turn		24.3	C	25.9	D
U.S. 50/Rubicon Trail	Signal	11.4	B	14.4	B
U.S. 50/Al Tahoe Boulevard	Signal	13.2	B	20.8	C
U.S. 50/San Francisco Avenue	EB/WB stop				
(Overall)		(0.6)	(A)	(0.9)	(A)
NB left turn		11.3	B	13.9	B
SB left turn		10.5	B	13.1	B
EB left+through+right turn		18.6	C	22.9	C
WB left+through+right turn		12.4	B	15.4	C
U.S. 50/Lakeview Avenue	Signal	4.3	A	4.6	A

Notes: EB = eastbound; LOS = level of service; NB = northbound; SB = southbound; WB = westbound; SR = State Route; U.S. 50 = U.S. Highway 50.

[1] Values in parentheses are the "overall" level of service for the intersection.

Source: KD Anderson & Associates 2007

Parking Facilities

No formal parking facilities are designated for use by visitors to the study area. Parking is permitted on the public road rights-of-way. TRPA and the CSLT approved additional Tahoe Keys Marina parking in 2009 and 2010, respectively, but a final agreement has not been completed. This final long-term lease agreement would create more than 100 spaces and would provide additional parking for visitors to the marina and study area alike.

The present demand for study area visitor parking was estimated using information from recreation and access surveys conducted by the Conservancy in 2004 and 2005 (Conservancy 2005). The information reported in the formal surveys was combined with observations of public use made by the Conservancy's land stewards during 2003, 2004, 2005, and 2007 (Rozance 2007a, 2007b). This information was compared with the size of parking facilities at other comparable destinations around Lake Tahoe. Reference sites included Baldwin Beach west and east lots, Cave Rock, Rabe Meadow, Kiva Beach, Logan Shoals, Mt. Tallac Trailhead, Pope Beach, Secline Beach, and Skunk Harbor.

Access data were collected by the Conservancy at East Venice Drive, the primary point of access, during 2004 and 2005 (Conservancy 2005). Some visitors also access the study area from adjacent neighborhoods; these visitors are primarily residents of those neighborhoods, and thus, generate relatively little parking demand. Access data collected at East Venice Drive indicate that on summer weekends and holidays, for portions of the day, the number of visitors accessing the study area at East Venice Drive exceeded 20 per hour and once exceeded 40 per hour (Table 3.16-5). On fall, winter, and spring weekends, the number of visitors accessing the study area frequently exceeded ten per hour for an hour or more but did not exceed 20 visitors per hour. Overall, the data collected during 2004 and 2005 show that people visit the study area mostly mid-day during the summer with parking demand peaking on weekends and holidays.

Table 3.16-5
Visitors Accessing Conservancy Property from East Venice Drive on Monitored Days during 2004–2005

Date and Day of Week	Time											
	0700–0800	0800–0900	0900–1000	1000–1100	1100–1200	1200–1300	1300–1400	1400–-1500	1500–1600	1600–1700	1700–1800	1800–1900
8/21/04, Saturday	11	21	14	20	19	20	28	20	17	12	8	10
8/24/04, Tuesday	3	5	3	2	7	3	10	2	4	8	16	5
9/06/04, Labor Day	6	14	19	10	12	17	14	15	13	9	2	0
10/24/04, Sunday	ND	ND	ND	8	9	9	9	10	ND	ND	ND	ND
11/28/04, Sunday	1	0	0	1	0	ND	ND	ND	ND	ND	ND	ND
12/12/04, Sunday	2	0	3	1	4	12	12	1	ND	ND	ND	ND
1/29/05, Saturday	3	2	5	0	0	0	1	3	ND	ND	ND	ND
4/24/05, Sunday	0	2	7	10	7	11	4	2	ND	ND	ND	ND
5/30/05, Memorial Day	8	13	10	14	15	10	5	15	12	20	15	9
7/04/05, Fourth of July	22	23	25	22	29	47	27	22	13	26	11	21
7/24/05, Sunday	6	11	11	10	20	30	25	12	0	0	0	
8/28/05, Sunday	2	7	12	20	23	12	4	8	14	9	9	15
8/30/05, Tuesday	3	2	0	8	9	8	9	10	7	3	8	2

Note: ND = no data.
Source: Conservancy 2005

Data on recreational uses of the study area from 2004–2005 (Conservancy 2005) and land steward observations during 2003–2007 (Rozance 2007a, 2007b) indicate that a substantial portion of users likely traveled to the study area alone and that some users walked or bicycled to the study area, particularly from adjacent neighborhoods, and thus did not contribute to demand for parking. Walking/running has been the most frequent user activity across all years and months. Bicycle riding has also been a popular activity across most years and months. It is likely that most of the runners and walkers travel to the study area alone and that most remain in the study area for only relatively short periods. However, on average, runners and walkers are likely to be in the study area for at least a half-hour, in part because of the distance from East Venice Drive to Cove East Beach (a primary destination of users). Runners, walkers, and bicyclists from the Tahoe Islands subdivision on the east side of the marsh have numerous access locations from the south and east of the study area. Although there is no quantified data, it is expected that visitors from the adjacent subdivision would access the study area via the southern and eastern access points. Therefore, these visitors likely do not substantially contribute to parking demand on East Venice Drive on the west side of the study area.

Other common recreational activities include beach use, picnicking, wildlife viewing, and fishing. Users engaged in these activities likely remain in the study area for longer periods than walkers/runners and bicyclists. In addition, they drive to the study area more often and are less likely to drive to the study area alone. Among months and years, the number of visitors performing these activities varies more than walking/running and bicycling, but combined, these activities typically accounted for 20–40 percent of observed users.

Assuming a range of likely values for average visit duration (0.75 to 1.25 hours), number of visitors per car (1.25 to 1.75), and the portion of visitors who do not drive to the study area (10–20 percent), the estimated number of 20 visitors per hour corresponds to a demand for seven to 18 parking spaces, 25 visitors per hour corresponds to nine to 23 parking spaces, and 30 visitors per hour corresponds to 10–27 parking spaces. (Assumptions were applied by subtracting the portion of users not driving to the study area, dividing the remaining number of visitors per hour by the number of visitors per car, and multiplying the number by the average duration of a visit.)

Bicycle and Pedestrian Facilities

No designated Class I (pedestrian and bicycle shared-use paths), Class II (bicycle lanes), or Class III (bicycle routes) bicycle and pedestrian facilities are located in the study area. Class I facilities are physically separated from automotive traffic. Class II facilities are not physically separated from traffic, but the bicycle lane is designated with striping. Class III facilities do not have striping, but signs are posted to alert drivers that they are sharing the traveling width with a bicycle route. Class designations are determined based on traffic, lane configurations, and available rights-of-way. A Class II–designated bicycle facility exists on Tahoe Keys Boulevard, providing bicycle access to the west side of the study area from U.S. 50. U.S. 50, along the study area boundary on the south, has bicycle facilities that alternate between Class III and Class I designations. North from U.S. 50 and on the east side of the study area, El Dorado Avenue and Bellevue Avenue have Class III bicycle facilities. From its intersection with Bellevue Avenue heading east away from the study area, Lakeview Avenue has Class II bicycle facilities. Exhibits 2-1through 2-4 show the existing bicycle and pedestrian facilities in the study area.

Ground Transit Facilities

BlueGO, a service provided by Tahoe Transportation District, provides fixed-route, demand-response service, ski shuttles, seasonal trolley service, and commuter express routes on the south shore of Lake Tahoe and to the Carson Valley. BlueGO is a coordinated public/private transportation system for the South Lake Tahoe and South Shore region of Lake Tahoe that combines the resources of previously offered services under one management. Buses on Route 52 provide service to Al Tahoe, east of the study area, and buses on Route 55 serve the Tahoe Keys Marina, west of the study area (Tahoe Transportation District 2012).

Waterborne Transit Facilities

No public ferries or water taxis operate on Lake Tahoe. In 2005, U.S. Congress approved $8,000,000 for a ferry project on Lake Tahoe, and the ferry was identified in the RTP. TRPA is heading the project in cooperation with the Tahoe Transportation District, which comprises local transportation districts, Caltrans, and the Nevada Department of Transportation. Caltrans funded a site selection study that considered South Lake Tahoe as a potential service hub (Fox 2006). A private company has been providing amphibious-vehicle tours from Heavenly Village in South Lake Tahoe since 2009.

Airport Facilities

Lake Tahoe Airport is the airport closest to the study area. The north approach of the airport is located approximately 1.15 miles (6,060 feet) south of the U.S. 50 crossing over the Upper Truckee River in South Lake Tahoe. The north approach is located approximately 1.90 miles south of the entrance to the Tahoe Keys Marina.

3.16.2 Environmental Consequences and Mitigation Measures

Significance Criteria

For this analysis, significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; the TRPA Initial Environmental Checklist; factual information; scientific data; and regulatory standards of federal, state, and local agencies. In development of mitigation measures for significant impacts of the project, effects on environmental thresholds of the Tahoe Regional Planning Compact were considered. The project's effects on thresholds are further described in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities."

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to transportation, parking, or circulation if it would:

- conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and nonmotorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit (CEQA 1);
- conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways (CEQA 2);
- result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks (CEQA 3);
- substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment) (CEQA 4);
- result in inadequate emergency access (CEQA 5); or
- conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities (CEQA 6).

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative would result in a significant impact on transportation, parking, or circulation if it would:

- generate 100 or more new Daily Vehicle Trip Ends (DVTE) (TRPA 1);
- result in changes to existing parking facilities or demand for new parking (TRPA 2);
- substantially affect existing transportation systems, including highway, transit, bicycle, or pedestrian facilities (TRPA 3);
- alter present patterns of circulation or movement of people and/or goods (TRPA 4);
- alter waterborne, rail, or air traffic (TRPA 5); or
- increase traffic hazards to motor vehicles, bicyclists, or pedestrians (TRPA 6).

METHODS AND ASSUMPTIONS

The relative impact of implementing the project has been determined by estimating the amount of traffic associated with construction activities in the study area and superimposing that traffic onto current traffic volume levels. For this evaluation, a maximum-intensity approach was taken that assumes maximum probable concurrent employment in the study area, as well as maximum concurrent truck activity.

Construction Employee Traffic

For each project alternative, it was assumed that each construction worker would drive a personal vehicle to the construction site. In reality, it is more likely that some employees in individual trade groups would carpool to the job site. As a result, this assumption yields a maximum-intensity view of site trip generation. It has also been assumed that all the on-site construction workers would arrive at the study area during the a.m. peak hour and that all would depart during the p.m. peak hour. It is more likely that some employees would arrive and depart during periods outside of peak commute hours. Therefore, this DEIR/DEIS/DEIS evaluates the potential impacts of a maximum-intensity scenario for peak-hour construction employee traffic.

Haul Truck Traffic

Haul trucks would travel to and from the study area during construction of each of the alternatives. Most construction truck activity would be related to hauling surplus material (including excavated soil for certain alternatives) from the study area to the designated regional disposal area and hauling materials to the study area for construction of bicycle paths. The amount of truck activity has been estimated based on a review of preliminary construction quantities for each alternative. The number of truck loads needed to accommodate identified quantities was estimated over the construction season and spread throughout the typical construction day to forecast hourly truck traffic.

Localized truck traffic could result as materials are hauled to specific work zones. For example, construction of bicycle paths along the east side of the study area would require importing decomposed granite and aggregate base materials that would be hauled by truck. The amount of material would depend on the length of bicycle trail planned under each alternative.

From the standpoint of traffic impacts, large trucks have a disproportionate impact on operating level of service and on roadway structures. The length and acceleration/deceleration characteristics of large trucks exceed those of regular passenger vehicles. Standard engineering practice is to convert each truck to a number of passenger car equivalents (PCEs) and to use that adjusted volume in LOS calculations. PCE factors range from 2.0 to 4.0. For the evaluation of each alternative, a PCE of 4.0 has been assumed for each truck.

Regional Trip Distribution

The relative regional distribution of the project's employee and truck traffic would differ because employee traffic would be oriented to residential centers throughout the Lake Tahoe/western Nevada area, whereas truck traffic would be oriented to the sources of imported materials or the disposal sites for exported materials.

The relative assumptions made regarding employee and truck distribution are identified in Table 3.16-6. The primary route for truck traffic would be to the east on U.S. 50 because this is the route to the Ormsby Landfill. Employee traffic could originate in areas surrounding the study area but would also be heaviest to the east.

Table 3.16-6
Project Trip Distribution

Direction	Route	Percentage of Total Traffic	
		Trucks	Employees
East	U.S. 50	100%	55%
East	Al Tahoe Boulevard	0%	10%
West	Lake Tahoe Boulevard	0%	10%
North	SR 89	0%	10%
South	U.S. 50/SR 89	0%	15%
	Total	**100%**	**100%**

Notes: SR = State Route; U.S. 50 = U.S. Highway 50
Source: KD Anderson & Associates 2007

Trip Assignment

Over the course of the construction schedule, various roads can be expected to be used to access individual work zones and staging areas. The primary staging area would be located off East Venice Drive, and this analysis assumes that employee commute traffic would be destined for that location. Therefore, Tahoe Keys Boulevard will be the primary route for construction-related traffic.

Although trucks may be noticeable briefly on these routes at various times over the construction period, they would not represent an appreciable volume measured on a daily or peak-hour basis. Therefore, for this evaluation, 100 percent of the site traffic for each alternative has been assumed to be directed to the staging area off East Venice Drive.

Operational Traffic after Construction

The facilities created under the project alternatives could be used by persons who would be attracted to the study area to use trails or take advantage of scenic vistas. Because of the project's location, most users would be expected to be existing residents living near the study area. Table 3.16-5 indicates that the number of visitors to the site has averaged 100 to 110 per day during peak visitation (i.e., summer weekends and holidays); on the busiest weekend days, the number of visitors to the project site has exceeded 200 only on rare occasions. As discussed in Section 3.1, potential increases of the number of visitors would range from slight (Alternative 2 Minimal Recreation Infrastructure) to small (Alternative 1 Maximum Recreation Infrastructure) with alternatives 3 and 4 (moderate recreation infrastructure) falling between Alternatives 1 and 2. The number of new visitor trips to the site is expected to be limited based on the following reasons:

(1) The recreation and public access elements of the alternatives are related to the existing use of the study area for dispersed recreation, not to support new uses. Most of these elements are intended to replace existing user-created features (e.g., trails) and/or reduce the impacts of existing dispersed recreation. For example, proposed trails follow the routes of or are intended to replace existing user-created trails.

(2) The most popular recreational uses of the study area are walking and running, beach use, wildlife viewing, and fishing. The Basin has an abundance of locations where people can engage in these activities, and thus, there is not a substantial unmet need for such recreational opportunities.

(3) Adjacent neighborhoods account for a substantial portion of visitors to the study area and the project would not alter the number of residents in adjacent neighborhoods nor substantially alter access from adjacent neighborhoods to the study area.

TRPA requires an evaluation of traffic impacts from the operation of a project, if the project would generate 100 or more new trips per day. Therefore, if implementation of any of the alternatives would double the number of visitors to the project site, then a traffic impact analysis would be required. None of the alternatives are expected to generate more than additional 10 to 20 additional trips per day, for the reasons listed above. A traffic impact analysis was determined to be not required.

Parking Demand

The relative impact of implementing the project on parking demand has been determined by estimating the number of people using the study area and for what purpose and comparing those numbers with similarly sized and purposed sites throughout the Lake Tahoe area that have existing parking facilities. During construction, workers would be required to park in designated parking areas in the construction staging areas.

IMPACTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Operational Traffic after Construction (CEQA 1 and 2, in part; TRPA 1, and 4 in part)—Based on the reasons given in the methods and assumptions, implementation of any of the alternatives would generate less than 100 new trips per day to the project site (between 10 and 20 new trips per day). Therefore, potential impacts on traffic and circulation would be minimal, and thus less than significant, and are not discussed further in this section.

Air Traffic and Airport Hazards (CEQA 3, TRPA 5 in part)—None of the proposed alternatives would alter air traffic patterns because the proposed improvements would be expected to be of interest to local people; a substantial number of people would not be expected to fly to visit the study area. The potential increase in air traffic hazards that could result from improving bird and bat habitat in the study area (i.e., increased possibility of bird and bat strikes on aircraft) is evaluated in Section 3.7, "Human Health/Risk of Upset." Therefore, potential impacts on air traffic are not discussed further in this section.

Hazards from Facility Design or Land Use (CEQA 4, TRPA 6)—None of the action alternatives would involve modifications to existing transportation infrastructure, and there would be no change in the uses of the study area. Therefore, none of the alternatives would result in a hazard related to design features or land use. This potential impact is not discussed further in this section.

Emergency Access (CEQA 5)—Potential impacts on emergency access during construction are evaluated in Section 3.7, "Human Health/Risk of Upset," and are not discussed further in this section.

Adopted Policies, Plans, or Programs Supporting Alternative Transportation (CEQA 6 and TRPA 5 in part)—None of the proposed alternatives would result in modifications to Tahoe Keys Marina; therefore, no alternative would affect the evaluation of South Lake Tahoe for a possible ferry terminal. None of the alternatives would result in road closures; therefore, no alternative would affect bus services to the study area. None of the alternatives involve adding or removing bicycle racks; therefore, no alternative would affect access to bicycle racks. For these reasons, none of the alternatives would interfere with the implementation of adopted policies, plans, or programs supporting alternative transportation. These topics are not discussed further in this DEIR/DEIS/DEIS. Effects related to construction traffic management are discussed below.

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.16-1 (Alt. 1) **Increased Traffic on Regional Circulation System during Construction. (CEQA 1, 2; TRPA 4)**
Construction of Alternative 1 would add traffic to major roads in the area of the project, but no appreciable change to current operating levels of service would result during construction. This impact would be ***less than significant****.*

The amount of automobile and truck traffic associated with implementing Alternative 1 would vary throughout the construction season as different activities occur. Overall, construction activities would require an average of four truckloads per day. Over the construction period, the truckloads would be hauled on roads through the A1 Tahoe and Highland Woods subdivisions (as shown in Exhibit 2-5). In the Al Tahoe subdivision, trucks would travel on Lakeview Drive to the Lily Avenue access point, San Francisco Avenue to its access point, and Los Angeles Avenue to the Bellevue Avenue access point. In the Highland Woods subdivision, trucks would travel on Rubicon Trail to its access point.

Table 3.16-7 summarizes the traffic characteristics of Alternative 1 regarding construction activities. Table 3.16-8 summarizes peak-hour and daily trip generation for Alternative 1 on both a vehicle and a PCE basis.

Table 3.16-9 identifies peak-hour levels of service at study area intersections during the a.m. and p.m. peak hours during construction activities under Alternative 1. As indicated, overall levels of service forecast under this alternative are the same as those occurring under the baseline "existing" condition. Additive construction traffic compared to existing 24-hour traffic volume counts is shown in Table 3.16-10.

Adopted standards identify LOS D as the minimum acceptable level of service at intersections in developed urban areas. All the study intersections currently operate at an "overall" level of service of LOS A–LOS C. None of the study intersections operate at an overall level of service of LOS D–LOS F. The construction-related traffic operational analysis conducted for this alternative estimates that 84 PCEs would be added during the a.m. and p.m. peak hours (see Table 3.16-8). The addition of this automobile and truck traffic would not cause any intersections currently operating at an overall level of service of LOS A–LOS C to operate at an overall level of service of LOS D–LOS F. At the intersections controlled by side street stop signs, the addition of through traffic on U.S. 50 resulting from project construction would incrementally increase the length of delays experienced by motorists waiting to enter the state highway, but project traffic would not change acceptable LOS conditions to unacceptable conditions. This impact would be **less than significant**.

Table 3.16-7 Construction Traffic Characteristics of Alternative 1	
Cut/Fill	
Total cubic yards over the life of the project	129,256
Total import/export over the life of the project	5,256 (cut)
Total external truckloads over the life of the project @ 20 cubic yards per truck	263
Annual external truckloads (cut/fill) in highest year	263
Bicycle Trail Material (DG/AB)	
Total cubic yards of DG and AB under the bicycle trail over the life of the project	2,312
Total external truckloads @ 15 cubic yards per truck	154
Annual truckloads in highest year (DG and AB)	154
Total annual truckloads	**417**
Duration of haul	120 days
Average daily truckloads	4
Highest hourly truck trips (10-hour day)	1 in, 1 out
Maximum on-site employment	76
Highest hourly employee traffic	a.m. 76 inbound p.m. 76 outbound
Total daily vehicular traffic[1]	176

Notes: cut = graded material exported from the study area; AB = aggregate base; DG = decomposed granite.

[1] Includes an additional 10 percent of highest hourly employee traffic to account for miscellaneous employee traffic during non-peak hours and daily external truck trips.

Source: KD Anderson & Associates 2007

Table 3.16-8
Peak-Hour Construction-Related Trip Generation Estimates for Alternative 1

Description	Alternative 1	
	In	Out
a.m. truck trips	1	1
a.m. employee trips	76	0
Total a.m. trips	77	1
Total a.m. PCEs	80	4
p.m. truck trips	1	1
p.m. employee trips	0	76
Total p.m. trips	1	77
Total p.m. PCEs	4	80
Total daily vehicles [1]	88	88
Total daily PCEs	100	100

Note: PCE = passenger car equivalent.

[1] Includes an additional 10 percent of highest hourly employee traffic to account for miscellaneous employee traffic during non-peak hours and daily external truck trips.

Source: KD Anderson & Associates 2007

Table 3.16-9
Existing Plus Alternative 1 (Construction Activities) Weekday Peak-Hour Levels of Service

Location	Control	Weekday a.m. Peak-Hour Levels of Service				Weekday p.m. Peak-Hour Levels of Service			
		Existing		Alternative 1		Existing		Alternative 1	
		Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS
Tahoe Keys Boulevard/East Venice Drive	All-way stop	9.8	A	10.4	B	11.6	B	12.6	B
SR 89/U.S. 50 (Lake Tahoe Boulevard)	Signal	26.9	C	27.0	C	33.8	C	33.9	C
U.S. 50/Tahoe Keys Boulevard	Signal	14.0	B	15.2	B	30.5	B	37.0	B
U.S. 50/Lodi Avenue									
(Overall)[1]	NB/SB stop	(0.6)	(A)	(0.6)	(A)	(1.3)	(A)	(1.4)	(A)
EB left turn		12.7	B	13.1	B	14.7	B	14.8	B
WB left turn		12.2	B	12.2	B	18.3	C	19.1	B
NB left+through+right turn		26.8	D	27.3	D	72.0	F	80.5	D
SB left+through+right turn		28.5	D	30.4	D	38.3	E	39.8	D
U.S. 50/Silver Dollar Avenue									
(Overall)		(0.6)	(A)	(0.6)	(A)	(0.5)	(A)	(0.5)	(A)
EB left turn		14.0	B	14.6	B	14.8	B	14.9	B
SB left+right turn		24.3	C	25.8	D	25.9	D	26.2	D
U.S. 50/Rubicon Trail	Signal	11.4	B	10.8	B	14.4	B	14.7	B
U.S. 50/Al Tahoe Boulevard	Signal	13.2	B	13.2	B	20.8	C	21.2	C
U.S. 50/San Francisco Avenue									
(Overall)	EB/WB stop	(0.6)	(A)	(0.6)	(A)	(0.9)	(A)	(0.9)	(A)
NB left turn		11.3	B	11.6	B	13.9	B	14.0	B
SB left turn		10.5	B	10.6	B	13.1	B	13.5	B
EB left+through+right turn		18.6	C	19.5	C	22.9	C	23.1	C
WB left+through+right turn		12.4	B	12.4	B	15.4	C	15.8	C
U.S. 50/Lakeview Avenue	Signal	4.3	A	4.2	A	4.6	A	4.2	A

Notes: EB = eastbound; LOS = level of service; NB = northbound; SB = southbound; WB = westbound; SR = State Route; U.S. 50 = U.S. Highway 50.
[1] Values in parentheses are the "overall" level of service for the intersection.
Source: KD Anderson & Associates 2007

Table 3.16-10 Existing Plus Alternative 1 Daily Construction Traffic Volumes						
Location			Daily Volume			
Road/Street	From	To	Current		Construction (Alternative 1)	
			September	Peak Month	Regular (PCEs)	Random (PCEs)
San Francisco Avenue	Riverside Avenue	U.S. 50	877	1,000	0	20
Lakeview Avenue	Riverside Avenue	U.S. 50	1,795	2,100	0	20
East Venice Drive	Tahoe Keys Boulevard	Marina	1,304	1,500	200	200
Silver Dollar Avenue	Ponderosa Street	U.S. 50	1,079	1,250	0	10
Sunset Drive	Ponderosa Street	Conestoga Street	74	85	0	10

Note: PCE = passenger car equivalent; U.S. 50 = U.S. Highway 50.
Source: KD Anderson & Associates 2007

IMPACT 3.16-2 (Alt. 1) **Increased Parking Demand. (TRPA 2)** *Operation of Alternative 1 would increase demand for parking. The construction-related increase in parking demand would be met by employees parking in designated project staging areas, and thus would not increase demand for parking during construction. An increase in demand for parking could result from operation of Alternative 1 because of increased recreation activity. Alternative 1 would provide additional parking at the end of East Venice Drive. With no reduction to current on-street parking availability and additional parking included in Alternative 1, sufficient parking would be available to accommodate peak visitation to the study area. This impact would be* ***less than significant****.*

Construction employees would be required to park in the designated project staging areas (shown in Exhibit 2-5), which are sized to accommodate the estimated maximum of 76 employees. As a result, there would be no increase in on-street parking demand during construction.

Based on the assumptions and calculation described above, the existing peak visitation rate of 25–30 visitors per hour corresponds to a demand for nine to 27 parking spaces, which is currently provided by on-street parking. As described above in "Methods and Assumptions," Alternative 1 involves constructing additional public access and recreational facilities, and thus, implementing Alternative 1 would likely result in an increase in the number of visitors to the study area and in demand for parking.

The additional demand for parking would be primarily near the western boundary of the study area because the additional public access and recreation facilities would be primarily in the western portion of the study area, west of the Upper Truckee River. Alternative 1 would provide additional parking in the western portion of the study area. Also, the supply of parking would likely be increased near the western boundary of the study area as part of the joint-use agreement between the Conservancy and the Tahoe Keys Marina. This agreement would allow visitors to the study area to park in an expanded parking lot at the Tahoe Keys Marina, which would be sufficient to accommodate the increased peak combined visitation to the study area and the Tahoe Keys Marina.

Although Alternative 1 would construct trails, a viewpoint, and a kiosk near the southern boundary of the study area, the kiosk would be along an existing bicycle path, and the new trails and viewpoint would be designed to provide habitat protection. Furthermore, Alternative 1 proposes to remove existing user-created trails from the core habitat area, thus not substantially increasing overall trails near the southern boundary of the study area. Therefore, near the southern boundary of the study area, parking demand would remain similar to existing demand.

The bridge over the Upper Truckee River and the boardwalk along the Lake Tahoe shoreline would connect the eastern portion of the study area to the western portion, and thus, could potentially affect demand for on-street parking near the study area's eastern boundary. However, it is expected that much of the use would be by residents of the Al Tahoe, Highland Woods, and Tahoe Keys neighborhoods and others who currently use the study area because most of the area is not directly connected with regional transit and is not located along the primary thoroughfare (U.S. 50). Therefore, near the eastern boundary of the study area, parking demand would remain similar to existing demand.

In summary, although Alternative 1 would likely increase the number of visitors to the study area, any increase in parking demand would not be substantial. First, a large portion of visitors would continue to be residents of adjacent neighborhoods who do not drive to the study area. Second, on-street parking would remain available, as under existing conditions, to accommodate a large portion of the parking demand. Third, Alternative 1 would include a small parking lot providing additional parking. Also, because Alternative 1 proposes a paved bike path, a greater portion of visitors using the area are expected to travel by bicycle, (not automobile) than under existing conditions. Therefore, this impact would be **less than significant**.

IMPACT 3.16-3 (Alt. 1) **Potential for Conflicts between Construction Traffic, Local Traffic, Pedestrians, and Bicycles (CEQA 6; TRPA 5).** *Construction under Alternative 1 would add short-term truck traffic on local roads in the project vicinity. This traffic has the potential to create conflicts with local traffic, pedestrians, and bicyclists. However, as described in Environmental Commitment 12, the Conservancy would prepare and implement traffic control plans to ensure the safety of local traffic, pedestrians, and bicycles during construction. Therefore, this impact would be* ***less than significant****.*

Under Alternative 1, approximately 27 paved parking spaces and regular automobile parking/circulation and parking access would be added near East Venice Drive. The proposed parking is not expected to create conflicts between cyclists and automobiles. Local access to the lot would be provided in an area where parking currently occurs, and signage would be included to direct visitors to parking and trails.

Under Alternative 1, large trucks would be required to travel on local streets between the study area and U.S. 50, and would need to make several turns. The construction access to the site includes the designated haul routes as shown in Exhibit 2-5. Other automobiles, pedestrians, or bicyclists present along those streets and at the local intersections could encounter conflicts with construction trucks. "Conflicts" in this context mean changes to normal travel behavior in response to encountering construction traffic, such as traveling outside designated lanes, stopping more quickly than normal, or otherwise maneuvering to avoid a hazard. Along these routes the potential for conflicts between pedestrians, bicyclists, and trucks would be most acute when large trucks would be involved. Regular "bobtail" dump trucks would not be expected to create substantial conflicts, but the turning requirements of large five-axle truck/trailer combinations could create conflicts. Traffic, bicycle, and pedestrian safety would be at risk where there would be a potential for such conflicts.

As described in Environmental Commitment (EC) 12 (Table 2-6), the Conservancy would prepare traffic control plans to ensure the safety of local traffic, pedestrians, and bicyclists during construction. The plans would be prepared sufficiently in advance of project construction to allow adequate review, comment, and concurrence by the City of South Lake Tahoe public service providers. They could include advance public advisories, construction-period signage, flag personnel, and other special traffic-control actions as necessary. The following specific measures could be included in the plans:

- Distribute or mail flyers to residents in the nearby Al Tahoe, Highland Woods, and Tahoe Keys subdivisions before the beginning of construction, advising them about the upcoming construction traffic.
- Place advisory signs along construction routes in advance of construction to alert motorists, pedestrians, and bicyclists about the upcoming construction traffic.

- Install signage on designated haul routes in the construction area to inform the public of the presence of trucks.
- Provide flag personnel at when truck activity is heavy (i.e., more than ten trucks per hour).
- Provide information to all truck drivers identifying haul routes, speed limits, locations of flaggers, and any other pertinent public safety information.
- Monitor truck and traffic conditions to identify traffic congestion and safety concerns related to truck, vehicle, and pedestrian and bicycle conflicts, and adjust the management approach as needed.

Because construction traffic controls implemented through the plans would minimize the potential conflicts, this impact would be **less than significant**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.16-1 (Alt. 2) **Increased Traffic on Regional Circulation System during Construction. (CEQA 1, 2; TRPA 4)**
Construction of Alternative 2 would add traffic to major roads in the area of the project, but no appreciable change to current operating levels of service would result from construction. This direct impact would be ***less than significant****.*

The amount of automobile and truck traffic associated with implementation of Alternative 2 would vary throughout the construction season as different activities occur. No bicycle path would be constructed for Alternative 2, but habitat restoration would require cut and fill of more material than under Alternative 1. As a result, Alternative 2 would result in a greater number of external truckloads than under Alternative 1: ten truckloads per day versus four truckloads per day under Alternative 1 (see Tables 3.16-11 and 3.16-7, respectively). During the construction period, the truckloads would be hauled on roads through the Al Tahoe and Highland Woods subdivisions (as shown in Exhibit 2-6). In the Al Tahoe subdivision, trucks would travel on Lakeview Drive to the Lily Avenue access point, San Francisco Avenue to its access point, and Los Angeles Avenue to the Bellevue Avenue access point. In the Highland Woods subdivision, trucks would travel on Rubicon Trail to its access point.

Table 3.16-11 summarizes the traffic characteristics of Alternative 2 regarding construction activities. Table 3.16-12 summarizes peak-hour and daily trip generation for Alternative 2 on both a vehicle and a PCE basis.

Table 3.16-13 identifies peak-hour levels of service at study area intersections during the a.m. and p.m. peak hours during construction activities under Alternative 2. Additive traffic compared to existing 24-hour traffic volume counts is shown in Table 3.16-14.

Adopted standards identify LOS D as the minimum acceptable level of service at intersections in developed urban areas. All the study intersections currently operate at an overall level of service of LOS A–LOS C. None of the study intersections operate at an overall level of service of LOS D–LOS F. The construction-related traffic operational analysis conducted for this alternative estimates that 86 PCEs would be added during the a.m. and p.m. peak hours (see Table 3.16-12). The addition of this automobile and truck traffic would not cause any intersections currently operating at an overall level of service of LOS A–LOS C to operate at an overall level of service of LOS D–LOS F. At the intersection controlled by side street stop signs, the addition of through traffic on U.S. 50 resulting from project construction would incrementally increase the length of delays experienced by motorists waiting to enter the state highway, but project traffic would not change acceptable LOS conditions to unacceptable conditions. This impact would be **less than significant**.

Table 3.16-11 Construction Traffic Characteristics of Alternative 2	
Cut/Fill	
Total cubic yards over the life of the project	189,800
Total import/export over the life of the project	23,800 (fill)
Total external truckloads over the life of the project @ 20 cubic yards per truck	1,190
Annual external truckloads (cut/fill) in highest year	1,190
Bicycle Trail Material (DG and AB)	
Total cubic yards of DG and AB under the bicycle trail over the life of the project	**0**
Total external truckloads @ 15 cubic yards per truck	**0**
Annual truckloads in highest year (DG and AB)	**0**
Total annual truckloads	**1,190**
Duration of haul	120 days
Average daily truckloads	10
Highest hourly truck trips (10-hour day)	1 in, 1 out
Maximum on-site employment	77
Highest hourly employee traffic	a.m. 77 inbound p.m. 77 outbound
Total daily vehicular traffic [1]	192

Notes: Fill is material imported into the study area.

[1] Includes an additional 10 percent of highest hourly employee traffic to account for miscellaneous employee traffic during non-peak hours and daily external truck trips.

Source: KD Anderson & Associates 2007

Table 3.16-12
Peak-Hour Construction-Related Trip Generation Estimates for Alternative 2

Description	Trips	
	In	Out
a.m. truck trips	1	1
a.m. employee trips	77	0
Total a.m. trips	78	1
Total a.m. PCEs	82	4
p.m. truck trips	1	1
p.m. employee trips	0	77
Total p.m. trips	1	78
Total p.m. PCEs	4	82
Total daily vehicles [1]	**96**	**96**
Total daily PCEs	**126**	**126**

Note: PCE = passenger car equivalent.

[1] Includes an additional 10 percent of highest hourly employee traffic to account for miscellaneous employee traffic during non-peak hours and daily external truck trips.

Source: KD Anderson & Associates 2007

Table 3.16-13
Existing Plus Alternative 2 (Construction Activities) Weekday Peak-Hour Levels of Service

Location	Control	Weekday a.m. Peak-Hour Levels of Service				Weekday p.m. Peak-Hour Levels of Service			
		Existing		Alternative 2		Existing		Alternative 2	
		Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS
Tahoe Keys Boulevard/East Venice Drive	All-way stop	9.8	A	10.4	B	11.6	B	12.6	B
SR 89/U.S. 50 (Lake Tahoe Boulevard)	Signal	26.9	C	27.0	C	33.8	C	33.9	C
U.S. 50/Tahoe Keys Boulevard	Signal	14.0	B	15.2	B	30.5	B	37.0	B
U.S. 50/Lodi Avenue									
(Overall) [1]	NB/SB stop	(0.6)	(A)	(0.6)	(A)	(1.3)	(A)	(1.4)	(A)
EB left turn		12.7	B	13.1	B	14.7	B	14.8	B
WB left turn		12.2	B	12.2	B	18.3	C	19.1	B
NB left+through+right turn		26.8	D	27.3	D	72.0	F	80.7	D
SB left+through+right turn		28.5	D	30.4	D	38.3	E	39.8	D
U.S. 50/Silver Dollar Avenue									
(Overall)		(0.6)	(A)	(0.6)	(A)	(0.5)	(A)	(0.5)	(A)
EB left turn		14.0	B	14.6	B	14.8	B	14.9	B
SB left+right turn		24.3	C	25.9	D	25.9	D	26.2	D
U.S. 50/Rubicon Trail	Signal	11.4	B	10.8	B	14.4	B	14.7	B
U.S. 50/Al Tahoe Boulevard	Signal	13.2	B	13.2	B	20.8	C	21.2	C
U.S. 50/San Francisco Avenue									
(Overall)	EB/WB stop	(0.6)	(A)	(0.6)	(A)	(0.9)	(A)	(0.9)	(A)
NB left turn		11.3	B	11.6	B	13.9	B	14.0	B
SB left turn		10.5	B	10.6	B	13.1	B	13.5	B
EB left+through+right turn		18.6	C	19.5	C	22.9	C	23.1	C
WB left+through+right turn		12.4	B	12.4	B	15.4	C	15.8	C
U.S. 50/Lakeview Avenue	Signal	4.3	A	4.2	A	4.6	A	4.6	A

Notes: EB = eastbound; LOS = level of service; NB = northbound; SB = southbound; WB = westbound; SR = State Route; U.S. 50 = U.S. Highway 50.
[1] Values in parentheses are the "overall" level of service for the intersection.
Source: KD Anderson & Associates 2007

Table 3.16-14 Existing Plus Alternative 2 Daily Construction Traffic Volumes						
Location			Daily Volume			
Road/Street	From	To	Current		Construction (Alternative 2)	
			September	Peak Month	Regular (PCEs)	Random (PCEs)
San Francisco Avenue	Riverside Avenue	U.S. 50	877	1,000	0	10
Lakeview Avenue	Riverside Avenue	U.S. 50	1,795	2,100	0	10
East Venice Drive	Tahoe Keys Boulevard	Marina	1,304	1,500	252	252
Silver Dollar Avenue	Ponderosa Street	U.S. 50	1,079	1,250	0	10
Sunset Drive	Ponderosa Street	Conestoga Street	74	85	0	10

Notes: PCE = passenger car equivalent; U.S. 50 = U.S. Highway 50.
Source: KD Anderson & Associates 2007

IMPACT 3.16-2 (Alt. 2) **Increased Parking Demand. (TRPA 2)** *Operational parking demand would be expected to be similar to existing demand because the increase in recreation infrastructure would be minimal. Construction-related parking demand would be met by employees parking in designated project staging areas, and thus would not increase demand for parking during construction. A small increase in demand for parking near the western boundary of the study area could result from operation of Alternative 2. However, no reduction to current on-street parking availability would occur and additional public parking may also be provided by the joint-use agreement between the Conservancy and the Tahoe Keys Marina. Because existing parking would be sufficient to accommodate peak visitation to the study area under Alternative 2, this impact would be* ***less than significant****.*

Construction employees would be required to park in the designated project staging areas (shown in Exhibit 2-6), which are sized to accommodate the estimated maximum of 77 employee trips. As a result, there would be no increase in on-street parking demand during construction.

Based on the assumptions and calculation described above, the existing peak visitation rate of 25–30 visitors per hour corresponds to a demand for nine to 27 parking spaces, which is currently provided by on-street parking. Because Alternative 2 involves constructing fewer public access and recreational facilities, implementation would likely result in less demand for additional parking spaces than other alternatives. The additional demand for parking would be near the western boundary of the study area because the additional public access and recreation facilities would be in the western portion of the study area, west of the Upper Truckee River. On-street parking would remain available to accommodate parking demand under Alternative 2. Also, the supply of parking would likely be increased through a joint-use agreement between the Conservancy and the Tahoe Keys Marina, which would expand marina parking. Because Alternative 2 would involve only small changes in recreation opportunities, existing on-street parking would be sufficient to accommodate peak combined visitation to the study area. Thus, this impact would be **less than significant**.

IMPACT 3.16-3 (Alt. 2) **Potential for Conflicts between Construction Traffic, Local Traffic, Pedestrians, and Bicycles. (CEQA 6; TRPA 5)** *Construction under Alternative 2 would add short-term truck traffic on local roads in the project vicinity. This traffic has the potential to create conflicts with local traffic, pedestrians, and bicyclists. However, as described in Environmental Commitment 12, the Conservancy would prepare and implement traffic control plans to ensure the safety of local traffic, pedestrians, and bicycles during construction. Therefore, this impact would be* ***less than significant****.*

Under Alternative 2, large trucks would be required to travel on local streets between the study area and U.S. 50, including the need to make several turns. The construction access to the site includes the designated haul routes as shown in Exhibit 2-6. As under Alternative 1, other automobiles, pedestrians, or bicyclists present along those streets and at the local intersections could encounter potential conflicts with construction trucks. This potential would be greater under Alternative 2 than Alternative 1, because the number of truck trips (Table 3.16-11) would be nearly three times more than under Alternative 1. As described in EC 12 (Table 2-6), the Conservancy would prepare traffic control plans to ensure the safety of local traffic, pedestrians, and bicyclists during construction. The plans would be prepared sufficiently in advance of project construction to allow adequate review, comment, and concurrence by the City of South Lake Tahoe public service providers. Because construction traffic controls implemented through the plans would minimize the potential conflicts, this impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.16-1 (Alt. 3) **Increased Traffic on Regional Circulation System during Construction. (CEQA 1, 2; TRPA 4)** *Construction of Alternative 3 would add traffic to major roads in the area of the project, but no appreciable change to current operating levels of service would result from construction. This impact would be* ***less than significant****.*

The amount of automobile and truck traffic associated with construction of Alternative 3 would vary throughout the construction season as different activities occur. Overall, construction activities would require an average of four truckloads per day of material hauling (see Table 3.16-15), which would be comparable to Alternative 1 and less than Alternative 2. During the construction period, the truckloads would be hauled on roads through the Al Tahoe and Highland Woods subdivisions (as shown in Exhibit 2-7). In the Al Tahoe subdivision, trucks would travel on Lakeview Drive to the Lily Avenue access point, San Francisco Avenue to its access point, and Los Angeles Avenue to the Bellevue Avenue access point. In the Highland Woods subdivision, trucks would travel on Rubicon Trail to its access point.

Table 3.16-15 summarizes the traffic characteristics of Alternative 3 regarding construction activities. Table 3.16-16 summarizes peak-hour and daily trip generation for Alternative 3 on both a vehicle and a PCE basis.

Table 3.16-17 identifies peak-hour levels of service at study area intersections during the a.m. and p.m. peak hours during construction activities under Alternative 3. Additive traffic compared to existing 24-hour traffic volume counts is shown in Table 3.16-18.

Adopted standards identify LOS D as the minimum acceptable level of service at intersections in developed urban areas. All the study intersections currently operate at an overall level of service of LOS A–LOS C. None of the study intersections operate at an overall level of service of LOS D–LOS F. The construction-related traffic operational analysis conducted for this alternative estimates that 76 PCEs would be added during the a.m. and p.m. peak hours (see Table 3.16-16). The addition of this automobile and truck traffic would not cause any intersections currently operating at an overall level of service of LOS A–LOS C to operate at an overall level of service of LOS D–LOS F. At the intersection controlled by side street stop signs, the addition of through traffic on

Table 3.16-15 Construction Traffic Characteristics of Alternative 3	
Cut/Fill	
Total cubic yards over the life of the project	116,800
Total import/export over the life of the project	6,800 (cut)
Total external truckloads over the life of the project @ 20 cubic yards per truck	340
Annual external truckloads (cut/fill) in highest year	340
Bicycle Trail Material (DG/AB)	
Total cubic yards of DG and AB under bicycle trail over the life of the project	500
Total external truckloads @ 15 cubic yards per truck	34
Annual truckloads in highest year (DG and AB)	34
Total annual truckloads	**374**
Duration of haul	120 days
Average daily truckloads	4
Highest hourly truck trips (10-hour day)	1 in, 1 out
Maximum on-site employment	68
Highest hourly employee traffic	a.m. 68 inbound p.m. 68 outbound
Total daily vehicular traffic[1]	158

Notes: cut = graded material exported from the study area; AB = aggregate base; DG = decomposed granite.

[1] Includes an additional 10 percent of highest hourly employee traffic to account for miscellaneous employee traffic during non-peak hours and daily external truck trips.

Source: KD Anderson & Associates 2007

Table 3.16-16
Peak-Hour Construction-Related Trip Generation Estimates for Alternative 3

Description	Trips	
	In	Out
a.m. truck trips	1	1
a.m. employee trips	68	0
Total a.m. trips	69	1
Total a.m. PCEs	72	4
p.m. truck trips	1	1
p.m. employee trips	0	68
Total p.m. trips	1	69
Total p.m. PCEs	4	72
Total daily vehicles[1]	**79**	**79**
Total daily PCEs	**92**	**92**

Note: PCE = passenger car equivalent.

[1] Includes an additional 10 percent of highest hourly employee traffic to account for miscellaneous employee traffic during non-peak hours and daily external truck trips.

Source: KD Anderson & Associates 2007

Table 3.16-17
Existing Plus Alternative 3 (Construction Activities) Weekday Peak-Hour Levels of Service

Location	Control	Weekday a.m. Peak-Hour Levels of Service				Weekday p.m. Peak-Hour Levels of Service			
		Existing		Alternative 3		Existing		Alternative 3	
		Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS
Tahoe Keys Boulevard/East Venice Drive	All-way stop	9.8	A	10.4	B	11.6	B	12.5	B
SR 89/U.S. 50 (Lake Tahoe Boulevard)	Signal	26.9	C	27.0	C	33.8	C	33.9	C
U.S. 50/Tahoe Keys Boulevard	Signal	14.0	B	15.1	B	30.5	B	36.2	B
U.S. 50/Lodi Avenue									
(Overall)[1]	NB/SB stop	(0.6)	(A)	(0.6)	(A)	(1.3)	(A)	(1.4)	(A)
EB left turn		12.7	B	13.1	B	14.7	B	14.8	B
WB left turn		12.2	B	12.2	B	18.3	C	19.1	B
NB left+through+right turn		26.8	D	27.2	D	72.0	F	79.6	D
SB left+through+right turn		28.5	D	30.2	D	38.3	E	39.7	D
U.S. 50/Silver Dollar Avenue									
(Overall)		(0.6)	(A)	(0.6)	(A)	(0.5)	(A)	(0.5)	(A)
EB left turn		14.0	B	14.6	B	14.8	B	14.9	B
SB left+right turn		24.3	C	25.7	D	25.9	D	26.2	D
U.S. 50/Rubicon Trail	Signal	11.4	B	10.8	B	14.4	B	14.7	B
U.S. 50/Al Tahoe Boulevard	Signal	13.2	B	13.2	B	20.8	C	21.1	C
U.S. 50/San Francisco Avenue									
(Overall)	EB/WB stop	(0.6)	(A)	(0.6)	(A)	(0.9)	(A)	(0.9)	(A)
NB left turn		11.3	B	11.6	B	13.9	B	14.0	B
SB left turn		10.5	B	10.6	B	13.1	B	13.4	B
EB left+through+right turn		18.6	C	19.4	C	22.9	C	23.1	C
WB left+through+right turn		12.4	B	12.4	B	15.4	C	15.8	C
U.S. 50/Lakeview Avenue	Signal	4.3	A	4.2	A	4.6	A	4.6	A

Notes: EB = eastbound; LOS = level of service; NB = northbound; SB = southbound; WB = westbound; SR = State Route; U.S. 50 = U.S. Highway 50.

[1] Values in parentheses are the "overall" level of service for the intersection.

Source: KD Anderson & Associates 2007

Table 3.16-18 Existing Plus Alternative 3 Daily Construction Traffic Volumes						
Location			Daily Volume			
Road/Street	From	To	Current		Construction (Alternative 3)	
			September	Peak Month	Regular (PCEs)	Random (PCEs)
San Francisco Avenue	Riverside Avenue	U.S. 50	877	1,000	0	10
Lakeview Avenue	Riverside Avenue	U.S. 50	1,795	2,100	0	10
East Venice Drive	Tahoe Keys Boulevard	Marina	1,304	1,500	184	184
Silver Dollar Avenue	Ponderosa Street	U.S. 50	1,079	1,250	0	10
Sunset Drive	Ponderosa Street	Conestoga Street	74	85	0	10

Notes: PCE = passenger car equivalent; U.S. 50 = U.S. Highway 50
Source: KD Anderson & Associates 2007

U.S. 50 resulting from project construction would incrementally increase the length of delays experienced by motorists waiting to enter the state highway, but project traffic would not change acceptable LOS conditions to unacceptable conditions. This impact would be **less than significant**.

IMPACT 3.16-2 (Alt. 3) **Increased Parking Demand. (TRPA 2)** *Operation of Alternative 3 would increase demand for parking, but the increase would be less under this alternative than under Alternative 1. Construction employees would park in designated project staging areas, and thus would not increase demand for parking during construction. A small increase in demand for parking could result from operation of Alternative 3, near the western boundary of the study area. However, no reduction to current on-street parking availability would occur, and on-street parking would continue to be sufficient to accommodate peak visitation to the study area. Also, additional public parking would likely be provided by a joint-use agreement between the Conservancy and the Tahoe Keys Marina. This impact would be* ***less than significant****.*

Construction employees would be required to park in the designated project staging areas (shown in Exhibit 2-7), which are sized to accommodate the estimated maximum of 68 employees. As a result, there would be no increase in on-street parking demand during construction.

Based on the assumptions and calculation described above, the existing peak visitation rate of 25–30 visitors per hour corresponds to a demand for nine to 27 parking spaces. Because Alternative 3 (moderate recreation) involves constructing less public access and recreational facilities than Alternative 1 and more than Alternative 2, implementation would likely result in an increase in demand for parking spaces intermediate between Alternative 1 (maximum recreation) and Alternative 2 (minimum recreation).

The additional demand for parking would be primarily near the western boundary of the study area because the additional public access and recreation facilities would be in the western portion of the study area, west of the Upper Truckee River. Although Alternative 3 would construct trails and viewpoints near the southern and eastern boundaries of the study area, these features have been designed to provide core habitat protection and Alternative 3 also would eliminate existing user-created trails within the core habitat; furthermore, it is expected that most of the use from this area would be localized from within the Al Tahoe, Highland Woods, and Tahoe Keys neighborhoods because the area is not connected with regional transit and is not located along primary thoroughfare. Thus, near the southern and eastern boundaries of the study area, parking demand would remain similar to existing conditions.

On-street parking would remain available, as under existing conditions, to accommodate the demand for parking. Also, near the western boundary of the study area, the supply of parking would likely be increased, because of the joint-use agreement between the Conservancy and the Tahoe Keys Marina. This agreement would allow visitors to the study area to park in an expanded parking lot at the Tahoe Keys Marina, which would be sufficient to accommodate peak combined visitation to the study area and the Tahoe Keys Marina. This impact would be **less than significant**.

IMPACT 3.16-3 (Alt. 3) **Potential for Conflicts between Construction Traffic, Local Traffic, Pedestrians, and Bicycles. (CEQA 6; TRPA 5)** *Construction under Alternative 3 would add short-term truck traffic on local roads in the project vicinity. This traffic has the potential to create conflicts with local traffic, pedestrians, and bicyclists. However, as described in Environmental Commitment 12, the Conservancy would prepare and implement traffic control plans to ensure the safety of local traffic, pedestrians, and bicycles during construction. Therefore, this impact would be* ***less than significant****.*

Under Alternative 3, large trucks would be required to travel on local streets between the study area and U.S. 50, and would need to make several turns. The construction access to the site includes the designated haul routes as shown in Exhibit 2-7. As under Alternatives 1 and 2, other automobiles, pedestrians, or bicyclists present along those streets and at the local intersections could encounter conflicts with construction trucks. Under Alternative 3, the potential for such conflicts would be similar to Alternative 1 and less than Alternative 2 because the number of truck trips (Table 3.16-15) would be similar to Alternative 1 and less than under Alternative 2. As described in EC 12 (Table 2-6), the Conservancy would prepare traffic control plans to ensure the safety of local traffic, pedestrians, and bicyclists during construction. The plans would be prepared sufficiently in advance of project construction to allow adequate review, comment, and concurrence by the City of South Lake Tahoe public service providers. Because construction traffic controls implemented through the plans would minimize the potential conflicts, this impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.16-1 (Alt. 4) **Increased Traffic on Regional Circulation System during Construction. (CEQA 1, 2; TRPA 4)** *Construction of Alternative 4 would add traffic to major roads in the area of the project, but no appreciable change to current operating levels of service would result from construction. This impact would be* ***less than significant****.*

The amount of automobile and truck traffic associated with implementation of Alternative 4 would vary throughout the construction season as different activities occur. Overall, construction activities would require an average of 106 truckloads per day of material hauling, which is substantially more than Alternatives 1–3. Over the construction period, the truckloads would be hauled on roads through the Al Tahoe and Highland Woods subdivisions (as shown in Exhibit 2-8). In the Al Tahoe subdivision, trucks would travel on Lakeview Drive to the Lily Avenue access point, San Francisco Avenue to its access point, and Los Angeles Avenue to the Bellevue Avenue access point. In the Highland Woods subdivision, trucks would travel on Rubicon Trail to its access point. Table 3.16-19 summarizes the traffic characteristics of Alternative 4 regarding construction activities. Table 3.16-20 summarizes peak-hour and daily trip generation for Alternative 4 on both a vehicle and a PCE basis. Table 3.16-21 identifies peak-hour levels of service at study area intersections during the a.m. and p.m. peak hours during construction activities under Alternative 4. Additive traffic compared to existing 24-hour traffic volume counts is shown in Table 3.16-22.

Adopted standards identify LOS D as the minimum acceptable level of service at intersections in developed urban areas. All the study intersections currently operate at an overall level of service of LOS A–LOS C. None of the study intersections operate at an overall level of service of LOS D–LOS F. The construction-related traffic operational analysis conducted for this alternative estimates that 121 PCEs would be added during the a.m. and p.m. peak hours (see Table 3.16-20). The addition of this automobile and truck traffic would not cause any

Table 3.16-19 Construction Traffic Characteristics of Alternative 4	
Cut/Fill	
Total cubic yards over the life of the project	294,644
Total import/export over the life of the project	280,644 (cut)
Total external truckloads over the life of the project @ 20 cubic yards per truck	14,032
Annual external truckloads (cut/fill) in highest year	12,632
Bicycle Trail Material (DG/AB)	
Total cubic yards of DG and AB under bicycle trail over the life of the project	386
Total external truckloads @ 15 cubic yards per truck	26
Annual truckloads in highest year (DG and AB)	26
Total annual truckloads	**12,658**
Duration of haul	120 days
Average daily truckloads	106
Highest hourly truck trips (10-hour day)	11 in, 11 out
Maximum on-site employment	33
Highest hourly employee traffic	a.m. 33 inbound p.m. 33 outbound
Total daily vehicular traffic[1]	306

Notes: cut = graded material exported from the study area; AB = aggregate base; DG = decomposed granite.

[1] Includes an additional 10 percent of highest hourly employee traffic to account for miscellaneous employee traffic during non-peak hours and daily external truck trips.

Source: KD Anderson & Associates 2007

Table 3.16-20 Peak-Hour Construction-Related Trip Generation Estimates for Alternative 4		
Description	Trips	
	In	Out
a.m. truck trips	11	11
a.m. employee trips	33	0
Total a.m. trips	44	11
Total a.m. PCEs	77	44
p.m. truck trips	11	11
p.m. employee trips	0	33
Total p.m. trips	11	44
Total p.m. PCEs	44	77
Total daily vehicles[1]	**153**	**153**
Total daily PCEs	**503**	**503**

Notes: PCE = passenger car equivalent.

[1] Includes an additional 10 percent of highest hourly employee traffic to account for miscellaneous employee traffic during non-peak hours and daily external truck trips.

Source: KD Anderson & Associates 2007

intersections currently operating at an overall level of service of LOS A–LOS C to operate at an overall level of service of LOS D–LOS F. At the intersection controlled by side-street stop signs, the addition of through traffic on U.S. 50 resulting from project construction would incrementally increase the length of delays experienced by motorists waiting to enter the state highway, but project traffic would not change acceptable LOS conditions to unacceptable conditions. This impact would be **less than significant**.

IMPACT 3.16-2 (Alt. 4) **Increased Parking Demand. (TRPA 2)** *Operation of Alternative 4 would increase demand for parking. Construction employees would park in designated project staging areas, and thus would not increase demand for parking during construction. A small increase in demand for parking could result from operation of Alternative 4, near the western boundary of the study area. However, no reduction to current on-street parking availability would occur, and existing parking would be sufficient to accommodate peak visitation to the study area. Also, additional public parking would likely be provided by a joint-use agreement between the Conservancy and the Tahoe Keys Marina. This impact would be* ***less than significant.***

Construction employees would be required to park in the designated project staging areas (shown in Exhibit 2-8), which are sized to accommodate the estimated maximum of 33 employees. As a result, there would be no increase in on-street parking demand during construction.

Based on the assumptions and calculation described above, the existing peak visitation rate of 25–30 visitors per hour corresponds to a demand for nine to 27 parking spaces. Because Alternative 4, like Alternative 3, involves constructing an amount of public access and recreation features intermediate between Alternatives 1 and 2, implementation of Alternative 4 would likely result in a similar increase in demand for parking. The additional demand for parking would be primarily near the western boundary of the study area because the additional public access and recreation facilities would be in the western portion of the study area, west of the Upper Truckee River. Although Alternative 4 would construct two trails, viewpoints, and an observation area near the southern and eastern boundaries of the study area, these features would be designed to provide habitat protection and existing user-created trails would be eliminated from these same areas; furthermore, it is expected that most of the use from this area would be localized from within the Al Tahoe, Highland Woods, and Tahoe Keys neighborhoods because the area is not connected with regional transit and is not located along primary thoroughfare. Thus, near the southern and eastern boundaries of the study area, parking demand would remain similar to existing conditions.

On-street parking would remain available, as under existing conditions, to accommodate the demand for parking. Also, near the western boundary of the study area, the supply of parking would likely be increased, because of the joint-use agreement between the Conservancy and the Tahoe Keys Marina. This agreement would allow visitors to the study area to park in an expanded parking lot at the Tahoe Keys Marina that would be sufficient to accommodate peak combined visitation to the study area and the Tahoe Keys Marina. This impact would be **less than significant**.

IMPACT 3.16-3 (Alt. 4) **Potential for Conflicts between Construction Traffic, Local Traffic, Pedestrians, and Bicycles (CEQA 6; TRPA 5).** *Construction under Alternative 4 would add short-term truck traffic on local roads in the project vicinity. This traffic has the potential to create conflicts with local traffic, pedestrians, and bicyclists. However, as described in Environmental Commitment 12, the Conservancy would prepare and implement traffic control plans to ensure the safety of local traffic, pedestrians, and bicycles during construction. Therefore, this impact would be* ***less than significant****.*

Table 3.16-21
Existing Plus Alternative 4 (Construction Activities) Weekday Peak-Hour Levels of Service

Location	Control	Weekday a.m. Peak-Hour Levels of Service				Weekday p.m. Peak-Hour Levels of Service			
		Existing		Alternative 4		Existing		Alternative 4	
		Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS	Average Delay (seconds)	LOS
Tahoe Keys Boulevard/East Venice Drive	All-way stop	9.8	A	10.8	B	11.6	B	13.1	B
SR 89/U.S. 50 (Lake Tahoe Boulevard)	Signal	26.9	C	26.9	C	33.8	C	33.8	C
U.S. 50/Tahoe Keys Boulevard	Signal	14.0	B	15.6	B	30.5	B	37.9	B
U.S. 50/Lodi Avenue									
(Overall)[1]	NB/SB stop	(0.6)	(A)	(0.6)	(A)	(1.3)	(A)	(1.5)	(A)
EB left turn		12.7	B	13.2	B	14.7	B	15.3	B
WB left turn		12.2	B	12.5	B	18.3	C	19.3	B
NB left+through+right turn		26.8	D	28.5	D	72.0	F	83.7	D
SB left+through+right turn		28.5	D	31.0	D	38.3	E	42.3	D
U.S. 50/Silver Dollar Avenue									
(Overall)		(0.6)	(A)	(0.6)	(A)	(0.5)	(A)	(0.5)	(A)
EB left turn		14.0	B	14.8	B	14.8	B	15.4	B
SB left+right turn		24.3	C	26.3	D	25.9	D	27.4	D
U.S. 50/Rubicon Trail	Signal	11.4	B	11.4	B	14.4	B	14.8	B
U.S. 50/Al Tahoe Boulevard	Signal	13.2	B	13.0	B	20.8	C	21.3	C
U.S. 50/San Francisco Avenue									
(Overall)	EB/WB stop	(0.6)	(A)	(0.6)	(A)	(0.9)	(A)	(0.9)	(A)
NB left turn		11.3	B	11.8	B	13.9	B	14.4	B
SB left turn		10.5	B	10.8	B	13.1	B	13.6	B
EB left+through+right turn		18.6	C	20.0	C	22.9	C	24.1	C
WB left+through+right turn		12.4	B	12.7	B	15.4	C	16.0	C
U.S. 50/Lakeview Avenue	Signal	4.3	A	4.1	A	4.6	A	4.6	A

Notes: EB = eastbound; LOS = level of service; NB = northbound; SB = southbound; WB = westbound; SR = State Route; U.S. 50 = U.S. Highway 50.

[1] Values in parentheses are the "overall" level of service for the intersection.

Source: KD Anderson & Associates 2007

Table 3.16-22 Existing Plus Alternative 4 Daily Construction Traffic Volumes						
Location			Daily Volume			
			Current		Construction (Alternative 4)	
Road/Street	From	To	September	Peak Month	Regular (PCEs)	Random (PCEs)
San Francisco Avenue	Riverside Avenue	U.S. 50	877	1,000	0	10
Lakeview Avenue	Riverside Avenue	U.S. 50	1,795	2,100	0	10
East Venice Drive	Tahoe Keys Boulevard	Marina	1,304	1,500	1,006	1,006
Silver Dollar Avenue	Ponderosa Street	U.S. 50	1,079	1,250	0	10
Sunset Drive	Ponderosa Street	Conestoga Street	74	85	0	10

Notes: PCE = passenger car equivalent; U.S. 50 = U.S. Highway 50
Source: KD Anderson & Associates 2007

Under Alternative 4, large trucks would be required to travel on local streets between the study area and U.S. 50, and would need to make several turns. The construction access to the site includes the designated haul routes as shown in Exhibit 2-7. As under Alternatives 1–3, other automobiles, pedestrians, or bicyclists present along those streets and at the local intersections could encounter conflicts with construction trucks. The potential for such conflicts would be greater under Alternative 4 than under Alternatives 1–3 because of the much greater number of truck trips (Table 3.16-19). As described in EC 12 (Table 2-6), the Conservancy would prepare traffic control plans to ensure the safety of local traffic, pedestrians, and bicyclists during construction. The plans would be prepared sufficiently in advance of project construction to allow adequate review, comment, and concurrence by the City of South Lake Tahoe public service providers. Because construction traffic controls implemented through the plans would minimize the potential conflicts, this impact would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.16-1 (Alt. 5) **Increased Traffic on Regional Circulation System during Construction. (CEQA 1, 2; TRPA 4)** *No construction or changes to the study area would occur with Alternative 5; therefore, no traffic would be added to major roads in the area of the project. No change to current operating levels of service would result. Therefore, **no impact** would occur.*

Under Alternative 5, LOS standards would not be exceeded because existing activities would continue at the same level into the future and no project construction would occur. No on-site construction would be needed for the No-Project/No-Action Alternative, because river and marsh restoration and recreation facilities would not be implemented. Existing levels of incidental recreational visits would continue as they do currently; therefore, LOS would remain comparable to current conditions. **No impact** would occur.

IMPACT 3.16-2 (Alt. 5) **Increased Parking Demand. (TRPA 2)** *No construction or changes to the study area would occur with Alternative 5; therefore, there would be no increase in demand for parking. Therefore, **no impact** would occur.*

Under Alternative 5, demand for parking would not change because existing activities would continue at the same level into the future and no project construction would occur. No on-site construction would be needed for the No-Project/No-Action Alternative, because river and marsh restoration and recreation facilities would not be implemented. Existing levels of incidental recreational visits would continue as they do currently; therefore, parking demand would remain comparable to current conditions. **No impact** would occur.

IMPACT 3.16-3 (Alt. 5)	**Potential for Conflicts between Construction Traffic, Local Traffic, Pedestrians, and Bicycles (CEQA 6; TRPA 5).** *No construction or changes to the study area would occur with Alternative 5; therefore, there would be no conflicts between construction and local traffic, pedestrians, and bicycles. Therefore,* ***no impact*** *would occur.*

Under Alternative 5, traffic conflicts would not change because existing activities would continue at the same level into the future and no project construction would occur. Existing levels of incidental recreational visits would continue as they do currently; therefore, traffic conflicts would remain comparable to current conditions. **No impact** would occur.

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3.17 UTILITIES

This section describes existing public utilities, presents an analysis of potential impacts resulting from Alternatives 1–5, and identifies mitigation measures for those impacts determined to be significant. Specifically, it addresses potential project impacts on water supply, wastewater, solid waste, electricity, natural gas, and telecommunications (telephone and cable television). Analysis provided in this section is based on review of agency documents, as well as consultation with local public services providers.

3.17.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

The Safe Drinking Water Act is relevant to the proposed alternatives and described in detail in Chapter 5, "Compliance, Consultation, and Coordination."

State

The Porter-Cologne Water Quality Control Act is relevant to the proposed alternatives and described in detail in Chapter 5, "Compliance, Consultation, and Coordination."

Tahoe Regional Planning Agency

1987 Regional Plan

TRPA implements its authority to regulate growth and development in the Lake Tahoe region through the *Regional Plan for the Lake Tahoe Basin* (Regional Plan). TRPA's Regional Plan, adopted in 1987, consists of several documents: Goals and Policies, Code of Ordinances, Water Quality Management Plan, Regional Transportation Plan—Air Quality Plan, Plan Area Statements, and Scenic Quality Improvement Plan. The Regional Plan Update was adopted on December 12, 2012.

Goals and Policies

The following goals and policies in Chapter VI (Public Services and Facilities Element) of TRPA's Goals and Policies (TRPA 2004) related to utilities are applicable to this analysis:

- **Goal #2:** Consider the existence of adequate and reliable public services and facilities in approving new development under the Plan.

  Goal #2 is supported by the following pertinent policies:

  - **Policy 1:** No additional development requiring water should be allowed in any area unless it can be demonstrated that there is adequate water supply within an existing water right.

  - **Policy 3:** No additional development requiring water should be allowed in any area unless there exists adequate storage and distribution systems to deliver an adequate quantity and quality of water for domestic consumption and fire protection.

- **Goal #3:** Prevent liquid and solid wastes from degrading Lake Tahoe and surface and groundwaters of the region.

Goal #3 is supported by the following pertinent policy:

- **Policy 3:** Garbage pick-up service shall be mandatory throughout the region, and will be so structured as to encourage clean-ups and recycling.

Code of Ordinances

Regulations in the TRPA Code of Ordinances are applicable to the analysis of utilities provided to the study area:

- **Chapter 32**, "Basic Services," establishes requirements for projects to be served by paved roads and water, electrical, and wastewater treatment services and establishes standards to implement those requirements.

- **Section 60.3**, "Source Water Protection," sets regulations pertaining to recognition of source water, prevention of contamination to source water, and protection of public health related to drinking water. It strengthens provisions of the TRPA Goals and Policies that address groundwater protection, and implements elements of the TRPA Source Water Protection Program.

City of South Lake Tahoe

The CSLT maintains storm drain facilities in the study area. The CSLT's Community Development Department administers the land use policies, which include planning, building, and environmental regulations. The Planning Division of the Community Development Department also administers various land use regulations through its code enforcement staff. The CSLT Municipal Code (2012) (City Code) establishes the minimum standards applicable throughout the city. The City Code includes policies that regulate utilities including electrical, stormwater, potable water, and wastewater facilities and services. The City Code prohibits illicit connections and discharges to the stormwater drainage system.

On January 1, 1990, the California Integrated Waste Management Act of 1989 (Public Resources Code Section 40000 et seq.), also known as Assembly Bill 939 (AB 939), became law, mandating that every local agency (i.e., city or county) divert at least 50 percent of its waste from landfills by the year 2000 or face fines up to $10,000 per day. Since August 2007, South Tahoe Refuse Company has been contracted by the CSLT to provide solid waste pickup and disposal services for both residential and commercial customers. As of January 2013, South Lake Tahoe is diverting 66 percent of its waste from landfill (STRR 2013).

The study area lies entirely within the South Tahoe Public Utility District (STPUD) service area for water and sewer service. STPUD, a public agency formed in 1950, provides wastewater collection, treatment, and recycling and drinking water to the community of South Lake Tahoe. STPUD has more than 14,000 residential water connections and 17,000 sewer connections, and operates a treatment plant that has a capacity of 7.7 million gallons per day and treats 1.8 billion gallons annually (STPUD 2013).

ENVIRONMENTAL SETTING

Existing utility services and their corresponding provider are as follows:

- Potable water, provided by STPUD
- Sanitary sewer, provided by STPUD
- Solid-waste collection, provided by South Tahoe Refuse and Recycling Company
- Electricity, provided by Liberty Energy
- Natural gas, provided by Southwest Gas Corporation
- Telephone, provided by AT&T
- Cable television, provided by Charter Communications

Each of these utility services is described below.

Water Lines

Several potable-water lines exist around the periphery of the study area near the Tahoe Island, Highland Woods, and Al Tahoe subdivisions. No potable-water lines cross the study area except a water main that is attached to the north side of the U.S. 50 bridge. Typical coverage over existing buried potable-water lines is four feet.

Sewer System

Several sanitary-sewer lines and manholes exist around the periphery of the study area near the Tahoe Island, Highland Woods, and Al Tahoe subdivisions. There are two sanitary-sewer crossings in the study area: one on Trout Creek near River Station 8+00, and one on the Upper Truckee River at approximately River Station 5+00.

The Trout Creek crossing is an active eight-inch-diameter gravity sewer main that serves the Al Tahoe Lift Station. The Upper Truckee River crossing is an eight-inch-diameter line that was abandoned in place more than five years ago. The manholes in the floodplain connected to this line are also abandoned.

All of these crossings are below the thalweg (the line connecting the deepest points along a stream) of their respective alignments. Typical coverage over the existing sanitary sewer lines is six feet in the residential neighborhoods and three feet within waterway alignments and Stream Environment Zones.

Storm Drain Lines

One existing storm drain line is located within the study area. This line runs from a sump pump located on Colorado Avenue within the Tahoe Island subdivision, to its outfall along the Upper Truckee River at approximately River Station 45+50. This pump and line is maintained by the CSLT and is used to relieve stormwater flooding from Colorado Avenue. Typical coverage over existing storm drain lines is two feet. Existing storm drain drainage inlets are located on both the north and south sides of the U.S. 50 bridge. These drainage inlets collect flows from the curb and gutter and discharge directly into the Upper Truckee River from the bridge. The drainage inlets are surface-mounted grates and incorporated into the bridge structure.

Refuse and Landfills

There are two known locations within the study area where refuse is collected: one at the LWS Restoration Area, and one at the end of Bellevue Avenue in the Al Tahoe subdivision. Both of these locations have trailhead trash cans. These trash cans are serviced by the Clean Tahoe Program. The trash cans are serviced an average of three times per week from May through October, and one time per week during the rest of the year (Lear, pers. comm., 2008). To comply with state law, refuse generated in the South Lake Tahoe area is taken to a materials recovery facility located at 2140 Ruth Avenue in South Lake Tahoe, where it is sorted into recyclable components before disposal. Nonrecyclable, nonhazardous refuse is taken to the Lockwood Regional Landfill, located in Sparks, Nevada.

South Tahoe Refuse and Recycling Company is permitted to receive 370 tons of waste per day. The current waste stream is approximately 250 tons per day (Lear, pers. comm., 2008). The Lockwood Regional Landfill is a 21,736-acre, unlined landfill that serves all of northern Nevada and much of northern California (Clements, Harmon, and Young 2007). It is permitted to accept only nonhazardous, municipal (household) waste (NSBDC 2011). This landfill currently has ten years left on its permit life, and is in the process of seeking an expansion with the Washoe County Health Department, which is responsible for permitting of the landfill (Lear, pers. comm., 2008).

Electrical, Telephone, and Cable Television Lines

Numerous overhead power, telephone, and cable television lines exist around the periphery of the study area near the Tahoe Keys, Tahoe Island, Highland Woods, and Al Tahoe subdivisions. These overhead utilities are typical

for the Tahoe Basin. No overhead utility line crossings and poles exist within the study area except lines that run on both sides of U.S. 50.

Natural Gas Lines

Several natural gas lines exist around the periphery of the study area near the Tahoe Island, Highland Woods, and Al Tahoe subdivisions. Natural gas lines cross within the study area, and a gas main is attached to the south side of the U.S. 50 bridge. Typical coverage over existing buried natural gas lines is three feet.

3.17.2 ENVIRONMENTAL CONSEQUENCES

SIGNIFICANCE CRITERIA

Below are outlined the significance criteria for CEQA, NEPA and TRPA. Each agency assigns significance to their criteria in different ways. For this document, an impact is considered to be a physical change in the environment and is considered significant under TRPA and CEQA and adverse under NEPA, if the following occur:

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to utilities if it would:

- exceed wastewater treatment requirements of the applicable regional water quality control board (CEQA 1);
- require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects (CEQA 2);
- require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects (CEQA 3);
- have insufficient water supplies available to serve the Project from existing entitlements and resources, or require new or expanded water supply resources or entitlements (CEQA 4);
- result in a determination by the wastewater treatment provider which serves or may serve the Project that it has inadequate capacity to serve the Project's projected demand in addition to the provider's existing commitments (CEQA 5);
- require solid waste disposal services from a landfill with insufficient permitted capacity to accommodate the Project's expected solid waste disposal needs (CEQA 6); or
- be out of compliance with Federal, state, and local statutes and regulations related to solid waste (CEQA 7).

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative would result in a significant impact for utilities if it would result in any of the following:

- Except for planned improvements, will the proposal result in a need for:
  - Power or natural gas (TRPA 1);
  - Communication systems (TRPA 2);
  - Utilize additional water which amount will exceed the maximum permitted capacity of the service provider (TRPA 3);
  - Utilize additional sewage treatment capacity which amount will exceed the maximum permitted capacity of the sewage treatment provider (TRPA 4);
  - Storm water drainage(TRPA 5); or
  - Solid waste and disposal (TRPA 6).

METHODS AND ASSUMPTIONS

Utilities and services data for the study area, the City of South Lake Tahoe, and other cities in the region were obtained from comprehensive plans and associated environmental documents, urban water management plans, capital improvement plans, and the service providers. The locations and conditions of local water supply, storm drainage, sanitary sewer, and solid waste were identified.

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Exceed wastewater treatment requirements (CEQA 1; TRPA 4) – None of the alternatives would include development of any facilities which would generate wastewater which would be sent to the public wastewater system. Any sanitary facilities required during or after construction would be portable toilets or bathrooms with vaults. Sanitary waste would be periodically removed by a private waste hauler.

Require or result in the construction of new or expanded water or wastewater treatment facilities (CEQA 2, 5; TRPA 4) – No alternatives would require permanent use of public water supplies or wastewater facilities. Therefore, there is no potential to cause construction of new or expanded facilities.

Require or result in the construction of new stormwater drainage facilities (CEQA 3, TRPA 5) – Alternatives 1–4 would include restoration elements to improve ecosystem functions within the study area, including hydrologic processes. The proposed public access and recreation infrastructure elements are designed to appropriately manage any increased surface runoff through infiltration (i.e., not requiring the construction of any new public stormwater collection or treatment facilities). Alternatives 2 and 3 also provide available area for the development of stormwater treatment areas. These areas are not proposed to manage stormwater generated by the project but provide a benefit for the treatment of stormwater generated outside the project area.

Have insufficient available water supplies (CEQA 4, TRPA 3) – The project would not, under any of the alternatives, result in the demand for a permanent water supply. No water would be supplied to proposed recreational facilities. During construction, periodic temporary use of public water supplies may be required (i.e., use of fire hydrants) and would be arranged under agreements with STPUD.

Result in the need for power or gas during construction (TRPA 1 in part) – The project would require temporary use of power during construction. For Alternatives 1, 2, 3, and 4, the use of electricity (provided by Liberty Energy) would be limited to power necessary for a construction trailer and security lighting. This use would not be significant. No use of natural gas is expected.

Result in the need for communications during construction (TRPA 2) – The primary communication system would likely be cell phones. It is possible that the project could require a temporary phone line for the construction trailer. This use would be short term and have a negligible effect on existing communication systems.

IMPACT ANALYSIS AND MITIGATION MEASURES

Alternative 1: Channel Aggradation and Narrowing (Maximum Recreation Infrastructure)

IMPACT 3.17-1 (Alt. 1) **Increased Waste Disposal Requirements Resulting from Construction and Operations (CEQA 6, TRPA 6).** *Implementing Alternative 1 would entail construction activities and operations that would generate solid waste. The quantity of solid waste would be very small relative to the existing solid waste generation from the population in the City of South Lake Tahoe and nearby communities, and the facility providing waste disposal services has sufficient capacity. Therefore, this impact would be* ***less than significant****.*

During construction, any trees or other vegetation removed would be reused (either replanted or mulched) within the study area. However, construction activities could potentially contribute to a temporary or short-term increase in solid waste generation. For any of these alternatives, the increased demand on solid waste generation resulting from construction would be small relative to the existing waste generation from the population in the City of South Lake Tahoe and nearby communities. Lockwood Landfill provides waste disposal services for the community and has adequate capacity. Thus, the construction-related effects of implementing Alternative 1 would be insubstantial.

During operation, Alternative 1 would result in a small increase in solid waste generation resulting from an increase in recreational use. Currently, South Tahoe Refuse collects solid waste from the site. To comply with state law, all recyclable waste is recycled and only non-recyclable waste is taken to the Lockwood Landfill, which has adequate capacity. (It currently has 10 years left on its permit life, and has been seeking an expansion with the Washoe County Health Department, which is responsible for permitting of the landfill [Lear, pers. comm., 2008].) Increased solid waste generation resulting from operation of Alternative 1 would be small relative to the existing waste generation from the population in the City of South Lake Tahoe and nearby communities, and would have similar recycling and waste diversion requirements. The increase in solid waste from operation of Alternative 1 would not have a substantial effect. Because the temporary, short-term, and long-term effects of implementing Alternative 1 would be very small and the landfill providing waste disposal services has adequate capacity, this impact would be **less than significant**.

IMPACT 3.17-2 (Alt. 1) **Increased Use of Electrical Power (TRPA 1).** *Implementing Alternative 1 would include construction of a parking lot, which would require permanent lighting. The use of power could be considerable if the lighting system is not properly designed and maintained. Because the final design of the alternative would include a low-energy parking lot lighting system, this impact would be* ***less than significant****.*

Alternative 1 includes the construction of a permanent parking lot off of East Venice Drive. For safety, the lot would have a permanent lighting system. Lighting parking areas can require significant use of electricity. At the current level of design, the lighting system has not been specified. Conventional street lighting systems can draw up to 500 to 1,000 watts per hour. The final design of the alternative will include a low-energy parking lot lighting system and include low wattage lights such as light emitting diode (LED) lamps and, if feasible, be solar-powered. This impact would be **less than significant**.

Alternative 2: New Channel—West Meadow (Minimum Recreation Infrastructure)

IMPACT 3.17-1 (Alt. 2) **Increased Waste Disposal Requirements Resulting from Construction and Operations (CEQA 6, TRPA 6).** *Implementing Alternative 2 would entail construction activities and operations that would generate solid waste. The quantity of solid waste would be very small relative to the existing solid waste generation from the population in the City of South Lake Tahoe and nearby communities, and the facility providing waste disposal services has sufficient capacity. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.17-1 (Alt. 1) above. For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.17-2 (Alt. 2) **Increased Use of Electrical Power (TRPA 1).** *Implementing Alternative 2 would not include any elements requiring electrical power to operate.* ***No impact*** *would occur.*

Alternative 2 would not include any elements requiring electrical power to operate. Therefore, additional electrical power would not be consumed. **No impact** would occur.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.17-1 (Alt. 3) **Increased Waste Disposal Requirements Resulting from Construction and Operations (CEQA 6, TRPA 6).** *Implementing Alternative 3 would entail construction activities and operations that would generate solid waste. The quantity of solid waste would be very small relative to the existing solid waste generation from the population in the City of South Lake Tahoe and nearby communities, and the facility providing waste disposal services has sufficient capacity. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.17-1 (Alt. 1) above. For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.17-2 (Alt. 3) **Increased Use of Electrical Power (TRPA 1).** *Implementing Alternative 3 would not include any elements requiring electrical power to operate.* ***No impact*** *would occur.*

Alternative 3 would not include any elements requiring electrical power to operate. Therefore, additional electrical power would not be consumed. **No impact** would occur.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.17-1 (Alt. 4) **Increased Waste Disposal Requirements Resulting from Construction and Operations (CEQA 6, TRPA 6).** *Implementing Alternative 4 would entail construction activities and operations that would generate solid waste. The quantity of solid waste would be very small relative to the existing solid waste generation from the population in the City of South Lake Tahoe and nearby communities, and the facility providing waste disposal services has sufficient capacity. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.17-1 (Alt. 1) above. For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.17-2 (Alt. 4) **Increased Use of Electrical Power (TRPA 1).** *Implementing Alternative 4 would not include any elements requiring electrical power to operate.* ***No impact*** *would occur.*

Alternative 4 would not include any elements requiring electrical power to operate. Therefore, additional electrical power would not be consumed. **No impact** would occur.

Alternative 5: No-Project/No-Action

IMPACT 3.17-1 (Alt. 5) **Increased Waste Disposal Requirements Resulting from Construction and Operations (CEQA 6, TRPA 6).** *Under Alternative 5, no construction activities would occur and operations would continue as under existing conditions. Therefore, additional solid waste would not be generated.* ***No impact*** *would occur.*

Under Alternative 5, no construction activities would occur and operations would continue as under existing conditions. Therefore, additional solid waste would not be generated. **No impact** would occur.

IMPACT 3.17-2 (Alt. 5) **Increased Use of Electrical Power (TRPA 1).** *Under Alternative 5, no construction activities would occur and operations would continue as under existing conditions.* ***No impact*** *would occur.*

Under Alternative 5, no construction activities would occur and operations would continue as under existing conditions. Therefore, additional electrical power would not be consumed. **No impact** would occur.

3.18 CUMULATIVE IMPACTS

This section analyzes the overall cumulative impacts of the project alternatives and the No-Project/No-Action Alternative, taken together with other past, present, and reasonably foreseeable future projects producing related impacts, as required by the State CEQA Guidelines (14 California Code of Regulations [CCR] Section 15130) and NEPA implementing regulations (40 Code of Federal Regulations [CFR] 1508.7).

This analysis follows applicable guidance provided by the Council on Environmental Quality (CEQ) in *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997) and *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (CEQ 2005). The analysis also follows applicable guidance and directives provided by Reclamation in the public review draft of Reclamation's *NEPA Handbook* (2000). The latter guidance is used informally in this analysis because the *NEPA Handbook* is currently being revised.

3.18.1 DEFINITIONS OF CUMULATIVE IMPACTS

NEPA DEFINITION OF CUMULATIVE IMPACTS

The CEQ regulations that implement provisions of NEPA define cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7).

Cumulative effects can result from individually minor, but collectively significant, actions over time and differ from indirect impacts (40 CFR 1508.8). They are caused by the incremental increase in total environmental effects when the evaluated project is added to other past, present, and reasonably foreseeable future actions. Thus, cumulative impacts can arise from causes that are totally unrelated to the project being evaluated, and the analysis of cumulative impacts looks at the life cycle of the effects, not the project at issue. These impacts can be either adverse or beneficial.

For this analysis, adverse cumulative impacts are analyzed separately from beneficial cumulative impacts, and significance conclusions are made only for adverse cumulative impacts.

TRPA DEFINITION OF CUMULATIVE IMPACTS

TRPA has not established a definition of cumulative impacts. Rather, TRPA applies NEPA and CEQA definitions of cumulative impacts to its impact assessments.

CEQA DEFINITION OF CUMULATIVE IMPACTS

Cumulative impacts are defined in the State CEQA Guidelines (CCR Section 15355) as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." A cumulative impact occurs from "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (CCR Section 15355(b)).

Consistent with the State CEQA Guidelines (CCR Section 15130(a)), the discussion of cumulative impacts in this section focuses on significant and potentially significant cumulative impacts. The State CEQA Guidelines (CCR Section 15130(b)) state that:

The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.

3.18.2 APPROACH TO THE CUMULATIVE IMPACT ANALYSIS

GEOGRAPHIC SCOPE OF EFFECTS OF THE PROJECT

Table 3.18-1 defines the geographic scope of the effects of the proposed action and alternatives for each of the resource topics addressed in this DEIR/DEIS/DEIS.

Table 3.18-1
Geographic Areas That Would Be Affected by the Project

Resource Area	Geographic Area
Air Quality and Climate Change	*Air Quality:* Lake Tahoe Air Basin *Climate Change:* Upper Truckee River watershed for related projects, although cumulative consequence issues can be global
Archaeological and Historical Resources	Study area, with regional implications
Biological Resources: Vegetation and Wildlife	Project vicinity and watershed of the Upper Truckee River, with regional implications
Fisheries	Watersheds of Trout Creek and the Upper Truckee River, with regional implications
Geology and Soils, Mineral Resources, and Land Capability and Coverage	Study area
Human Health/Risk of Upset	Study area
Hydrology and Flooding	Project vicinity and watershed of the Upper Truckee River
Geomorphology and Water Quality	Project vicinity and watershed of the Upper Truckee River, with implications for Lake Tahoe
Land Use	Project vicinity
Noise	Project vicinity
Public Services	South shore of Lake Tahoe
Recreation	South shore of Lake Tahoe
Scenic Resources	Project vicinity
Socioeconomics, Population and Housing, and Environmental Justice	*Socioeconomics and Population and Housing:* South shore of Lake Tahoe *Environmental Justice:* Project vicinity
Transportation, Parking, and Circulation	South shore of Lake Tahoe
Utilities	South shore of Lake Tahoe
Source: Data compiled by AECOM in 2012	

METHODS AND ASSUMPTIONS OF ANALYSIS

NEPA guidelines do not provide specific guidance on how to conduct a cumulative impact analysis; however, Reclamation's draft *NEPA Handbook* states that an EIS should identify associated actions (past, present, or future) that, when viewed with the proposed or alternative actions, may have significant cumulative impacts. Cumulative impacts should not be speculative, but should be based on known long-range plans, regulations, or operating agreements.

The State CEQA Guidelines identify two basic methods for establishing the cumulative environment in which the project is to be considered: the use of a list of past, present, and probable future projects (the "list approach") or the use of adopted projections from a general plan, other regional planning document, or certified EIR for such a planning document (the "plan approach"). For this cumulative impact analysis, the list approach has been followed to generate the most reliable future projections possible. To analyze the cumulative impacts of the Upper Truckee River and Marsh Restoration Project's action alternatives, a list of related past, present, and reasonably foreseeable future projects was compiled, and the combined effects of these projects and each action alternative were evaluated by resource topic.

Significance Criteria

When considering cumulative impacts of the Upper Truckee River and Marsh Restoration Project, the environmental consequences of project-related actions were evaluated, using the criteria in Appendix G of the CEQA checklist, to determine whether implementing such actions would make a cumulatively considerable contribution to a significant cumulative impact. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other projects, and the effects of probable future projects (State CEQA Guidelines, Section 15065[a][3]). Thus, the effects of project actions were evaluated in combination with the effects of other past, present, and reasonably foreseeable future actions to determine whether (1) the overall cumulative impact would be significant and (2) the actions would considerably contribute to that overall cumulative impact. Both circumstances must exist to conclude that an environmental consequence would be cumulatively significant. Cumulatively significant effects would do any of the following:

- cause a significant adverse impact on a resource (using the criteria for significance described in Chapter 3, "Affected Environment and Environmental Consequences");
- make a considerable contribution to an already degraded or declining resource that has experienced substantial adverse effects from other past, present, or reasonably foreseeable future projects; or
- cause an effect that was initially not significant by itself, but that would be part of a cumulatively degrading or declining future trend resulting from other reasonably foreseeable future actions.

A project's potential cumulative impacts that would be significant based on the criteria above may be reduced to a less-than-significant level if the project would comply with the requirements of an approved plan or mitigation program designed to reduce the project's potential incremental contribution to a cumulative effect to a level that is not cumulatively considerable. The approved plan or mitigation program must contain specific requirements that, if implemented, would avoid or substantially lessen the cumulative problem within the geographic area where the project would occur.

Short-Term and Long-Term Cumulative Impacts

Because the project involves restoring natural functions and values to a river and marsh through construction activity, short-term impacts may result from construction-related disturbance. Therefore, the analysis needs to examine whether short-term cumulative impacts may be caused by implementation of a combination of the Upper

Truckee River and Marsh Restoration Project and other past, present, and reasonably foreseeable future projects in the watershed.

Short-term impacts include both effects that would be transient and are related to construction activities (e.g., noise) and effects that would last for three to five years and are related to the restoration that would occur after completion of construction. The restoration period is a transitional time after construction when plant growth and other natural processes revegetate exposed soils, reestablish wildlife habitats or develop them for the first time, and stabilize river channels. The relevant time period for the analysis of short-term cumulative impacts, therefore, is the duration of the project's construction phase and up to five years thereafter.

In this cumulative impact analysis, short-term impacts are addressed separately from long-term impacts. Typically, such transitory effects do not result in a cumulatively significant impact, because they do not add to the effects of other actions. However, the construction and transitional periods of the Upper Truckee River and Marsh Restoration Project could be concurrent with the construction and transitional periods of several other restoration and erosion control actions in the Upper Truckee River watershed (Table 3.18-2). Thus, the combined short-term effects of these restoration and related actions (including the Upper Truckee River and Marsh Restoration Project) could be cumulatively significant for certain resources (e.g., water quality), and therefore are discussed in this section. Also, the short-term effects on a resource could be adverse, while long-term effects on the same resource would be beneficial. (For example, the short-term risk of construction-period sedimentation could be adverse, even though the project would fulfill its purpose of creating long-term benefits to water quality.) For these reasons, short-term cumulative impacts are distinguished from long-term impacts in the cumulative impact analysis and conclusions.

Long-term cumulative impacts are the more common subject of cumulative impact analysis. Adverse effects typically accumulate over time as a combination of projects is implemented. Because this DEIR/DEIS/DEIS examines a proposed restoration project, long-term cumulative environmental effects could be either adverse or beneficial; both types of effects are considered in this analysis. Long-term cumulative impacts are discussed for each resource after short-term cumulative impacts, if both apply.

Mitigation Measures for Cumulative Impacts

Where a considerable contribution to a significant cumulative adverse effect is identified, mitigation measures are presented, where feasible. If mitigation for project-related impacts described in Sections 3.2 through 3.17 would also resolve cumulative impacts, it is cross-referenced in the discussion below. If a new mitigation measure is needed for the cumulative impact, it is described in its entirety in the following discussion.

Related Projects Considered in the Cumulative Impact Analysis

Past Projects

The Upper Truckee River, its watershed, and surrounding areas have been substantially altered by land use practices during the past 150 years. The opening of the Comstock silver mining boom in Nevada in mid-1859 prompted a surge in timber harvesting, and agricultural and developed land uses also increased. From the 1900s to the present, developed land uses have continued to increase, particularly since 1960. For example, the population of the city of South Lake Tahoe has increased five-fold since 1960 (CSLT 2003).

As a result of these changes in land use, the Upper Truckee River watershed has experienced ecosystem degradation that is typical of what has occurred elsewhere in the Tahoe Basin (Murphy and Knopp 2000). The river has been modified from its original conditions by human activities such as logging, livestock grazing, and road construction, and by residential, commercial, and industrial developments (including the Lake Tahoe Airport and U.S. 50 bridge). Many of these past actions continue to affect resources in the project vicinity and Upper

Truckee River watershed, and along the south shore of Lake Tahoe. These major past actions include the following:

- *Historic Timber Harvests.* Most forests within the watershed of the Upper Truckee River have been grazed and logged during the past 150 years, and an associated network of skid trails, flumes, logging roads, and railroads has been constructed during that time (Murphy and Knopp 2000). This extensive grazing, logging, and road construction altered biologic, hydrologic, geomorphic, and other resources in the Upper Truckee River watershed, including the project vicinity. Some logging occurred in the study area, and the study area was grazed for more than 100 years beginning in the 1860s (Lindström 1995, 1996). Both this grazing and the network of water impounding and diverting dams, gates, and miscellaneous earthen works affected resources in the study area and adjacent areas.

- *Fire Suppression.* Before the late 1800s, fires were frequent in the Tahoe Basin, and were mostly of low to moderate intensity. Since that time, changes in land use and fire management have altered the frequency and intensity of fires. In particular, since about the 1920s, fire suppression has resulted in a several-fold increase in tree density and fuel loads in most forests in the Tahoe Basin (Barbour et al. 2002:461–462). These changes in forest structure have altered biological habitats and increased the frequency of high-intensity fires and the vulnerability of trees to insect outbreaks.

- *Species Introductions.* Nonnative species have been accidentally or deliberately introduced into the aquatic and terrestrial ecosystems of the Tahoe Basin. Species that have become particularly abundant and are present in the project vicinity include cowbird (*Molothrus ater*), beaver (*Castor canadensis*), brown trout (*Salmo trutta*), brown bullhead catfish (*Ictalurus nebulosus*), cheatgrass (*Bromus tectorum*), and Eurasian milfoil (*Myriophyllum spicatum*) (Conservancy and DGS 2003). These species have been altering the resources of the project vicinity, the Upper Truckee River watershed, and the south shore of Lake Tahoe.

- *Urban Development.* During the past 150 years, a portion of the watershed of the Upper Truckee River has been converted to developed land uses. Based on a review of land cover within the watershed (using geographic information system [GIS] data layers from CAL FIRE 2002 and California Interagency Watershed Mapping Committee 2004), this portion is about 9 percent, concentrated in the lower elevation areas of the watershed, and includes much of the project vicinity. Urban development has been altering hydrologic, geomorphic, and other resources within the Upper Truckee River watershed, including the project vicinity. Several development projects along the Upper Truckee River have adversely affected geomorphic processes, water quality, and habitats: the golf course at the Lake Valley State Recreation Area (SRA), the South Lake Tahoe Airport, U.S. 50, and the Tahoe Keys Marina and residential area. (In particular, construction of the Tahoe Keys Marina and Tahoe Keys residential area has substantially affected resources in the project vicinity, as described separately below.)

- *Newlands Project—Tahoe City Dam.* Since 1870, a dam has been operated at Tahoe City to regulate the flow of water from Lake Tahoe into the Lower Truckee River. After enactment of the Reclamation Act of 1902, the Secretary of the Interior authorized construction of the Newlands Project, and during 1909–1913, the dam at Tahoe City was reconstructed to its present configuration. This dam controls the top 6.1 feet of storage at Lake Tahoe as a federal reservoir. The Truckee River Operating Agreement governs the operation of this dam, and consequently the surface elevation of Lake Tahoe (Reclamation 2008), which has a substantial effect on the resources of the study area.

- *Tahoe Keys Marina and Tahoe Keys Residential Area.* From the late 1950s into the 1970s, construction of the Tahoe Keys Marina and the Tahoe Keys residential area substantially altered the Upper Truckee Marsh and the downstream reach of the Upper Truckee River. During this time, approximately 500 acres in the center of the marsh was excavated to create canals and the Tahoe Keys Marina, and fill was placed to create the housing pads of the Tahoe Keys residential area. This project fragmented the marsh into what is now known as Pope Marsh on the west and the Upper Truckee Marsh on the east. In addition, by 1965, the adjacent

portion of the Upper Truckee River was channelized, which effectively disconnected it from its former floodplain (Conservancy and DGS 2003).

- *Heavenly Mountain Resort Master Plan* This plan by Vail Resorts, Inc. guided improvement, expansion, and management of facilities and uses at Heavenly Mountain Resort, including areas within the Cold Creek watershed (which is within the Trout Creek watershed) (Vail Resorts 2007). Phase I projects included replacing ski lifts and regrading ski trails; constructing a 1,000-seat restaurant, a bridge for skiers, and new ski trails; and constructing other facilities. The project involved construction activities (e.g., installing trail, road, and pipeline crossings) in the channel of perennial waterways.

- *Lower West Side Wetland Restoration Project.* During the summers of 2001 and 2002, approximately 12 acres of former wetland that was filled during Tahoe Keys construction was excavated three to five feet, and subsequently restored as wetland and reconnected to the Upper Truckee River as part of the active floodplain. The Lower West Side Wetland Restoration Project area is located next to Tahoe Keys Marina behind Cove East Beach, west of the river.

- *Angora Creek Restoration Projects.* Two restoration projects were completed by the California Department of Parks and Recreation (DPR) on Angora Creek, in 1997 and 2002:

  - A reach of Angora Creek that flows through the study area was restored in 1997. That reach was channelized and diverted to dry the meadow for grazing. The Lake Tahoe Golf Course was later built over part of this meadow and abandoned channel. Both reaches were restored, building a new, more sinuous channel reconnected to the meadow floodplain. The objective of both projects was to decrease erosion, enhance wetland and riparian habitat, and improve water quality by restoring the stream channel to a geomorphically functioning condition. Restoring the bed elevation and sinuosity of the stream restored access to the meadow floodplain, raised groundwater elevations, increased sediment deposition and nutrient removal, and improved meadow health.

  - In 2002, DPR restored a second reach of Angora Creek, as well as the adjacent meadow. A section of Angora Creek once meandered through a wet meadow, but the stream was captured by the South Tahoe Public Utility District's sewer alignment in the 1960s. The stream deviated from its original winding path over the sewer, giving the stream more power and causing an increase in erosive forces. The channel had down-cut, scouring the bed of the stream to two feet below its original elevation. This in turn caused the meadow to dry out and degraded critical habitat.

- *Angora Fisheries and Water Quality Project.* This project, completed in 2010 by the Conservancy, El Dorado County, and Reclamation, is located in the watershed of the Upper Truckee River at the Angora Creek crossing of Lake Tahoe Boulevard (El Dorado County DOT 2006). The project involved modifying Angora Creek near the culverts under Lake Tahoe Boulevard to improve fish passage. As part of these modifications, fill was removed in the Stream Environment Zone (SEZ) and the existing culverts were replaced. Angora Creek was dewatered and isolated while the culverts were replaced.

- *Upper Truckee Middle Reaches 3 and 4 Restoration Project.* This project was implemented by the CSLT with funding from the Conservancy and Reclamation and completed in 2011. The project is located along the Upper Truckee River from roughly 0.5 mile northeast of the northern runway limit of the Lake Tahoe Airport to approximately the midpoint of the runway (Reclamation, CSLT, and TRPA 2008). The objectives were to restore natural river and floodplain processes by increasing overbank flow and depositing sediment onto the floodplain, and to improve habitat for terrestrial and aquatic wildlife. To accomplish these objectives, a new channel (approximately 4,000 feet long) was constructed and revegetated and the abandoned channel was backfilled and revegetated. A new floodplain was constructed by removing existing fill. Construction of this new channel and floodplain entailed constructing a temporary river crossing, removing and stockpiling approximately 52,000 cubic yards of soil, and removing and stockpiling a large amount of plant materials.

Additionally, three fish barriers were removed and three in-channel habitat structures were constructed. The total area of disturbance associated with this project was approximately 28 acres.

- *Trout Creek Restoration Project.* Trout Creek is a tributary to the Upper Truckee River, reaching the confluence within the study area. Geomorphic problems with Trout Creek stem from channelization of the lower portions of this stream during construction of a 19th-century railroad route. The straightened channel produced an incised and eroded bed, sand and sediment deposition, and degraded aquatic and riparian habitat conditions. As a part of efforts to control sediment delivery into Lake Tahoe and stabilize stream channels in the watershed, a restoration project began on Trout Creek to reconstruct natural channel sinuosity, pool-riffle sequences, substrate composition, bank stability, and hydrologic function. The project site was located on lower Trout Creek meadows, above and below the confluence with Cold Creek. Restoration of the upper channelized section of stream (above Cold Creek) to control erosion and stabilize the channel involved completely replacing this upstream reach with an adjacent reconstructed sinuous channel. The channel and bank of the downstream reach (below Cold Creek) was only partly reconfigured, interspersed with existing channel forms where natural sinuosity occurred. The reconstruction project was completed during 2000–2001, with flow of the creek redirected into the new channels in summer 2001 (Herbst 2009:2–3).

- *Lake Tahoe Airport Runway Restoration Project.* This project by the CSLT was located at the South Lake Tahoe Airport adjacent to the Upper Truckee River. Along the existing runway, the CSLT removed a 25-foot-wide by 1,300-foot-long area of impervious surface and replaced a portion of this area with pervious concrete. Fill within the SEZ of the Upper Truckee River was removed and the area revegetated. The project did not involve activities within the channel of the Upper Truckee River or any perennial tributaries of the river. The project was completed in 2010.

- *Multi-Agency Erosion Control Projects.* Multiple agencies have completed erosion control projects throughout the Upper Truckee River watershed and elsewhere in the Tahoe Basin to restore the clarity of Lake Tahoe. Most projects addressed erosion control and source runoff improvements, as well as the implementation of best management practices (BMPs) to capture fine sediment and other pollutants before they reach the lake. Erosion control projects and advance treatment methods are implemented to reduce both the volume of water running off roadways and the amount of fine sediment, nitrogen, and phosphorus discharging into Lake Tahoe. El Dorado County, the Conservancy, TRPA, Caltrans, CSLT, and the U.S. Forest Service (USFS) have implemented erosion control measures along Angora Creek, U.S. 50, North Upper Truckee Road, Al Tahoe neighborhood, and other roadways, including forest roads and trails. Measures include redesign and replacement of inadequately sized culverts, inlets, and outfalls; revegetation and other source control measures on eroding slopes; and installation of curbs and gutters, rock bowls at culvert outlets, vegetated swales, and sediment traps and other BMPs. Specific project examples in the Upper Truckee River watershed include El Dorado SR 89, Segment 1–Luther Pass to Meyers Water Quality Improvement Project, Apalachee 3B–Water Quality Project, and U.S. 50 Caltrans Water Quality Projects.

- *Sawmill 1B Bike Trail Project—Air Quality and Recreation Access.* This project by El Dorado County, with funding from the Conservancy and TRPA, is located along U.S. 50 from the entrance to the Lake Tahoe Golf Course to Sawmill Road (Ferry, pers. comm., 2007). It provides a bike trail across the project area. This project involved some construction activities in the channel of waterways (e.g., footings and abutments of crossings). Construction was completed in 2010.

- *Riparian Hardwoods Restoration and Enhancement Description.* This project by DPR was completed in 2011 in selected areas of DPR properties, including Washoe Meadows State Park and Lake Valley State Recreation Area. It involved removing lodgepole pines from areas of aspen, willow, and alder along the maintenance road adjacent to the Upper Truckee River upstream of the golf course (DPR and Reclamation 2007). The project did not involve construction activities in the channel of a perennial waterway.

Present and Reasonably Foreseeable Projects

Present and reasonably foreseeable, probable future projects are those projects that are currently under construction, approved for construction, or in various stages of formal planning. Some of these projects are planned to be under construction during the period when this project is expected to be constructed (2015–2018).

The present or reasonably foreseeable, probable future projects considered in this cumulative analysis are those projects that are located within the Upper Truckee River watershed and the south shore area of the Tahoe Basin and that have been identified as potentially affecting resources that also may be affected by the Upper Truckee River and Marsh Restoration Project. Table 3.18-2 lists these related projects. A preliminary list of projects was compiled by reviewing available information regarding planned projects (including agency Web sites), and by contacting staff members from the CSLT, the Conservancy, El Dorado County, Lake Valley Fire Protection District, DPR, TRPA, and USFS. Projects were then reviewed for inclusion in the cumulative impact analysis based on three criteria:

(1) The project is reasonably foreseeable because it has an identified sponsor and has initiated CEQA, TRPA, and/or NEPA environmental review or other regulatory procedures.

(2) Available information defines the project in sufficient detail to allow meaningful analysis.

(3) The project could affect resources potentially affected by the Upper Truckee River and Marsh Restoration Project.

Identified projects that satisfied these three criteria have been organized into the following three categories:

(1) river and stream restoration,

(2) water quality and erosion control, and

(3) other projects.

The projects within each of these categories are listed in Table 3.18-2.

Table 3.18-2
List of Related Projects in the Upper Truckee River Watershed and the South Shore Area

Name	Description and Status
River and Stream Restoration Projects	
Sunset Stables Restoration Project	**Description:** This project proposed by the Conservancy and the USFS would be located in a 739-acre Management Planning Area in the vicinity of the South Lake Tahoe Airport, and adjacent to and directly south of the Upper Truckee Middle Reaches 3 and 4 Restoration Project (Conservancy and DGS 2008a). Its goals include restoring a more naturally functioning river and floodplain, improving water quality by restoring floodplain processes, and reducing erosion from bank failure. The project would restore, enhance, and protect aquatic and terrestrial habitat diversity and quality and provide for appropriate and compatible public access. To accomplish these goals, it would restore a portion of the 2.6-mile-long reach of the Upper Truckee River that is in the Management Planning Area. This new channel would start east of the U.S. 50 bridge and would be designed around existing sewer and water pipelines to the extent possible. Lateral grade controls would be installed where the new channel crosses the old channel, and vertical grade controls would be installed where the new channel transitions to existing channel. Implementation would entail excavating new channels, and after the new channels have been revegetated, diverting the river's flow into the new channel(s) and filling and revegetating the abandoned channel.

Table 3.18-2 List of Related Projects in the Upper Truckee River Watershed and the South Shore Area	
Name	Description and Status
	Status: Environmental review (IS/MND and EA/FONSI) is complete and construction of the first phase (Reach 5) began in 2012 and will be complete in 2016. Construction of the second phase (Reach 6) has not secured construction funding and would begin construction in 2015 at the earliest and last for four years.
Upper Truckee River Middle Reaches 1 and 2 Stream Restoration Project	**Description:** This project led by the Conservancy and the USFS would be located from U.S. 50 upstream to the vicinity of the South Lake Tahoe Airport, and just downstream of the Upper Truckee Middle Reaches 3 and 4 Restoration Project. The objectives of the Upper Truckee Middle Reaches 1 and 2 Stream Restoration Project are to (1) eliminate a gully that is eroding along the river at this site, and (2) enhance aquatic and adjacent terrestrial habitat along the Upper Truckee River. To accomplish these objectives, the gully channel would be filled and revegetated, and portions of the channel banks of the Upper Truckee River would be recontoured and revegetated. Some riparian enhancements, bank stabilization, and aquatic habitat structures are also being considered (Carroll, pers. comm., 2008). **Status:** Currently the project is on hold while the USFS proceeds through the federal land acquisition process with the intention of acquiring the property by 2013. The environmental document (IS/MND and EA/FONSI) is being developed. Construction could begin in 2014 and would last for 1 season, with only irrigation anticipated in subsequent seasons.
Upper Truckee River Restoration and Golf Course Reconfiguration Project	**Description:** This DPR, TRPA, and Reclamation project would occur in the Upper Truckee River watershed at Washoe Meadows SP and Lake Valley SRA. The purpose of the project is to improve geomorphic processes, ecological functions, and habitat values of a 1.5-mile reach of the Upper Truckee River, helping to reduce the river's discharge of nutrients and sediment that diminish Lake Tahoe's clarity while providing access to public recreation opportunities in Washoe Meadows SP and Lake Valley SRA. Four alternative approaches to implementing the proposed project are being considered, along with the No-Project/No-Action Alternative. Depending on which alternative is selected, the proposed restoration project may include continuing existing golf course use, removing the entire Lake Tahoe Golf Course, or reconfiguring the golf course to allow for restoration of the river, reduce the area of SEZ occupied by the golf course, and allow for establishment of a buffer area between the golf course and the river. The four action alternatives (Alternatives 2–5) and the No-Project/No-Action Alternative (Alternative 1) are analyzed in the draft EIR/EIS/EIS. Under the No-Project/No-Action Alternative, Alternative 1, the river restoration and changes to the golf course would not be implemented. This alternative represents a projection of reasonably foreseeable future conditions that could occur if no project actions were implemented. Alternative 2 would involve restoring the Upper Truckee River and providing a reconfigured 18-hole regulation golf course. Alternative 3 would involve restoring the river and providing a reduced-play golf course. Alternative 4 would use a combination of hard and soft stabilization to keep the river in its present configuration and would involve only minor changes to the existing golf course. Alternative 5 would involve decommissioning and removing the 18-hole regulation golf course to restore all or a portion of the golf course landscape to meadow and riparian habitat. **Status:** An EIR/EIS/EIS is currently being prepared for the project. Construction could begin in 2014, and would last for three to four years (with most in-channel work occurring during one season).
High Meadows Forest Plan Designation; Ecosystem Restoration; and Access Travel Management Project	**Description:** This project by USFS would be located on 1,790 acres in the upper Cold Creek watershed, which is part of the Trout Creek watershed (USFS 2008a). Its purpose includes guiding management of the property, restoring the channel of Cold Creek through the High Meadow Complex to increase water and sediment storage and to allow it to function as a wet meadow ecosystem, and to provide for current and future recreation needs and reduce the impacts associated with recreation. The project could include creation of approximately 8,700 feet of new channels and associated floodplain on the mainstem, East Fork, and North Fork of Cold Creek; removal and fill of diversion ditches; removal of lodgepole pines; rerouting and decommissioning of roads and trails; and redesign of stream crossings by roads and trails to reduce effects on aquatic ecosystems. **Status:** The project is to be completed in 2012.

Table 3.18-2 List of Related Projects in the Upper Truckee River Watershed and the South Shore Area	
Name	**Description and Status**
Erosion Control and Water Quality Projects	
Sierra Tract Erosion Control Project	**Description:** This project, proposed by the CSLT with funding from the Conservancy and USFS, is located in the Sierra Tract subdivision in the Trout Creek watershed in South Lake Tahoe. It entails constructing a stormwater conveyance and treatment system and stabilizing roadsides with vegetation. This project has been structured into five phases. The project does not include activities in the channel of a perennial waterway. **Status:** Phases 1 and 2 have been completed, except for a small Phase 1c that is on hold. (USFS 2007). Phase 3 is being planned and designed and may be constructed in 2012. Phases 4 and 5 are future projects whose schedule is dependent on the availability of funding.
Montgomery Estates Phases 1, 2, and 3 Water Quality Project	**Description:** This project proposed by El Dorado County, with funding from the Conservancy and USFS, would be located in the watershed of Trout Creek in the El Dorado County. It would implement various slope stabilization, infiltration, sediment trapping, and channel or road source treatment BMPs to reduce the amount of sediment discharging into Cold Creek and Trout Creek. **Status:** Environmental review is complete, Phase 1 is scheduled to be completed in 2012. Phase 2 is scheduled for 2013 and Phase 3 is scheduled for 2014 contingent on funding.
Christmas Valley Phase 2 Water Quality and Recreation Access	**Description:** This project by El Dorado County, with funding from the Conservancy and USFS, would be located in the watershed of the Upper Truckee River along SR 89 from the intersection with U.S. 50 to Portal Drive (Ferry, pers. comm., 2007). It would reduce both peak discharge of stormwater during large storm events and the quantity of fine and coarse sediment entering the Upper Truckee River from the project area. The project would not involve activities in the channel of a perennial waterway. **Status:** Construction is scheduled to be completed in 2012
Sawmill 2 Bike Path and Erosion Control Project	**Description:** This project by El Dorado County, with funding from the Conservancy and USFS, would be located in the watershed of the Upper Truckee River along Sawmill Road from Lake Tahoe Boulevard to U.S. 50 (Ferry, pers. comm., 2007). It would provide a bike trail through the project area, and it would install appropriate BMPs to reduce erosion and nutrient loading and increase treatment of stormwater runoff from existing impervious surfaces in the project area. This project would include construction activities in the channel of perennial waterways, which would be dewatered during construction. **Status:** Environmental review is complete and Phase 1 was completed in 2012 and Phase 2 is scheduled to be completed in 2013.
Other Projects	
US50/Stateline Corridor Project	The USFS partnering with the Federal Highway Administration, CSLT, TRPA, Nevada Department of Transportation, and California Department of Transportation are evaluating alternatives for the US50/Stateline Corridor Project. As identified in TRPA Environmental Improvement Program (EIP), recommended alternatives include water quality, intersection, roadway, pedestrian, bicycle, air, and scenic improvements. Several other projects identified in the EIP will be implemented as a packaged project. US-50 is the principal highway into South Lake Tahoe. Entering the Basin west of Echo Summit, it continues through the South Shore, crosses Stateline, continues to the East Shore, and exits the Basin at Spooner Summit. A major portion of traffic enters the Lake Tahoe Basin through this route, and traffic volumes are predicted to increase 27% over the next 20 years. Traffic delay has a major effect on the Lake environment including impacts to air quality, and pedestrian, bicycle, transit, and vehicle travel. **Status:** The Draft EIR/EIS is currently being prepared.

Table 3.18-2 List of Related Projects in the Upper Truckee River Watershed and the South Shore Area	
Name	**Description and Status**
Edgewood Lodge and Golf Course Improvement Project	**Description:** The approximately 231-acre project site is located within the Edgewood Tahoe Golf Course and includes a small area to the east across U.S. 50. The Edgewood Lodge and Golf Course Improvement Project would include construction of a new lodge complex with associated parking, and other improvements. The project would include construction of a 194-unit lodge complex, including accessory uses; expansion of the South Room at the Edgewood clubhouse; relocation of two existing lakefront residential lots; construction of a new public beach, lakefront recreation facilities, and pedestrian path; pier removal, relocation, and reconstruction; golf course and cart path modifications; and implementation of five threshold improvement projects. **Status:** The final EIR was completed and the project approved. Construction could begin in 2014.
Greenway Bike Trail Project	**Description:** This project by the Conservancy would be located between the intersection of Pioneer Trail and U.S. 50 in Meyers, California, and Van Sickle Bi-State Park at Stateline, Nevada. A portion of this project site is in the watershed of the Upper Truckee River and a portion is in the Trout Creek watershed. The project would also include restoration actions and fuel reduction actions along the trail route. The project would cross waterways on bridges or raised platforms, and the construction of these crossings would require some in-channel construction activities. **Status:** Phase 1 (Sierra Blvd to Van Sickle Bi-State Park) has completed environmental review and permitting (IS/MND and FONSI/EA) and pending funding and easement acquisition could be constructed in 2014 at the earliest. Future phases of the trail would need to complete environmental review and obtain construction funding. The schedule is unknown.
Lake Tahoe Boulevard Enhancement Project	**Description:** This project by the Conservancy, El Dorado County, and USFS would be located in the watershed of the Upper Truckee River in a corridor along Lake Tahoe Boulevard from Tahoe Mountain Road to the CSLT. It would involve constructing a 2-mile-long bike trail along the road and implementing erosion control measures. The project would not involve construction activities in the channel of a perennial waterway. **Status:** Environmental review is in process. Construction could begin in 2014 and could continue for two years.
Multi-Agency Fuel Reduction Plan	**Description:** This plan is a multiagency strategy for coordinating implementation of fuel reduction treatments in the Tahoe Basin (USFS et al. 2007). Treatment types (i.e., general prescriptions) include community defensible space–wildland urban interface, urban core, defense zone, and general forest prescriptions. All of these prescriptions reduce surface and ladder fuels, and tree density, to reduce flame lengths and the likelihood of crown fire. Treatment methodologies include thinning, pruning, prescribed burning, and masticating and chipping. The strategy identifies a substantial portion of the Upper Truckee River watershed as priority areas for treatment. These treatments would not involve construction activities in the channel of perennial waterways. **Status:** Fuel reduction treatments are ongoing and the plan identifies priority areas for treatment during the next five and ten years.
Angora Fire Restoration and Redevelopment	**Description:** Much of the Tahoe Mountain/North Upper Truckee neighborhood is being redeveloped after the Angora Fire in the summer of 2007 destroyed 254 structures. Current rules allow for property owners to pursue the replacement of previously existing development. Provisions allow for an expedited permitting process for landowners and for granting of fee waivers and allocation requirements. Coverage that was preexisting, including coverage located within SEZs and on steep slopes, may be redeveloped. Various agencies including the Conservancy, El Dorado County, and USFS have implemented erosion control techniques and provided assistance with removal of hazardous trees in the area. These agencies are proposing additional restoration activities including channel reconstruction and meadow and wetland complex restoration in the burn area. **Status:** Angora Fire restoration and redevelopment is ongoing. It is expected that additional restoration and redevelopment will continue for the next five to ten years.

Table 3.18-2 List of Related Projects in the Upper Truckee River Watershed and the South Shore Area	
Name	**Description and Status**
Additional Urban Development	**Description:** This urban development would consist of numerous small residential, commercial, industrial, and infrastructure projects in the project vicinity and elsewhere in the watershed of the Upper Truckee River and south shore of Lake Tahoe. These projects might include some construction activities in the channel of perennial or intermittent waterways (e.g., at road and utility crossings). Based on current land use planning and projected changes in population, additional urban development in the project vicinity, the Upper Truckee River watershed, and the south shore of Lake Tahoe is likely. Based on a review of land cover and general plan land use designations within the watershed (using the GIS data layers from CAL FIRE 2002, and California Interagency Watershed Mapping Committee 2004), approximately 8 percent of the watershed is in natural vegetation within areas zoned for developed land uses, and thus a portion of this natural vegetation could be converted to developed land uses in the foreseeable future. However, zoning does not necessarily guarantee development as most of the Basin is fully developed and most improvements are within existing developed land uses. Most development in the area consists of numerous small residential, commercial, industrial, and infrastructure projects. These projects might include some construction activities in the channel of perennial or intermittent waterways (e.g., at road and utility crossings). **Status:** Additional urban development is ongoing, and anticipated to be ongoing throughout implementation of the Upper Truckee River and Marsh Project.

Notes: BMP = best management practice; CAL FIRE = California Department of Forestry and Fire Protection; Caltrans = California Department of Transportation; Conservancy = California Tahoe Conservancy; CSLT = City of South Lake Tahoe; EA = environmental assessment; EIR = environmental impact report; EIS = environmental impact statement; FHWA = Federal Highway Administration; FONSI = finding of no significant impact; GIS = geographic information system; IS = initial study; ND = negative declaration; Reclamation = U.S. Department of the Interior, Bureau of Reclamation; SEZ = Stream Environment Zone; SP = (California) State Park; SR = State Route; SRA = State Recreation Area; DPR = California Department of Parks and Recreation; TRPA = Tahoe Regional Planning Agency; U.S. 50 = U.S. Highway 50; USFS = U.S. Forest Service.

Source: Data compiled by EDAW (now AECOM) in 2010.

3.18.3 CUMULATIVE IMPACT ANALYSIS

AIR QUALITY

IMPACT 3.18-C1 (Alts. 1–5)

Cumulative Air Quality—Short-Term Emissions of Criteria Air Pollutants and Precursors during Construction. *Without Environmental Commitment 1, emissions of oxides of nitrogen (NO_X) from constructing any of the action alternatives (Alternatives 1–4) and simultaneous construction projects in the Lake Tahoe Air Basin could result in an air quality violation, contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations. However, the project proponents would implement several measures to reduce construction-generated emissions of reactive organic gases (ROG), NO_X, and respirable particulate matter less than or equal to 10 microns in diameter (PM_{10}). Proponents of other projects in the air basin would be required to implement similar measures and be evaluated using similar thresholds of significance. These required measures and thresholds of significance have been designed to ensure that cumulatively significant impacts on air quality would not result if the applicable measures (as discussed in Section 3.2, "Air Quality") were implemented by future projects and thresholds of significance are not exceeded. These measures would be implemented and associated criteria would be attained under Alternatives 1–4. In addition, Alternatives 1–4 would not exceed the El Dorado County Air Quality Management District's (EDCAQMD) short-term significance thresholds of 82 pounds per day of ROG or NO_X. Therefore, implementing Alternatives 1–4 would not result in a considerable contribution to the cumulative effect on air quality related to construction-generated emissions of ROG, NO_X, or PM_{10}. The contribution of*

*Alternatives 1–4 to this cumulative impact would be **less than significant**. Implementing the No-Project/No-Action Alternative (Alternative 5) would not result in construction-related emissions of criteria air pollutants and precursors in the study area; therefore Alternative 5 would make no contribution and would have **no impact**.*

Implementing any of the action alternatives (Alternatives 1–4) would emit criteria air pollutants and precursors during construction. (These emissions would be greater under Alternative 4 than under Alternatives 1–3.) As discussed in Impact 3.2-1 (Alts. 1–4), emissions of pollutants generated during construction are short term in nature but can contribute substantially to air quality violations and nonattainment conditions. Emissions are associated primarily with operation of heavy-duty construction equipment and fugitive emissions from ground disturbance and earth-moving activities. With implementation of Environmental Commitment (EC) 1, "Reduce the Generation of Construction-Related Emissions of ROG, NO_X, and PM_{10}," described in Table 2-6, emissions associated with Alternatives 1–4 would not be expected to exceed the applicable significance thresholds (82 lb/day of ROG or NO_X). Even though EC 1 could reduce emissions below the applicable significance threshold for most of the alternatives, when taken together, project-generated emissions combined with emissions from other projects undergoing simultaneous construction could result in violations of or substantial contributions to ambient air quality standards. This can be especially pronounced in the Tahoe Basin because of strict seasonal restrictions on construction activities that cause many projects to be under construction at the same time.

Implementation of EC 1 (planned as part of the alternatives) would reduce the project's potential effects substantially. Project construction would comply with all applicable TRPA, Bureau of Air Quality Planning, and Bureau of Air Pollution Control codes—specifically, TRPA Code of Ordinances Section 33.3 (Grading Standards), Section 60.4 (Best Management Practice Requirements), and Section 65.1 (Air Quality Control). The project proponents would also implement all required measures to feasibly reduce construction-generated emissions of ROG, NO_X, and PM_{10}. EC 1, planned as part of Alternatives 1–4, includes the following: (1) obtaining all necessary TRPA permits and approvals and following all required codes and procedures with respect to BMPs, grading and excavation for the project, and all construction-related and emissions-generating activities; (2) obtaining all necessary El Dorado County permits and approvals and following all required county laws and procedures with respect to BMPs, grading and excavation for the project, and all other construction-related and emissions-generating activities; and (3) implementing dust control measures for any grading activity creating substantial quantities of dust in compliance with the provisions of Section 33.3.3 of the TRPA Code of Ordinances. Implementing these measures would substantially reduce the project's potential effects, and all associated criteria would be attained under Alternatives 1–4. Furthermore, proponents of other reasonably foreseeable projects in the Tahoe Basin would implement similar measures to reduce their emissions of ROG, NO_X, and PM_{10}. With EC 1, implementing Alternatives 1–4 individually would not make a considerable contribution to impacts related to emissions of ROG, NO_X, or PM_{10}. Therefore, the contribution of Alternatives 1–4 to a cumulative impact on air quality because of construction-generated emissions of NO_X would be **less than significant**.

No construction would occur under the No-Project/No-Action Alternative (Alternative 5), so implementing that alternative would not result in construction-related emissions of criteria air pollutants and precursors in the study area; therefore, Alternative 5 would make no contribution and would have **no impact**.

IMPACT 3.18-C2 (Alts. 1–5)

Cumulative Air Quality—Long-Term Operational (Regional) Emissions of Criteria Air Pollutants and Precursors. *Long-term project operation under Alternatives 1–4 would not result in regional daily emissions that would exceed any of the applicable standards, which have been developed to ensure that present and future projects do not result in cumulatively significant impacts on air quality. Therefore, implementing any of the action alternatives would not result in a cumulatively considerable contribution to effects on regional emissions of criteria air pollutants or precursors; this cumulative impact would be **less than significant**. Alternative 5 would make no contribution and therefore would have **no impact**.*

The action alternatives (Alternatives 1—4) would generate minimal long-term emissions from additional mobile sources used by recreational visitors (discussed below in Impact 3.18-C3); however, no alternatives propose pollutant-generating facilities.

For the action alternatives, associated regional emissions of ROG, NO_X, PM_{10}, carbon monoxide (CO), and oxides of sulfur (SO_X) from stationary, area, and mobile sources were estimated using the URBEMIS 2007 Version 9.2.4 computer program, as described in Section 3.2, "Air Quality." Based on this modeling, operation of the project would result in daily emissions of up to approximately 1.31 lb/day of ROG, 1.90 lb/day of NO_X, 0.07 lb/day of PM_{10}, 14.75 lb/day of CO, and 0.01 lb/day of SO_X, which would not exceed any of the applicable standards. While the original modeling used an operational year (i.e., 2014) earlier than the currently anticipated construction year of 2015, it continues to represent a conservative estimate of operational emissions. Trips during 2015 and later are not anticipated to increase over those estimates included in the original modeling , and emission factors for motor vehicles and area sources are anticipated to decrease in future years (e.g., 2030) due to rules and regulations adopted by EPA, ARB and TRPA. Therefore, the originally modeled emissions represent the highest daily level of emissions associated with the proposed project. All future emissions would continue to decrease as a result of equal vehicle trips and lower emissions from mobile and area sources.

In addition, because Alternatives 1-4 would not include the construction or operation of any major sources of stationary emissions, project implementation would not conflict with any air quality planning efforts. Thus, generation of long-term operational emissions from the project under Alternatives 1-4 would not violate an air quality standard, expose sensitive receptors to substantial pollutant concentrations, or conflict with or obstruct implementation of the applicable air quality plan. Thus, implementing Alternatives 1-4 would not make a cumulatively considerable contribution to regional emissions of criteria air pollutants or precursors; this impact would be **less than significant**. Implementing the No-Project/No-Action Alternative (Alternative 5) would not result in a project-related increase in emissions of criteria air pollutants and precursors; therefore, Alternative 5 would make no contribution and would have **no impact**.

IMPACT 3.18-C3 (Alts. 1–5)

Cumulative Air Quality—Long-Term Operational (Local) Emissions of Carbon Monoxide by Mobile Sources. *Although any of the action alternatives (Alternatives 1–4) would generate additional motor vehicle trips during operation, the level of service (LOS) at intersections in the project vicinity would not be reduced to levels that would violate the applicable air quality standard for local mobile-source emissions of CO (i.e., the 8-hour TRPA standard of 6 parts per million [ppm]). Therefore, when viewed in connection with the effects of other projects, implementing any of the action alternatives would not make a cumulatively considerable contribution to effects on local mobile-source CO emissions; this cumulative impact would be* ***less than significant****. Alternative 5 would make no contribution and therefore would have* ***no impact****.*

Implementing any of the action alternatives (Alternatives 1-4) would increase vehicle trips (< 20 additional trips per day) by recreational visitors in the long term, thus generating long-term emissions of CO. Among the action alternatives, Alternative 1 would involve construction of the most public access facilities and would result in the most additional visitor trips, followed by Alternatives 3 and 4. Alternative 2, with the fewest public access facilities, would result in the fewest additional visitor trips.

If these additional trips, in combination with other reasonably foreseeable projects, would change the LOS at signalized intersections to LOS E or F, an air quality standard for local mobile-source emissions of CO (i.e., the 8-hour TRPA standard of 6 ppm) would be violated and sensitive receptors would be exposed to substantial pollutant concentrations, which would be a cumulatively significant impact. However, according to the transportation analysis (Section 3.16, "Transportation, Parking, and Circulation"), LOS at signalized intersections is at acceptable levels. Implementing any of the action alternatives (Alternatives 1-4) would not reduce the LOS at any signalized intersection to an unacceptable level during any time of the day; nor would it substantially worsen an already existing LOS of concern at any signalized intersection. Furthermore, reasonably foreseeable projects would not reduce LOS at intersections affected by the Upper Truckee River and Marsh Restoration Project. Thus,

implementing Alternatives 1-4 would not make a cumulatively considerable contribution to effects on local mobile-source CO emissions; this cumulative impact would be **less than significant**. Implementing the No-Project/No-Action Alternative (Alternative 5) would not result in a project-related increase in mobile-source CO emissions; therefore, Alternative 5 would make no contribution and would have **no impact**.

IMPACT 3.18-C4 (Alts. 1–5)

Cumulative Air Quality—Exposure of Sensitive Receptors to Odors. *Long-term project operation under any of the action alternatives (Alternatives 1–4) would not result in the generation of odors in the study area or its vicinity, nor would implementation of other known related projects. Construction under any action alternative and construction of other projects would generate diesel exhaust. However, these emissions would be short term and intermittent, and would dissipate rapidly. Therefore, when viewed in connection with the effects of other projects, implementing any of the action alternatives would not make a cumulatively considerable contribution to objectionable odors affecting a substantial number of people; this cumulative impact would be* ***less than significant****. Alternative 5 would make no contribution and therefore would have* ***no impact****.*

Neither Alternatives 1–5 nor other projects would result in any long-term, major sources of odor in the study area or its vicinity. In addition, the project's proposed land use type is not one of the types commonly known to generate odors (e.g., landfill, coffee roaster, wastewater treatment plant). However, for both the action alternatives (Alternatives 1-4) and for some other projects in the vicinity of the study area, construction would entail using on-site equipment that would emit diesel exhaust. These emissions would be intermittent and short term, and the exhaust would dissipate rapidly from the source. Therefore, when viewed in connection with the effects of other known projects, construction and operation under Alternative 1, 2, 3, or 4 would not make a cumulatively considerable contribution to objectionable odors affecting a substantial number of people; this cumulative impact would be **less than significant**. Alternative 5 would make no contribution and therefore would have **no impact**.

IMPACT 3.18-C5 (Alts. 1–5)

Cumulative Air Quality—Exposure of Sensitive Receptors to Emissions of Hazardous Air Pollutants. *No major sources of hazardous air pollutants (HAPs) (toxic air contaminants [TACs]) exist in the study area or its vicinity, nor would long-term operation under any of the action alternatives (Alternatives 1–4) or other known projects result in a major source of HAPs. However, construction for any action alternative and for reasonably foreseeable projects would result in short-term emission of HAPs in diesel exhaust. Because these emissions would be short term and diesel exhaust is highly dispersive, sensitive receptors would not be exposed to substantial quantities of HAPs. Therefore, when viewed in connection with the effects of other projects, implementing any of the action alternatives would not make in a cumulatively considerable contribution to the exposure of sensitive receptors to HAPs; this cumulative impact would be* ***less than significant****. Alternative 5 would make no contribution and therefore would have* ***no impact****.*

No major sources of HAPs (known in state parlance as TACs) exist in the study area or its vicinity. Reasonably foreseeable projects also would not create a long-term source of HAPs in the study area or its vicinity, but some short-term emissions of HAPs could occur when such projects are constructed in the vicinity of the study area. Similarly, the project's action alternatives (Alternatives 1-4) would not create a long-term source of HAPs in the study area or its vicinity, but on-site heavy-duty equipment would emit HAPs in diesel exhaust during construction. (These emissions would be greater under Alternative 4 than under Alternatives 1-3.) Because off-road heavy-duty diesel equipment would be used only temporarily, and because of the highly dispersive properties of diesel PM (Zhu et al. 2002), construction of Alternatives 1-4 and of other projects would not expose sensitive receptors to substantial emissions of HAPs. Thus, implementing Alternative 1, 2, 3, or 4 would not expose sensitive receptors to substantial emissions of HAPs, either individually or in combination with other projects. As a result, implementing any of the action alternatives would not result in a considerable incremental contribution to a cumulatively significant exposure of sensitive receptors to emissions of HAPs; this cumulative impact would be **less than significant**. Alternative 5 would make no contribution and therefore would have **no impact**.

IMPACT 3.18-C6 (Alts. 1–5)	**Cumulative Air Quality—Generation of Greenhouse Gases.** *Implementation of any of the action alternatives (Alternatives 1–4) would not result in the generation of substantial short-term construction or long-term operation-related emissions of greenhouse gases (GHGs). When considered in conjunction with other projects throughout the region, the project's emissions would not affect GHG reduction planning efforts. Therefore, implementing the project would not result in a considerable contribution to cumulative effects on generation of GHGs; this cumulative impact would be* ***less than significant****. No construction or operational activities would occur in the study area under the No-Project/No-Action Alternative (Alternative 5); therefore, Alternative 5 would make no contribution and would have* ***no impact.***

Construction-related GHG emissions were estimated for each alternative using URBEMIS 2007, Version 9.2.4. Operation-related emissions, including direct (e.g., maintenance) and indirect (e.g., vehicle trips) emissions were also calculated using URBEMIS 2007. A complete project-level GHG analysis is provided in Section 3.2, "Air Quality and Climate Change."

Construction-Generated Greenhouse Gas Emissions

Activities associated with constructing any of the action alternatives (Alternatives 1-4) would occur during a period of approximately four years. During this time, construction-related GHG emissions would be associated with engine exhaust from heavy-duty construction equipment, material transport trucks, and worker commute trips. Although any increase in GHG emissions would add to the quantity of emissions that contribute to global climate change, emissions associated with construction of the project would occur over a limited period. Following completion of the project, all construction emissions would cease. Despite the intensity and duration of construction activities and the lack of available mitigation measures to abate GHG emissions from heavy-duty construction equipment and on-road hauling emissions, the incremental contribution to climate change by the project's construction emissions would be short term and minimal and would not be a considerable contribution to the cumulative condition.

To establish additional context in which to consider the magnitude of project-generated construction-related GHG emissions, it may be noted that facilities (i.e., stationary, continuous sources of GHG emissions) in California that generate greater than 25,000 metric tons of CO_2 per year are mandated to report their GHG emissions to ARB pursuant to Assembly Bill (AB) 32. As shown in Table 3.18-7, estimated GHG emissions associated with constructing the project would be a maximum of 449 metric tons of CO_2 per year under the conditions for the highest emitting alternative (Year 3 of Alternative 4).

The project would generate substantially less emissions than the ARB reporting level of 25,000 metric tons of CO_2 per year and the cap-and-trade level of 10,000 metric tons of CO_2 per year set by AB 32. This information is presented for informational purposes only, and it is not the intention of the Conservancy to adopt 25,000 or 10,000 metric tons of CO_2 per year as a numeric threshold. Rather, the intention is to put project-generated GHG emissions in the appropriate context to evaluate whether the project's contribution to the global impact of climate change is considered substantial. Because construction-related emissions under all alternatives would be short term, minimal, and finite in nature (i.e., would not be continuing) and would not approach emissions levels of concern to agencies that have established emission reporting levels, the project's construction-related GHG emissions would not be a considerable contribution to the cumulative condition; this cumulative impact would be **less than significant**. No construction activities would occur under the No-Project/No-Action Alternative (Alternative 5); therefore, Alternative 5 would make no contribution and would have **no impact**.

Operation-Related GHG Emissions

Operation-related GHG emissions would be generated by area and mobile sources during the life of the project. Area-source GHG emissions would be associated with maintenance largely related to maintaining public access infrastructure, waste disposal, and other miscellaneous activities. Existing maintenance programs would continue as they do today. The largest increase in emissions would occur under Alternative 1, which would entail the most

Table 3.18-7 Summary of Modeled Construction-Generated Emissions of Greenhouse Gases under the Conditions for the Highest Emitting Alternative (Alternative 4) [1]	
Source	**Total Mass CO_2 Emissions (metric tons)[1]**
Construction Emissions [2]	
Year 1	297
Year 2	296
Year 3	449
Year 4	297
Total Construction Emissions (Years 1–4)	**1,338**

Notes; CO_2 = carbon dioxide.

Values may not appear to add exactly due to rounding.

[1] The values presented do not include the full life cycle of GHG emissions that occur over the production/transport of materials used during construction of the project, solid waste that occurs over the life of the project, and the end-of-life of the materials and processes that indirectly result from the project. Estimation of the GHG emissions associated with these processes would be speculative, would require analysis beyond the current state of the art in impact assessment, and may lead to a false or misleading level of precision in reporting of project-related GHG emissions.

[2] Construction emissions were modeled with the URBEMIS 2007 computer model. The URBEMIS 2007 model does not account for CO_2 emissions associated with the production of concrete or other building materials used in project construction. It also does not estimate emissions for GHGs other than CO_2, such as CH_4 and N_2O, because the emission levels of these other GHGs are expected to be nominal in comparison to the estimated CO_2 levels despite their higher global warming potential.

See Appendix F, "Air Quality Modeling Results," for detailed model input, assumptions, and threshold calculations.

Source: Modeling conducted by EDAW (now AECOM) in 2012.

public access facilities in the study area. No alternative would involve municipal water use; therefore, implementing the project would not generate off-site GHG emissions associated with water conveyance, treatment, and consumption. Quantification of sequestration of carbon by vegetation is not feasible without an accurate inventory of vegetation types and sequestration rates. Nonetheless, it was assumed that carbon sequestration would remain similar to existing conditions because the site would remain in natural vegetation, and although some changes in vegetation type would likely reduce sequestration rates in small areas (e.g., where Jeffrey pine forest would be replaced with other vegetation), other changes in vegetation type in large areas would likely increase carbon sequestration rates (e.g., conversion of montane meadow to willow-scrub). Mobile-source GHG emissions would be generated by the slight increase in project-related vehicle trips associated with the improvements to public access infrastructure in the study area attracting some additional visitors. Table 3.18-8 presents the operation-related GHG emissions associated with Alternative 1, the highest emitting alternative. Estimates of mobile-source GHG emissions are based on the traffic analysis prepared for the project, which estimates fewer than 100 additional trips per day under Alternative 1, compared to existing conditions, which are associated with an increase in recreational users.

While the original modeling used an operational year (i.e., 2014) earlier than the currently anticipated construction year of 2015, it continues to represent a conservative estimate of operational emissions. Trips during 2015 and later are not anticipated to increase over those estimates included in the original modeling , and emission factors for motor vehicles and area sources are anticipated to decrease in future years (e.g., 2030) due to rules and regulations adopted by EPA, ARB and TRPA. Therefore, the originally modeled emissions represent the highest daily level of emissions associated with the proposed project. All future emissions would continue to decrease as a result of equal vehicle trips and lower emissions from mobile and area sources.

Table 3.18-8 Summary of Modeled Operation-Related Emissions of Greenhouse Gases under the Conditions for the Highest Emitting Alternative (Alternative 1) [1]	
Source	**Annual Mass CO_2 Emissions (metric tons/year)**
Operation-Related Emissions of Alternative 1 (Year 5)	
Area Sources [1]	0.2
Mobile Sources [1,2]	111.1
Electricity Consumption [3]	0
Municipal Water Use [4]	0
Total Operation-Related Emissions	**111.3**

[1] Direct operation-related emissions (i.e., area and mobile sources) were modeled using the URBEMIS 2007 computer model, based on trip generation rates obtained from the traffic analysis, as well as the other assumptions and input parameters used to estimate criteria air pollutant emissions. Mobile source emissions assume nine trips per day above existing conditions. Year 2018 is the earliest year when completion of the project would likely occur. URBEMIS does not estimate emissions for GHGs other than CO_2, such as CH_4 and NO_2, because the emission levels of these other GHGs are expected to be nominal in comparison to the estimated CO_2 levels despite their higher global warming potential.

[2] Estimation of mobile-source emissions is based on the traffic study, which assumes 100 additional trips).

[3] No additional substantial electricity consumption is expected under all alternatives.

[4] No additional substantial water consumption is expected under all alternatives.

See Appendix F, "Air Quality Modeling Results," for detailed model input, assumptions, and threshold calculations.

Source: Modeling conducted by EDAW (now AECOM) in 2008

For context (as with construction emissions), projects that generate more than 25,000 metric tons of CO_2 per year are mandated to report GHG emissions to ARB pursuant to AB 32. As shown in Table 3.18-8, the estimated increase in GHG emissions associated with operation of Alternative 1 would be approximately 111 metric tons of CO_2 per year. Again, implementing any of the action alternatives would generate substantially fewer emissions than the above-referenced threshold levels of 25,000 and 10,000 metric tons of CO_2 per year. Because operation-related emissions would not approach the recommended thresholds of ARB and legislation that have established screening levels, the project's GHG emissions would not be a considerable contribution to the cumulative condition. The project's contribution to this cumulative impact would be **less than significant**. No operational activities would occur under the No-Project/No-Action Alternative (Alternative 5); therefore, Alternative 5 would make no contribution and would have **no impact**.

ARCHAEOLOGICAL AND HISTORICAL RESOURCES

IMPACT 3.18-C7 (Alts. 1–5)

Cumulative Archaeological and Historical Resources—Damage to or Destruction of Potentially Significant Cultural Resources or Human Remains. *In the Tahoe Basin, past and ongoing development and natural forces, such as erosion and weathering, have been reducing the information potential and cultural value of prehistoric- and ethnographic-period cultural resources and human remains. Significant, undocumented, buried archaeological materials or human remains may be present that could be damaged or destroyed by grading or excavation associated with Alternatives 1–4. However, implementation of Environmental Commitments 2 and 3 would ensure that project-related activities would not make a considerable contribution to cumulative effects on important undocumented cultural resources. This cumulative impact would be* ***less than significant****. No construction activities would occur in the study area under Alternative 5. For this reason, Alternative 5 would make no contribution to a cumulative impact; however, natural forces would continue to affect information potential and cultural value of cultural resources within the study area and throughout the Tahoe Basin. This impact would be* ***less than significant****.*

Research conducted for the project indicates that the study area contains one prehistoric cultural resource that is considered significant as defined by CEQA, Section 106, and TRPA criteria. Undiscovered cultural resources may also be present in the study area. However, as described in Environmental Commitments EC 2, "Prepare and Implement a Cultural Resources Protection Plan," and EC 3, "Stop Work within an Appropriate Radius around the Discovered Human Remains, Notify the El Dorado County Coroner and the Most Likely Descendants, and Treat Remains in Accordance with State and Federal Law" would reduce impacts on prehistoric and historic-era resources and human interments to a less-than-significant level under all action alternatives (Alternatives 1-4). The Conservancy would prepare a cultural resources protection plan that would include oversight of grading in areas that could have the potential to find significant resources in the vicinity of CA-ELD-26/H. Additionally, project construction personnel would be trained on the possibility of encountering potentially significant resources and human remains; if encountered, proper measures would be taken to protect them. Furthermore, final design of the bike path will completely avoid the CA-ELD-26/H site. Therefore, the action alternatives would comply with CEQA, Section 106, and TRPA guidance and would not incrementally contribute to any significant cumulative impacts on important cultural resources in the project vicinity.

Cumulatively considerable effects on cultural resources would be avoided by implementing ECs 2 and 3, planned as part of the alternatives, which would reduce or eliminate impacts on site CA-Eld-26, presently undocumented cultural resources, and human remains. If project-related destruction or disturbance of these resources is reduced or eliminated, the integrity of these resources would be maintained, and, except for natural degradation, these sites would remain as they are for an extensive period, providing future cultural information opportunities and serving as traces of traditional lifeways and industries once common in the Tahoe Basin. Therefore, implementing ECs 2 and 3 would ensure that project-related activities would not make a considerable contribution to cumulative effects on important undocumented cultural resources or human remains.

The contribution to cumulative impacts to undocumented cultural resources or human remains would be **less than significant** for Alternatives 1–4. Under Alternative 5 (No-Project/No-Action), no construction activities would occur, so no undocumented, potentially significant cultural resources would be damaged or destroyed. Therefore, Alternative 5 would make no contribution to a cumulative impact; however, natural forces would continue to affect information potential and cultural value of cultural resources within the study area and throughout the Tahoe Basin. This impact would be **less than significant**.

BIOLOGICAL RESOURCES: VEGETATION AND WILDLIFE

IMPACT 3.18-C8 (Alts. 1–5)

Cumulative Biological Resources: Vegetation and Wildlife—Introduction and Spread of Invasive Plants. *Despite the implementation of minimization measures, reasonably foreseeable projects could contribute to the introduction and spread of invasive plants in the vicinity of the study area. Under the action alternatives (Alternatives 1–4), construction activities could introduce or spread invasive plants, and recreational use could increase in portions of the study area, which in turn could increase the introduction and spread of invasive plants. However, Environmental Commitment 4, planned as part of the alternatives, would substantially reduce the potential for construction activities to introduce and spread invasive species. Furthermore, each action alternative removes user-created trails, which would reduce human disturbance in the core habitat area. Therefore, in connection with other projects, none of the alternatives would make a considerable contribution to this cumulative effect; this cumulative impact would be* ***less than significant****. Under the No-Project/No-Action Alternative (Alternative 5), ongoing management by the Conservancy would continue to control the introduction and spread of invasive plants in the study area, and best management practices implemented by others would limit the introduction and spread of invasive plants in the watershed. This impact would be* ***less than significant****.*

Past actions have introduced and contributed to the spread of a number of invasive plant species in the watershed of the Upper Truckee River and Trout Creek. Under the action alternatives (Alternatives 1-4), construction activities could introduce or spread invasive plants, and recreational use could increase in portions of the study area, which in turn could increase the introduction and spread of invasive plants. The potential for causing these

effects differs among the action alternatives. Ground disturbance is a major factor affecting the introduction and spread of invasive species and differs among alternatives. Implementing Alternative 2 or 4 would disturb the greatest and least acreage, respectively, and implementing Alternative 1 or 3 would disturb comparable, intermediate acreages. However, for all the action alternatives, the duration of construction activities would be the same, and ground disturbance would be dispersed over a comparable area; these are the two most important factors affecting the potential of construction activities to introduce and spread invasive plants. Alternative 1 would have the greatest and Alternative 2 the least potential for increasing recreational use of the study area; Alternatives 3 and 4 would have intermediate effects on recreation use. This increase in use provides the opportunity to introduce and spread invasives through accidental transport by humans (e.g., attached to shoes, tires, and dogs).

EC 4, "Prepare and Implement Invasive Species Management Plan," was planned as part of the alternatives to reduce the potential for introducing and spreading invasive plants. This environmental commitment involves cleaning construction machinery, using seed and other erosion control materials free of invasive plant seed, conducting preconstruction and postconstruction monitoring, and removing invasive plants. These measures would substantially reduce the potential for construction activities to introduce and spread invasive species.

Each alternative also involves removing user-created trails in the core habitat area, which would reduce human disturbance, and the introduction and spread of invasive plants, over the long term in the core habitat area. The Conservancy would also continue to incorporate best management practices throughout the study area to control introduction and spread of invasive weeds related to recreation activities under all alternatives.

Best management practices would also continue to be implemented by others in the basin (e.g., USFS, California Conservation Corps, California DPR) to control the introduction and spread of invasive species.

Because none of the action alternatives would make a considerable contribution to this cumulative effect, their contribution would be **less than significant**.

Under the No-Project/No-Action Alternative (Alternative 5), the Conservancy would continue to limit the introduction and spread of invasive plants in the study area. Similarly, in the rest of the watershed, reasonably foreseeable projects would incorporate best management practices as required by TRPA and Lahontan Regional Water Quality Control Board to limit the introduction and spread of invasives. Therefore, under Alternative 5, a cumulatively considerable contribution to the introduction and spread of invasive plants would not occur. This impact would be **less than significant**.

IMPACT 3.18-C9 (Alts. 1–5)

Cumulative Biological Resources: Vegetation and Wildlife—Construction-Related Effects on Special-Status Plants and Sensitive Habitats (Jurisdictional Wetlands, Riparian Vegetation, and SEZs). *Reasonably foreseeable projects would involve construction activities that would cause short-term disturbances that could affect special-status plants and sensitive habitats in the Upper Truckee River–Trout Creek watershed. These effects would be reduced by implementing avoidance and minimization measures. The action alternatives (Alternatives 1–4) could affect Tahoe yellow cress and would affect sensitive habitats. Regarding Tahoe yellow cress, implementing Mitigation Measure 3.4-3 would fully mitigate this potential effect. Therefore, the cumulative impact to special-status plants would be* ***less than significant****. Regarding sensitive habitats, Alternatives 1–4 would reduce construction-related effects by implementing Environmental Commitments 5 and 6. Nonetheless, Alternatives 1–4 would entail short-term disturbance of some sensitive habitats within the study area. After implementation of all feasible mitigation measures, these short-term effects would remain significant and would make a considerable contribution to the overall significant cumulative effect on sensitive habitats in the watershed. Therefore, the contribution of any of the action alternatives to this cumulative impact would be* ***significant****. No construction would occur under the No-Project/No-Action Alternative (Alternative 5); therefore, Alternative 5 would make no contribution to construction-related effects on special status plants and sensitive habitats and would have* ***no impact****.*

Past actions have converted land to developed uses and substantially altered the hydrologic, geomorphic, and habitat conditions of most natural vegetation in the study area. As a result of these alterations, the ecological functions of some habitats have been impaired, and a number of plant species have been substantially adversely affected. In addition, reasonably foreseeable projects would involve construction activities that would cause short-term disturbances that could affect special-status plants and sensitive habitats in the Upper Truckee River–Trout Creek watershed. These projects would incorporate measures to avoid or minimize these effects, but some residual effects would likely contribute to the significant overall cumulative impact on the watershed's sensitive habitats and potentially to the overall cumulative effect on special-status plant species.

Implementing Alternative 1, 2, or 3 would entail construction activities that could affect Tahoe yellow cress. However, Mitigation Measure 3.4-3, which is planned as part of the alternatives, would require protocol-level surveys for Tahoe yellow cress and avoidance and minimization measures that would fully mitigate construction-related effects on any occupied habitat. Therefore, the construction-related effects of Alternatives 1-3 would not contribute to the overall cumulative effect on Tahoe yellow cress. Alternative 4 does not propose construction in the vicinity of Tahoe yellow cress and therefore would have no effect.

Implementing any of the action alternatives would entail short-term disturbance of some sensitive habitats (e.g., jurisdictional wetlands, riparian vegetation, and SEZs). This short-term disturbance would likely affect the greatest acreage under Alternative 2, would be least under Alternatives 1 and 4 that would have comparable effects, and the effect of Alternative 3 would be intermediate.

Construction-related disturbance of sensitive communities and the potential effects of that disturbance on related ecosystem functions would be substantially reduced by implementing EC 5, "Prepare and Implement Effective Construction Site Management Plans to Minimize Risks of Water Quality Degradation and Impacts to Vegetation," and EC 6, "Obtain and Comply with Federal, State, Regional, and Local Permits." Nonetheless, considerable short-term disturbance of sensitive communities would be unavoidable because such disturbance is integral to the river, floodplain, and other restoration elements of the action alternatives. This impact on sensitive habitats would be significant and would make a considerable contribution to the overall cumulative impact on the watershed's sensitive habitats. Thus, the short-term contribution of any of the action alternatives to this cumulative impact would be **significant**.

All feasible measures to avoid or further reduce the short-term, construction-related impacts of Alternatives 1–4 on special-status plants and sensitive communities have been incorporated into the design of the alternatives. Additional feasible mitigation is not available to reduce this impact to less than significant, so the residual impact would be **significant and unavoidable**.

No construction would occur under the No-Project/No-Action Alternative (Alternative 5); therefore, it would make no contribution and would have **no impact**.

IMPACT 3.18-C10 (Alts. 1–5)

Cumulative Biological Resources: Vegetation and Wildlife—Long-Term Effects on Special-Status Plants and Sensitive Habitats (Jurisdictional Wetlands, Riparian Vegetation, and SEZs). *The combined long-term effect of reasonably foreseeable projects on some sensitive habitats (jurisdictional wetlands, riparian vegetation, and SEZs) would be beneficial because restoration projects would be implemented and other projects would avoid or minimize their effects on sensitive habitats; for other sensitive habitats (e.g., beach), conditions would remain similar to existing conditions. Under the action alternatives (Alternatives 1–4), the long-term result would be an increase in the acreage and quality of sensitive habitats because additional habitat would be created, geomorphic and hydrologic conditions improved, and human disturbance limited. Although the magnitude of these effects would be different for each action alternative, combining the effects of any of the action alternatives with those of other ongoing and future river restoration projects in the Tahoe Basin would result in an increase in acreage and quality of some sensitive habitats. This contribution to a cumulative effect would be* ***beneficial****. As a result of reasonably foreseeable projects, conditions for special-status plants, except for Tahoe yellow cress, would*

remain similar to existing conditions or would be improved. Tahoe yellow cress could be adversely affected by several reasonably foreseeable projects. Under Alternative 2, there would be a long-term increase in special-status plant habitats, and this contribution to a cumulative effect would also be ***beneficial****. Under Alternatives 3 and 4, the extent of special-status plant habitat and the long-term effects of human activities on special-status plants would remain comparable to existing conditions. This cumulative impact would be* ***less than significant****. Alternative 1, however, would negatively affect Tahoe yellow cress by creating additional recreation features (the bridge and boardwalk) in the vicinity of occupied habitat that would create the opportunity for damage by recreationists. Alternative 1 would contribute to a cumulative effect from habitat loss and human activities on Tahoe yellow cress. This impact would be* ***significant****. Under the No-Project/No-Action Alternative (Alternative 5), the Conservancy would continue to provide an exclosure for Tahoe yellow cress and other sensitive plants and existing sensitive habitats would remain. This impact would be* ***less than significant****.*

In the Upper Truckee River–Trout Creek watershed, reasonably foreseeable projects would have a cumulatively beneficial effect on some sensitive habitats (e.g., jurisdictional wetlands, riparian vegetation, and SEZs) because restoration projects would be implemented and other projects would be required to avoid or minimize effects on sensitive habitats.

Implementing any of the action alternatives (Alternatives 1-4) would increase the extent and quality of other sensitive habitats (e.g., jurisdictional wetlands, riparian vegetation, and SEZs). These beneficial effects would result from restoring habitat through habitat creation and improving geomorphic and hydrologic conditions (e.g., increasing the frequency, duration, and extent of overbank flows). Alternatives 2 and 3 would create the greatest acreages of sensitive habitats, and Alternative 1 would create the least; Alternative 4 would create an intermediate acreage. Each action alternative would limit human disturbance in a core habitat area. The acreage of this core habitat area would be greatest under Alternatives 2 and 4, and smallest under Alternative 3; Alternative 1 would have an intermediate sized acreage of core habitat. For the action alternatives, this contribution to a cumulative effect would be **beneficial**.

As a result of reasonably foreseeable projects, conditions for special-status plants, except for Tahoe yellow cress, would be improved or remain similar to existing conditions. In the Upper Truckee River–Trout Creek watershed, the combined long-term effect of reasonably foreseeable projects on some special-status plants could be beneficial because restoration projects would be implemented and other projects would avoid or minimize their effects on special-status plants; for other special-status plants and sensitive habitats, conditions would remain similar to existing conditions. Reasonably foreseeable projects are not expected to affect American mannagrass.

Tahoe yellow cress could be adversely affected by construction and recreation activities resulting from reasonably foreseeable projects (e.g., Edgewood Lodge and Golf Course Improvement Project). Also, as discussed in Impact 3.18-C30 (Alts. 1–5), "Cumulative Geomorphology and Water Quality—Long-Term Modifications in Upper Truckee River Coarse Sediment Transport and Delivery Downstream," depending on the alternatives implemented by upstream restoration projects and depending on the effects of climate change, the delivery of sands and gravel to Tahoe yellow cress habitat at the study area's beaches could be affected. Potential effects of the action alternatives (particularly Alternatives 1-3) could combine with effects of other actions on transport and delivery of coarse sediment; however, the incremental or combined effects on beach erosion are not predictable because climate change influences are highly uncertain. Conditions could range from worse than the existing degraded condition to a possible improvement regardless of changes in coarse sediment delivery. After thorough investigation, the cumulative effect on delivery of coarse sediment to the study area's beaches remains speculative.

The action alternatives differ in their effects on special-status plants. Under Alternative 2, lagoon restoration would increase the extent of potential habitat for American mannagrass, and the restoration and increased inundation of willow scrub-wet meadow under this alternative could also increase the extent of habitat. However, both of these effects are uncertain and may not alter the extent of suitable habitat for American mannagrass.

Under Alternative 2, beach and dune restoration could, and new river mouth construction likely would, increase the extent of habitat suitable for Tahoe yellow cress. Therefore, this contribution to a cumulative effect would be **beneficial**.

Under Alternatives 3 and 4, the extent of habitat for special-status plants and the long-term effects of human activities on those habitats would remain largely unaltered. Thus, the contribution of these alternatives to the overall cumulative impact on special-status plants would be **less than significant**.

Although it includes lagoon restoration that could benefit American mannagrass, Alternative 1 could potentially negatively affect Tahoe yellow cress by creating additional recreation features (the bridge and boardwalk) in the vicinity of occupied habitat that would create the opportunity for damage by recreationists. This contribution to the overall cumulative effect on Tahoe yellow cress of habitat loss and damage from human activities would be **significant**. Additional feasible mitigation is not available to reduce this impact to less than significant, so the residual impact would be **significant and unavoidable**.

Under the No-Project/No-Action Alternative (Alternative 5), the Conservancy would continue to provide exclosures for Tahoe yellow cress and existing habitat for sensitive plant species would remain comparable to existing conditions. This impact would be **less than significant**.

IMPACT 3.18-C11 (Alts. 1–5) **Cumulative Biological Resources: Vegetation and Wildlife—Short-Term Effects on Common or Special-Status Wildlife Resources and Wildlife Movement Corridors.** *Reasonably foreseeable projects would involve construction activities that would cause short-term disturbances that could disrupt common and special-status wildlife use of habitats, including as movement corridors. Measures would be implemented to avoid or minimize these construction-related effects. Nonetheless, some effects on common and special-status species could occur. Implementing any of the action alternatives would cause construction-related disturbance that could potentially affect use of the study area by special-status wildlife species (e.g., willow fly catcher, yellow warbler) and would affect use of the study area by common wildlife species. Mitigation planned as part of the alternatives would avoid effects on most special-status wildlife species, but not on waterfowl. When viewed in connection with other projects, the contribution of any of the action alternatives to effects on common wildlife species would not be cumulatively considerable because construction-related effects on common wildlife species would be short term, would occur at non-contiguous locations and not be concurrent, and would affect only a small portion of available habitat. The contribution of any of the action alternatives to this cumulative impact would be **less than significant**. For these same reasons, the contribution of any of the action alternatives to short-term effects on wildlife movement corridors would not be cumulatively considerable, and this cumulative impact would be **less than significant**. However, the effects to special-status species, specifically waterfowl, could not be avoided by implementing environmental commitments or mitigation measures, and the contribution of any of the action alternatives to this cumulative impact would be **significant**. Alternative 5 would make no contribution and therefore would have **no impact**.*

Past actions have converted land to developed uses and substantially altered hydrologic, geomorphic, and habitat conditions of most natural vegetation in the study area. As a result of these alterations, the ecological functions of some habitats have been impaired, and a number of wildlife species have been substantially adversely affected. In the Upper Truckee River–Trout Creek watershed, reasonably foreseeable projects would involve construction activities that would cause short-term disturbances that could disrupt wildlife use of habitats, including as movement corridors. Some projects could potentially affect special-status wildlife species, but measures would be implemented to avoid or minimize construction-related effects. Nonetheless, some effects on common and special-status species could occur.

Under the action alternatives (Alternatives 1-4), without mitigation, construction-related disturbance could potentially affect use of the study area by special-status wildlife species (e.g., yellow warbler) and would affect use of the study area by common wildlife species, including use of the study area as a movement corridor. This

short-term disturbance would likely be greatest under Alternative 4 and least under Alternative 1; Alternatives 2 and 3 would have comparable, intermediate effects.

Because construction-related effects of the action alternatives and other projects on common wildlife species and wildlife movement corridors would be short term, would occur at non-contiguous locations and not be concurrent, and would affect only a small portion of available habitat, there would not be a substantial cumulative effect on common wildlife species or on wildlife movement corridors. Thus, when viewed in connection with the effects of other projects, the effects of any of the action alternatives would not be cumulatively considerable, and thus, the contribution of any of the action alternatives to this cumulative impact would be **less than significant**.

Effects on special-status wildlife would be avoided or reduced by mitigation planned as part of these alternatives (Mitigation Measures 3.4-8A and 3.4-8B [Alts. 1–4]). This mitigation includes conducting preconstruction surveys for special-status wildlife and, if necessary, using buffers and/or limiting operation periods, which would avoid the loss of individuals, nests, or roost sites of special-status wildlife species, except for effects on waterfowl nesting. Because of this effect on waterfowl, any of the action alternatives would make a considerable contribution to cumulative effects on special-status wildlife resources. This contribution would be a **significant** impact.

Because waterfowl likely nest near the river mouth, Sailing Lagoon, Trout Creek Lagoon, and elsewhere within the study area for a considerable portion of the construction season, implementing buffers or a limited operation period that would avoid substantial effects on waterfowl nesting would not be feasible. Feasible mitigation is not available to reduce this impact to less than significant, so the residual impact would be **significant and unavoidable**.

Under the No-Project/No-Action Alternative (Alternative 5), conditions in the study area would remain similar to existing conditions. Alternative 5 would make no contribution and therefore would have **no impact**.

IMPACT 3.18-C12 (Alts. 1–5)	**Cumulative Biological Resources: Vegetation and Wildlife—Long-Term Effects on Common or Special-Status Wildlife Resources and Wildlife Movement Corridors.** *Because reasonably foreseeable projects include several restoration projects in the Upper Truckee River–Trout Creek watershed, the effects on at least some wildlife resources would be beneficial. For other wildlife resources, future conditions would remain similar to existing conditions. Under the action alternatives (Alternatives 1–4), the long-term ecosystem response to restoring the river and floodplain, enhancing forest habitat, and limiting human disturbance would be substantially improved habitat quality and functions for riparian and aquatic wildlife, including special-status species, such as yellow warbler, willow flycatcher, and waterfowl. River and floodplain restoration would also increase the size and enhance the functions of TRPA-designated wildlife habitats of special significance (i.e., wetlands, meadows, and riparian areas). When viewed in connection with the effects of other projects, which include several ongoing and future river restoration projects, implementing any of the action alternatives would not contribute to a cumulative adverse impact on common and special-status wildlife species associated with riparian, wetland, and aquatic habitat and with forest wildlife habitats. Rather, this effect would be* ***beneficial****. By increasing habitat quality, connectivity of native vegetation, and corridor width, the beneficial effect of the action alternatives on wildlife habitats would also improve the SEZ's wildlife corridor function. This effect would be* ***beneficial****. Alternative 5 would make no contribution and therefore would have* ***no impact****.*

In the Upper Truckee River–Trout Creek watershed, reasonably foreseeable projects would have a cumulatively beneficial long-term effect on some sensitive habitats (e.g., jurisdictional wetlands, riparian vegetation, and SEZs) because several restoration projects would be implemented and other projects would be required to avoid or minimize effects on these sensitive habitats.

Implementing any of the action alternatives (Alternatives 1-4) would increase the extent and quality of habitat for special-status and common wildlife species. These beneficial effects would result from restoring habitat (through

habitat creation), improving geomorphic and hydrologic conditions (e.g., increasing the frequency, duration, and extent of overbank flows), enhancing forest habitat, and constructing features to reduce the effects of human disturbance on habitat.

The action alternatives include long-term restoration and enhancement of forest, riparian, lagoon, and beach habitats. Alternatives 1 and 2 include lagoon and beach restoration that would benefit a variety of species, including shorebirds and waterfowl. All the action alternatives involve restoring and enhancing wetlands, riparian vegetation, and SEZs by creating additional acreage, improving geomorphic and hydrologic conditions, and limiting human disturbance. (The public access elements of the alternatives include features to limit human disturbance.) Alternatives 2-4 involve creating (and improving the geomorphic and hydrologic conditions of) more acres of these sensitive habitats than would be created and improved under Alternative 1. Human disturbance of sensitive habitats would be limited in a larger core area under Alternative 2 or 4 than under Alternative 1 or 3 (with Alternative 3 having the smallest core area).

Under the action alternatives (Alternatives 1-4), the long-term ecosystem response to river and floodplain restoration and enhancement and to other restoration and enhancement features of the alternatives would be substantially improved habitat quality and functions, particularly for riparian and aquatic wildlife, including special-status species, such as yellow warbler, willow flycatcher, and waterfowl. River and floodplain restoration would also increase the size and enhance the functions of TRPA-designated wildlife habitats of special significance (i.e., wetlands, meadows, and riparian areas).

In summary, implementing any of the action alternatives would restore, enhance, and protect common and special-status wildlife species associated with riparian, wetland, and aquatic habitat and TRPA-designated wildlife habitats of special significance. Thus, none of the action alternatives would make a considerable contribution to a cumulatively significant adverse effect; rather, this effect would be **beneficial**.

By increasing habitat quality, connectivity of native vegetation, and corridor width, the beneficial effect of the action alternatives on wildlife habitats would also improve the SEZ's wildlife corridor function. This effect would be **beneficial**.

Alternative 5 would make no contribution and therefore would have **no impact**.

FISHERIES

IMPACT 3.18-C13 (Alts. 1–5)

Cumulative Fisheries—Short-Term Disruption of Aquatic Habitat and Movement Corridors for Fish. *Construction activities associated with the action alternatives (Alternatives 1–4) would temporarily affect the lowest reach of the Upper Truckee River. The Marsh Reach is the downstream connection between the Upper Truckee River and Lake Tahoe and therefore is an important link between the lake and river for such species as Lahontan cutthroat trout, rainbow trout, mountain whitefish, Tahoe sucker, and Lahontan redside. Aquatic habitat supporting trout and native fishes would be temporarily eliminated during the time the channel is dewatered. During the period that water is pumped around a dewatered reach, fish movement within the Upper Truckee River would be restricted. A summer disruption would have little to no effect on species which migrate into the river and spawn in the spring or fall (e.g. rainbow trout, Lahontan cutthroat trout, and mountain whitefish). A short-term disruption of localized aquatic habitat and access would not impair the ability of river dwelling fish (e.g. Lahontan redside, Tahoe sucker) to persist in the river. Most spawning of these species occurs upstream of the Marsh Reach. Therefore, when viewed in connection with the effects of other projects, implementing any of the action alternatives would not result in a cumulatively considerable contribution to this impact; this cumulative impact would be* ***less than significant****. Implementing the No-Project/No-Action Alternative (Alternative 5) would not cause any construction-related impacts and therefore would not contribute to any short-term cumulative disruption of aquatic habitat supporting fishes in the Upper Truckee River;* ***no impact*** *would occur.*

Implementing any of the action alternatives (Alternatives 1-4) would result in channel improvements that could temporarily disrupt migration corridors and the availability of habitat during the summer construction period. Most lake dwelling, river spawning fish (e.g. Lahontan cutthroat trout, rainbow trout) migrate into the Upper Truckee River during spring and fall to access spawning habitat in the Upper Truckee River and Trout Creek. Restoration project implementation would disrupt river flow continuity during summer and into early fall, when restored channel segments are activated. Projects in the Upper Truckee River could also potentially affect river dwelling fish species (e.g. Lahontan redside, Tahoe sucker, and Paiute sculpin). However, the scope of restoration projects is limited by the amount of work that can be accomplished in a single season. Sufficient unaffected habitat would be available to support the spawning and rearing needs of these fish in the Upper Truckee River.

Mountain suckers are a state species of special concern. They spawn in mountain streams during the early summer months (Moyle 2002) and may make short migrations before, during, or following the spawning season. Mountain suckers have been documented in the Upper Truckee River (Conservancy and DGS 2007a). Restoration actions could overlap with the spawning period for mountain suckers. However, mountain suckers are a river dwelling - river spawning species and restoration projects would not restrict habitat in multiple reaches of the river in any given construction year. Unaffected reaches of the Upper Truckee River would continue to provide sufficient habitat for mountain sucker movement and spawning.

In-channel construction and other restoration work would occur in different years for the various projects planned for the Upper Truckee River. The first restoration project was constructed in summer 2008 on Reaches 3 and 4 (Table 3.18-3) and required diverting water around dewatered sections in late summer. Summer dewatering in the Upper Truckee River could occur in one or more reaches during summer from 2015 through 2018. The cumulative impact of these future activities is unlikely to directly affect access to spawning habitat normally available in the Upper Truckee River for lake dwelling, river spawning fish or for river dwelling species because the timing of flow discontinuity would occur outside the spawning and migration season, or for river dwelling species that spawn during summer, it would not affect local sites used for migration and spawning opportunities.

Table 3.18-3
Active Construction Years for Restoration Projects on the Upper Truckee River

Reach (in upstream order)	Construction Start (year)	Construction End (year)
Upper Truckee Marsh	2015	2018
Reaches 1 and 2	2014	2014
Reaches 3 and 4	2008	2011
Reaches 5 and 6	2012	2015
Lake Valley SRA	2015	2018

Note: Active construction includes any disturbance on the floodplain or in the active channel requiring dewatering, diverting water around a channel segment, or connecting up newly constructed channels to the existing channel.

Implementing any of the action alternatives would not disrupt spawning because the project would occur outside of the migration and spawning period. The area contains low-gradient habitat conditions that do not support spawning habitat. It is unlikely that any single project would substantially reduce habitat availability and access to spawning habitat in the Upper Truckee River because the flow discontinuity would occur late in the year, after or before the species that inhabit the river would have spawned. Therefore, the contribution of any of the action alternatives to this cumulative impact would be **less than significant**.

Implementing the No-Project/No-Action Alternative (Alternative 5) would not result in project-related short-term disruption of aquatic habitat, rearing or migration or summer spawning activity of fish in the Upper Truckee River because under this alternative, the stream channel would not be disturbed. However, reasonably foreseeable river

restoration projects could affect the spawning activity of mountain sucker in upstream reaches. Alternative 5 would make no contribution and therefore would have **no impact**.

IMPACT 3.18-C14 (Alts. 1–5)	**Cumulative Fisheries—Short-Term Disruption of Spawning Migration, Rearing, and Holding Activity of Lahontan Cutthroat Trout**. *The action alternatives (Alternatives 1–4) include construction activities that would affect the lowest reach of the Upper Truckee River. Lahontan cutthroat trout occur in the Upper Truckee River, although hatchery fish were recently sighted near the mouth of the river. Lahontan cutthroat trout have been reintroduced in the upper watershed, near Meiss Meadows, as part of an active Lahontan cutthroat trout restoration program. Under any of the action alternatives, Lahontan cutthroat trout might be present in the project area and could be stranded during construction in dewatered areas. Implementing Environmental Commitment 7, planned as part of the action alternatives, would ensure that an aquatic species rescue and relocation plan was implemented. Therefore, when viewed in connection with the effects of other projects, none of the action alternatives would result in a cumulatively considerable contribution to effects on rearing and holding activity of Lahontan cutthroat trout. The contribution of any of the action alternatives to this cumulative impact would be* ***less than significant****. Implementing the No-Project/No-Action Alternative (Alternative 5) would not create any construction-related impacts and therefore would not contribute to any short-term cumulative disruption of spawning migration, rearing, or holding activity of Lahontan cutthroat trout in the Upper Truckee River;* ***no impact*** *would occur.*

Implementing any of the action alternatives would result in channel improvements that could disrupt river flow continuity during summer and into early fall. Lahontan cutthroat trout were recently observed in Lake Tahoe and the Upper Truckee River (following a June 2011 release of hatchery fish into Lake Tahoe by the Nevada Department of Wildlife). However, it is uncertain whether these fish will persist. Lahontan cutthroat trout were previously reintroduced to the headwaters (near Meiss Meadows) by the LTBMU, but natural migration barriers exist between the headwaters and reaches undergoing stream restoration projects. As a result of construction-season restrictions, the restoration projects' disruption of flow continuity would typically occur after Lahontan cutthroat trout have spawned. Because the species would not be restricted to any one restoration project reach and because river flow interruptions for any of the construction seasons would occur late in the summer or early fall, none of the action alternatives would disrupt spawning activity. In-channel restoration activities for the various projects would occur in different years and different subreaches along the Upper Truckee River. The cumulative impact of future activities could result in the short-term disruption of access to spawning habitat for Lahontan cutthroat trout, depending on fish presence and the timing of flow disruption. However, it is unlikely that any single project would substantially reduce access to spawning migration for Lahontan cutthroat trout in the Upper Truckee River because the construction-season flow discontinuity would occur late in the year, after their migration season.

Under any of the action alternatives, adult or juvenile Lahontan cutthroat trout that might be present in the study area could potentially be stranded during construction in dewatered areas. However, implementing EC 7, "Prepare and Implement an Aquatic Species Rescue and Relocation Plan," would ensure that an aquatic species rescue and relocation plan that identifies protocols and procedures specific to Lahontan cutthroat trout and approved by USFWS was prepared in accordance with applicable regulations and implemented by the project proponent. Other restoration projects planned for the Upper Truckee River would occur during future years and could have different regulatory requirements, but it is assumed that all projects would comply with federal protections to limit potential take. Therefore, implementing any of the action alternatives would not result in a cumulative effect on spawning migration, rearing, or holding activities of Lahontan cutthroat trout in the Upper Truckee River. The contribution of any of the action alternatives to this cumulative impact would be **less than significant**.

Implementing the No-Project/No-Action Alternative (Alternative 5) would not result in project-related short-term disruption of spawning migration, rearing, or holding activity for Lahontan cutthroat trout in the Upper Truckee River. Under this alternative, the stream channel would not be disturbed, so spawning migration, rearing, and holding activity by the species would not be disrupted. However, reasonably foreseeable river restoration projects

could affect potential spawning migration, rearing, and holding activity of Lahontan cutthroat trout if the fish are present. Alternative 5 would make no contribution and therefore would have **no impact**.

IMPACT 3.18-C15 (Alts. 1–5)

Cumulative Fisheries—Short-Term Localized Impacts on Fish Abundance and Distribution Related to Rescue and Relocation. *The action alternatives (Alternatives 1–4) include construction activities that would affect the lowest reach of the Upper Truckee River and result in localized effects on fish abundance and distribution. Implementing Environmental Commitment 7 would minimize the potential for fish mortality but could result in short-term changes in fish abundance and distribution. With implementation of fish rescue and relocation actions, the action alternatives would not considerably contribute to effects on population levels for any fish species and thus would not result in a cumulatively considerable contribution to effects on fish populations; therefore, this cumulative impact would be* ***less than significant****. Implementing the No-Project/No-Action Alternative (Alternative 5) would not create any construction-related impacts and therefore would not contribute to any short-term cumulative localized impacts on fish abundance and distribution related to fish rescue and relocation in the Upper Truckee River;* ***no impact*** *would occur.*

Implementing any of the action alternatives (Alternatives 1-4) would result in channel improvements that would involve disrupting aquatic habitat, dewatering channel reaches, and rescuing and relocating fish in the Upper Truckee River. However, because fish are highly mobile, they would redistribute themselves throughout the river segments after restoration work is completed and streamflow is restored. There would be no considerable contribution to long-term population level impacts on introduced trout or native fish populations and therefore no considerable contribution to a cumulatively significant effect from implementing the action alternatives.

Under the proposed restoration actions, fish species known to occur in the Tahoe Basin would be expected to occur in the Upper Truckee River and would be present in the channel segments or lagoons of the project area. During dewatering for construction, EC 7, "Prepare and Implement an Aquatic Species Rescue and Relocation Plan," would be implemented, and fish would be rescued before complete dewatering. Fish rescue and relocation for several proposed restoration actions may occur sequentially or concurrently during summer construction periods from 2013 to 2018. Some fish mortality would occur as a result of capture and handling, but it would be minor relative to the number rescued and would not result in effects on population levels. Multiple season and/or concurrent rescue and relocation efforts would lead to short-term changes in the distribution of fish in the Upper Truckee River. However, fish are highly mobile and would quickly recolonize restored habitats. Following the completion of proposed future restoration actions, the fish community would gradually return to a more natural condition with all species present relative to existing conditions. Therefore, implementing any of the action alternatives would not result in a considerable contribution to effects on fish populations in the Upper Truckee River. The contribution of any of the action alternatives to this cumulative impact would be **less than significant**.

Implementing the No-Project/No-Action Alternative (Alternative 5) would not result in cumulative effects on fish abundance and distribution related to rescue and relocation in the Upper Truckee River. Under this alternative, the stream channel would not be disturbed, so there would be no reason to rescue and relocate fish from this reach of the Upper Truckee River. However, reasonably foreseeable restoration projects would entail construction activities that could result in localized effects on fish abundance and distribution. Alternative 5 would make no contribution and therefore would have **no impact**.

IMPACT 3.18-C16 (Alts. 1–5)

Cumulative Fisheries—Long-Term Increase in Upper Truckee River Habitat Quality. *Action Alternatives 1, 2 and 4 include construction activities that would improve long-term habitat quality in the study area and therefore support the activities of other projects designed to improve conditions for aquatic biological resources in the Upper Truckee River. Therefore, when viewed in connection with other projects, implementing action alternatives 1, 2 and 4 would result in a contribution to* ***beneficial*** *effects on Upper Truckee River habitat quality. Alternative 3 will improve long-term habitat quality in the study area, but its design approach (i.e., natural formation of channels downstream of the constructed "pilot channel")*

allows for potential disruption of upstream migrations and downstream dispersal. Fish passage through the study area would not be certain in all years over the long term so fish access to improved habitat throughout the river system might be impaired and Alternative 3 would not effectively support the cumulative benefit, therefore, the impact is less than significant. Implementing the No-Project/No-Action Alternative (Alternative 5) would not involve any activities to improve habitat quality and therefore would not contribute to any long-term improvements for aquatic biological resources in Upper Truckee River; ***no impact*** *would occur.*

Implementing action alternatives 1, 2 and 4 would result in channel improvements that would provide long-term improvements to aquatic habitat conditions in the study area and would provide cumulative improvements to habitat quality in the Upper Truckee River. Uncertainty regarding the time period required for formation of a channel suitable for upstream fish passage and downstream dispersal exists under Alternative 3. Although cumulative improvements to habitat quality in the study area and throughout the Upper Truckee River may still occur, there is no guarantee of fish passage through the study area (particularly for mountain whitefish due to their migration season) to access upstream habitats in the Upper Truckee River during low-flow periods.

Under existing conditions, aquatic habitat is of a marginal quality and continues to be impaired by the effects of channel incision and widening, including increased deposition of fine sediment; low depth of flow, which results in poor rearing habitat conditions during summer and limited passage in fall; poor substrate suitability, limited stream margin or shallow water habitat during high flows; and increased turbidity during high-flow events. Increased deposition of fine sediment and limited or poor substrate suitability affect habitat for most fish species in the Upper Truckee River, as well as habitat for invertebrates (i.e., western pearlshell mussel) and macroinvertebrates (e.g., mayflies, stoneflies, caddisflies). The project's restoration actions, particularly Alternatives 1, 2 and 4, would be beneficial to aquatic habitat for fish, invertebrates, and macroinvertebrates in the Upper Truckee Marsh and would contribute to the following specific cumulative beneficial impacts:

- Reduced bank erosion—Channel restoration would provide improved long-term stability of the channel, reducing the processes of channel incision and bank failure as a source of fine sediment loading of the Upper Truckee River. This would result in improvements in substrate conditions supporting fish, mussels, and macroinvertebrates.

- Decreased bed shear stress—Restoration actions would reduce bankfull channel capacity by raising the bed of the existing channel or by constructing a new channel with a higher bed elevation relative to the existing channel. The result would be decreased shear stress on the bed, which would improve habitat for aquatic macroinvertebrates and fish by promoting a more geomorphically diverse bed.

- Increased summer depth of flow—Restoration actions would result in improvements to the existing channel or mostly new channels or channel segments that would have a bed elevation higher compared to the existing channel. For Alternative 2, the restored channel would have greater depth of flow and improved fish access from the lake into the river system. With a higher water level in the channel, more of the adjacent groundwater supply would remain and be available to support stream flows later into summer. Under Alternative 3, which relies on the natural formation of channels downstream of the proposed "pilot channel," the depth of flow advantage is uncertain in the marsh reach of the river where uncontrolled flow could result in multiple smaller and shallower distributary channels.

- Improved water quality (turbidity, temperature flux)—Reduction of suspended sediment sources would reduce the level and/or duration of turbidity events and would improve habitat conditions in the bed of the river, thereby improving macroinvertebrate, invertebrate, and fish habitats and therefore the populations that can be supported in the study area. A narrower channel with increased depth of flow would also reduce the diurnal thermal flux (gain and loss of heat) during the long, warm summer days or freezing winter nights by providing more stable temperature conditions that would benefit fish and macroinvertebrates. Raised

groundwater levels could result in groundwater inflow into the channel later into summer and increased base flow conditions. The added influx of cool groundwater would also serve to moderate temperatures.

- Improved spawning habitat (decrease in fines, improved gravel resources)—The proposed restoration actions would use gravel substrate in restored reaches that is designed to be of suitable size distribution for trout spawning invertebrate production, and reintroduction of Lahontan Cutthroat Trout.

- Improved lagoon and floodplain rearing habitat (floodplain inundation, summer base flow)—The proposed restoration actions would improve floodplain connectivity and greatly increase the amount of shallow water edge habitat under high-flow conditions compared to existing conditions. The proposed restoration actions would restore the river-fed shallow lagoon areas. The expansion of shallow water habitats through proposed restoration actions would assist in providing a basis for beneficial systemwide effects on the rearing success of juvenile trout and native fishes. Such habitat improvements could benefit Lahontan cutthroat trout reintroduction efforts if they occur in the future, consistent with TRPA objectives.

Because implementing any of the action alternatives would improve food production in the Upper Truckee River, it could make a positive contribution to food resources available to fish using the Upper Truckee River. This effect would be **beneficial**.

As mentioned above, given the design of Alternative 3 (i.e. natural formation of channels downstream of the proposed "pilot channel") there is the potential for disruption of upstream migrations and downstream dispersal and guaranteed fish passage would not be possible in the long term. The spawning migration of at least one species, mountain whitefish, could be adversely affected during low fall flows. Implementing the No-Project/No-Action Alternative (Alternative 5) would not result in a project-related long-term increase in Upper Truckee River habitat quality. Under this alternative, habitat in the study area would not be improved, and no additional habitat function is expected. Reasonably foreseeable restoration projects would improve habitat in some upstream reaches of the Upper Truckee River. Therefore Alternative 5 would not contribute to cumulative effects on aquatic habitat. Alternative 5 would make no contribution and therefore would have **no impact**.

IMPACT 3.18-C17 (Alts. 1–5)

Cumulative Fisheries—Long-Term Population Level Impacts on Western Pearlshell Mussels. *The action alternatives (Alternatives 1–4) include construction activities that would affect the lowest reach of the Upper Truckee River; however, the substrate conditions in this reach of the river are unsuitable for western pearlshell mussels, which likely are not present or are present in only low numbers in this reach. In addition, Environmental Commitment 7 would be implemented to address this species if it is present. Therefore, none of the action alternatives would have a long-term effect on the population level of western pearlshell mussels in this reach and thus would not contribute to a cumulative effect on the western pearlshell mussel in the Upper Truckee River; this cumulative impact would be* ***less than significant****. Implementing Alternative 5 would not result in any construction-related impacts and therefore would not contribute to any long-term cumulative population level impacts on western pearlshell mussels in the Upper Truckee River;* ***no impact*** *would occur.*

The action alternatives (Alternatives 1-4) would result in channel improvements that would disrupt substrate and potential mussel habitat in the Upper Truckee River. However, because the substrate in this part of the Upper Truckee River is unsuitable for western pearlshell mussels, there would likely not be any individuals present during construction. EC 7, "Prepare and Implement an Aquatic Species Rescue and Relocation Plan," would be implemented to detect and address this species if it is found. Even if present, they would likely be in very low numbers and would therefore not contribute to a long-term population level impacts on western pearlshell mussels and therefore no cumulatively significant adverse effects from the action alternatives.

The restoration actions associated with the Upper Truckee River and Marsh Restoration Project would result in improved habitat conditions consisting of a better diversity of substrates suitable for mussels and decreased bed shear stress (Howard and Cuffey 2003, Strayer et al. 2004) within the project reach. Western pearlshell musse occur

in the Upper Truckee River (Conservancy and DGS 2007b). They are a large riverine mussel that was once common to many of the larger salmon and trout streams throughout the northwest (Nedeau et al. 2005). In the Upper Truckee River, the main population of western pearlshell mussels is located in Reaches 3–6; however, they are also found in Reach 2 and may be present upstream in Lake Valley SRA. Mussels may be very patchy in their distribution, with most of the population in relatively few, very dense beds (defined as more than 300 mussels in one gravel bar or riffle). Dense beds have been documented in Reaches 3–6 of the Upper Truckee River. Abundance in other reaches appears much lower. They have not been documented in the study area, but a standardized riverwide survey of the western pearlshell mussel has not been conducted in the Upper Truckee River. The mussel is not a federal or state special-status species, so there is no mandate to protect it.

Western pearlshell mussels are locally mobile and capable of recolonizing in suitable habitat (Conservancy and DGS 2007b). They reproduce and grow extremely slow, so it would probably take many decades for mussels to fully recolonize restored habitats on their own. Implementing any of the action alternatives could affect individual mussels, but this action would not adversely affect the population because it would not affect individuals upstream of the Upper Truckee Marsh. Based on the very low abundance in the project area, the preconstruction survey and relocation efforts to be conducted under EC 7, "Prepare and Implement an Aquatic Species Rescue and Relocation Plan," and the potential long-term beneficial effects on local habitat for this species, none of the action alternatives would make a considerable contribution to an effect on long-term population levels. Reasonably foreseeable restoration projects in Reaches 3 to 6 of the Upper Truckee River could place the core mussel populations for the Upper Truckee River at risk. However, although implementing these projects would cause short-term disturbance, each project has (Reaches 3 and 4) would (Reaches 5 and 6) implement well-designed relocation programs (the project in Reaches 3 and 4 has been completed and mussels were successfully rescued and relocated); and they would result in long-term improvements to aquatic habitats for western pearlshell mussels. Therefore, this impact would be **less than significant**.

Implementing the No-Project/No-Action Alternative (Alternative 5) would not result in long-term, project-related impacts on population levels of western pearlshell mussels in the Upper Truckee River. Under this alternative, the stream channel and associated substrate would not be disturbed. Already completed projects that rescued and relocated Western pearlshell mussels and reasonably foreseeable restoration projects in Reaches 3 to 6 of the Upper Truckee River could place the core populations for the Upper Truckee River at risk. However, although implementing these projects would cause short-term disturbance, each project has (Reaches 3 and 4) and would (Reaches 5 and 6) implement well-designed relocation programs; and they would result in long-term improvements to aquatic habitats for western pearlshell mussels. Alternative 5 would make no contribution a cumulative impact; however channel substrate would not be improved and therefore this impact would be **less than significant**.

IMPACT 3.18-C18 (Alts. 1–5)

Cumulative Fisheries—Long-Term Impacts of Aquatic Invasive Species to Aquatic Habitat in the Upper Truckee River. *The action alternatives (Alternatives 1–4) include construction activities that would affect the lowest reach of the Upper Truckee River and potentially introduce or spread invasive aquatic plant and animal species (i.e., Eurasian watermilfoil, introduced sunfish, Asian clams, and bull frogs) into or throughout the river channels in the Upper Truckee Marsh, including the Upper Truckee River and Trout Creek. The Eurasian watermilfoil is of particular concern and is present in the project area and the Tahoe Keys and has spread to other marinas or popular anchoring areas around Lake Tahoe by plant pieces becoming fouled in boat ground tackle and establishing new colonies after anchors are re-set at new locations. Construction activities could provide opportunities for invasive aquatic species to be moved on boats, construction equipment, sampling gear, and personal equipment. Implementing Environmental Commitment 4 would minimize the risk of spreading invasive plant and animal species, such as Eurasian watermilfoil. Given these protection measures, this cumulative impact would be* ***less than significant****. Implementing the No Project/No Action Alternative (Alternative 5) would involve no construction and therefore not introduce construction related vectors that could spread invasive aquatic species. However, other vectors to spread aquatic invasive species already occur in the Lake and associated water ways and would continue to affect the spread of aquatic invasive species. Therefore, this impact would be* ***less than significant****.*

Implementing any of the action alternatives (Alternatives 1-4) would involve construction in the vicinity of existing water bodies (i.e., creek and river channel, sailing lagoon) where aquatic invasive species are present. Implementation of EC 4, "Prepare and Implement and Invasive Species Management Plan," would address aquatic invasive species in the project area. This plan would involve taking measures to eliminate the adverse effects of nonnative introduced and/or invasive aquatic plant and animal species (i.e., nonnative plants, nonnative warm-water fish, and other invasive species) during project construction.

The objective of project activities linked to the aquatic invasive species management plan is to reduce threats to native aquatic fauna and flora within the project area. The plan would be developed to be consistent with the State of California's *Aquatic Species Management Plan* (CDFG 2008), and would be completed, reviewed, and approved by CDFG and TRPA prior to initiation of construction. A preconstruction survey would determine whether any populations of invasive aquatic plants or animals are present in the project area. Aquatic habitat within construction sites would be isolated prior to in-channel work. A qualified biologist(s), with expertise in Tahoe basin aquatic plant and animal species, would be present during construction and would supervise the removal and disposal of nonnative invasive species from the project area. All biologists working on this program would be qualified to conduct nonnative aquatic species removal/disposal in a manner that would avoid and/or minimize all potential risks to native aquatic species, particularly any special-status species potentially encountered. Biologists would be on-site when work sites are isolated and/or dewatered, if necessary, in order to capture, handle, and safely remove or dispose of any nonnative aquatic invasive species encountered. All equipment entering the study area from areas suspected of harboring infestations by invasive aquatic plants or areas of unknown infestation status would be cleaned of all attached substrate plant parts before being allowed into the study area. All equipment used for in-channel work would be thoroughly cleaned prior to use on the project and then be cleaned before leaving the site. This includes construction equipment, boats, kayaks, canoes, fish nets and other fish sampling equipment, all water quality sampling and monitoring equipment, waders, wading boots, and any other equipment that comes into contact with water or that may come in contact with aquatic vegetation during project implementation.

This program would be closely coordinated with the Aquatic Species Rescue and Relocation Program, prepared and implemented as EC 7, which is aimed at reducing the direct loss of native fish and desired sport fish (i.e., trout) and native mussels from impacts associated with construction of the project. Implementing EC 7 would minimize stranding and mortality of these desirable species in the project area through rescue and relocation. Reasonably foreseeable restoration projects would entail construction activities that could affect aquatic invasives introduction or control on other reaches of the Upper Truckee River, but would be expected to implement invasive species control and eradication measures. Existing nonconstruction-related vectors that result in the establishment or spread of aquatic invasive species throughout the Upper Truckee River would continue. It is possible that measures to eradicate and control invasives at the construction sites could provide a beneficial effect where aquatic species have previously established. Therefore, implementing any of the action alternatives would not result in a considerable contribution to effects on aquatic invasive species in the Upper Truckee River. The contribution of any of the action alternatives to this cumulative impact would be **less than significant**.

Implementing the No-Project/No-Action Alternative (Alternative 5) would not result in cumulative effects on aquatic invasive species in the Upper Truckee River. Under this alternative, the water bodies within the project reach would not be disturbed, so there would be no construction-related mobilization of invasive species. Reasonably foreseeable restoration projects would entail construction activities that could affect aquatic invasive species introduction or control on other reaches of the Upper Truckee River, but would be expected to implement invasive species control and eradication measures. Existing and continuing non-construction related vectors that result in aquatic invasive species' establishment or spread throughout the Upper Truckee River would continue in the absence of the project. Therefore, this impact would be **less than significant**.

IMPACT 3.18-C19 (Alts. 1–5) **Cumulative Geology and Soils, Mineral Resources, and Land Capability and Coverage—Construction-Related, Short-Term Increases in Soil Erosion, Sedimentation, and Loss of Topsoil.** *Past actions that have disturbed natural vegetation or converted it to developed land uses have resulted in erosion, sedimentation, and loss of topsoil. Implementing reasonably foreseeable projects and any of the action alternatives could temporarily result in additional erosion, sedimentation, and loss of topsoil. However, implementing Environmental Commitments 5, 6, and 8, planned as part of the action alternatives, would minimize this short-term effect by implementing effective construction management plans. Other reasonably foreseeable projects also would be required to implement BMPs and minimize soil erosion, sedimentation, and loss of topsoil. Furthermore, many effects of the action alternatives and reasonably foreseeable projects on erosion, sedimentation, or loss of topsoil (even in the event of BMP failures) would be localized in their extent and unlikely to combine with the effects of other projects. Therefore, when viewed in connection with the effects of other projects, the effects of the action alternatives on soil erosion, sedimentation, and loss of topsoil would not be cumulatively considerable; this cumulative impact would be* ***less than significant****. No construction would occur under the No-Project/No-Action Alternative (Alternative 5); however, erosion, sedimentation, and loss of topsoil would continue. Therefore, the contribution of Alternative 5 to a cumulative impact would be* ***less than significant****.*

Past actions that have converted natural vegetation to developed land uses or that have disturbed natural vegetation have resulted in substantial erosion, sedimentation, and loss of topsoil in the watershed of the Upper Truckee River. Reasonably foreseeable projects include erosion control projects that would reduce erosion, sedimentation, and loss of topsoil but also include development and other projects that potentially could increase these effects, at least temporarily during construction. For example, river restoration projects could temporarily increase erosion, sedimentation, and topsoil loss during their construction.

Similarly, implementing any of the action alternatives of the Upper Truckee River and Marsh Restoration Project could temporarily increase erosion, sedimentation, and loss of topsoil during construction. All four action alternatives (Alternatives 1-4) would require construction in active stream channels and adjacent floodplains of the study area. The extent of construction would depend on the restoration approach. Alternative 2 would disturb the greatest acreage and Alternative 4 the least; Alternatives 1 and 3 would disturb comparable, intermediate acreages.

As discussed in EC 5, "Prepare and Implement Effective Construction Site Management Plans to Minimize Risks of Water Quality Degradation and Impacts to Vegetation," EC 6, "Obtain and Comply with Federal, State, Regional, and Local Permits," and EC 8, "Prepare a Final Geotechnical Engineering Report, and Implement All Applicable Recommendations," all the action alternatives would incorporate construction site management plans and vegetation protection and planting measures. These plans include many specific measures to be implemented by the Conservancy and their contractors, including restricted disturbance areas and duration, BMPs that are effective up to the 20-year precipitation event and 50-year streamflow event, discrete measures for subdrainage areas, construction equipment and vehicle restrictions, specific winterization guidelines, protection for transported and stored materials and debris, revegetation measures, topsoil salvaging, custom dewatering/bypassing plans, rewetting requirements, and monitoring requirements regarding BMP performance and remedial action requirements. These measures would limit the likelihood and magnitude of potential effects on erosion, sedimentation, and loss of topsoil. Reasonably foreseeable projects would also be required to implement comparable BMPs. Nonetheless, erosion, sedimentation, and loss of topsoil could occur during construction, particularly in the event of BMP failures.

Reasonably foreseeable projects in the vicinity of the study area, including stream restoration projects along the Upper Truckee River, could have active construction during overlapping periods and thus exposure to the same large storm events, high flows, or both during intervening winters. The performance standards for BMPs on other projects would be expected to be the same or similar as those planned for the action alternatives, but it is possible

that the BMPs could fail, particularly if unusual runoff conditions occur that exceed the BMP design capacity. However, it is very unlikely that a BMP failure at one project site could combine with effects on erosion, sedimentation, or loss of topsoil at other project sites because these failures would be localized in their extent. Therefore, when viewed in connection with the effects of other projects, none of the action alternatives would make a considerable contribution to the existing cumulative effect on erosion, sedimentation, and loss of topsoil; this impact would be **less than significant**. No construction would occur under the No-Project/No-Action Alternative (Alternative 5); however, erosion, sedimentation, and loss of topsoil would continue. Therefore, Alternative 5 contribution to a cumulative impact would be **less than significant.**

IMPACT 3.18-C20 (Alts. 1–5) **Cumulative Geology and Soils, Mineral Resources, and Land Capability and Coverage—Land Coverage Changes.** *Past actions have converted natural vegetation to developed uses, and increased the coverage by impervious surfaces (land coverage) in the Upper Truckee River–Trout Creek watershed. These changes have substantially altered geomorphic and hydrologic conditions of the most sensitive lands in the lower portion of these watersheds. Reasonably foreseeable projects in the vicinity of the study area would have individually varied effects on land coverage, but either these effects would be beneficial or the projects would include mitigation to offset their adverse effects. Implementing any of the action alternatives (Alternatives 1–4) would decrease land coverage in the study area and in the sensitive lands (LCD 1b) adjacent to the Upper Truckee River. In LCD 7, alternatives either would increase coverage but not exceed allowable coverage or would reduce coverage. Therefore, none of the alternatives would contribute to the existing cumulatively significant effect on land coverage; this impact would be* ***less than significant****. No new development would occur under the No-Project/No-Action Alternative (Alternative 5); therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

In the past 150 years, some of the Upper Truckee River watershed has been converted to developed land uses containing impervious surfaces (land coverage). Based on a review of land cover in the watershed (using the CAL FIRE 2002 and California Interagency Watershed Mapping Committee 2004 GIS data layers), this portion is about 9 percent, concentrated in the lower elevation areas of the watershed, and includes much of the project vicinity. The land coverage associated with this urban development has substantially altered hydrologic, geomorphic, and habitat conditions in the SEZs of the Upper Truckee River and Trout Creek watershed. Past projects that increased land coverage include the Lake Tahoe Golf Course, South Lake Tahoe Airport, U.S. 50, and the Tahoe Keys Marina and residential and commercial areas in the watershed (e.g., Tahoe Keys, Al Tahoe, or Highland Woods).

Reasonably foreseeable projects would have individually varied effects on coverage. Some projects may potentially increase the amount of impervious surfaces (e.g., bike trails or development projects), others may potentially decrease the amount of impervious surfaces (e.g., Elks Club, the Lake Tahoe Airport Runway Restoration), and others may include no coverage changes (e.g., some restoration projects). Projects that would increase the amount of impervious surfaces would also be required to incorporate mitigation to limit their incremental contribution to the cumulative effect on coverage.

Implementing any of the action alternatives would be less than the allowable coverage on the Dillingham settlement parcels and the other parcels in the study area regulated by Bailey's land classification system. Because the action alternatives would reduce land coverage in LCD 1b and coverage would be consistent with allowable coverage throughout the study area, the project would not make a considerable contribution to the cumulative impact on land coverage; this impact would be **less than significant**. No new development would occur under the No-Project/No-Action Alternative (Alternative 5); therefore, Alternative 5 would make no contribution and would have **no impact**.

HUMAN HEALTH/RISK OF UPSET

IMPACT 3.18-C21 (Alts. 1–5)	**Cumulative Human Health/Risk of Upset—Potential Hazards to the Public from Use of Hazardous Materials or Exposure to Existing On-Site Hazardous Materials.** *None of the action alternatives would have a long-term effect on human health hazards from exposure to hazardous materials because following project implementation, the land uses of the study area would be similar to current conditions. Mitigation planned as part of Alternatives 1–3 include oversight, transport, and disposal procedures related to encountering potential hazardous materials located at the TKPOA yard. There would be no change from current conditions in the transport, use, release, or disposal of hazardous materials related to Alternative 4 and 5. Additionally, Environmental Commitment 9, planned as part of the alternatives, would further reduce potential human health hazards through preparation of a health and safety plan and appropriate noticing requirements, reducing this effect to a less-than-significant level. However, this would not eliminate the risk of construction workers being exposed to hazardous materials. The remaining risk would not contribute to a greater overall cumulative impact because other reasonably foreseeable construction activities would not occur in the same place or at the same time and would be unlikely to concurrently involve the same workers. Therefore, when viewed in connection with other projects, none of the action alternatives would make a considerable contribution to potential hazards to the public from use of or exposure to hazardous materials; this cumulative impact would be* ***less than significant****. No construction would occur and land uses would be unchanged under the No-Project/No-Action Alternative (Alternative 5); therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

The action alternatives (Alternatives 1-4) would have no short-term or long-term effect on human health hazards from exposure to hazardous materials because following project implementation, the land uses of the study area would be similar to current conditions, and there would be no change from current conditions in the transport, use, release, or disposal of hazardous materials.

Mitigation Measures 3.7-2a and 3.7-2b planned as part of Alternatives 1-3 include oversight, transport, and disposal procedures related to encountering potential hazardous materials located at the TKPOA yard. There would be no change from current conditions in the transport, use, release, or disposal of hazardous materials related to Alternatives 4 and 5. Additionally, EC 9, "Develop and Implement a Construction Management Program" (Table 2-6), planned as part of the alternatives, would further reduce potential human health hazards through preparation of a health and safety plan and appropriate noticing requirements reducing this effect to a less-than-significant level. However, this would not eliminate the risk of construction workers being exposed to hazardous materials. The Conservancy would review existing information on hazardous materials during design development and implement avoidance and/or remediation measures, including preparing a site plan for each construction phase that identifies any necessary remediation activities and notifying the appropriate agencies if evidence of previously undiscovered soil or groundwater contamination is discovered. These measures would reduce this effect to a less-than-significant level but would not eliminate the risk that construction workers would be exposed to hazardous materials. However, the remaining risk would not contribute to a greater overall cumulative impact because other reasonably foreseeable construction activities would not occur in the same place or at the same time and would be unlikely to concurrently involve the same workers. Thus, in connection with other projects, the action alternatives would not result in a considerable contribution to human health hazards from exposure to hazardous materials; this cumulative impact would be **less than significant**.

Under the No-Project/No-Action Alternative (Alternative 5), there would be no short-term or long-term effect on human health hazards from exposure to hazardous materials. Construction activities that could potentially expose workers to hazardous materials would not occur; the land uses of the study area would be similar to current conditions; and there would be no change in the transport, use, release, or disposal of hazardous materials. Alternative 5 would make no contribution and therefore would have **no impact**.

IMPACT 3.18-C22 (Alts. 1–5) **Cumulative Human Health/Risk of Upset—Potential Increase in Public Health Hazards from Mosquitoes Resulting from Increased Floodplain Inundation.** *Implementing any of the action alternatives would result in more extensive floodplain inundation that could result in a greater abundance of mosquitoes and thus a greater potential for exposing people to mosquito-borne viruses. However, implementing Environmental Commitment 10, planned as part of the action alternatives, would limit mosquito production in the study area to an amount comparable to or less than preproject (baseline) conditions. Therefore, the action alternatives would not make a cumulatively considerable contribution to effects on mosquito vector control and thus would not result in a cumulatively significant effect. This impact would be* ***less than significant****. Under the No-Project/No-Action Alternative (Alternative 5), the quality and extent of mosquito habitat in the study area would remain similar to baseline conditions; therefore, Alternative 5 would make no contribution to a cumulative impact; however, mosquito production would continue in the study area. This impact would be* ***less than significant.***

In the short term, implementing any of the action alternatives (Alternatives 1-4) would not increase the quality or extent of mosquito breeding habitat and would not reduce the effectiveness of mosquito control efforts because areas disturbed by construction activities would provide less suitable habitat for mosquito breeding than the river channels, willow scrub-wet meadow, and other natural vegetation that currently exist at those sites.

Other restoration actions on the Upper Truckee River could contribute to a cumulative adverse effect on mosquito vector control that could be additive with the effects of the project. However, in the long term, , implementing EC 10, "Establish and Implement a Management Agreement with the El Dorado County Vector Control District" (Table 2-6), would limit mosquito production in the study area to an amount comparable to or less than preproject (baseline) conditions. Therefore, implementing any of the action alternatives would not contribute to effects on mosquito vector control; this impact would be **less than significant**.

Under the No-Project/No-Action Alternative (Alternative 5), it is anticipated that the quality and extent of mosquito habitat in the study area would remain similar to baseline conditions and that the El Dorado County Vector Control District would continue its control efforts in the study area. Therefore, Alternative 5 would not contribute to a cumulative impact, however, mosquito production would continue in the study area. This impact would be **less than significant.**

IMPACT 3.18-C23 (Alts. 1–5) **Cumulative Human Health/Risk of Upset—Potential for Airspace Safety Hazards Associated with Restoration and Enhancement of Habitat for Hazardous Wildlife.** *Although extensive habitat that attracts hazardous wildlife already exists in the study area and elsewhere in the vicinity of the Lake Tahoe Airport, bird-aircraft collisions have not been occurring at the airport. Implementing reasonably foreseeable projects would result in changes to a small amount of this habitat that would not attract additional wildlife into the Critical Zone of the Lake Tahoe Airport. Under any of the action alternatives, additional habitat for hazardous wildlife would be restored or enhanced in and near the approach/departure zone of the Lake Tahoe Airport. This increase would be very small relative to the total amount of habitat. Also, the Comprehensive Land Use Plan identifies restoration as a compatible land use for the approach/departure zone. Therefore, the restoration and enhancement features of any of the action alternatives, in combination with other reasonably foreseeable projects, would not attract significant additional wildlife into the Critical Zone of the Lake Tahoe Airport. Implementing any of the action alternatives therefore would not result in a considerable contribution to a cumulatively significant impact; this cumulative impact would be* ***less than significant****. Under the No-Project/No-Action Alternative (Alternative 5), restoration and enhancement of habitat would not occur. Alternative 5 would make no contribution to a cumulative impact; however, reasonably foreseeable projects may enhance some existing habitat for hazardous wildlife, and therefore, this impact would be* ***less than significant****.*

The Critical Zone of the Lake Tahoe Airport encompasses the area within 10,000 feet of the airport operations area, and a portion of the study area is located in this Critical Zone. The attraction of hazardous wildlife into the Critical Zone can create airspace safety hazards because of the potential for bird-aircraft collisions. However, bird-aircraft collisions have not been occurring at the Lake Tahoe Airport; therefore, there is not an existing safety hazard.

In the short-term, the noise and construction activity associated with implementing any of the action alternatives (Alternatives 1-4) would reduce attraction of hazardous wildlife to the study area because of the commotion of construction activity. Therefore, no contribution to cumulative wildlife hazards to aviation would occur.

The long-term cumulative impact issue is whether the contributions of the project and other foreseeable restoration projects would increase wildlife hazards to aviation to a cumulatively significant level. In the Federal Aviation Administration National Wildlife Strike Database and according to airport staff members, there are no records of bird strikes (i.e., bird-aircraft collisions) at the Lake Tahoe Airport (CDM 2007). In addition, habitat management, open space, recreational uses, and SEZ restoration are considered compatible land uses in the airport Comprehensive Land Use Plan (CSLT 2007).

Several reasonably foreseeable river restoration projects would be located in or southwest of the Critical Zone, including the Upper Truckee River Middle Reaches 1 and 2 SEZ and Wildlife Enhancement, Upper Truckee Middle Reaches 3 and 4, Sunset Stables Restoration, and Upper Truckee River Restoration and Golf Course Reconfiguration projects. These projects would generally include land cover types that provide habitat for hazardous wildlife under existing conditions and would continue to provide habitat post-project. Other reasonably foreseeable projects either would not affect habitat for hazardous wildlife or would cause small reductions in that habitat. Therefore, reasonably foreseeable projects would not measurably increase the number of hazardous wildlife attracted to the area.

In the long term, implementing Alternative 1, 2, or 3 could cause a small increase in habitat amount (and potentially quality) by connecting the existing Sailing Lagoon to the Upper Truckee River. This restoration feature would increase the area of the lagoon water surface during low lake levels and would increase breeding habitat for waterfowl and other marsh-associated birds. In addition, Alternatives 1 and 2 also include the removal of fill behind East Barton Beach to recreate lagoon and wet meadow conditions, which would also increase habitat values for hazardous wildlife. These restoration features represent very small increases in the amount of habitat available to hazardous wildlife in the vicinity of the Lake Tahoe Airport. Although a small portion of the study area is located in the Critical Zone, the floodplain and lagoon restoration features identified for this area would be located north of the Critical Zone. Restoring these features would not result in a detectable increase in the numbers of wildlife moving through the Critical Zone.

Therefore, implementing any of the action alternatives in combination with other reasonably foreseeable projects would not result in a cumulatively significant impact on aviation hazards; this cumulative impact would be **less than significant**.

As described above, Under the No-Project/No-Action Alternative (Alternative 5), restoration and enhancement of habitat would not occur. Alternative 5 would make no contribution to a cumulative impact; however, reasonably foreseeable projects may enhance some existing habitat for hazardous wildlife and therefore this impact is **less than significant**.

HYDROLOGY AND FLOODING

IMPACT 3.18-C24 (Alts. 1–5) **Cumulative Hydrology and Flooding—Long-Term Increased Stormwater Runoff Volumes and Long-Term Increased Peak Flows Generated.** *Project changes to impervious surface areas or modifications to existing channels of the creeks, drainages, or the Upper Truckee River in the study area would be localized and have stormwater runoff volume effects that are beneficial or have effects that could be controlled on-site with design features planned as part of Environmental Commitment 11. The stormwater runoff volume and peak flow effects could combine with other potential changes to stormwater runoff generation or floodplain attenuation in the vicinity, but would not be cumulatively considerable on their own, or in combination. The project's contribution to this cumulative impact would be* ***less than significant****. Because no construction would occur under the No-Project/No-Action Alternative (Alternative 5), the extent of impervious surfaces in the study area would not increase and no channels would be modified; therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

Implementing any of the action alternatives (Alternatives 1-4) would not adversely affect the existing stormwater generation in the study area; rather, it would have a beneficial effect. In compliance with existing CSLT and TRPA requirements, Alternatives 1–4 would incorporate on-site stormwater controls for areas that would have increased runoff under the alternative. The detention or infiltration facilities would be sized to accommodate the entire 20-year, 1-hour storm runoff from each of the developed portions of the site; would convey runoff safely to discharge points without erosion; and would be maintained over the life of the project. The planned controls include providing on-site storm drainage facilities approved by the CSLT and TRPA that would identify the location, size and type of facilities used to retain and treat the runoff volumes and peak flows to meet or surpass preproject conditions. The stormwater designs would incorporate BMPs, such as pervious pavement or pavers, bioswales and vegetated swales, constructed wetlands and detention ponds, rock-lined areas to prevent disruption or erosion, and training of maintenance personnel on stormwater pollution prevention measures. In addition, floodplain improvements that moderate runoff volumes and peak flows would be created under Alternatives 1-4. These floodplain improvements would include measures such as direct removal of existing fill in the floodplain to improve detention storage and storage of runoff entering the study area from surrounding local drainages and the upstream watershed. These actions would be beneficial to both existing and future conditions.

Implementing any of the action alternatives would result in a decrease in existing coverage, and the proposed coverage would be less than that allowed by TRPA regulations. Design requirements for the project and projects upstream would limit increases in runoff resulting from changes in coverage relative to existing and future conditions.

Reasonably foreseeable restoration projects in the vicinity would be either neutral or beneficial to stormwater runoff volumes and peak flows because they would remove impervious surfaces and/or restore natural soil and vegetation properties that better allow the infiltration of runoff. River and stream restoration projects in the Upper Truckee River–Trout Creek watershed may also improve detention and overbank storage of runoff. However, the adverse consequences of past actions in the local drainages and upstream watersheds would continue to contribute runoff to the study area. Reasonably foreseeable erosion control projects in the vicinity would be either neutral or beneficial to stormwater runoff and peak flow volumes because they would provide opportunities for detention and infiltration. These actions would result in conditions similar to or better than existing conditions.

Reasonably foreseeable projects that would include changes in coverage and that might increase runoff would be required to meet TRPA standards regarding the control of runoff volume and rate increases. Although hydrologic effects in the local subwatersheds naturally combine downstream, changes to stormwater volume and peak flow generation in the study area would have only limited potential to combine with other stormwater modifications in the vicinity, and the changes would be small and difficult to discern. In addition, implementing EC 11, "Incorporate Effective Permanent Stormwater Best Management Practices" (Table 2-6), would help to ensure that on-site runoff would be infiltrated into the ground prior to discharging to surface waters. Therefore, implementing any of the action alternatives would not make a considerable contribution to a potentially significant cumulative

effect on stormwater runoff volumes or peak flows generated or released downstream; this impact would be **less than significant**.

Under the No-Project/No-Action Alternative (Alternative 5), no construction would occur; therefore, the extent of impervious surfaces in the study area would not increase and no channels would be modified. For this reason, Alternative 5 would make no contribution and therefore would have **no impact**.

IMPACT 3.18-C25 (Alts. 1–5) **Cumulative Hydrology and Flooding—Long-Term Increased 100-Year Flood Hazard Area or Elevation.** *Project-generated changes to the existing channel (size, shape, or location) or to the floodplain topographic surfaces and configurations in the Federal Emergency Management Agency (FEMA) regulatory floodway or floodplain would not result in a higher 100-year floodwater surface elevation or enlarged 100-year floodplain under Alternative 1 or 4. Changes to the 100-year floodwater surface or floodplain area under Alternative 2 or 3 could occur, but on-site design features planned for the alternatives would avoid increased flood hazards or potential flood damage. The 100-year flood effects from all the action alternatives would remain localized in the study area because of its downstream location and the U.S. 50 bridge crossing upstream, which controls the rate of flow entering from upstream reaches, even during a 100-year flood. Therefore, implementing any of the action alternatives would not result in a cumulatively considerable contribution to effects on the 100-year flood hazard area or elevation; this cumulative impact would be* ***less than significant****. The channel and floodplain would not be modified under the No-Project/No-Action Alternative (Alternative 5); however, existing flood hazards would remain. This impact would be* ***less than significant****.*

Implementing any of the action alternatives (Alternatives 1-4) would maintain the existing 100-year floodplain storage and flow routes in the study area, create minor improvements through removal of fill or net excavation (Alternatives 1 and 4), or incorporate on-site design features to remain neutral and not increase risks from flood hazard in the FEMA floodplain (Alternatives 2 and 3). The action alternatives include hydraulic modeling of the proposed channel configuration at a detailed design level to identify modifications that would be incorporated into final design to prevent the future 100-year water surface elevation from increases greater than one foot and prevent any increase in flood elevation or inundation area that could increase flood hazards or potential damages to existing structures, residences, or public infrastructure.

Reasonably foreseeable future restoration projects upstream on the Upper Truckee River would not be expected to result in adverse changes to the 100-year floodplain storage capacity, flow routes, or boundaries. Several projects have proposed alternatives that would remove previously placed fill and/or recontour areas in the existing 100-year floodplain to provide minor incremental improvements to the existing degraded condition. Some of the proposed alternatives for various projects may require incorporation of self-mitigating design features in final designs to meet commitments of remaining neutral and not adversely affecting FEMA special hazard zones. The potential effects in some project reaches could be noticeable if the existing floodplain is highly confined, but in the study area the existing 100-year floodplain is already large and has a large storage volume, so changes are less likely to affect the floodplain boundaries. The project changes in the study area would not be substantial on their own, and the upstream constriction of the U.S. 50 bridge crossing would further limit the ability of project effects in the study area from combining with effects from upstream reaches because the U.S. 50 bridge crossing would continue to control the rate of flow into the study area and would control water surface elevations immediately upstream. Some of the upstream reaches between constricting bridges (e.g., the middle reaches 1–6) might experience combined effects, but those could not cause changes downstream in the study area. Therefore, implementing any of the action alternatives would not make a considerable contribution to a potentially significant cumulative effect on 100-year flood hazard area or elevation; this impact would be **less than significant**. The channel and floodplain would not be modified under the No-Project/No-Action Alternative (Alternative 5) and would therefore not contribute to a cumulative impact; however, existing flood hazards would remain. This impact would be **less than significant**.

IMPACT 3.18-C26 (Alts. 1–5) **Cumulative Hydrology and Flooding—Long-Term Increased Overbanking during Small Flood Events.** *Project changes to the size and configuration of the Upper Truckee River channel or floodplain in the study area would produce beneficial increases in overbanking during small flood events under Alternatives 1–4. The overbanking effects would produce a discernible* ***beneficial*** *effect on their own and could combine with other potential improvements in overbanking processes from upstream projects. The channel and floodplain would not be modified under the No-Project/No-Action Alternative (Alternative 5) and incised channel conditions would remain, limiting overbanking during small flood events. This impact would be* ***less than significant****.*

Implementing any of the four action alternatives (Alternatives 1-4) would decrease the capacity of the Upper Truckee River channel, increase the length of appropriately sized channel, and enlarge the area inundated by the two-year return interval flow (e.g., 760 cubic feet per second in the study area). Under the action alternatives, channel and floodplain conditions would be modified substantially along the Upper Truckee River channel in the study area to improve overbanking at specific streamflow magnitudes. There would be a substantial beneficial effect relative to the existing condition, although it is uncertain whether possible adverse influences of climate change would be fully offset. Changes to overbanking frequency in the study area, although measureable and substantial under Alternatives 1–4, would not have a direct effect on overbanking conditions in other upstream river reaches because of the natural downstream processes and because of the intervening hydraulic controls of the upstream U.S. 50 bridge and road fill across the active floodplain.

Reasonably foreseeable river restoration projects on the Upper Truckee River have alternatives under consideration that would also decrease channel capacity and increase overbank flooding for small flood events and would improve channel and floodplain relationships relative to the existing degraded condition along their respective project reaches. Direct benefits to overbanking would be largely limited to each project area because flows would often return to the channel from the floodplain, particularly where road fill, bridges, or both limit down-valley floodplain continuity. The benefits in the study area that would result from implementing one of the action alternatives would additively combine with the benefits of other projects upstream, but changes in the study area would not directly enhance overbanking and the active floodplain upstream. Increased overbanking upstream of the study area resulting from implementation of other foreseeable projects might alter the flood hydrographs and incrementally reduce the magnitude of the benefits of increased overbanking in the study area. However, the overall effects of increased overbanking along the Upper Truckee River would still be **beneficial**. The channel and floodplain would not be modified under the No-Project/No-Action Alternative (Alternative 5) and incised channel conditions would remain, limiting overbanking during small flood events. This impact would be **less than significant**.

IMPACT 3.18-C27 (Alts. 1–5) **Cumulative Hydrology and Flooding—Long-Term Modified Groundwater Levels and Flow Patterns.** *Project-generated changes to the size, shape, or location of existing river channels, the size, elevation, or frequency of inundation of lagoons and increased overbanking and active floodplain area under Alternatives 1, 2, and 3 would result in* ***beneficial*** *changes to groundwater levels and flows in the study area. The potential benefits could be substantial on their own in the study area and would add to the beneficial effects of similar restoration projects upstream by supporting groundwater levels in the study area. Alternative 4 would not change the groundwater levels or flow patterns from existing condition in the majority of the area (outside of the inset floodplain); therefore, this cumulative impact would be* ***less than significant****. The channel would not be modified and surface connections and subsurface conditions around the channels and lagoons would not be changed under the No-Project/No-Action Alternative (Alternative 5); therefore, groundwater levels would not benefit. Alternative 5 would not contribute to this beneficial effect. This impact would be* ***less than significant.*** *.*

Implementing Alternative 1, 2, or 3 would result in net improvements to groundwater levels and patterns of flow in the study area relative to existing degraded conditions. The location and magnitude of benefit would differ among alternatives. It is uncertain whether implementing Alternative 1, 2, or 3 would fully compensate for the possible adverse influences of climate change. The effects of implementing any of the action alternatives on

groundwater in the study area could be measureable and generally beneficial but would be localized and transitory. The expected changes would affect only the unconfined uppermost water-bearing zone.

Implementing Alternative 4 would not substantially modify the groundwater conditions in the study area (outside of the new inset floodplain) relative to existing degraded conditions. The construction of Alternative 4 would mimic a possible future geomorphic state with an active floodplain inset in a widened stream corridor. This design would result in groundwater levels and flow paths that could be similar to the existing condition. Any changes would be localized and would not substantially affect regional groundwater conditions, this cumulative impact would be **less than significant**.

Other restoration projects along the Upper Truckee River could incrementally improve (i.e., increase) groundwater levels and incrementally improve down-valley groundwater connectivity between adjacent reaches. Restoration project alternatives that would raise streambed elevations and expand groundwater storage capacity in the replaced (backfilled) valley floor materials might provide minor incremental benefits to adjacent downstream locations by increasing groundwater levels, increasing storage volumes, and decreasing losses to surface water upstream. Projects that would improve groundwater levels upstream in the Upper Truckee River–Trout Creek watershed could incrementally and locally improve recharge potential in the watershed and between the upstream reaches and the study area. Proposed erosion control and water quality projects and other enhancement and restoration projects in the local drainages and upstream watersheds would involve site-specific restoration or enhancement of surface water features. These features may control peak-flow hydrology in ways that also improve groundwater recharge potential. To the degree that groundwater recharge is improved in dispersed areas of the groundwater basin, incremental benefits to recharge, total storage, and long-term groundwater support to the stream corridors and the study area may result. The detention of peak flows provided by proposed stormwater treatment facilities might help to counteract reduced opportunities for groundwater recharge that would result from climate change, which is expected to increase rainfall runoff relative to snowmelt runoff. The effects on groundwater conditions from erosion control and water quality projects would be beneficial relative to the existing condition. The study area's location downstream of other reasonably foreseeable restoration projects suggests that the localized and transitory effects in the study area would have a limited ability to combine with the effects of actions upstream, but the study area's benefits would be in addition to those of the upstream reaches and would support improved groundwater discharge through the study area to the lake. This effect would be **beneficial**.

The channel would not be modified and surface connections and subsurface conditions around the channels and lagoons would not be changed under the No-Project/No-Action Alternative (Alternative 5); therefore, groundwater levels would not benefit. Alternative 5 would not contribute to this beneficial effect. This impact would be **less than significant.**

IMPACT 3.18-C28 (Alts. 1–5)

Cumulative Geomorphology and Water Quality—Short-Term Risk of Surface Water and Groundwater Degradation during Construction. *Project construction activities would occur along or in the channel of the Upper Truckee River, in Trout Creek, in the Sailing Lagoon, and near the shoreline of Lake Tahoe under the action alternatives. Although temporary BMPs would be developed as part of Environmental Commitments 5 and 6, short-term risk of water quality degradation during construction could occur during summer construction seasons or intervening winters. Short-term turbidity that potentially impairs noncontact recreation beneficial uses (i.e., aesthetics) would be minimized by environmental commitments planned as part of the alternatives development. The residual impact would be minor under the action alternatives but could violate water quality standards of the Basin Plan, including the turbidity standard (<10 percent above background). If similar impacts occurred under reasonably foreseeable projects at the same time, the effects could combine downstream to increase the magnitude or duration of the water quality standard violation. Although the joint probability of concurrent failures of BMPs, given the high anticipated performance standards and short overlapping periods of construction, would be extremely remote, if it occurred, the combined effect would be cumulatively significant. The project could result in a considerable contribution to the combined, significant cumulative*

adverse effects related to violation of a water quality standard. This cumulative impact would be ***significant****. Because no construction would occur under the No-Project/No-Action Alternative (Alternative 5), the Basin Plan's turbidity standard would not be violated; therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

All four action alternatives (Alternatives 1–4) would require active construction upslope of, near, or in active stream channels and adjacent to the shoreline of Lake Tahoe, the Tahoe Keys Marina, and other surface water bodies and groundwater recharge areas. Although temporary BMPs would be implemented, short-term risk of water quality degradation during construction could occur. EC 5, "Prepare and Implement Effective Construction Site Management Plans to Minimize Risks of Water Quality Degradation and Impacts to Vegetation," described in Table 2-6, would be implemented under all the action alternatives. The planned controls include many specific measures to be implemented by the Conservancy, including restricting the extent of the areas disturbed and the duration of disturbance; implementing BMPs that are effective up to the 20-year precipitation event and 50-year streamflow event, discrete measures for various subdrainage areas on each side of each water body, and construction equipment and vehicle restrictions; implementing specific winterization guidelines; protecting transported and stored materials and debris; implementing custom dewatering/bypassing plans and rewetting requirements; and monitoring water quality, BMP effectiveness, and remedial action requirements. The controls would limit the likelihood and magnitude of potential short-term water quality degradation that could result in persistent turbidity above background that would impair beneficial uses. EC 6, "Obtain and Comply with Federal, State, Regional, and Local Permits," also would be implemented. However, the potential for violations of narrative or numerical water quality standards of the *Water Quality Control Plan for the Lahontan Region* (Basin Plan), at least for short periods, cannot be feasibly eliminated.

The reasonably foreseeable stream restoration projects along the Upper Truckee River are in contiguous reaches upstream of the study area. They could have active construction over the next several years and exposure to high flows during intervening winters. Each proposed restoration project would be required to take many measures to reduce the potential risk of short-term water quality degradation, including:

- restricting the area and duration of construction disturbance to the absolute minimum necessary and
- designing, installing, and maintaining temporary BMPs to protect disturbed areas and minimize soil erosion, prevent surface runoff interaction with disturbed surfaces, and limit the potential for release of sediment, nutrient, or otherwise contaminated water from entering water bodies outside the construction disturbance zone.

The performance standards for BMPs on other projects would be expected to be the same as those identified in the environmental commitments, but it remains possible that the BMPs could experience failure, particularly if unusual runoff or streamflow conditions occur that exceed the BMP design capacity. The Upper Truckee River has no dams or other flow-regulation facilities, and it is not possible to predict weather and runoff conditions before the onset of construction, especially construction that occurs over more than one season. The projects would all be located along the same unregulated river, and all would be scheduled without advanced prediction of future storm events. If a storm event created conditions in the watershed that overwhelmed temporary BMPs at one project site, BMPs for other projects concurrently in active construction also could fail. The exposure would largely be related to sediment from disturbed or revegetated surfaces that are present on-site over winter, rather than other type of potential pollutants that would be present during active summer construction seasons. The concurrent exposure to the same impact mechanism produces a potential adverse cumulative impact involving storm damage in one construction reach influencing BMP performance in other, downstream reaches. However, the BMP performance standards would be expected to be relatively high (i.e., 20-year precipitation event, 50-year streamflow event) relative to the short time frame of overlapping construction for multiple project reaches (i.e., likely just days or weeks within the years of active construction).

The probability that the BMPs of multiple projects would concurrently fail would be extremely remote. However, the potential for violations of narrative or numerical water quality standards of the Basin Plan, including the turbidity standard, cannot be feasibly eliminated, although inclusion of BMPs would substantially reduce impacts so aesthetics or other beneficial uses would not be affected. Thus, the cumulative risk of violating a water quality standard would be substantial, and the project's contribution to this cumulative impact would be considerable; this cumulative impact would be **significant**.

All feasible mitigation measures to avoid or further reduce the short-term risk of surface water and groundwater degradation during construction under Alternatives 1-4 would be expected to be incorporated into the individual restoration project plans and construction BMPs for specific projects. Additional feasible mitigation is not available to reduce this impact to less than significant, so the residual impact would be cumulatively **significant and unavoidable**.

Because no construction would occur under the No-Project/No-Action Alternative (Alternative 5), the Basin Plan's turbidity standard would not be violated; therefore, Alternative 5 would make no contribution and would have **no impact**.

IMPACT 3.18-C29 (Alts. 1–5)	**Cumulative Geomorphology and Water Quality—Short-Term Risk of Surface Water and Groundwater Degradation Following Construction.** *Project implementation would include channel sections that need periods of channel adjustment following construction to meet final design (Alternatives 1 and 3), areas of reseeded native species on active floodplains and biotechnical streambank treatments (all action alternatives) that could be vulnerable to a large flood within the first few years following construction. Potential reductions in coarse sediment delivery downstream, generation of fine sediment related to adjustments to the channel bed and banks, mobilization of fine sediment and organic matter on reactivated floodplains, and flood damage that could result in persistent or chronic water quality degradation would be reduced by design elements planned as part of the alternatives. The residual impacts would be minor under the action alternatives but could still violate water quality standards, and if similar impacts occurred at other project sites during the same period, effects could combine to increase the magnitude or severity of a water quality impact. In the short term, implementing any of the action alternatives could result in a considerable contribution to effects on surface water; this cumulative impact would be* ***significant****. Implementing the No-Project/No-Action Alternative (Alternative 5) would not require construction activities and thus would not require a period of channel adjustments following construction to meet final design; however, existing oversteepend banks and incised channel conditions would remain. This impact would be* ***less than significant****.*

Geomorphic adjustments would occur after construction of any of the action alternatives (Alternatives 1-4) as part of the normal response to the new dimensions, materials, and hydraulics of constructed and/or reactivated channels and floodplains. In particular, implementation of Alternatives 1 and 3 would feature channel sections that would require periods of channel adjustment following construction to meet final design, including net aggradation (e.g., deposition of coarse sediment), bed mobilization to redistribute materials, and (in the case of Alternative 3) natural processes to reoccupy remnant channel sections throughout the floodplain. These adjustments would most likely occur during and just following peak seasonal streamflows. The probability that project-related turbidity impacts would be substantially worse than under the existing flows, that they would extend outside the treatment reach, and that they would impair beneficial uses during the channel adjustment flows would be low.

Implementation of any action alternative would include revegetation of modified floodplain areas (excavated inset floodplains/lowered terraces) and/or re-activation of floodplain surfaces that have been dormant and collecting sediment and organic matter. Under all of the action alternatives, biotechnical streambank protections would be installed that might not achieve maximum hydraulic resistance or geotechnical strength within five years of construction. A large flood (i.e., 25-year or greater) occurring within the first few years of construction could produce erosion and sedimentation in the modified channels and/or floodplain that degrades water quality, at least

for short periods (potentially hours, days, or, at most, weeks). Although the same flood event could also result in potential water quality degradation under existing conditions, the project activities may alter the location, extent, and duration of impacts. Fine sediment and organic matter mobilization in newly reactivated floodplain areas would be minimized by design elements of Alternative 3. Possible channel and floodplain damage that could result in persistent or chronic water quality degradation in the study area would be reduced by mitigation planned as part of all action alternatives (Mitigation Measure 3.9-2 [Alts. 1-4]) to address issues during the interim period after construction. The residual impacts of the action alternatives could be substantial on their own.

The reasonably foreseeable stream restoration projects on the Upper Truckee River are in contiguous reaches upstream of the study area, and although each restoration project is expected to take many measures to reduce potential effects during construction, post-construction mitigation measures for each project have not yet been determined. Some of the alternatives for various reaches include the need for post-construction natural channel adjustments, and all the projects likely include channel, bank, or floodplain treatments that may not reach full geotechnical or hydraulic resistance within the first couple of years. The projects would all be located along the same unregulated river, and if a large flood occurred within the first few years of construction, it could affect multiple project reaches, combining to increase the potential magnitude or duration of effect and/or causing a channel response that eventually affects more than one reach. During an interim period of five years following construction, the probability of damage from a large flood (e.g., 25-year recurrence or larger) is relatively high because it would be the additive probability of the same statistical chance for each year and for each project. Therefore, such an event could be reasonably expected. Overall, the potential for water quality degradation during such an event for the restored condition on multiple project reaches would likely be less than during a flood in the existing degraded channel due to lowered bank heights and reduced channel slopes expected for the restored condition compared the existing degraded channel. Furthermore, a large flood event would have naturally high background turbidity levels. However, locally worse conditions and/or flood damage that could pose a risk of becoming persistent or chronic might result under the action alternatives and other reasonably foreseeable restoration projects. Additionally, violations of the strict water quality standards could occur even if similar effects may result under the No- Project/No-Action Alternative. Therefore, implementing the action alternatives would make a considerable contribution to a potentially significant cumulative impact; this impact would be **significant**.

Implementing the No-Project/No-Action Alternative (Alternative 5) would not require construction activities and thus would not require a period of channel adjustments following construction to meet final design; however, existing oversteepend banks and incised channel conditions would remain. This impact would be **less than significant**.

Mitigation Measure 3.18-C29: Implement an Interim Coordinated Adaptive Management Plan on the Upper Truckee River.

The sponsors (landowners/funders) for all the foreseeable river restoration projects that would be constructed on the Upper Truckee River shall develop and implement an interim coordinated adaptive management plan focused on potential short-term water quality degradation that may result if unexpectedly large flood flows occur within the first five years after construction. The plan shall be jointly developed to address issues that cross project boundaries and look at the system as a whole. The plan shall be in force for the interim period of channel adjustment and initial flood vulnerability (i.e., at least five years but no more than ten years from the end of construction—potentially as long as needed to allow for expected natural channel adjustments).

The plan shall identify specific data collection and monitoring protocols, describe decision-making processes and authorities, and advise on corrective actions. The performance criteria for the corrective actions shall focus on preventing damage or turbidity effects from becoming a persistent, recurring, or chronic source, whether the corrective action is needed at the initial damage site or at other location(s) that could be affected by channel response to the initial damage. The plan shall include a discussion of responsibilities for implementing corrective actions, with a starting assumption that each project sponsor would be financially responsible for implementing

the plan within their project reach. However, it is possible that problems occurring in one reach may affect other reaches and that the group will decide, following review of monitoring data, that mitigation should be applied in a reach different from the one where the problems are initially observed to prevent future or chronic water quality effects.

With implementation of Mitigation Measure 3.18-C29 under Alternatives 1-4, the likelihood and potential magnitude of Impact 3.18-C29 would not be considerably worse than under existing conditions; however, the residual effects could still result in violations of water quality standards. Therefore, Impact 3.18-C29 would be **significant and unavoidable**.

IMPACT 3.18-C30 (Alts. 1–5)	**Cumulative Geomorphology and Water Quality—Long-Term Stream Channel Erosion.** *Under any of the action alternatives, changes to the channel of the Upper Truckee River and Trout Creek would result in stream channel erosion effects that are generally beneficial in most of the study area while creating localized erosion that could be controlled by Environmental Commitments 5, 6, and 11 planned as part of the alternatives. The stream channel erosion benefits would be considerable on their own and could combine with other potential reductions of erosion along the Upper Truckee River in upstream restoration reaches by preventing upstream migration of channel instability. Therefore, the effect would be beneficial on its own and would result in a considerable contribution to a cumulatively beneficial effect on stream channel erosion; this cumulative effect would be* ***beneficial****. Implementing the No-Project/No-Action Alternative (Alternative 5) would allow the adverse conditions in the Upper Truckee River channel and the Trout Creek channel in the study area to persist, but this would not be a change from existing conditions; therefore, this cumulative impact would be* ***less than significant****.*

Implementing any of the action alternatives would reduce stream channel erosion in the study area relative to existing conditions, resulting in substantial overall benefits. Under the action alternatives, the Upper Truckee River channel in the study area would be repaired, restored, and/or reconstructed, which would directly reduce rates of erosion relative to the degraded existing condition. Compiling the total maximum daily load (TMDL) streambank erosion results (California Water Boards and NDEP 200) for specific subreaches of the Upper Truckee River allows a quantitative estimate of the effect of the action alternatives on stream channel erosion (Table 3.18-4). The four action alternatives propose varied restoration approaches and designs in the study area. However, the estimated reduction in loads of fine sediment from streambank erosion in the study area varies by only ten cubic yards among the alternatives (Appendix I). These data indicate that implementing any of the action alternatives would reduce loads of fine sediment from streambank erosion in the study area by nearly 60 percent (reduced to 220.55 cubic yards from 538.13 cubic yards under the existing conditions). The potentially significant local erosion impacts of each action alternatives would be controlled through design elements and EC 5, 6, and 11 planned as part of each action alternative. The planned controls include providing channel bed and bank stabilization at and immediately upstream of the river mouth and changed Sailing Lagoon connection, and ensuring bed and bank stability in lower Trout Creek. The dominant long-term project effect of any action alternative would be beneficial.

The study area is a small portion of the entire 15 miles of TMDL study reaches, and the proposed action alternatives alone would reduce the entire Upper Truckee River's channel erosion load of fine sediment from streambanks by about seven percent relative to existing conditions. Although small, this would be a considerable and measureable benefit relative to the degraded existing condition. Other reasonably foreseeable restoration projects in the watershed would also repair, restore, and/or reconstruct portions of the Upper Truckee River channel and would be expected to have a beneficial long-term overall effect on stream channel erosion rates. It is expected, for example, that any potential localized increase in erosion risks in their study areas or adverse effects on immediate upstream or downstream reaches would be controlled through design and implementation of on-site, project-specific mitigation measures.

Table 3.18-4 Estimated Erosion of Stream Channel Banks on the Upper Truckee River under the Upper Truckee Marsh Alternatives and Other Foreseeable Actions			
River Reach	Distance Upstream of Lake (feet)	Bank Erosion of Fine Sediment[1] (cubic yards)	
		Upper Truckee Marsh Alternatives Only	With Other Foreseeable Upstream Actions
Upper Truckee Marsh study area	0 to 9,646	220.55	220.55
Upstream project reaches	9,646 to 46,260	2,894.47	1,069.50 to 1,337.25 [2]
Upper watershed	46,260 to 79,364	887.14	887.14
Total	**79,364**	**4,002.16**	**2,177.19 to 2,444.94 [2]**

Notes:

[1] Fine sediment is less than 0.063 millimeter in diameter.

[2] The smaller amount is for the Mixed Treatment assumption; larger value is for the Full Restoration assumption.

Source: California Water Boards and NDEP 2008 (compiled for these subreaches in Appendix I)

If the action alternatives and the other foreseeable Upper Truckee River restoration projects were all implemented, the load of fine sediment from streambanks would be reduced to about 2,177.19 to 2,444.94 cubic yards, depending on the alternatives selected for other upstream project reaches (Table 3.18-4). This would represent a substantial measureable benefit, reducing the entire Upper Truckee River's load of fine sediment from streambank erosion by 43.4 to 51.0 percent relative to the existing degraded conditions. It is uncertain whether these measures would fully compensate for possible adverse influences of climate change. Benefits of these channel modifications would be substantial relative to existing conditions but would be largely limited to each respective project area. Minor interaction and combining benefits between reaches would be expected where project changes in one reach could protect channel stability of adjacent upstream reaches and tributaries. Because of the study area's downstream position, implementing the action alternatives alone would not be expected to directly or indirectly reduce channel erosion along the Upper Truckee River upstream.

The TMDL analysis of load reduction opportunities (California Water Boards and NDEP 2008:211–215) produced quantitative estimates of erosion of fine sediment from streambanks of the Upper Truckee River under the existing condition and for a range of treatments to reduce streambank erosion. Compiling the results for specific subreaches of the Upper Truckee River allows a quantitative estimate of the effect of foreseeable projects on stream channel erosion (Table 3.18-5). The TMDL analysis looked at three tiers of treatment types: Tier 1, Restoration; Tier 2, Mixed Treatment; and Tier 3, Bank Protection. Final designs have not yet been selected for some of the foreseeable stream and river restoration projects upstream of the study area, and a range of alternatives is still being considered for some of these projects. However, most of the projects are focused on full restoration and mixed treatment approaches, so the results compiled in Table 3.18-5 reflect those TMDL treatment tiers. These data indicate that implementing other foreseeable actions throughout the adjacent upstream reaches of the Upper Truckee River would potentially reduce loads of fine sediment from the Upper Truckee River by 1,557.2 to 1,825.0 cubic yards, which equates to a reduction of 36.1 to 42.3 percent of the total under the No-Project/No-Action Alternative without any other foreseeable actions. This would be a substantial benefit relative to the existing degraded condition.

Reasonably foreseeable erosion control projects in the vicinity would be neutral or beneficial because they would control runoff volumes and regulate peak flows in the contributing subwatersheds. Other foreseeable projects include a range of projects that have individually varied effects on runoff. Some projects may potentially increase runoff from increased impervious surfaces (e.g., bike trails, development projects) or reduced vegetation cover (e.g., fuel reduction projects); others may potentially decrease runoff from decreased impervious surfaces (e.g., Lake Tahoe Boulevard Enhancement, Lake Tahoe Airport Runway Restoration). Foreseeable projects that would

Table 3.18-5 Estimated Erosion of Stream Channel Banks along the Upper Truckee River under the No-Project/No-Action Alternative with Other Foreseeable Actions			
River Reach	Distance Upstream of Lake (feet)	Bank Erosion of Fine Sediment[1] (cubic yards)	
		No-Project/No-Action	Other Foreseeable Actions
Upper Truckee Marsh study area	0 to 9,646	538.13	538.13
Upstream project reaches	9,646 to 46,260	2,894.47	1,069.50 to 1,337.25 [2]
Upper watershed	46,260 to 79,364	887.14	887.14
Total	**79,364**	**4,319.74**	**2,494.77 to 2,762.52 [2]**

Notes:

[1] Fine sediment is less than 0.063 millimeter in diameter.

[2] The smaller value is for the Mixed Treatment assumption; the larger value is for the Restoration assumption.

Source: California Water Boards and NDEP 2008

increase the extent of impervious surfaces would be required to incorporate mitigation to limit their incremental contribution. A measureable beneficial effect of smaller erosion control and other projects would be difficult to discern because the projects focus on controlling runoff for small to moderate events, which are less likely to cause erosion in the main stream channel.

Reductions of stream channel erosion in the study area would be additive with other stream channel erosion reductions in terms of total long-term benefit along the entire Upper Truckee River, but changes in the study area would not directly improve channel erosion upstream. Because of the location of the study area, improvements in the channel stability would combine with other actions only by preventing channel instability from migrating further upstream. Therefore, the effect would be **beneficial**.

Implementing the No-Project/No-Action Alternative (Alternative 5) would allow the adverse conditions in the Upper Truckee River channel and the Trout Creek channel in the study area to persist, but this would not be a change from existing conditions; therefore, this cumulative impact would be **less than significant**.

IMPACT 3.18-C31 (Alts. 1–5) **Cumulative Geomorphology and Water Quality—Long-Term Fine Sediment and Nutrient Retention.** *Project changes to the channel capacity, elevation, the frequency of overbanking, and the area of functional active floodplain and lagoon in the study area would produce beneficial increases in fine sediment and nutrient retention during small to moderate flood events under any of the action alternatives. The fine sediment and nutrient retention effects would produce a discernible beneficial effect on their own and could combine with other potential improvements in floodplain processes upstream to reduce sediment and nutrients delivered to Lake Tahoe. This cumulative effect would be* ***beneficial****. Implementing the No-Project/No-Action Alternative (Alternative 5) would allow the existing impaired fine sediment and nutrient retention conditions to persist. This impact would be* ***less than significant****.*

Implementing any of the action alternatives would decrease the Upper Truckee River channel capacity, increase the length of appropriately sized channel, remove floodplain fill, restore lagoon area, and enlarge the area inundated by the two-year return interval flow (e.g., 760 cubic feet per second in the study area). These changes would result in a substantial improvement to overbanking at specific streamflow magnitudes in the study area. The area of active floodplain would be enlarged, and the length of channel with overbanking would increase, allowing more opportunities for low-velocity, shallow flooding that retains fine sediment and supports vegetation uptake of nutrients. In the absence of empirical data or calibrated models to estimate potential quantities of fine sediment and nutrients trapped by floodplain processes, the area inundated by frequent small streamflow events (i.e., the two-year recurrence) under any of the action alternatives is presented as a proxy for comparison

(Table 3.18-6). Changes to active floodplain processes of sediment and nutrient retention in the study area, although measureable and considerable under the action alternatives, would not contribute to floodplain process changes in other adjacent river reaches because of limited natural upstream effects and the intervening hydraulic controls of the upstream U.S. 50 bridge and road fill across the active floodplain.

Table 3.18-6
Estimated Active Floodplain Area along the Upper Truckee River Project Reaches

River Reach	Area of Active Floodplain (acres)[1, 2]		
	Existing	Upper Truckee Marsh Alternatives Only	With Other Foreseeable Upstream Actions
Upper Truckee Marsh study area	65.0	74.0 to 156.0	74.0 to 156.0
Upstream project Reaches 1 and 2 [3]	NA	NA	NA
Upstream project Reaches 3 and 4	18.4	0	18.4
Upstream project at Sunset Stables	58.0	58.0	99.0 to 131.0
Upstream project at Lake Valley State Recreation Area	35.7	35.7	36.9 to 56.8
Subtotal for the project reaches	**177.1**	**167.7 to 249.7**	**228.3 to 362.2**

Notes:

[1] Active floodplain is defined as the area inundated from a 2-year recurrence peak streamflow event.

[2] The range of active floodplain areas for the alternatives under consideration is listed for projects that have not yet selected a preferred alternative or final design.

[3] No quantitative estimate of floodplain area has yet been calculated or modeled for this reach (Rudd, pers. comm., 2008).

Sources: Conservancy and DGS 2005, 2008; CSLT 2006

Reasonably foreseeable river restoration projects on the Upper Truckee River have alternatives under consideration that would also improve floodplain retention of sediment and nutrients for small and moderate flood events, relative to the existing degraded condition along their respective project reaches. Final designs have not yet been determined for some of the proposed stream and river restoration projects upstream, and a range of alternatives are still being considered for some of these projects. Some alternatives along some subreaches of the proposed future restoration projects on the Upper Truckee River might reduce stream-erosion sediment sources while making only very minor improvements to overbanking frequency or the area of floodplain (e.g., the bank stabilization alternative for the Upper Truckee River Restoration and Golf Course Reconfiguration Project). However, the opportunity for floodplain processes to provide water quality treatment would be substantially improved along the Upper Truckee River relative to the degraded existing conditions (see areas listed in Table 3.18-6). Improving floodplain function in particular reaches would incrementally reduce loads conveyed farther downstream, and opportunities might improve for any overbanking in those downstream reaches (including the study area) to trap additional net sediment and nutrients before discharge of the river to the lake. Substantial benefits could result, although it is uncertain whether possible adverse influences of climate change would be fully offset by the implemented action alternatives for the cumulative river restoration projects. Direct benefits to sediment and nutrient retention would be largely limited to each project area because return flows back from the floodplain to channel would occur, particularly where road fill and/or bridges limit down-valley floodplain continuity. However, between existing bridges, it is possible that benefits of improved floodplain connectivity between adjacent reaches may result. The benefits in the study area that would result from implementing any of the action alternatives would add to benefits of other restoration projects upstream to reduce fine sediment and nutrients delivered to Lake Tahoe. The combined effect of the proposed restoration projects would be **beneficial**. Implementing the No-Project/No-Action Alternative (Alternative 5) would allow the existing impaired fine sediment and nutrient retention conditions to persist. This impact would be **less than significant**.

IMPACT 3.18-C32 (Alts. 1–5)	**Cumulative Geomorphology and Water Quality—Long-Term Modifications in Transport of Coarse Sediment to Upper Truckee River and Effects on Beach Processes.** *Project-generated changes to the channel bed profile, bank and bed materials, or the hydraulic conditions controlling bedload (i.e., sands and gravel) transport could worsen under Alternative 1, 2, or 3 relative to the effects of historically declining watershed coarse sediment yield on channel erosion and beach erosion adjacent to the river mouth (i.e., at Cove East and Barton Beach), or they could remain similar to existing conditions under Alternative 4. Potential effects of the project could be considerable and could combine with effects of other actions on coarse sediment transport and delivery, but because of highly uncertain climate change influences, especially on beach erosion, the incremental or combined consequences to channel and beach erosion are not predictable. Conditions could range from worse than the existing degraded condition to a possible improvement regardless of coarse sediment delivery changes, and after thorough investigation, the determination for all alternatives, including the No-Project/No-Action Alternative (Alternative 5), remains* ***too speculative for a meaningful significance conclusion****.*

Implementing Alternative 1, 2, or 3 would result in modifications to the channel bed profile, bank and bed materials, and the hydraulic conditions controlling bedload (i.e., sands and gravel) transport in the study area and into the mouth of the Upper Truckee River, at least for an interim period of geomorphic adjustment following construction. Under Alternative 3, major modifications would be made to potential low-flow connectivity in the marsh through the lagoon system and would anticipate net sedimentation of coarse sediment over the long term. This could limit transport from upstream sources through the study area to the lake. Under Alternative 4, no modifications would be made to the bed profile, and bed and bank erosion that could reduce local sources of coarse sediment would be limited; however, transport of coarse sediment from upstream sources through the study area to the mouth of the river would not be limited. Given the background of naturally declining watershed coarse sediment yield and ongoing channel and beach erosion, adverse changes in the project reach could worsen the existing degraded condition.

Impacts of the project could combine with the potential coarse sediment effects of other reasonably foreseeable future restoration projects upstream on the Upper Truckee River to increase the potential risk of erosion consequences in study area channel reaches and along the beach. Although the performance goals of the proposed restoration projects would be focused on reducing human-induced excessive erosion, some of the treatment approaches and channel designs might also further reduce the supply of coarse sediment generated by streambed or streambank erosion. Implementing the projects would not modify coarse sediment sources along the river upstream of Meyers, but it could reduce the downstream delivery of coarse sediment relative to existing conditions because it would create additional opportunities for in-channel and floodplain sedimentation.

Implementing foreseeable erosion control and water quality projects in the local drainages and upstream watersheds would involve installing measures designed to detain runoff and capture fine sediment. Although the performance goals would be focused on treating fine sediment, nutrient, and other urban pollutant loads, many of the methods and facilities would inadvertently trap coarse sediment. Coarse sediment captured in stormwater facilities would likely be removed under normal maintenance practices. This could create a minor but potentially measureable decrease in coarse sediment delivery to downstream receiving waters.

For the long term, highly uncertain climate change influences might overwhelm the possible long-term effects of any action. It is possible that climate change may exacerbate impacts (e.g., further decrease coarse sediment delivery) or counteract them (e.g., lower lake levels, reducing beach erosion). Given the uncertainty of current scientific understanding related to future climate change–and related baseline conditions, the determination of project-specific effects and potential cumulative impacts for all alternatives, including the No-Project/No-Action Alternative (Alternative 5), remains **too speculative for a meaningful significance conclusion**.

LAND USE

IMPACT 3.18-C33 (Alts. 1–5) **Cumulative Land Use—Potential to Physically Divide an Established Community or Conflict with Land Use Plans, Policies, or Regulations.** *Implementing any of the action alternatives (Alternatives 1–4) would not physically divide an established community; the public access components of these alternatives would increase connectivity between established communities. In addition, implementing alternatives 2, 3, and 4 would not conflict with applicable plans, policies, or regulations, including any habitat conservation plans or natural community conservation plans. Thus, when viewed in connection with other projects, implementing any of the action alternatives would not make a considerable contribution to effects on California State Lands Commission policies and regulations regarding use of public trust lands along the Upper Truckee River; would not contribute to conflicts with other land use plans, policies, or regulations; and would not physically divide an established community. The project's contribution to this cumulative impact would be* ***less than significant****. Alternative 1, however, would conflict with the formalized conservation strategy for Tahoe yellow cress, and the memorandum of understanding/conservation agreement for the species. This cumulative impact would be* ***significant****. Implementing the No-Project/No-Action Alternative (Alternative 5) would not alter existing land uses in the study area; thus, it would not physically divide an established community or conflict with plans, policies, or regulations; however, Alternative 5 would make no contribution to attaining the goals of the Regional Plan. This impact would be* ***less than significant****.*

Neither the restoration components nor the public access, recreation, or habitat protection features of any of the action alternatives (Alternatives 1-4) would physically divide an established community. The public access components of the action alternatives would instead increase connectivity between established communities.

No habitat conservation plan or natural community conservation plan is applicable to the study area, so none of the action alternatives would conflict with any applicable habitat conservation plan or natural community conservation plan. However, a formalized conservation strategy exists for Tahoe yellow cress, and a memorandum of understanding/conservation agreement for the species is in place. Alternatives 2-4 would be consistent with this memorandum of understanding/conservation agreement. Alternative 1, however, would conflict with this strategy and memorandum of understanding/conservation agreement because it would negatively affect Tahoe yellow cress by creating additional recreation features (the bridge and boardwalk) in the vicinity of occupied habitat creating opportunity for damage by recreationists and removing potential habitat in the back beach area.

In addition, implementation of any of the action alternatives (Alternative 1-4) would not conflict with applicable plans, policies, or regulations. Land use under these alternatives would be consistent with the applicable plan area statements, including special areas, shorezone tolerance districts, and the Tahoe Keys Marina Master Plan. Land use under these alternatives would also be consistent with the goals and objectives of the city and county general plans; the Lake Tahoe Airport Comprehensive Land Use Plan for the approach/departure zone, which extends into the southeastern corner of the study area; and the policies and regulations of the California State Lands Commission, which has jurisdiction over public trust lands, including the beds of Lake Tahoe and the Upper Truckee River.

Thus, when viewed in connection with other projects, Alternatives 2-4 would not make a considerable contribution to a cumulative effect on physically dividing an established community or conflicting with land use plans, policies, and regulations; this cumulative impact would be **less than significant**. Alternative 1, however, would conflict with the formalized conservation strategy for Tahoe yellow cress, and the memorandum of understanding/conservation agreement for the species. This cumulative impact would be **significant**. Feasible mitigation is not available to reduce this impact to less than significant, so the residual impact would be cumulatively **significant and unavoidable**.

Implementing the No-Project/No-Action Alternative (Alternative 5) would not alter existing land uses in the study area; thus, it would not physically divide an established community or conflict with plans, policies, or regulations; however, Alternative 5 would not contribute to attaining the goals of the Regional Plan. This impact would be **less than significant**.

NOISE

IMPACT 3.18-C34 (Alts. 1–5) **Cumulative Noise—Short-Term or Long-Term Increased Noise and Vibration.** *Noise and vibration generated by any of the action alternatives (Alternatives 1–4) would not combine with other noise sources (existing or related to reasonably foreseeable projects) in the study area or its vicinity to create a cumulatively significant impact. For that reason, and because construction noise and vibration would be at less-than-significant levels, short term, and within time periods exempted by applicable ordinances (i.e., daytime hours), short-term and long-term noise would be similar to current conditions. Therefore, implementing any of the action alternatives would not make a considerable contribution to a cumulatively significant effect on the noise environment; this cumulative impact would be* ***less than significant****. Implementing the No-Project/No-Action Alternative (Alternative 5) would not introduce new sources of noise or vibration; therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

Although implementing any of the action alternatives (Alternatives 1-4) would generate noise from construction activity and project-generated construction traffic, and a reasonably foreseeable project in the vicinity of the study area also could generate construction-related noise (i.e., Al Tahoe Erosion Control project), the action alternatives would not make a considerable contribution to an overall significant effect on noise in either the short term or long term. First, construction-related noise generated by any of the action alternatives would not exceed applicable regulations. Noise from construction activity that occurs between 8:00 a.m. and 6:30 p.m. (daily) is exempt from the provisions of the applicable TRPA regulations; noise from construction activity that occurs between 7:00 a.m. and 7:00 p.m. (weekdays) and between 8:00 a.m. and 5:00 p.m. (weekends and federal holidays) is exempt from the provisions of the applicable El Dorado County regulations because noise sensitivity is less during these daytime periods than during quieter evening, nighttime, or early morning hours. Because construction activities and project-generated construction traffic would occur only during these exempt times, none of the action alternatives would make a considerable contribution to any overall effect on noise that could be cumulatively significant in the short term. A substantial, ongoing, postconstruction increase in noise would not occur under any of the action alternatives because the land uses of the study area would be similar to current conditions following project implementation. In addition, project construction and operation under any of the action alternatives also would not include major sources of vibration. Finally, reasonably foreseeable projects would not create a long-term source of noise or vibration in the study area or adjacent neighborhoods. Therefore, none of the action alternatives would make a considerable contribution to any long-term cumulatively significant effect on noise or vibration; this impact would be **less than significant**. Implementing the No-Project/No-Action Alternative (Alternative 5) would not introduce new sources of noise or vibration; therefore, Alternative 5 would make no contribution and would have **no impact**.

PUBLIC SERVICES

IMPACT 3.18-C35 (Alts. 1–5) **Cumulative Public Services—Increased Demand for and Interference with Public Services.** *Implementing any of the action alternatives (Alternatives 1–4) would not generate substantial demand for public services, and this demand would not contribute to an overall cumulatively significant impact in the study area or its vicinity. Implementing any of the action alternatives could potentially lead to temporary interference with the ability of animal control, law enforcement, fire protection, and emergency medical service providers to provide emergency services to the study area and its vicinity, especially if other reasonably foreseeable projects were to occur at the same time in the area. Environmental Commitment 12 includes commitments to notify public service providers and provide detours where potential access issues may occur as part of the construction management program and traffic control plan planned as part*

of the alternatives. These environmental commitments, along with traffic control measures implemented by other projects, would reduce the potential for temporary disruption of public services during construction to a level that would not be cumulatively significant. Therefore, the project would not make a considerable contribution to a cumulatively significant effect on public services; this impact would be ***less than significant****. Under the No-Project/No-Action Alternative (Alternative 5), no additional recreation facilities would be created, so there would be no additional demand for public services and no roadway construction that could interfere with emergency response; therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

Implementing any of the action alternatives (Alternatives 1-4) could result in a minor increase in demand for law enforcement, fire protection, and animal control services, but the increase in demand would be minimal and would not create the need for additional services or facilities for police, fire, or animal control services. The combined effects of any alternative with other projects would not result in an overall significant impact on any public service.

AS described below, implementing any of the action alternatives would not make a considerable contribution to an overall significant impact on traffic in either the short term or the long term. However, without mitigation, construction of the action alternatives could lead to temporary interference with the ability of law enforcement, fire protection, and emergency medical service providers to provide emergency services to the study area or its vicinity, especially if other reasonably foreseeable projects were being constructed at the same time in the vicinity. As described in Section 3.12, "Public Services," implementation of EC 12, "Prepare and Implement Traffic Control Plans" (Table 2-6), which involves notifying public service providers and providing detours where potential access issues may occur, would reduce the project's potential effects on provision of public services during construction. Along with traffic control measures that would be incorporated into other projects, this mitigation, planned as part of the alternatives, would prevent the combined effect of this and other projects from being cumulatively significant. Therefore, the project would not make a considerable contribution to a cumulatively significant effect on public services; this impact would be **less than significant**. Under the No-Project/No-Action Alternative (Alternative 5), no additional recreation facilities would be created, so there would be no additional demand for public services and no roadway construction that could interfere with emergency response; therefore, Alternative 5 would make no contribution and would have **no impact**.

RECREATION

IMPACT 3.18-C36 (Alts. 1–5) **Cumulative Recreation—Construction-Related Loss of Recreational Opportunities and Public Access, Conflicts among Existing and Proposed Recreational Uses, and Increased Use of Existing Recreational Facilities.** *Implementing any of the action alternatives (Alternatives 1–4) would involve construction activities that would reduce access to the Upper Truckee River, Lake Tahoe, and public land in the study area and thus, for the short term, would displace a small number of recreational users. Environmental Commitments 13 and 14, planned as part of the action alternatives, would be implemented to address safety, accessibility, and other recreation opportunities. Other reasonably foreseeable projects would contemporaneously displace a small number of recreational users and/or limit access to lakes, public land, or waterways. Nonetheless, the combined effects of any of the action alternatives and other reasonably foreseeable projects would not cause substantial short-term effects on recreational opportunities, public access, or existing recreational facilities because of the relatively large number of similar recreational facilities among which the dislocated users would be dispersed. Therefore, in connection with other projects, the short-term contribution of any of the action alternatives to effects on recreational opportunities and public access, conflicts among existing and proposed uses, and existing recreational facilities would not be cumulatively considerable; this impact would be* ***less than significant****. The No-Project/No-Action Alternative (Alternative 5) would not involve construction or new recreation activities that would displace recreational users; therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

The most popular recreational uses of the study area are walking and running, beach use, wildlife viewing, and fishing. The Tahoe Basin has an abundance of locations where people can engage in these activities. Nearby trail systems suitable for walking, running, and wildlife viewing are available on USFS lands south and east of the study area and on California Department of Parks and Recreation lands, including Washoe Meadows, D. L. Bliss, and Emerald Bay DPR and the Lake Valley SRA. Nearby beaches include Baldwin, Kiva, Pope, and El Dorado Beaches. Fishing opportunities are available at numerous locations around Lake Tahoe and at the many smaller lakes in the vicinity. As noted in Section 3.13, "Recreation," during construction, recreational use of the study area would be reduced as a small number of recreationists instead used other existing recreational facilities. This effect would be comparable for all the action alternatives. As described in EC 13, "Prepare and Implement a Public Outreach Plan," and EC 14, "Prepare and Implement a Waterway Traffic Control Plan for Alternatives That Affect the Sailing Lagoon" (Table 2-6), the Conservancy would prepare a Public Outreach Plan and Water Traffic Control Plan to address safety, accessibility, and other recreation opportunities. Other reasonably foreseeable projects would also contribute a small number of recreationists to the number of users of existing recreational facilities during construction. Recreationists displaced by the Upper Truckee River and Marsh Restoration Project and contemporaneous projects would be distributed around the Tahoe Basin to the numerous alternative locations for recreation such that there would not be a resulting short-term cumulatively substantial effect on recreational opportunity; public access to lakes, waterways, or public land; or existing recreational facilities.

Therefore, in connection with other projects, the construction-related effects of any of the action alternatives would not make a considerable contribution to cumulative effects on recreational opportunities, conflicts between existing and proposed recreational uses, public access, or existing recreational facilities; this cumulative impact would be **less than significant**. The No-Project/No-Action Alternative (Alternative 5) would not involve construction or new recreation activities that would displace recreational users; therefore, Alternative 5 would make no contribution and would have **no impact**.

IMPACT 3.18-C37 (Alts. 1–5)	Cumulative Recreation—Operation-Related Loss of Recreational Opportunities and Conflicts among Surrounding and Proposed Recreational Facilities. *Implementing any of the action alternatives (Alternatives 1–4) would provide additional recreation facilities compared to existing conditions and therefore have little effect on surrounding recreational facilities with the exception of short-term dispersed increase in use of nearby facilities during construction. Implementing Alternative 3 would likely change the timing and location of boat access along the Upper Truckee River, however, these are user-created facilities and not currently managed for boat access and the study area would remain available to boaters. Therefore, in connection with the effects of other projects, the effect of operation of Alternatives 1–4 on recreational facilities would not be cumulatively considerable; this cumulative impact would be* ***less than significant****. The No-Project/No-Action Alternative (Alternative 5) would not involve changes to access or facilities or other activities that would displace recreational users; therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

In the long term, the cumulative effect of reasonably foreseeable projects (listed in Table 3.18-2) would not create conflicts between existing and proposed uses, or increase the use of surrounding parks and recreational facilities. The river and stream restoration and the water quality and erosion control projects would have no impact or limited adverse or beneficial effects on existing recreational facilities. Only the ongoing urban development would have a long-term adverse effect on existing dispersed recreational facilities. The projects involving new bike paths would likely reduce the number of users of some existing dispersed recreational facilities by providing an alternative location for recreation. Given the slow rate of urban development in the vicinity of the study area, the availability and capacity of alternate locations for dispersed recreation activity, and the additional opportunities for dispersed recreation that would be provided by reasonably foreseeable projects, Alternatives 1-4 would not contribute to a significant cumulative long-term decrease in recreational opportunities, conflicts among existing or proposed recreational facilities, reduction in public access, or long-term increase in the use of surrounding recreational facilities.

If Alternative 3 is implemented, the Upper Truckee River might have multiple, smaller channels with flows dispersed over the study area that would change the timing when nonmotorized watercraft access is possible. However, access is currently dependent on seasonal flows. Under small to moderate flow years, flows would likely be too shallow to allow access, but during larger flow years, access would be expanded because flows would spread across the study area. Because access would continue to be dependent on seasonal flow conditions, and access would continue to be available throughout the rest of the watershed and around the lake, this impact is not significant. Implementing any of the action alternatives (Alternatives 1-4) would provide additional recreation facilities compared to existing conditions and therefore have little effect on surrounding recreational facilities with the exception of short-term dispersed increase in use of nearby facilities during construction.

Therefore, implementing Alternatives 1-4 would not make a considerable contribution to cumulative effects on recreational opportunities, conflicts between surrounding and proposed recreational facilities and public access; this cumulative impact would be **less than significant**. The No-Project/No-Action Alternative (Alternative 5) would not involve changes to access or facilities or other activities that would displace recreational users; therefore, Alternative 5 would make no contribution and would have **no impact**.

IMPACT 3.18-C38 (Alts. 1–5)

Cumulative Recreation—Construction or Expansion of Recreational Facilities That May Have an Adverse Physical Effect on the Environment. *The action alternatives (Alternatives 1–4) would have short-term significant unavoidable construction impacts but long-term benefits on wildlife, water quality and fisheries, as discussed in Section 3.4, "Vegetation and Wildlife Resources," Section 3.5, "Fisheries," and Section 3.9, "Geomorphology and Water Quality." Both the short-term impacts and long-term benefits to these resources are primarily consequences of the construction of the restoration features of these alternatives. Implementing any of the action alternatives (Alternatives 1–4) would also involve construction of public access features that would be used for recreation. With the exception of Alternative 1, environmental commitments and mitigation measures planned as part of the alternatives as described in Table 2-6 and Table S-1, respectively, would reduce the long-term adverse effects to the physical environment from constructing these features and the residual contributions to cumulative effects would not be considerable (as discussed for each resource area in this section). The recreation facilities associated with Alternative 1 are designed to preserve the natural resources in the study area while providing compatible recreational opportunities, public access, and recreational infrastructure. However, the boardwalk and bridge would likely attract more visitors than the other alternatives. Furthermore, the bridge and boardwalk would be located within Tahoe yellow cress habitat in the back beach area and may lead to negative impacts on the Tahoe yellow cress population. Consequently, implementing any of the action alternatives (Alternatives 1–4) in combination with projects related to construction or expansion of recreational facilities would contribute to a short-term* ***significant*** *impact; however, Alternatives 2–4 would not cause an adverse long-term effect and this cumulative impact would be* ***less than significant****. Implementing Alternative 1, however, would result in a contribution to a cumulative long-term impact that would be* ***significant****. The No-Project/No-Action Alternative (Alternative 5) would not involve project-related construction or expansion of recreational facilities in the study area; therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

The action alternatives (Alternatives 1–4) would have short-term construction impacts on wildlife, water quality and fisheries, as discussed in Section 3.4, "Vegetation and Wildlife Resources," Section 3.5, "Fisheries," and Section 3.9, "Geomorphology and Water Quality," but long-term benefits to these resources. Both the short-term impacts and long-term benefits to these resources are primarily consequences of the construction of the restoration features of these alternatives. The cumulative effects of project construction are discussed in each resource section of this cumulative impact analysis.

The Upper Truckee River and Marsh Restoration Project would also include public access features; some of these features and related construction activities have the potential to adversely affect the environment. Among the action alternatives, Alternative 1 would have the most new public access features and the greatest potential impacts, and Alternative 2 would have the fewest new public access features and the least potential impacts;

Alternatives 3 and 4 would have intermediate amounts of new public access features. With the exception of Alternative 1, environmental commitments (Table 2-6) and mitigation measures (Table ES-1) planned as part of the action alternatives would reduce the adverse effects to the physical environment from recreation features and the residual contributions to cumulative effects would not be considerable (as discussed for each resource area in this section). The recreation facilities associated with Alternative 1 are designed to preserve the natural resources in the study area while providing compatible recreational opportunities, public access, and recreational infrastructure. However, the boardwalk and bridge would likely attract more visitors than the other alternatives. Furthermore, the bridge and boardwalk would be located within Tahoe yellow cress habitat in the back beach area and may lead to negative impacts on the Tahoe yellow cress population.

Other reasonably foreseeable projects related to the construction or expansion of recreational facilities would incorporate mitigation measures to reduce their project-specific and cumulative effects on the environment. Some of the reasonably foreseeable projects involving the construction or expansion of recreational facilities have also been designed to protect, enhance, or restore sensitive resources. Consequently, implementing any of the action alternatives (Alternatives 1-4) in combination with projects related to construction or expansion of recreational facilities would contribute to a short-term **significant** impact. Alternatives 2-4 would not cause an adverse long-term effect, however, and this cumulative impact would be **less than significant**.

Implementing Alternative 1, however, would result in a contribution to a cumulative long-term impact that would be **significant**. Feasible mitigation is not available to reduce this impact to less than significant, so the residual impact would be cumulatively **significant and unavoidable**.

The No-Project/No-Action Alternative (Alternative 5) would not involve project-related construction or expansion of recreational facilities in the study area; therefore, Alternative 5 would make no contribution and would have **no impact**.

SCENIC RESOURCES

IMPACT 3.18-C39 (Alts. 1–5)

Cumulative Scenic Resources—Short-Term Glare from Construction Activities. *Implementing foreseeable projects in the vicinity of the study area would involve construction activities that may temporarily create glare, but construction would not require construction lighting because construction would not occur at night. Implementing any of the action alternatives (Alternatives 1–4) would also involve construction activities that may temporarily create glare but that would not require construction lighting because construction would not occur at night. Potential glare effects would be intermittent, confined to the short term, and unlikely to combine with the effects of other projects. Therefore, these effects would not be a considerable contribution to cumulative effects on glare on their own, or in combination; this cumulative impact would be* ***less than significant****. The No-Project/No-Action Alternative (Alternative 5) would not involve construction or changes to existing land uses, and thus would not alter light and glare in the study area; therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

Glare can be an annoyance to nearby residences, and lighting can reduce the quality of nighttime views. Nighttime lighting can also cause skyglow, a glow that extends beyond the light source and reduces views of the nighttime sky, which are a scenic resource.

The project could introduce heavy construction vehicles and equipment that may create some glare. However, construction would not take place at night and would not require construction lighting. In addition, potential glare effects related to construction would be intermittent and short term.

Under any of the action alternatives (Alternatives 1-4), no new lighting or facilities constructed of materials that would create new sources of light, glare, or skyglow would be constructed. Other projects either would not create new sources of light, glare, or skyglow (e.g., most restoration and erosion control projects listed in Table 3.18-2) or would be required to conform to all applicable design standards in the TRPA Code of Ordinances (e.g., the

small residential, commercial, industrial, and infrastructure projects included in Table 3.18-2 as "Additional Urban Development"). It is unlikely that the short-term, intermittent glare resulting from implementing any of the action alternatives would be combined with glare from other projects.

In summary, the action alternatives would have only short-term, intermittent effects on glare, and in combination with other projects, these effects would not be a considerable contribution to the cumulative effect on glare; this impact would be **less than significant**. The No-Project/No-Action Alternative (Alternative 5) would not involve construction or changes to existing land uses and thus would not alter light and glare in the study area; therefore, Alternative 5 would make no contribution and would have **no impact**.

IMPACT 3.18-C40 (Alts. 1–5)

Cumulative Scenic Resources—Short-Term and Long-Term Effects of Construction Activities and Additional Facilities on Existing Visual Character and Quality. *Implementing foreseeable projects would affect visual character and quality in the vicinity of the study area, including the scenic quality of Roadway Travel Unit 35 and potentially including the scenic quality of Shoreline Travel Unit 33. These projects would intermittently alter views during construction but would not substantially alter visual character or quality in the long term. During the short term, implementing any of the action alternatives (Alternatives 1–4) would entail construction activities that would intermittently alter visual character and quality. However, all such construction-related impacts would be intermittent and short term. For all action alternatives this short-term impact would be* ***less than significant****. Constructed project elements under Alternatives 2–4 would be consistent with existing views, the low-lying boardwalk and observation platforms would be relatively well screened by existing vegetation, and the study area would remain largely undeveloped and unchanged in the long term. Under Alternative 1, however, the bridge across the Upper Truckee River would result in a substantial change in views from Shoreline Travel Unit 33. Alternative 1 would contribute to cumulative long-term impact. This impact would be* ***significant****. The long-term contribution to a cumulative impact on scenic resources under Alternatives 2–4 would be* ***less than significant****. The No-Project/No-Action Alternative (Alternative 5) would not alter visual character or quality of the study area; therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

Implementing foreseeable projects would result in changes to the visual character and quality of the study area or its vicinity, but these changes would not make a considerable contribution to cumulative effects on visual character and quality, for the reasons described below.

Implementing any of the action alternatives (Alternatives 1-4) would alter the visual character and quality of the study area and its vicinity. In the short term, implementing any of these alternatives would involve construction activities and staging areas in the study area that would change views during a period of approximately 3–5 years. However, all such construction-related impacts would be intermittent and short term. As described in Section 3.14, "Scenic Resources," implementing Alternative 2, 3, or 4 would not result in long-term changes in views from Roadway Travel Unit 35, Shoreline Travel Unit 33, or the surrounding area. Implementing Alternative 1, however, would result in a long-term change in views from Shoreline Travel Unit 33. Although screening and optimal colors would be used, long-term changes in views would occur with implementation of Alternative 1.

Other projects could also affect scenic resources in the study area, its vicinity, or both, including views from Roadway Travel Unit 35 and potentially views from Shoreline Travel Unit 33. Reasonably foreseeable projects in the vicinity of the study area include the Upper Truckee River Middle Reaches 1 and 2 SEZ and Habitat Enhancement project and the Al Tahoe Erosion Control project and may include small residential, commercial, and/or infrastructure development projects in the vicinity of the study area. The Upper Truckee River Middle Reaches 1 and 2 SEZ and Habitat Enhancement project would be visible from Roadway Travel Unit 35, but the temporary effects related to its construction would occur before implementation of the Upper Truckee River and Marsh Restoration Project, and its short-term and long-term effects on visual character and quality would be minor and may not be adverse. The Al Tahoe Erosion Control project would not be visible from Roadway Travel Unit 35 or Shoreline Travel Unit 33 and implementing the project would not result in substantial short-term or long-term effects on visual character or quality. Any other small development projects that may occur in the

vicinity of the study area would be required to conform to standards in the TRPA Code of Ordinances designed to maintain scenic resources (i.e., Section 30.12, "Scenic Quality Standards"). These standards have been designed to ensure that cumulatively significant impacts on scenic resources would not result if applicable standards were conformed to by future projects. Also, small development projects that may occur in the vicinity of the study area may not be visible from Roadway Travel Unit 35 or Shoreline Travel Unit 33 and therefore may not affect the same scenic resources as other projects.

During the short term, implementing any of the action alternatives (Alternatives 1-4) would entail construction activities that would intermittently alter visual character and quality. Constructed project elements under Alternatives 2-4 would be consistent with existing views, the low-lying boardwalk and observation platforms would be relatively well screened by existing vegetation, and the study area would remain largely undeveloped and unchanged in the long term. Under Alternative 1, however, the bridge across the Upper Truckee River would result in a substantial change in views from Shoreline Travel Unit 33. Alternative 1 would contribute to a cumulative long-term impact. This impact would be **significant**. Additional feasible mitigation is not available to reduce this impact to less than significant, so the residual impact would be **significant and unavoidable.** The long-term contribution to a cumulative impact on scenic resources under Alternatives 2-4 would be **less than significant**. The No-Project/No-Action Alternative (Alternative 5) would not alter visual character or quality of the study area; therefore, Alternative 5 would make no contribution and would have **no impact**.

SOCIOECONOMICS, POPULATION AND HOUSING, AND ENVIRONMENTAL JUSTICE

IMPACT 3.18-C41 (Alts. 1–5)

Cumulative Socioeconomics, Population and Housing, and Environmental Justice—Increase in Population and Housing Demand Resulting from Construction-Related Activities. *Implementing any of the action alternatives (Alternatives 1–4) would not directly induce any long-term population growth, displace substantial numbers of people or existing housing, or require replacement housing to be constructed elsewhere. It would, however, involve construction activities. Any of these alternatives, together with other construction projects, would generate a short-term increase in employment in South Lake Tahoe from construction-related activities. However, this increase would be small relative to the existing labor pool in the City of South Lake Tahoe and nearby communities and thus would not be a considerable contribution to cumulative effects on population growth or on demand for housing; this cumulative impact would be* ***less than significant****. The No-Project/No-Action Alternative (Alternative 5) would not include any construction or other new short-term activities; therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

Because implementing any of the action alternatives (Alternatives 1-4) would not involve new housing or new employment opportunities, it would not directly induce long-term population growth, displace substantial numbers of people or existing housing, or require replacement housing to be constructed elsewhere. Thus, no long-term impact on population and housing would occur as a result of implementing any of these alternatives.

Implementing any of the action alternatives could, however, potentially contribute to a short-term increase in population and housing demand from construction-related activities. For any of these alternatives, the demand for construction workers would be small relative to the existing labor pool of at least several hundred construction workers in the City of South Lake Tahoe and nearby communities. Therefore, the number of existing construction workers in the region is anticipated to be sufficient to meet the demands associated with implementing these alternatives, making the impact of this short-term increase in employment less than significant. Cumulatively, demand for construction workers from the project combined with other projects anticipated during the same construction seasons also would be less than the existing labor pool. (Although based on demographic data and estimates of required construction workers, this interpretation is consistent with the outcome of recent construction seasons with comparable amounts of construction. No evidence of a labor shortage has been demonstrated, planned construction was able to be accomplished with the existing labor pool, and projects were not delayed to future seasons because of labor shortages.) Because the existing labor pool is sufficient to construct the proposed and concurrent projects, implementing the project would not make a considerable contribution to a

cumulatively significant increase in population or housing demand; this cumulative impact would be **less than significant**. The No-Project/No-Action Alternative (Alternative 5) would not include any construction or other new short-term activities; therefore, Alternative 5 would make no contribution and would have **no impact**.

IMPACT 3.18-C42 (Alts. 1–5) **Cumulative Socioeconomics, Population and Housing, and Environmental Justice—Potential Long-Term Increases in Sales or Incomes of Local Businesses Resulting from Additional Visitors to the Study Area.** *Each of the action alternatives (Alternatives 1–4) includes public access facilities that could attract visitors to the study area and thus potentially increase commercial activity at local businesses in South Lake Tahoe. Public access or recreation facilities are also planned for other reasonably foreseeable projects in the area. Nonetheless, the overall number of additional visitors would not be substantial because there are already many similar facilities in the Tahoe Basin to attract visitors looking for similar recreational experiences. Therefore, implementing any of the action alternatives together with other reasonably foreseeable projects would not result in a substantial increase in sales or incomes of local businesses in South Lake Tahoe; this cumulative impact would be* ***less than significant****. Under the No-Project/No-Action Alternative (Alternative 5), no additional recreation facilities would be constructed, and existing facilities would not be expanded; therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

Each of the action alternatives (Alternatives 1-4) includes public access facilities that could attract visitors to the study area and thus potentially increase commercial activity at local businesses in South Lake Tahoe. The overall number of additional visitors would not be substantial; therefore, only a minimal increase in commercial activity would be associated with any of these alternatives. The recreation facilities planned for other restoration projects in the Upper Truckee River watershed and other reasonably foreseeable projects are similar to the Upper Truckee River and Marsh Restoration Project in that they consist of trails and other dispersed recreation facilities or reconfiguration of existing public access or recreation facilities (such as the Lake Tahoe Golf Course). Although additional public access and dispersed recreation facilities in existing public lands improve the visitor experience, there are already many similar facilities in the Tahoe Basin to attract visitors looking for that experience. Consequently, the change in recreation opportunities resulting from implementing the project in conjunction with other reasonably foreseeable projects would not be sufficient to increase the number of recreation visitors substantially; this cumulative impact would be **less than significant**.

Under the No-Project/No-Action Alternative (Alternative 5), no restoration activities, construction of public access facilities, or habitat restoration and enhancement would occur in the study area; therefore, Alternative 5 would make no contribution and would have **no impact**.

TRANSPORTATION, PARKING, AND CIRCULATION

IMPACT 3.18-C43 (Alts. 1–5) **Cumulative Transportation, Parking, and Circulation—Construction and Operation Impacts on the Local and Regional Circulation System.** *Under existing conditions, roadways in neighborhoods adjacent to the study area operate at levels above the minimum acceptable LOS. Implementing reasonably foreseeable projects would not result in substantial construction-related traffic in the study area or adjacent neighborhoods. Implementing any of the action alternatives (Alternatives 1–4) would generate construction traffic but would not reduce operation below the minimum LOS. In addition, the effects of implementing the Upper Truckee River and Marsh Restoration Project would be reduced by implementing Environmental Commitment 12, which involves developing traffic control plans as part of the action alternatives. Implementing reasonably foreseeable projects also would not cause a long-term increase in traffic in the study area or adjacent neighborhoods, and the increase resulting from any of the action alternatives would be small relative to overall traffic and insufficient to alter levels of service. Therefore, the combined effect of implementing reasonably foreseeable projects and any of the action alternatives would not be sufficient to cause a cumulatively significant impact on traffic. Under existing conditions, the supply of parking is sufficient to satisfy demand for parking, and implementing reasonably foreseeable projects would not*

increase demand for parking in the study area or adjacent neighborhoods. Implementing any of the action alternatives would result in an increase in demand for parking, but as described in Section 3.16, "Transportation, Parking, and Circulation," the increased demand for parking would be satisfied by available supply. Therefore, in connection with other projects, none of the action alternatives would make a considerable contribution to cumulative effects on traffic or parking in either the short term or the long term; this cumulative impact would be ***less than significant****. No construction or changes to the study area would occur under the No-Project/No-Action Alternative (Alternative 5); therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

Under existing conditions, potentially affected roadways in adjacent neighborhoods and the intersections of these roads with U.S. 50 operate at LOS A–C, which are above the minimum acceptable level of service (LOS D). The existing demand for parking by visitors to the study area is accommodated by available parking.

Implementing any of the action alternatives (Alternatives 1-4) would generate construction-related traffic. Construction-related traffic would be greater under Alternative 4 than under Alternative 1, 2, or 3. However, under any of the action alternatives, the addition of this automobile and truck traffic would not cause any intersections currently operating at an overall level of service within the range of LOS A–C to operate at an overall level of service within the range of LOS D–F. In addition, the effects of construction-related traffic would be reduced by implementing EC 12, "Prepare and Implement Traffic Control Plans," described in Table 2-6. The traffic control plans would follow the standards of the agency responsible for the affected roadway. Measures typically identified in traffic control plans include advertising planned lane closures, posting warning signage, using a flag person to direct traffic flows when needed, and adopting methods to ensure continued access by emergency vehicles. During project construction, access to existing land uses would be maintained at all times, with detours used as necessary during road closures. The plans would reduce effects on transportation and circulation.

Construction-related traffic also would be generated by reasonably foreseeable projects in South Lake Tahoe, but outside of the neighborhoods adjacent to the study area, such as the Sunset Stables Restoration and Resource Management Plan Project, and the El Dorado U.S. 50, Segment 2—Lake Tahoe Airport to U.S. 50/SR 89 Junction Water Quality Improvement Project. However, construction traffic from these projects would generate only a small fraction of the overall traffic on local and regional roadways, and it would not enter and exit U.S. 50 at the same intersections as construction traffic associated with any of the action alternatives. Furthermore, reasonably foreseeable projects would be constructed at various times and locations in South Lake Tahoe during the summer construction period over the life of the project, which would further reduce their potential to affect intersections that would be measurably affected by implementing any of the action alternatives. Therefore, implementing these other projects and the Upper Truckee River and Marsh Restoration Project would not result in a substantial combined peak traffic congestion impact in the vicinity of the study area, which under existing conditions operates above minimum standards. Thus, the construction-related effects of any of the action alternatives in connection with other projects would not result in a considerable contribution to cumulative effects on traffic or circulation.

Reasonably foreseeable projects would not generate a long-term increase in traffic in the study area or adjacent neighborhoods. Although implementing any of the action alternatives could result in a long-term increase in recreational use of the study area, it also would not increase traffic substantially. Alternative 1 would have the greatest effect on recreational use because it includes the most public access features (however, it also includes parking facilities), Alternative 2 would have the least effect because it includes the fewest public access features, and Alternatives 3 and 4 would have intermediate effects. While an increase in use would occur for any of the action alternatives, this increase would not significantly increase traffic loads (as described in Section 3.16, "Transportation, Parking, and Circulation"). Therefore, in combination with the effects of other projects, the effects of any of the action alternatives would not create an unacceptable level of service or otherwise cause a cumulatively significant effect on transportation or circulation.

Similarly, implementing reasonably foreseeable projects would not increase demand for parking in the study area or in adjacent neighborhoods. Implementing any of the action alternatives would result in a small increase in public use of the study area, and the increased demand for parking would be small relative to available parking capacity in the vicinity of the study area. Also, near the western boundary of the study area, the supply of parking may be increased under Alternative 1 through a joint-use agreement between the Conservancy and the Tahoe Keys Marina. Thus, implementing any of the action alternatives would not result in a considerable contribution to the cumulative effect on parking.

In summary, implementing any of the action alternatives in connection with other projects would not cause a considerable contribution to cumulative effects on transportation, parking, or circulation; this cumulative impact would be **less than significant**.

Under the No-Project/No-Action Alternative (Alternative 5), no construction activities or other changes would occur; therefore, Alternative 5 would make no contribution and would have **no impact**.

UTILITIES

IMPACT 3.18-C44 (Alts. 1–5)

Cumulative Utilities—Short-Term and Long-Term Impacts on Sanitary Sewer, Potable Water, Natural Gas, Electrical, Storm Drain, and Solid Waste Utilities. *The action alternatives (Alternatives 1–4) entail construction activities and long-term changes in use of the study area that would cause a variety of effects on utilities. However, even in combination with the impacts of other reasonably foreseeable projects, the impacts of any of the action alternatives would not make a considerable contribution to a cumulative effect on utilities because all reasonably foreseeable projects would not appreciably increase long-term utility demand and would be required to comply with local waste diversion and recycling requirements, and because area landfills have enough remaining capacity to accommodate potential increase in solid waste generated from all projects; this cumulative impact would be* ***less than significant****. The No-Project/No-Action Alternative (Alternative 5) would not entail construction activities or any long-term changes in use of the study area; therefore, Alternative 5 would make no contribution and would have* ***no impact****.*

Implementing any of the action alternatives (Alternatives 1-4) would involve constructing public access facilities, some of which have the potential to increase recreational use of the study area. Both construction activities and increased recreational use of the study area would affect utilities.

Construction activities could potentially contribute to a short-term increase in utility demand and solid waste generation. For any of these alternatives, the increased demand on utilities and solid waste generation resulting from construction would be small relative to the existing demand and waste generation from the population in the City of South Lake Tahoe and nearby communities. Liberty Energy is expected to have adequate energy resources, and the Lockwood Landfill has adequate capacity, making this impact less than significant. Increased utility demand and solid waste generation resulting from construction activities associated with the project combined with those of other projects anticipated during the same construction seasons also would be small relative to the existing demand. Thus, the project's construction-related effects would not make a considerable contribution to cumulative effects on utilities.

Although none of the action alternatives include sanitary sewer, potable water, or other utility connections, a very small increase in solid waste generation resulting from a small increase in recreational use could have a long-term impact. Currently, South Tahoe Refuse collects solid waste from the area. To comply with state law, all recyclable waste is recycled, and only nonrecyclable waste is taken to the Lockwood Landfill, which has adequate capacity. Increased solid waste generation resulting from implementing the project combined with that from implementing other reasonably foreseeable projects would be small relative to the existing waste generation from the population in the City of South Lake Tahoe and nearby communities, and these projects also would need to meet the state's recycling and waste diversion requirements. Because this increase is very small relative to existing waste

generation from the population in the CSLT and nearby communities and because Lockwood Landfill has adequate capacity, the project's long-term contribution to cumulative effects on utilities would not be considerable. In summary, the project's short-term and long-term contribution to cumulative effects on sanitary sewer, potable water, natural gas, electrical, storm drain, and solid waste utilities would be **less than significant**.

The No-Project/No-Action Alternative (Alternative 5) would not result in project-related short-term or long-term impacts on utilities. Under this alternative, no additional waste or utility demand would be generated, and no increase is stormwater is expected; therefore, Alternative 5 would make no contribution and would have **no impact**.

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4 OTHER REQUIRED SECTIONS

4.1 SIGNIFICANT ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED

CEQA Section 21100(b)(2)(A) states that an EIR shall include a detailed statement setting forth "[i]n a separate section…[a]ny significant effect on the environment that cannot be avoided if the project is implemented." State CEQA Guidelines Section 15126.2(b) requires that an EIR describe any significant impacts, including those that can be mitigated but not reduced to a less-than-significant level. In addition, Code of Federal Regulations (CFR) Title 40, Section 1502.16 (40 CFR 1502.16) and Section 3.7.2 of the TRPA Code of Ordinances require an EIS to identify any significant adverse environmental effects that cannot be avoided if any of the alternatives are implemented. Chapter 3 of this DEIR/DEIS/DEIS addresses the potential environmental effects of the project alternatives for all applicable environmental topic areas and recommends mitigation measures, as necessary, to mitigate project effects to the extent feasible. The contributions of project alternatives to cumulative impacts are discussed in Section 3.18, "Cumulative Impacts," of this DEIR/DEIS/DEIS.

If a specific impact cannot be reduced to a less-than-significant level, it is considered a significant and unavoidable impact. The action alternatives (Alternatives 1–4) would have the following significant and unavoidable environmental impacts (direct, indirect, and cumulative):

- Impact 3.4-5 (Alt. 1): Damage to or Mortality of Special-Status Plants Resulting from Recreational Activities
- Impact 3.4-6 (Alts. 1, 2, 3, 4): Short-Term Disturbance of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Construction Activities
- Impact 3.4-8 (Alts. 1, 2, 3, 4): Disruption of Wildlife Habitat Use and Loss of Wildlife Resulting from Construction Activities
- Impact 3.5-4 (Alt. 3): Long-Term Disruption of Fish Passage/Migration
- Impact 3.9-1 (Alts. 1, 2, 3, 4): Short-Term Risk of Surface Water and Groundwater Degradation during Construction
- Impact 3.9-2 (Alts. 1, 2, 3, 4): Short-Term, Project-Related Risk of Surface Water Degradation Following Construction
- Impact 3.10-3 (Alt. 1): Potential Conflict with Regional Conservation Strategy for Tahoe Yellow Cress
- Impact 3.13-2 (Alts. 1, 2, 3, 4): Short-Term Construction Impacts of Recreation Facilities That May Have an Adverse Physical Effect on the Environment
- Impact 3.13-5 (Alt. 1): Long-Term Operation and Expansion of Recreation Facilities That May Have an Adverse Physical Effect on the Environment
- Impact 3.14-3 (Alt. 1): Potential for Long-Term Degradation of the Scenic Quality of Shoreline Travel Unit 33 and Mapped Scenic Resources Related to the Upper Truckee River Bridge and Ramps
- Impact 3.18-C9 (Alts. 1, 2, 3, 4): Cumulative Biological Resources: Vegetation and Wildlife—Construction-Related Effects on Special-Status Plants and Sensitive Habitats (Jurisdictional Wetlands, Riparian Vegetation, and SEZs)

- Impact 3.18-C10 (Alt. 1): Cumulative Biological Resources: Vegetation and Wildlife—Long-Term Effects on Special-Status Plants and Sensitive Habitats (Jurisdictional Wetlands, Riparian Vegetation, and SEZs)
- Impact 3.18-C11 (Alts. 1, 2, 3, 4): Cumulative Biological Resources: Vegetation and Wildlife—Short-Term Effects on Common or Special-Status Wildlife Resources and Wildlife Movement Corridors
- Impact 3.18-C28 (Alts. 1, 2, 3, 4): Cumulative Geomorphology and Water Quality—Short-Term Risk of Surface Water or Groundwater Degradation during Construction
- Impact 3.18-C29 (Alts. 1, 2, 3, 4): Cumulative Geomorphology and Water Quality—Short-Term Risk of Surface Water or Groundwater Degradation Following Construction
- Impact 3.18-C33 (Alt. 1): Cumulative Land Use—Potential to Physically Divide an Established Community or Conflict with Land Use Plans, Policies, or Regulations
- Impact 3.18-C38 (Alt. 1): Cumulative Recreation—Construction or Expansion of Recreational Facilities That May Have an Adverse Physical Effect on the Environment
- Impact 3.18-C40 (Alt. 1): Cumulative Scenic Resources—Short-Term and Long-Term Effects of Construction Activities and Additional Facilities on Existing Visual Character and Quality

As discussed in Table 2-6, the Conservancy will implement several environmental commitments to reduce potential environmental impacts. Where feasible mitigation exists, it also has been included to reduce these impacts; however, the mitigation and/or environmental commitments would not be sufficient to reduce these impacts to a less-than-significant level.

4.2 SIGNIFICANT AND IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA Section 21100(b)(2)(B) states that an EIR shall analyze in a separate section significant and irreversible environmental changes. State CEQA Guidelines Section 15126.2(c) provides the following guidance for an analysis of the significant and irreversible changes of a project:

> Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

40 CFR 1502.16 also states that an EIS shall analyze irreversible and irretrievable commitments of resources such as soils, wetlands, and waterfowl habitat. The irreversible and irretrievable commitment of resources is the permanent loss of resources for future or alternative purposes. These resources cannot be recovered or recycled or are consumed or reduced to unrecoverable forms. As discussed in Chapter 2, “Project Alternatives,” of this DEIR/DEIS/DEIS, implementing Alternative 1 would involve constructing recreation and public access facilities (e.g., kiosks, bridge, boardwalk, bicycle paths, and pedestrian trails), reestablishing and improving floodplain processes through a combination of approaches, and restoring various habitats. A potential “maximum” level of recreation and public access infrastructure would be constructed under Alternative 1. Constructing recreational facilities under Alternative 1 would commit future generations to the use of those facilities in the study area because some of the facilities (e.g., kiosks, bridge) are relatively permanent structures.

Implementing Alternative 2 also would involve constructing recreation and public access facilities, reestablishing and improving floodplain processes, and restoring various habitats; however, a relatively minimal level of public access and recreation infrastructure would be constructed under Alternative 2. Therefore, although some components of Alternative 2 would commit future generations to the proposed uses to some extent, the commitment would be less than under Alternative 1.

Both Alternatives 3 and 4 would involve a moderate amount of recreational development, habitat restoration, and restoration of the Upper Truckee River and its floodplain. Implementing either Alternative 3 or 4 would involve constructing a kiosk, bicycle paths, and pedestrian trails; however, neither alternative would include the bridge and connected boardwalk that would be constructed under Alternative 1. Implementing Alternative 3 or 4 would commit future generations to the proposed uses under those alternatives; however, the commitment would be less than under Alternative 1.

Implementing Alternative 5 (the No-Project/No-Action Alternative) would involve no significant irreversible or irretrievable commitments of resources.

Although the selection of one of the action alternatives would commit future generations to the approved uses, the commitment could for the most part be reversed. Changes in the use or restoration of natural resources in the study area under Alternative 2, 3, or 4 would be feasible if future decisions by the Conservancy directed such changes. Therefore, the impacts on land use related to Alternative 2, 3, or 4 would not be irreversible. Construction of some of the recreational facilities under Alternative 1 (e.g., kiosks, bridge) would be more difficult to remove and would largely commit future generations to those uses.

Implementing Alternative 1, 2, 3, or 4 would result in the irreversible and irretrievable commitment of energy and material resources during construction and operations. Energy would be expended in the form of gasoline, diesel fuel, and oil for equipment and transportation vehicles. Building materials for the project would include rocks, sand, asphalt, concrete, steel, and other materials. Construction activities would generate nonrecyclable materials, such as solid waste and construction debris. The use of these nonrenewable resources is expected to account for a very small portion of the resources in the Tahoe Basin and their area of origin (generally, northern California and Nevada) and would not affect the availability of these resources for other needs in the basin.

4.3 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Section 3.7.2 of the TRPA Code of Ordinances and 40 CFR 1502.16 require a discussion of the relationship between a project's local short-term uses of the environment and the maintenance and enhancement of long-term productivity. The following discussion addresses how implementing the project would affect the short-term use and the long-term productivity of the environment.

The study area is composed of land that may be needed for project implementation or may be required for access during construction. It includes the downstream reaches of Trout Creek and the Upper Truckee River, adjacent wetland and uplands habitats, more than three-fourths of a mile of Lake Tahoe shoreline, and the Lower West Side Wetland Restoration Area. The study area is easily accessible and is used extensively by the public.

Implementation of any of the action alternatives (Alternatives 1–4) would result in short-term impacts in the study area. These impacts would include reduced recreational access to the study area, local traffic and circulation interference, increased ambient noise levels, exceedance of the turbidity standards, and disruption of wildlife use of some habitats. Because these impacts would occur only during construction and for a short period after, they are not expected to adversely affect the long-term productivity of the natural environment.

The project's short-term effects would be related to the project's long-term beneficial effects on socioeconomic productivity. Implementing any of the action alternatives (Alternatives 1–4) would improve public access and recreational opportunities and experiences in the study area, which could attract additional visitors, potentially increasing commercial activity at local businesses. Therefore, implementing any of the action alternatives could result in a slight increase in long-term socioeconomic productivity. A substantial increase in revenues or long-term productivity in the study area or South Lake Tahoe area would not result under any of the action alternatives. Implementing Alternative 5 (the No-Project/No-Action Alternative) would result in long-term socioeconomic productivity similar to existing conditions.

The project's short-term effects also would be related to the project's long-term beneficial effects on river and floodplain ecosystem productivity (e.g., on the services produced by ecosystems, including sediment and nutrient retention and decreased erosion rates, and provision of fish, wildlife, and plant habitats). Increased sediment and nutrient retention would also have beneficial effects on conditions in Lake Tahoe. Most of these beneficial effects would be similar among the action alternatives, but some substantial differences would exist among these alternatives. The floodplain area inundated by a two-year recurrence flow (at median lake levels) would be much greater under Alternative 2 or 3 than under Alternative 1 or 4, and enhanced core habitat area would be greater under Alternative 2 or 4 than under Alternative 1, and it would be smallest under Alternative 3. While Alternative 1 does enhance the core habitat area it also includes a bridge that increases access to sensitive Tahoe yellow cress habitat and therefore has a long term significant and unavoidable impact to Tahoe yellow cress. Implementing Alternative 5 (the No-Project/No-Action Alternative) would result in the continuation of existing adverse conditions and trends in the productivity of river and floodplain ecosystems.

4.4 GROWTH-INDUCING IMPACTS

CEQA Section 21100(b)(5) specifies that the growth-inducing impacts of a project must be addressed in an EIR. Section 15126.2(d) of the State CEQA Guidelines provides that a project alternative would be growth inducing if it could "foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." Direct growth inducement would result if a project involved, for example, the construction of new housing. Indirect growth inducement would result if a project established substantial new permanent employment opportunities (e.g., new commercial, industrial, or governmental enterprises), involved a construction effort with substantial short-term employment opportunities that would indirectly stimulate the need for additional housing and services, or removed an obstacle to housing development. Examples of growth-inducing actions include developing water, wastewater, fire, or other types of service areas in areas not previously served; extending transportation routes into previously undeveloped areas; and establishing major new employment opportunities.

Direct growth would not be induced under any of the project alternatives because none of the project alternatives propose additional housing. In addition, implementing the project would not indirectly induce growth because substantial new permanent employment opportunities would not result under any of the action alternatives. Construction of Alternative 1, 2, 3, or 4 would generate short-term employment opportunities; the work would be temporary and would occur over several years, with certain activities starting and stopping for shorter durations within that period. Alternative 5 (the No-Project/No-Action Alternative) would not involve any work. Because of the limited number and type of jobs that would be generated and the temporary nature of those jobs, it is anticipated that the jobs would be filled using the existing local employment pool. Existing available housing in the region would easily accommodate any workers who relocate from outside the area, if needed. The number of permanent employees would not increase under any of the alternatives. Therefore, none of the alternatives would have an effect on the local workforce or would significantly affect employment.

In addition, the project would not involve the provision of any new services or construction of new utilities to the study area that would have more capacity than needed for uses currently being proposed, and no road improvements are proposed as part of the project. For these reasons, indirect growth-inducing impacts resulting from implementing the project would be less than significant.

As discussed in Section 3.15, "Socioeconomics, Population and Housing, and Environmental Justice," a slight increase in economic growth may be realized under Alternative 1, 2, 3, or 4 because each would improve public access and recreational opportunities and experiences in the study area, which could attract additional visitors. However, this increase would be expected to be minimal, resulting in no significant indirect growth-inducing effects. Implementing Alternative 5 (the No-Project/No-Action Alternative) would result in no change in economic growth because no changes to public access or recreational opportunities or experiences would occur.

4.5 ENVIRONMENTALLY SUPERIOR ALTERNATIVE/ENVIRONMENTALLY PREFERRED ALTERNATIVE

NEPA requires that the alternative considered to be environmentally preferable be identified. "Environmentally preferable" is used to describe the alternative that would best promote the national environmental policy as expressed in Section 101 of the National Environmental Policy Act—that is, it would cause the least damage to the biological and physical environment. In addition, the "environmentally preferable" alternative best protects, preserves, and enhances historic, cultural, and natural resources. Although U.S. Council on Environmental Quality regulations require that the environmentally preferred alternative be identified, they do not require that this alternative be adopted.

Section 101(b) of NEPA states:

> *In order to carry out the policy set forth in this Act, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate federal plans, functions, programs and resources to the end that the Nation may—*
>
> *(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;*
>
> *(2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;*
>
> *(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;*
>
> *(4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice;*
>
> *(5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and*
>
> *(6) enhance the quality of renewable resources and approach the maximum attainable recycling of dependable resources.*

The State CEQA Guidelines (Section 15126.6(a) and e(2)) require that an EIR's analysis of alternatives identify the "environmentally superior" alternative among all of those considered. In addition, if the No-Project Alternative is identified as the environmentally superior alternative, then the EIR must also identify the environmentally superior alternative among the other alternatives. Under CEQA, the goal of identifying the environmentally superior alternative is to assist decision makers in considering project approval. CEQA does not require an agency to select the environmentally superior alternative (State CEQA Guidelines Section 15042–15043).

The TRPA Compact and Code of Ordinances do not specifically call for identifying an environmentally superior or preferred alternative; however, they rely on other state and federal regulations and when evaluating alternatives, TRPA identifies the alternative that would best maintain and/or achieve environmental thresholds (discussed in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities," below). The

Compact and the Code of Ordinances allow for the consideration of social, technical, or economic impacts when an alternative is selected.

Based on the analysis of impacts on resources in Chapter 3, the action alternatives present trade-offs related to overall environmental advantages. Implementing Alternative 1, 2, 3, or 4 would involve restoring the river and its floodplain, which would improve long-term water quality, increase the amount and improve the quality of aquatic and floodplain habitats, and restore the stream environment zone. These alternatives would have short-term and interim impacts on water quality that could not be avoided because of the strict turbidity criteria used to determine a significant and unavoidable impact (Section 3.8) and to sensitive habitats and wildlife (Section 3.4). Implementing Alternative 1 would also create long-term significant and unavoidable scenic impacts and Tahoe yellow cress impacts related to bridge construction (Sections 3.4 and 3.14). Implementing Alternative 3 could have a long-term significant unavoidable impact to fish passage through the study area during low flow periods if channel disconnectivity occurs (Section 3.5). Implementing Alternative 5 (the No-Project/No-Action Alternative) would avoid the adverse impacts generated by construction of additional recreational facilities; however, the long-term water quality and habitat benefits would not occur. Consequently, Alternative 5 (the No-Project/No-Action Alternative) is not the environmentally superior or environmentally preferred alternative.

Of the action alternatives, Alternative 2, New Channel—West Meadow (Minimum Recreation Infrastructure), is the environmentally superior alternative because it involves a relatively minimal level of impacts associated with public access and recreational infrastructure while including river, lagoon, floodplain, and beach and dune restoration benefits comparable to or greater than those under Alternative 1, 3, or 4. However, unlike under the other action alternatives, implementing Alternative 2 would not provide recreation infrastructure to redirect public access from sensitive areas. Compared with the other action alternatives, this alternative minimizes construction activities and costs, maintenance and staffing responsibilities and costs, disturbances associated with infrastructure construction, and formal public access to locations throughout the study area.

Although Alternative 2 would be environmentally superior, it includes non-environmental trade-offs. Implementing Alternative 2 would provide the least benefit for public access and recreation opportunities and experiences.

4.6 CONSEQUENCES FOR ENVIRONMENTAL THRESHOLD CARRYING CAPACITIES

TRPA Threshold Carrying Capacities (thresholds) are standards of environmental quality to be achieved in the Tahoe Region. The standards identify the level of human impact the Lake Tahoe environment can withstand before irreparable damage occurs. Thresholds have been established for nine resource areas:

- air quality;
- water quality;
- soil conservation;
- vegetation preservation;
- fisheries;
- wildlife;
- scenic;
- noise; and
- recreation.

The thresholds and the indicators used to measure how well a project complies with the thresholds were adopted in 1987 and remain in effect today. The analysis of attainment status (i.e., whether each threshold is being achieved and/or maintained) is updated approximately every five years and was most recently assessed in the *2011 Threshold Evaluation* (TRPA 2012).

An evaluation of the effects of each of the project alternatives on the thresholds is provided below for the nine resource areas. For each threshold, it is stated whether the threshold is applicable to the project and, if so, what the consequences of implementing each alternative would be on each applicable threshold. The evaluation of the project alternatives' effects on the thresholds focuses on long-term changes in attainment. Short-term impacts associated with construction of each of the alternatives would be temporary and intermittent and would not change the attainment status of any of the thresholds. Thresholds in "attainment" are those meeting the adopted TRPA standard, and thresholds in "non-attainment" are not meeting the TRPA standard. Thresholds are designated as "unknown" when TRPA did not have adequate data to make a determination of attainment.

4.6.1 AIR QUALITY

Eight numerical air quality thresholds have been established by TRPA:

- AQ-1, Carbon Monoxide;
- AQ-2, Ozone (ROG [reactive organic gases] and NO_X [oxides of nitrogen]);
- AQ-3, PM_{10} [respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less];
- AQ-4, Visibility;
- AQ-5, U.S. 50 Traffic Volumes;
- AQ-6, Wood Smoke Emissions;
- AQ-7, Vehicle Miles Traveled; and
- AQ-8, Atmospheric Nutrient Loading.

In 2006, the AQ-1, AQ-2, AQ-3, and AQ-7 thresholds were designated "non-attainment"; the AQ-4 and AQ-5 thresholds were designated "attainment"; and the AQ-6 and AQ-8 thresholds were designated "unknown." In 2011, the AQ-1 threshold was in attainment, AQ-2, AQ-3, AQ-4, AQ-5 and AQ-7 thresholds were still in "non-attainment," AQ-6 and AQ-8 are still designated as "unknown." The thresholds for air quality are established for long-term operational emissions only. Therefore, temporary, short-term construction-related emissions are not considered in determining compliance with TRPA thresholds.

As stated for Impact 3.2-2 (Alternatives 1–4), implementing the project would not cause any long-term operational emissions thresholds set by TRPA to be exceeded. Thus, long-term operational emissions of criteria air pollutants (ozone [ROG and NO_X] and PM_{10}) would not violate the air quality standards established by thresholds AQ-2 and AQ-3. Subsequently, because the AQ-4, AQ-7, and AQ-8 thresholds are based on the formation of criteria air pollutants (visibility: ozone and PM_{10}; vehicle miles traveled: ozone; and atmospheric nutrient loading: NO_X), they also would not be violated by long-term project operation.

As stated for Impact 3.2-3 (Alternatives 1–4), implementing the project would not cause long-term levels of service to deteriorate at any intersection or on any route, including U.S. 50. Thus, long-term operational (local) emissions of carbon monoxide by mobile sources and resulting changes in level of service (i.e., on U.S. 50) related to the project would not violate the air quality standards established by thresholds AQ-1 and AQ-5.

No long-term operational sources of wood smoke emissions are associated with any of the project alternatives. Thus, the project would not affect threshold AQ-6.

4.6.2 WATER QUALITY

Seven narrative and numerical water quality thresholds have been established by TRPA:

- WQ-1, Littoral Lake Tahoe, Turbidity;
- WQ-2, Pelagic Lake Tahoe, Winter Water Clarity;
- WQ-3, Pelagic Lake Tahoe, Phytoplankton Primary Productivity;
- WQ-4, Tributaries, Tributary Water Quality;

- WQ-5, Surface Water, Runoff Water Quality;
- WQ-6, Groundwater; and
- WQ-7, Other Lakes.

None of the project alternatives (Alternatives 1–5) would produce a discernible effect on four of the TRPA water quality thresholds: WQ-1, Littoral Lake Tahoe, Turbidity (attainment); WQ-2, Pelagic Lake Tahoe, Winter Water Clarity (non-attainment); WQ-3, Pelagic Lake Tahoe, Phytoplankton Primary Productivity (non-attainment); and WQ-7, Other Lakes (non-attainment). Therefore, these thresholds are not discussed further.

Water quality thresholds are applied basinwide; that is, the entire Tahoe Basin is considered in attainment or in non-attainment. However, spatial data by stream, lake, or other water body are tracked, and local attainment status is reported by TRPA. No spatially discrete targets have been established. The three directly related water quality thresholds all have a "non-attainment" status. Implementing any of the action alternatives would not adversely affect or interfere with attainment of any of TRPA's seven water quality thresholds. The relevant thresholds are discussed in more detail below.

WQ-4, Tributaries, Tributary Water Quality

The TRPA tributaries threshold is intended to attain state standards for nitrogen, phosphorus, iron, and a 90th percentile value for suspended sediment of 60 milligrams per liter. The WQ-4 threshold is in non-attainment. Using the 2011 threshold evaluation, the status is somewhat worse than target, and the trend is moderate improvement (TRPA 2012).

A major goal of the Upper Truckee River and Marsh Restoration Project is the reduction of fine sediment (and associated nutrients, including nitrogen, phosphorous, and iron) production and transport in the study area. This goal is addressed by the design elements of Alternatives 1–4 that reduce fine sediment sources in the study area and promote fine sediment retention on the Upper Truckee River floodplain. Although the magnitude of both the reduction in fine sediment generated and the increase in sediment retained on the floodplain cannot be accurately quantified, the reduction of sediment sources and increased sediment retention in the study area would reduce the transport of fine sediment to Lake Tahoe, directly supporting the TRPA goal of decreasing the sediment load to the lake. A significant contributing element for the reduction of sediment production is the creation of more stable channel segments and the removal/abandonment of existing unstable channel segments. Implementing Alternative 1, 2, 3, or 4 would increase the length of "geomorphically sized" (and inherently more stable) channels through modifications of existing channel segments and construction of new segments. The channel geometry in the improved segments would be designed to reduce channel instability and related erosion of the channel bed and banks. With the increase in the length of "geomorphically sized" channels (relative to existing conditions) used as a measure of improved channel stability, the action alternatives would be ranked in descending order as follows: Alternative 1 (6,200 feet), Alternative 2 (5,650 feet), Alternative 3 (5,080 feet), and Alternative 4 (3,400 feet).

Additionally, implementing any of the action alternatives would promote increased retention of sediment in the study area by improving floodplain connectivity for the Upper Truckee River and by increasing the frequency and duration of channel overbanking and the area of floodplain inundation during high-frequency flooding events. The increased floodplain connectivity (and opportunity for floodplain retention) would be realized as a combination of raising the existing channel bed (Alternatives 1, 2, and 3) and constructing inset (lowered) floodplain areas or terraces (Alternatives 1, 2, 3, and 4). The effect of both of these actions would be to increase the area of the study area more frequently inundated during seasonal high-flow events. With the estimated increase in the area inundated during a two-year flow event used as a measure of increased opportunity for deposition of fine sediment in the study area, the action alternatives would be ranked in descending order as follows: Alternative 3 (91 acres), Alternative 2 (61 acres), Alternative 4 (17 acres), and Alternative 1 (11 acres).

Each action alternative would also include installation of bank protection for the Upper Truckee River downstream of the U.S. 50 bridge (generally between River Stations 0+00 and 12+00). The bank protection would

stabilize eroding banks or banks with a high susceptibility to erosion, thereby reducing sediment production and turbidity. Based on the length of protected bank, implementing Alternative 1 or 4 would provide the most protection, and implementing Alternative 2 or 3 would provide the least.

As described above, implementing any of the action alternatives would reduce sediment sources and provide opportunities for increased floodplain retention relative to existing conditions. These improved conditions would be expected to reduce fine sediment loading to the Upper Truckee River in the study area and result in the increased retention of fine sediment transported into the study area. In general, implementing any of the action alternatives would contribute to attainment of the WQ-4 threshold.

Alternative 5 (the No-Project/No-Action Alternative) would not include any specific measures to be implemented in the study area that would reduce sediment and nutrient loading to the Upper Truckee River and, ultimately, Lake Tahoe. Existing conditions, which include river channel instability and reduced floodplain connectivity with the river, would persist. These conditions would result in continued elevated sediment loading in the Upper Truckee River. Relative to Alternatives 1, 2, 3, and 4, Alternative 5 would have the least potential to reduce sediment loading and would not contribute to attainment of the WQ-4 threshold.

WQ-5, Surface Water, Runoff Water Quality

The WQ-5 threshold, including TRPA standards focused on limiting nitrogen, phosphorous, iron, grease, oil, and suspended sediment in stormwater surface water discharges, is in non-attainment. Implementing Alternative 1, 2, 3, or 4 would require extensive grading and construction activities over an approximately four-year construction period. The construction activities would result in removal of vegetation and disturbance of surface soils and underlying floodplain sediments. This disturbance could potentially result in short-term increased erosion hazards in disturbed areas. Under all the action alternatives, construction would result in a temporary increase in the risk of releases of fuel, lubricants, and other hazardous substances related to the operation of heavy equipment. However, compliance with existing regulations regarding the control of stormwater discharges for construction activities would be required under all the action alternatives. Environmental Commitment 5 would be implemented to protect water quality during the construction period.

Proposed recreational facilities (including the kiosk, trails, viewpoints and observation areas, and fishing platforms) for all the action alternatives would be accessible by foot or bicycle. These facilities would not introduce significant new sources of stormwater contaminants. Runoff from impervious structures (i.e., pavement) would require collection and treatment (e.g., infiltration) to minimize discharge of stormwater.

Alternative 2 or 3 would include creation of stormwater treatment areas at the eastern margin of the study area. These treatment areas would be included to provide for the management/treatment of stormwater that enters the study area from developed areas to the east. This provision is a benefit of implementing Alternative 2 or 3, allowing treatment of stormwater generated from off-site sources.

Required compliance with existing regulations would mitigate potential increases in stormwater pollutants associated with implementing any of the action alternatives. Additionally, the action alternatives would provide increased opportunity for retention of fine sediment and associated nutrients on the Upper Truckee River floodplain in the study area (see discussion of the WQ-4 threshold, above). The combined effect of specific stormwater controls for proposed recreational facilities and the increased opportunity for treatment of Upper Truckee River flows would contribute to the attainment of the WQ-5 threshold under Alternative 1, 2, 3, or 4.

Relative to existing conditions, Alternative 5 would not result in any improvements for treatment of stormwater and would not contribute to attainment of the WQ-5 threshold.

WQ-6, GROUNDWATER

The Tahoe Basin is in non-attainment for the WQ-6 threshold, which includes standards focused on limiting nitrogen, phosphorous, iron, grease, oil, and turbidity in stormwater discharges to groundwater through infiltration. The goal of the WQ-6 threshold is to generally improve the potential for treatment of stormwater through groundwater infiltration and reduce nitrogen and phosphorous in groundwater. Data collected for the 2005 Total Maximum Daily Load Best Management Practices Evaluation and Feasibility Study indicate that in the Lake Tahoe Basin most untreated runoff samples would meet groundwater (or land treatment) standards. Implementing Alternative 1, 2, 3, or 4 would not introduce any significant sources of nitrogen or phosphorus into the study area or the Upper Truckee River. Implementation of any of the action alternatives would eliminate most existing impervious surfaces in the study area and would create a smaller amount of new impervious cover, resulting in a net decrease in the amount of impervious cover. The new impervious cover would be limited to paved trails and to kiosks and signs at observation points and view points (Alternative 1, 2, 3, or 4). The proposed extent of impervious cover would not substantially change (i.e., reduce) the recharge properties of the study area. All runoff collected from impervious surfaces would be treated in infiltration facilities before it reached groundwater.

All the action alternatives include modifications to the Upper Truckee River channel in the study area that would promote more frequent inundation of the floodplain/marsh surface during small and moderate flow events. The increased frequency and area of inundation during these smaller flood events would promote retention of sediment and associated nutrients (including nitrogen and phosphorous) on the floodplain, making nutrients available for uptake by riparian and marsh vegetation. Most of the sediment and nutrients would be transported by the river into and would not be generated at the study area. Although not directly quantifiable, the uptake of nutrients would reduce nutrient loading to Lake Tahoe (and therefore reduce the amount of nutrients delivered to groundwater through infiltration).

Implementing Alternative 1, 2, 3, or 4 would decrease the cover of impervious surfaces in the study area, treat stormwater runoff before it is discharged to groundwater, and increase opportunities for retention of nutrients on the Upper Truckee River floodplain. Therefore, implementing any of the action alternatives would generally benefit the goals of the WQ-6 threshold. Under Alternative 5, the existing conditions would continue therefore, the attainment of the WQ-6 threshold would not be affected.

4.6.3 SOIL CONSERVATION

Two soil conservation thresholds have been established by TRPA:

- SC-1, Impervious Coverage and
- SC-2, Stream Environment Zone, Naturally Functioning SEZ.

SC-1, IMPERVIOUS COVERAGE

This threshold is in non-attainment. It has two components, the first is based on controlling the amount of new impervious coverage, and the second involves a continuing effort to bring all land coverage into compliance with Bailey System coefficients. Implementing Alternative 1, 2, 3, or 4 would decrease coverage in the most sensitive lands (LCD 1b) adjacent to the Upper Truckee River and Trout Creek, therefore decreasing existing coverage of sensitive lands in the watershed. Coverage would be decreased by removing user-created trails in LCD 1b throughout the study area (Alternatives 1–4) and by removing fill from the TKPOA Corporation Yard and restoring it to natural vegetation (Alternatives 1–3). Alternatives 1–4 also involve constructing public access and recreation infrastructure; these elements would be new coverage in LCD 1b around the perimeter of the study area. Overall, implementing Alternative 1, 2, 3, or 4 would result in a net decrease in coverage in LCD 1b and in the study area as a whole. Consequently, implementing any of these alternatives would contribute to attainment of threshold SC-1 by decreasing land coverage. However, coverage allowed in the study area exceeds that allowed

by the Bailey System. Coverage removed would be banked and used for other projects (e.g., bike trails) as allowed by TRPA. Implementing Alternative 5 would maintain existing conditions and thus would not affect attainment of threshold SC-1.

SC-2, NATURALLY FUNCTIONING SEZ THRESHOLD

The SC-2 threshold is in non-attainment. It sets the goal of preserving naturally functioning Stream Environment Zone (SEZ) lands in their natural hydrologic condition, restoring all disturbed SEZ lands in undeveloped lands and restoring a five-percent increase in the area of naturally functioning SEZ lands (in the TRPA area of jurisdiction). Nearly all of the study area is designated as SEZ. The primary purpose of the Upper Truckee River and Marsh Restoration Project is to improve the natural function of the Upper Truckee River and floodplain in the study area. Implementing any of the action alternatives (Alternative 1, 2, 3, or 4) would restore river processes and functions of the Upper Truckee River and improve connectivity of the river with its floodplain. All the action alternatives involve preserving and improving natural hydrologic conditions in the study area, and only uses that are consistent with allowable uses in the SEZ lands are proposed for the alternatives, including Alternative 5. All the action alternatives are also consistent with the TRPA Environmental Improvement Program, which provides direction and funding for projects restoring degraded SEZ conditions.

Implementing any of the action alternatives (Alternative 1, 2, 3, or 4) would contribute to the attainment of the SC-2 threshold. Although implementing Alternative 5 would not degrade existing SEZ lands or propose inconsistent land uses, implementing this alternative would not contribute to attainment of the SC-2 threshold.

4.6.4 VEGETATION PRESERVATION

Four vegetation thresholds have been established by TRPA:

- V-1, Common Vegetation;
- V-2, Uncommon Plant Communities;
- V-3, Sensitive Plants; and
- V-4, Late Seral/Old Growth Ecosystems.

V-1, COMMON VEGETATION

The goal of the V-1 threshold is to increase plant and structural diversity of forest communities through appropriate management practices as measured by diversity indices of species richness, relative abundance, and pattern. The V-1 threshold includes separate standards for diversity and pattern of vegetation types and relative abundance for conifer forest types, meadow and wetland vegetation types, and deciduous riparian vegetation types that are applied basinwide:

- Provide for the perpetuation of yellow pine forest, red fir forest, subalpine forest, sagebrush scrub, and cushion plant associations and riparian, marsh, and meadow associations.
- Maintain at least four percent meadow and wetland vegetation and four percent deciduous riparian vegetation.
- Maintain no more than 25 percent dominant shrub vegetation.
- Maintain 15–25 percent of the yellow pine forest in seral stages other than mature.
- Maintain 15–25 percent of the red fir forest in seral stages other than mature.
- Limit the acreage size of new forest openings to no more than eight acres.
- Ensure that adjacent forest openings are not of the same relative age class or successional stage.

Regarding conifer forest, implementing any of the action alternatives (Alternative 1, 2, 3, or 4) would contribute to attainment of the V-1 threshold. Each of these alternatives involves enhancing forest communities in the study area by removing and restoring user-created trails.

Regarding deciduous riparian (i.e., willow-wet meadow scrub) and meadow and wetland vegetation (i.e., lagoon and montane meadow) in the study area, short-term construction-related effects would be avoided or substantially reduced by implementing measures incorporated into the project as environmental commitments (Table 2-6), implementing proposed mitigation, or meeting the terms and conditions of permits. Consequently, common vegetation would not be degraded. Furthermore, implementing any of the action alternatives (Alternative 1, 2, 3, or 4) would result in long-term increases in the acreage and quality of deciduous riparian vegetation and meadow and wetland vegetation in the study area. Because the relative abundance threshold for these vegetation types is presently in non-attainment, implementing any of the action alternatives would contribute to attainment of the V-1 threshold. Implementing Alternative 5 would not improve existing deciduous riparian, meadow, or wetland vegetation; rather, degradation would continue. Implementing this alternative would not contribute to attainment of the V-1 threshold.

V-2, UNCOMMON PLANT COMMUNITIES

The V-2 threshold calls for providing nondegradation of the natural qualities of any plant community that is uncommon to the Tahoe Basin or of exceptional scientific, ecological, or scenic quality. This threshold applies but is not limited to the deep-water plants of Lake Tahoe, Grass Lake (sphagnum fen), Osgood Swamp, the Freel Peak Cushion Plant Community, Hell Hole (sphagnum fen), Upper Truckee Marsh, Taylor Creek Marsh, and Pope Marsh. This threshold applies to the sensitive plant communities of the study area.

The threshold status for V-2 is in non-attainment. The adverse effects of construction activities would be only short-term and would be avoided or substantially reduced by implementing measures incorporated into the project, implementing proposed mitigation, or meeting the terms and conditions of permits. Consequently, uncommon plant communities would not be degraded. Furthermore, all the action alternatives include restoration and enhancement components that would bring the V-2 threshold closer to attainment. Each project alternative would increase the acreage of uncommon communities in the study area; enhance uncommon communities by reducing human disturbance, particularly in a core habitat area; and increase river-floodplain connectivity (e.g., the frequency of inundation by floodwaters), which would enhance uncommon communities. Implementing Alternative 5 would not improve existing uncommon plant communities; rather, degradation would continue. Thus, implementing this alternative would not contribute to attainment of the V-1 threshold.

V-3, SENSITIVE PLANTS

The goal of the V-3 threshold is to maintain a minimum number of population sites for five TRPA special-interest plant species: Galena Creek rockcress (*Arabis rigidissima* var. *demota*) (seven sites), long-petaled lewisia (*Lewisia longipetala*) (two sites), Cup Lake draba (*Draba asterophora* var. *macrocarpa*) (two sites), Tahoe draba (*Draba asterophora* var. *asterophora*) (five sites), and Tahoe yellow cress (*Rorippa subumbellata*) (26 sites). The threshold status for V-3 is attainment.

Of these plant species, only Tahoe yellow cress is found in the study area. Under any of the action alternatives, impacts on Tahoe yellow cress plants could include damage to plants during construction activities, loss of habitat from construction of project features, or subsequent damage to plants as a result of altered recreational activities. Although these potential adverse effects could occur under Alternative 2, this alternative also involves creating additional potential habitat for Tahoe yellow cress.

Under the action alternatives, potential impacts from construction activities would be avoided by implementing Mitigation Measure 3.4-3: Conduct Protocol-Level Preconstruction Surveys and Avoid or Mitigate Impacts on Tahoe Yellow Cress Plants. If all Tahoe yellow cress plants cannot be avoided, the Conservancy, in coordination

with the Tahoe Yellow Cress Adaptive Management Working Group, will delineate and fence a mitigation area, excavate and translocate potentially affected stems, plant additional nursery-grown Tahoe yellow cress plants, and monitor and adaptively manage the population. (No construction activities would occur under Alternative 5, the No-Project/No-Action Alternative.)

Unlike Alternatives 2, 3, 4, and 5, implementing Alternative 1 would result in the loss of habitat for Tahoe yellow cress (along the beach where the boardwalk would be constructed). Although implementing Alternative 1 would increase the acreage of beach and dune by restoring dunes at Cove East Beach (see Table 3.4-4), most of this restored vegetation would be dunes up to several hundred feet from the immediate shoreline and may not include the moist microsites that provide habitat for Tahoe yellow cress.

Under existing conditions, a comprehensive set of measures is being implemented and would continue to be implemented to maintain the Tahoe yellow cress populations in the study area. These measures also would be implemented under the action alternatives (Alternatives 1–4) and Alternative 5 (the No-Project/No-Action Alternative). The measures are components of a Conservancy-adopted management plan for Tahoe yellow cress in the study area (Conservancy and DGS 2007). For Alternatives 2, 3, 4, and 5, these measures would be sufficient to prevent recreational activities from having a significant effect on these Tahoe yellow cress populations. However, for Alternative 1, the management plan's measures would not prevent effects on the Barton Beach population site, where a boardwalk would be constructed close to the existing populations and an increase in visitors is expected. Despite signage, protective measures, and continued implementation of the Tahoe yellow cress management plan, trampling of plants and other disturbance to Tahoe yellow cress populations are expected to increase at this location.

For these reasons, implementing Alternative 2, 3, 4, or 5 (the No-Project/No-Action Alternative) would continue to maintain population sites for Tahoe yellow cress and thus would contribute to continued attainment of the V-3 threshold. Implementation of Alternative 1, however, would result in a significant impact on Tahoe yellow cress populations and habitat in the study area and therefore may not continue to maintain all population sites for Tahoe yellow cress in the study area. Therefore, implementing Alternative 1 would not contribute to continued attainment of the V-3 threshold and could result in nonattainment of this threshold.

V-4, LATE SERAL/OLD GROWTH ECOSYSTEMS

The goal of the V-4 threshold is to attain and maintain a minimum percentage of 55 percent by area of forested lands in the Tahoe Basin in a late seral or old-growth condition, distributed across elevation zones. Forested lands in TRPA-designated urban areas are excluded from the calculations for threshold attainment. The threshold status for the V-4 threshold is non-attainment.

The study area is in an urban area not included in attainment calculations and does not contain any late seral/old-growth forest. Implementing any of the five alternatives would not affect the attainment status of this threshold. Because of the long period over which late seral/old-growth ecosystems develop, project implementation under any of the alternatives also would not contribute to attainment of the V-4 threshold.

4.6.5 FISHERIES

Four fisheries thresholds have been established by TRPA:

- F-1, Lake Habitat;
- F-2, Stream Habitat;
- F-3, Instream Flows; and
- F-4, Lahontan Cutthroat Trout.

F-1, LAKE HABITAT

The goal of the F-1 threshold is to apply a nondegradation standard to fish habitat in Lake Tahoe and achieve the equivalent of 5,948 total acres of excellent (prime) habitat. According to TRPA (1982a), "[t]he quality of the lake can be evaluated and tested against the threshold using measures of habitat disturbance and substrate conditions." TRPA (1982a) also considered moderate to heavy boat traffic as disturbance that significantly contributed to the decline of lake fish habitat quality. The indicator for the F-1 threshold standard was later identified by TRPA as "[p]hysical disturbance of rocky substrate (acres)" and also considered the rearrangement or clearing of near shore substrate to accommodate beach use during low lake levels as disturbance to fish habitat and thus a degradation of fish habitat conditions (TRPA 1996). However, because of challenges associated with defining and measuring "disturbed rocky substrates" TRPA subsequently measured and reported on the extent and distribution of rocky substrates ("prime" fish habitat in the littoral zone) in their 2006 Threshold Evaluation. It was felt that this approach more directly addressed whether the management target of 5,958 acres was achieved (TRPA 2012).

The current status of this threshold is non-attainment, although based on remote sensing data collected and analyzed from 2002, the region has reached about 94% of the management target of 5,948 acres (TRPA 2012). Implementing Alternative 5 would not change fish habitat conditions in the lake; therefore, implementing this alternative would not affect attainment of the F-1 threshold. Implementing Alternative 1, 2, 3, or 4 would reduce suspended sediment loads to Lake Tahoe that originate from the study area. Therefore, implementing any of these alternatives could contribute to attainment of the F-1 threshold.

F-2, STREAM HABITAT

The goal of the F-2 threshold is to "maintain 75 miles of excellent, 105 miles of good, and 38 miles of marginal stream habitat," for streams classified as residential and migratory and as indicated by the map on page 76 of the EIS for the Establishment of Environmental Thresholds (TRPA 1982b). Past evaluations (1991 and 1996) of stream habitat quality used a list of subjective evaluation criteria. Each threshold stream (defined as those streams in the Lake Tahoe Region designated by TRPA as residential or migratory (TRPA 1982a; TRPA 2012, stream habitat map) was scored according to criteria used to conclude the relative condition of each stream. The resulting score for a particular length of stream was then fitted into one of three classes—excellent, good, or marginal—and the overall mileage of that stream segment was calculated. According to TRPA documents, it was unclear which fish species group the classification scheme was relevant to (e.g., suckers, trout, all). Consequently, because the criteria used in the classification scheme appeared biased toward salmonid life histories, an assumption was made that the classification scheme was most relevant to trout species. Based on the availability of data, past evaluations have used different criteria to draw conclusions on the conditions of different streams. For example, biological data were not available for the 1996 Threshold Evaluation; therefore, those criteria were dropped from the condition assessment of all threshold streams. In the 2001 Threshold Evaluation Report, because no field effort had been conducted since 1996, the professional opinions of Fisheries Technical Advisory Group members were used to report on the condition of stream habitat. Similarly, the 2006 Threshold Evaluation of stream habitat was hampered because of a lack of field effort to assess fisheries conditions (TRPA 2007).

The current status of this threshold is unknown because of lack of data (TRPA 2007, 2012). Implementing Alternative 5 would not change stream habitat conditions in the study area; therefore, implementing this alternative would not affect the attainment status of the F-2 threshold. Implementing Alternative 1, 2, 3, or 4 would improve stream habitat conditions in the Upper Truckee River to varying degrees and would contribute to the attainment of threshold F-2.

F-3, INSTREAM FLOWS

The F-3 threshold states that "until instream flow standards are established in the Regional Plan to protect fishery values, a nondegradation standard shall apply to instream flows." The original evaluation criterion for the instream flow threshold standard is found in TRPA (1982a), which states, "It can be evaluated for compliance by

monitoring the number of new diversions and changes in points of diversion." TRPA states that the indicator of instream flows is "evaluated by use of an in-stream beneficial use assessment, such as the type established by Title 23, Section 670.6 of the California Administrative Code" (TRPA 1996). An interim indicator and standard was adopted in the 2001 TRPA Threshold Evaluation because TRPA's staff has not had the technical ability or the staffing capacity to generate instream beneficial use assessments for each threshold stream. The interim indicator and standard is consistent with TRPA (1982b) to ensure that TRPA-reviewed and -permitted projects/activities do not jeopardize streamflows for fish. Thus, this evaluation quantifies the number of applications for diversions and lake transfers filed with TRPA as an indicator of maintenance of streamflow conditions in the region. Additionally, a summary of research completed by Desert Research Institute on streamflow condition is provided in this evaluation (Tracy and Rost 2003).

The current status of the threshold is attainment. Implementing any of the project alternatives, including Alternative 5, would not change instream flows in the Upper Truckee River. Therefore, it would not affect the attainment status of the F-3 threshold.

F-4, LAHONTAN CUTTHROAT TROUT

The goal of the F-4 threshold is to "support, in response to justifiable evidence, state and federal efforts to reintroduce Lahontan cutthroat trout." The current status of the threshold is attainment. Implementing Alternative 5 would not change habitat conditions for Lahontan cutthroat trout in the study area; therefore, implementing this alternative would not affect attainment of the F-4 threshold. Implementing Alternative 1, 2, 3, or 4 would improve stream habitat conditions in the Upper Truckee River to varying degrees for native fish species, including Lahontan cutthroat trout; therefore, it would contribute to further attainment of the F-4 threshold. All of the action alternatives support the 2012 TRPA recommendations to continue efforts to restore and enhance stream habitat conditions.

4.6.6 WILDLIFE

Two wildlife habitat thresholds have been established by TRPA:

- W-1, Wildlife Species of Special Interest, and
- W-2, Habitats of Special Significance.

W-1, WILDLIFE SPECIES OF SPECIAL INTEREST

The goal of the W-1 threshold is to provide a minimum number of population sites for six TRPA special-interest wildlife taxa: northern goshawk (12 sites), osprey (four sites), bald eagle (two winter sites and one nesting site), golden eagle (four sites), peregrine falcon (two sites), and waterfowl (18 sites). Mule deer is also a special-interest species; however, no number of sites has been specified for deer. Perching and nesting sites of special-interest bird species shall not be physically disturbed. TRPA maintains a nondegradation standard within buffer zones ("disturbance zones") around nest sites of these species. In areas outside existing urban areas, projects or land uses in the disturbance zones shall not, directly or indirectly, significantly affect the habitat or cause the displacement or extirpation of the population. Habitat in disturbance zones shall not be manipulated in any manner, except for habitat enhancement. The disturbance zone for northern goshawk and bald eagle is a 0.5-mile radius around each nest site; the disturbance zone for osprey, peregrine falcon, and golden eagle is a 0.25-mile radius around each nest site. TRPA has also mapped disturbance zones for wintering bald eagles. Disturbance zones for deer are meadows. This threshold is in non-attainment status for deer, waterfowl, and northern goshawk and bald eagle nesting and wintering sites, but it is near attainment for bald eagle wintering sites and goshawk. The threshold status is unknown for golden eagle and peregrine falcon. The nondegradation standard in wildlife disturbance zones does not apply to situations where these species select areas close to developed parcels.

A designated bald eagle winter site and a waterfowl site are located in the study area. Implementing any of the action alternatives would not degrade the bald eagle wintering site because construction activities would not occur during winter or otherwise affect perch sites, and winter recreational activities would remain at levels comparable to existing levels, which have not interfered with bald eagle use of the study area. (Under Alternative 5, the No-Project/No-Action Alternative, construction activities would not occur, and recreational activities would remain at a level comparable to existing conditions.) Implementing any of the action alternatives would not degrade conditions for waterfowl because short-term disturbances or loss of nesting waterfowl would be minimized by conducting preconstruction surveys and implementing avoidance measures. Recreation-related effects on waterfowl would remain comparable to or be reduced from existing conditions through habitat protection components and through decommissioning and restoration of user-created trails, and waterfowl habitat would be improved through ecosystem restoration of the river-floodplain system. Under Alternatives 1 and 2, additional lagoon habitat would also be created, which would benefit waterfowl. (Under Alternative 5, construction and ecosystem restoration would not occur, so recreational activities would remain comparable to existing conditions.) Therefore, implementing any of these alternatives would not affect the attainment status of the W-1 threshold, except with regard to waterfowl, for which conditions would be improved.

W-2, HABITATS OF SPECIAL SIGNIFICANCE

The goal of the W-2 threshold is to apply a nondegradation standard to habitats consisting of deciduous trees, wetlands, and meadows while providing for opportunities to increase the acreage of riparian and wetland associations. These opportunities include but are not limited to preserving existing naturally functioning SEZ lands in their natural hydrologic condition; restoring all disturbed SEZ lands in undeveloped, unsubdivided lands; and restoring 25 percent of the SEZ lands that have been identified as disturbed, developed, or subdivided, to attain a five-percent total increase in the naturally functioning SEZ land. This threshold is in a non-attainment status. River and floodplain restoration under any of the action alternatives and lagoon restoration under Alternatives 1 and 2 would enhance the quality and increase the size of riparian, wetland, and aquatic habitat. Therefore, implementing any of these alternatives would contribute to attainment of the W-2 threshold. No habitat restoration would occur under Alternative 5, so implementing this alternative would not contribute to attainment of this threshold.

4.6.7 SCENIC

Four scenic thresholds have been established by TRPA:

- SR-1, Travel Route Ratings;
- SR-2, Scenic Quality Ratings;
- SR-3, Public Recreation Areas and Bike Trails; and
- SR-4, Community Design.

SR-1, Travel Route Ratings

The TRPA travel route rating threshold tracks long-term cumulative changes to views seen from federal and state highways in urban, transitional, and natural landscapes in the region and changes to views seen from Lake Tahoe, looking toward the shore (TRPA 1998). Roadways have been divided into 53 travel segments (called “roadway travel units”), each representing a continuous two-directional viewshed of similar visual character. Lake Tahoe’s shoreline is divided into 33 separate “shoreline travel units.” Roadway travel units are rated using the following six threshold criteria, and shoreline travel units are rated using criteria 1, 5, and 6:

1. Human-made features along roadways and shoreline
2. Physical distractions to driving along roadways
3. Roadway characteristics
4. Views of the lake from roadways

5. General landscape views from roadways and shoreline
6. Variety of scenery from roadways and shoreline

SR-1 is in non-attainment. However, for the City of South Lake Tahoe, SR-1 status is trending in the positive direction as a result of improvements in commercial and urban districts and shorezone units. Under Alternative 2, 3, 4, or 5, few project facilities would be visible from these travel units, and with the use of screening and natural colors and textures, the alternatives would meet the TRPA contrast rating and be consistent with moving towards attainment of the SR-1 threshold. However, construction of the proposed bridge under Alternative 1 would degrade views from Shoreline Travel Unit 33 and the lake. Although TRPA-approved colors and screening would be used to minimize the appearance of the bridge, these measures would not fully screen the views of this public access facility. Alternative 1 would not be consistent with the SR-1 threshold and would not assist with moving this threshold towards attainment status.

SR-2, Scenic Quality Ratings

The purpose of the TRPA scenic quality threshold is to maintain or enhance views of individual existing scenic resources. The scenic resources in the region include the views of the natural landscape and distinctive natural features that were identified, mapped, described, and evaluated as part of the 1982 Scenic Resource Evaluation. The subcomponents that make up the scenic resources are:

- foreground, middle-ground, and background views of the natural landscape from roadways;
- views to Lake Tahoe from roadways;
- views of Lake Tahoe and natural landscape from roadway entry points into the region;
- unique landscape features, such as streams, beaches, and rock formations that add interest and variety, as seen from roadways;
- views of the shoreline, the water's edge, and the foreground as seen from the lake;
- views of the backdrop landscape, including the skyline, as seen from the lake; and
- visual features seen from the lake that are points of particular visual interest on or near the shore.

Numerical scenic quality ratings are derived for each mapped scenic resource, using four visual indicators as subcomponents of the composite rating: unity, vividness, variety, and intactness. According to TRPA's *2001 Threshold Evaluation* (TRPA 2002), *unity* is the degree to which the visual resources of a scene join together to form a single, coherent, harmonious unit. *Vividness* is a measure of contrasting elements, such as color, line, and shape, marked differences seen as related, or repetition of similarities (sometimes referred to as distinctiveness). *Variety* is numerous or different parts seen together and can be referred to as richness. *Intactness* describes the degree to which a landscape retains its natural condition or the degree to which modifications emphasize or enhance the natural condition of the landscape.

These four indicators are each rated on a scale from zero (absent) to three (high). The ratings for all four indicators are summed to yield the scenic quality threshold rating. Each resource is defined by the length of the resource and the areas seen from that unit.

SR-2 is in non-attainment but is near attainment status. For the Tahoe Basin, SR-2 status is trending in the positive direction through improvements in commercial and urban distracts and shorezone units. No specific changes in the City of South Lake Tahoe were identified in the 2006 threshold evaluation report. Under Alternative 2, 3, 4, or 5, few project facilities would be visible from these travel units, and with the use of screening and natural colors and textures, the alternatives would meet the TRPA contrast rating and be consistent

with moving towards attainment of the SR-2 threshold. However, construction of the proposed bridge under Alternative 1 would degrade views from Shoreline Travel Unit 33 and the lake. Although TRPA-approved colors and screening would be used to minimize the appearance of the bridge, these measures would not fully screen the views of this public access facility. Alternative 1 would not be consistent with the SR-2 threshold and would not assist with moving this threshold towards attainment status.

SR-3, Public Recreation Area Scenic-Quality Threshold

The TRPA threshold for scenic quality of public recreation areas applies to specific public recreation areas, including beaches, campgrounds, ski areas, and segments of Class I and Class II bicycle trails. Public recreation areas with views of scenic resources are valuable because they are major public gathering places, hold high scenic values, and are places where people are static (compared to people on the travel routes) and have more time to focus their attention on the views and scenic resources.

Scenic resources as seen from the public recreation areas are composed of the following subcomponents:

- views of the lake and natural landscape from the recreation area;
- views of natural features in the recreation area; and
- views of human-made features in or adjacent to the recreation area that influence the viewing experience.

SR-3 is in non-attainment but is near attainment status. Threshold SR-3 does not apply to Alternatives 1–5 because no TRPA-designated public recreation areas have direct views of the study area.

SR-4, Community Design

The community design threshold is a policy statement that applies to the built environment and is not restricted to roadways or shoreline units. Design standards and guidelines found in the Code of Ordinances, the Scenic Quality Improvement Program, and the adopted community plans provide specific implementation direction. To secure threshold attainment, design standards and guidelines must be widely implemented to improve travel route ratings and produce built environments compatible with the natural, scenic, and recreational values of the region. The visual quality of the built environment has also become an issue of increasing importance to residents, local businesses, and community leaders. Because the early design and signage policies of the local governments and TRPA were inadequate, there was a critical need to develop greater sensitivity to site design and visual impacts to protect the lake's future as a premiere vacation area. The Goals and Policies contain a Community Design Subelement in the Land Use Element, which sets forth policies for new and existing development.

The community design threshold is implemented in two ways. First, the community plan and redevelopment plan process has been used to develop design standards and guidelines that are tailored to the needs and desires of individual communities. The standards are considered "substitute" standards because they replace all or portions of TRPA ordinances adopted to regulate the same subject. This process has been used extensively throughout the region to provide community-specific sign standards, but it has also addressed issues such as building height and architectural design guidelines. Second, the site planning and design principles contained in the ordinances and guidelines are implemented as part of individual development or redevelopment projects and are reviewed and approved by TRPA and local government.

All elements of Alternatives 2, 3, 4, and 5 would conform to all applicable design standards and guidelines and be consistent with the SR-4 threshold. Except for the proposed bridge over the Upper Truckee River, all elements of Alternative 1 also would conform to all applicable design standards and guidelines. The proposed bridge would degrade views from Shoreline Travel Unit 33 and the lake. Although TRPA-approved colors and screening would be used to minimize the appearance of the bridge, these measures would not fully screen the views of this public access facility. Alternative 4 would not be consistent with this threshold.

4.6.8 NOISE

Three noise thresholds have been established by TRPA:

- N-1, Aircraft Noise;
- N-2, Single Event Noise; and
- N-3, Community Noise Equivalent Levels.

The status of the N-1 threshold is "unknown." Thresholds N-2 and N-3 have a "non-attainment" status. Implementing the project would not adversely affect attainment of any of these thresholds. None of the alternatives would affect the attainment of threshold N-1 because none would involve altering aircraft operations. The attainment of threshold N-2 also would not be affected because none of the alternatives would involve creating or contributing to single-event noise sources as defined in the TRPA Environmental Threshold Carrying Capacity Noise Standards for Single Events (Table 3.11-2). Although implementing any of the action alternatives would affect short-term and long-term noise levels, none would affect attainment of threshold N-3. Implementing Alternative 1, 2, 3, or 4 would increase noise levels in the short term because construction equipment would be used to perform restoration activities and in the long term because visitor use would increase; however, construction noise would be exempt under the TRPA Code of Ordinances, and visitor noise would be insufficient to cause noise increases at nearby sensitive receptors and thus would not alter community noise equivalent levels as defined by TRPA (Table 3.11-3). Alternative 5 would be consistent with noise thresholds.

4.6.9 RECREATION

Two qualitative recreation thresholds have been established by TRPA:

- R-1, High Quality Recreational Experiences, and
- R-2, Fair Share of Resource Capacity.

R-1, High Quality Recreational Experiences

Threshold R-1 consists of two parts: (1) preservation and enhancement of a high-quality recreation experience and (2) the provision of additional high-quality, undeveloped lands for recreation, including lake access. The R-1 threshold is in attainment (TRPA 2007).

The attainment of this threshold standard is evaluated by considering the experience of recreation users and by considering public access to Lake Tahoe and to other natural features. TRPA's *2012 Threshold Evaluation* considers threshold R-1 to be in attainment based on the results of recreation surveys conducted by TRPA and recreation providers, improvements in the quality of recreation facilities, increases in the amount of shoreline accessible to the public, and increases in access to other lands and recreation opportunities, including additional bike paths that are accessible to the public in the basin. In 2001, the R-1 threshold was determined to be in non-attainment (TRPA 2007:10–8). However, based on an increase in publicly owned shoreline and additional bicycle and multi-use trails, the *2006 Threshold Evaluation* determined the R-1 threshold to be in attainment (TRPA 2007:10–4 to 10-8).

The temporary and short-term effects related to the construction of any of the action alternatives would not adversely affect the attainment status of the R-1 threshold. Construction activities would be managed to avoid long-term effects on high-quality undeveloped shorezone and other natural areas. Although construction activities would preclude access to portions of the study area during the short term, pedestrian access that bypasses areas of active construction would be maintained. Additional, dispersed recreation opportunities in the surrounding areas would accommodate recreation opportunities displaced from the study area. Because implementing any of the action alternatives would have only minor, short-term construction-related effects access to recreation resources, these effects would not be sufficient to affect the attainment status of the R-1 threshold.

The long-term operation of any of the action alternatives also would be consistent with the objectives of the R-1 threshold. Recreation-related amenities would serve to maintain the high quality of the recreational experience in the study area while also reducing the effects of recreation activities on sensitive natural resources and allowing the preservation of the more sensitive natural areas in the study area.

Under Alternative 5 (the No-Project/No-Action Alternative), no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Public access to the study area would continue similar to existing conditions. Therefore, implementing Alternative 5 would be consistent with threshold R-1.

R2, Fair Share of Resource Capacity

The R-2 threshold is intended to ensure that a fair share of the region's outdoor recreation capacity is available to the general public. The *2006 Threshold Evaluation* considered three indicators for evaluation of the R-2 threshold: (1) cumulative accounts of persons-at-one-time (PAOT) allocations, when applicable; (2) facility development for recreation projects that do not require PAOT assignments; and (3) land acquisition of new public lands that support recreation purposes. Overall, based on an assessment of these three indicators, the R-2 threshold is considered to be in attainment (TRPA 2007:10–8).

The action alternatives would involve facility development for public access and recreation. Alternative 1 includes the most elements emphasizing public access and recreation, Alternative 2 the fewest, and Alternatives 3 and 4 intermediate amounts of these elements. Although these facilities would support similar dispersed recreational uses, they are moving toward developed recreation use (but not as developed as, for example, a campground or marina). Uses such as the fishing platform (Alternatives 2 and 3) and observation areas and viewpoints (Alternatives 1, 3, and 4) would require day-use PAOT allocations from the regional pool. Implementing Alternative 1, 2, 3, or 4 would support the attainment status of threshold R-2 and would not adversely affect this attainment status because only certain components of certain alternatives would require PAOT allocations and would be consistent with a fair share of the resource capacity. Under Alternative 1, 2, 3, or 4, the study area would be accessible to and provide recreation opportunities for the general public similar to existing conditions.

Under Alternative 5 (the No-Project/No-Action Alternative), no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Public access to the study area would continue similar to existing conditions. Therefore, implementing Alternative 5 would not affect TRPA thresholds related to recreation.

5 COMPLIANCE, CONSULTATION, AND COORDINATION

This DEIR/DEIS/DEIS presents a thorough evaluation of the project alternatives, in accordance with CEQA, NEPA, and TRPA requirements. This chapter describes the proposed project's compliance with applicable federal statutes and executive orders and state statutes and regulations in addition to NEPA, CEQA, and TRPA environmental review provisions. Regulatory setting sections that discuss applicable federal, state, and local laws and regulations are also included in each of the resource sections (see Chapter 3, "Affected Environment and Environmental Consequences").

This chapter also describes the consultation and coordination undertaken to involve the public and agencies related to the development of the Upper Truckee River and Marsh Restoration Project and the EIR/EIS/EIS. These consultations assisted the Conservancy, Reclamation, and TRPA in determining the scope of this DEIR/DEIS/DEIS, developing program components and objectives, identifying the range of alternatives, defining potential environmental impacts and the significance of those impacts, and identifying appropriate mitigation measures. These efforts consist of public scoping meetings and ongoing meetings with agencies to obtain their input and comments. Conservancy and TRPA will continue to solicit public and agency input on the Upper Truckee River and Marsh Restoration Project by encouraging review of this DEIR/DEIS/DEIS. Past and future public involvement, consultation, and coordination efforts are discussed in Section 5.3, "Consultation and Coordination."

5.1 FEDERAL

5.1.1 FEDERAL ENDANGERED SPECIES ACT OF 1973, AS AMENDED (16 USC SECTION 1531 ET SEQ.)

The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) are charged with oversight of species designated as threatened or endangered under the Federal Endangered Species Act (ESA) of 1973, as amended (16 U.S. Code (USC) 1531 et seq.). The act prohibits "take" of species listed as threatened or endangered. To "take" a species means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns also constitutes take. USFWS administers the ESA for terrestrial and freshwater species, and NMFS administers the ESA for marine and anadromous fish species.

Where a proposed project has a federal nexus, compliance with the ESA is through a process described by Section 7 of the ESA. Section 7(a)(2) of the ESA requires federal agencies to consult with USFWS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species. Regulations jointly issued by USFWS and NMFS guide the consultation process.

When implementing Section 7(a)(2), a federal agency may make one of three possible determinations: no effect, not likely to adversely affect (NLAA), or may adversely affect (MAA). If the agency determines that implementing the proposed action would have no effect on listed species and provides a logical rationale for that determination, then ESA compliance for that action is complete. If the agency makes an NLAA determination, then it must seek concurrence with that determination from USFWS and/or NMFS. Projects that are wholly beneficial or have insignificant or unlikely adverse effects merit an NLAA determination. If the agency makes an MAA determination, then it must enter a formal consultation.

Under Section 7, the consultation process involves producing a biological assessment (BA) to describe the impact mechanisms and any adverse effects on the listed species. Based on the information contained in the BA, USFWS and/or NMFS may issue a biological opinion (BO), which states whether or not the federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. Nonjeopardy BOs include an incidental take statement, describing the amount of "take" that is allowed to

occur for otherwise lawful activities. BOs also identify "reasonable and prudent measures" that USFWS and NMFS believe are necessary and appropriate to minimize the effects of implementing a project, as well as terms and conditions to minimize incidental take or avoid take altogether.

As discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife," EDAW (now AECOM), on behalf of the Conservancy, TRPA, and Reclamation, conducted surveys for terrestrial endangered and threatened species and determined that implementing the proposed project would not result in take of a species federally listed by USFWS as threatened or endangered. However, implementing the project is expected to result in take of a state-listed species, Tahoe yellow cress, that is also a candidate for federal listing by USFWS. Consequently, Mitigation Measure 3.4-3, "Conduct Protocol-Level Preconstruction Surveys and Avoid or Mitigate Impacts on Tahoe Yellow Cress Plants," would be implemented to avoid or fully mitigate disturbance of Tahoe yellow cress during construction. Although initial surveys have been conducted, additional preconstruction surveys for Tahoe yellow cress would be conducted to further assess potential take based on final design. The Conservancy and Reclamation would also coordinate with USFWS regarding the final design and preconstruction survey results and would determine the need for formal consultation.

As discussed in Section 3.5, "Fisheries," Cardno ENTRIX, on behalf of the Conservancy, TRPA, and Reclamation, conducted surveys for endangered and threatened aquatic species. Lahontan cutthroat trout (LCT) (*Oncorhynchus clarkii henshawi*), which is federally listed as threatened, was recently reported in the study area (Lemmers and Santora 2012). However, the two individual fish were determined to be from a group of hatchery fish that had been released by the Nevada Department of Wildlife (NDOW) into Lake Tahoe near Cave Rock during Summer 2011. It is uncertain whether a self-sustaining population will persist, but at present, the lake is considered an occupied water body, and appropriate ESA consultation procedures must be followed before any of the action alternatives could be implemented. Implementing any of the action alternatives (1–4) would result in potential take issues in the short term, as well as long-term benefits through improved habitat condition of the stream, lagoon(s), and floodplain of the study area. The Conservancy and Reclamation have coordinated with USFWS regarding potential project effects on federally listed and candidate species. Before the record of decision is issued, the Conservancy and Reclamation would complete informal and, if necessary, formal consultation with USFWS through Section 7 of the ESA. Thus, because the proposed project includes environmental commitments and mitigation measures that would avoid or fully mitigate effects on federally listed species, and because the Conservancy and Reclamation would complete the Section 7 consultation process, the proposed project would comply with the ESA.

5.1.2 MIGRATORY BIRD TREATY ACT

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, domestically implements a series of international treaties that provide protection for migratory birds. It authorizes the Secretary of the Interior to regulate the taking of migratory birds and provides that it shall be unlawful, except as permitted by regulations, to pursue, take, or kill any migratory bird or any part, nest, or egg of any such bird (16 USC 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA includes several hundred species, which essentially includes all native birds.

Compliance with the MBTA is being addressed through compliance with the ESA and CEQA and through an additional measure. As discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife," adverse impacts on special-status migratory birds would be avoided and effects on other migratory species reduced by conducting preconstruction surveys and establishing exclusion zones and/or limiting construction activities to the period outside the breeding season. In addition to these measures, to comply with the MBTA, a preconstruction survey for migratory bird nests would be conducted to locate and avoid or minimize the loss of active nests during construction. For construction activities during the nesting season (approximately April 1 to August 15) and within suitable nesting habitat, a preconstruction survey for active nest sites of migratory birds would be conducted within 30 days before construction. The survey would be limited to areas where the loss of active nests

could occur as a result of vegetation removal or other ground disturbance. If a migratory bird nest or likely nest site is located, a buffer around the nest would be avoided until the nest is no longer active.

5.1.3 FEDERAL WATER POLLUTION CONTROL ACT OF 1977 (33 USC 1251 ET SEQ.)

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 act 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 U.S. Environmental Protection Agency (EPA). Section 404 requires projects to receive authorization from the Secretary of the Army, acting through USACE, to discharge dredged or fill material into waters of the United States, including wetlands, whether the discharge is temporary or permanent. 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 404 is generally applicable to projects for which fill material would be placed within or below the ordinary high-water mark of a stream. In conjunction with USACE's CWA Section 404 permits, CWA Section 401 requires that water quality certifications or waivers be issued by EPA, the states, or both (see below).

Before approval of detailed design used for project construction, a delineation of waters of the United States (including wetlands) that would be affected by project implementation would be conducted by a qualified biologist through the formal Section 404 wetland delineation process. The delineation would be submitted to and verified by the Sacramento District of USACE. Authorization for fill or reconstruction of jurisdictional waters of the United States, including wetlands, would be secured from the Sacramento District of USACE through the Section 404 permitting process. Section 404 permitting usually requires the following items:

- a determination of the volume and types of material to be placed into waters of the United States;
- a determination of the total area of waters of the United States to be directly and indirectly affected;
- a wetland delineation in accordance with the 1987 Wetland Delineation Manual (Environmental Laboratory 1987) and the Western Mountain Regional Supplement (USACE 2008) when a project would impact wetlands;
- a description of habitats, including plant communities, located in the study area;
- a description of any environmental impacts that are expected to occur, including methods to avoid, minimize, or mitigate adverse impacts on water quality or aquatic functions at the project site;
- any other information pertinent to the wetland, stream, or water body involved;
- for projects involving the restoration of greater than 3 acres of wetlands, evidence that USFWS has been provided with a courtesy copy of the project notification; and
- a copy of the Section 401 water quality certification or waiver issued for the project.

The Conservancy would coordinate with USACE as appropriate and obtain the appropriate permit for construction of all aspects of the project. All general terms required for permit compliance would be implemented. Because the project would identify the location of sensitive habitats, minimize impacts, and compensate for any losses through the permit process, it would comply with Section 404 of the CWA.

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. In California, the authority to grant water quality certification has been delegated to the regional water quality control board (RWQCB) with local jurisdiction—in this case, the Lahontan RWQCB. 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. Federal government delegates water pollution control authority under Section 401 to the states. Refer to Section 5.2.8, "Porter-Cologne Water Quality Control Act."

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. A NPDES permit sets specific discharge limits for point sources discharging pollutants into waters of the United States and establishes monitoring and reporting requirements, as well as special conditions. The Federal government delegates water pollution control authority under Section 402 to the states, so the states oversee compliance. Refer to Section 5.2.8, "Porter-Cologne Water Quality Control Act."

5.1.4 SAFE DRINKING WATER ACT

The Safe Drinking Water Act (SDWA) (42 USC 300f et seq.) was established to protect the quality of drinking water in the United States. This law focuses on all waters actually or potentially designated for drinking use, whether from aboveground or underground sources. The SDWA authorized EPA to establish water quality standards and required all owners or operators of public water systems to comply with primary (health-related) standards. State governments, which assume this power from EPA, also encourage attainment of secondary (nuisance-related) standards. Contaminants of concern in a domestic water supply are those that either pose a health threat or in some way alter the aesthetic acceptability of the water. These types of contaminants are regulated by EPA using primary and secondary maximum contaminant levels (MCLs). As directed by the SDWA amendments of 1986, EPA has been expanding its list of primary MCLs. MCLs have been proposed or established for approximately 100 contaminants. Furthermore, water used for domestic purposes is required to be treated by the local or regional water supplier in accordance with federal and state standards, and the proposed project would not change existing license requirements, impede enforcement of standards, or otherwise affect drinking water quality. Therefore, the project would be in compliance with any applicable drinking water standards. Federal government delegates water pollution control authority under the SDWA to the states, so the states oversee compliance. Refer to Section 5.2.8, "Porter-Cologne Water Quality Control Act."

5.1.5 FLOODPLAIN REGULATIONS

The Upper Truckee River and Trout Creek through the marsh are regulated as part of the National Flood Insurance Program (NFIP) of the Federal Emergency Management Agency (FEMA). Areas of special flood hazards are identified by FEMA, which issues Flood Insurance Rate Maps showing the regulatory floodplain. Under the NFIP, FEMA mandates that development cannot occur in the regulatory floodplain (typically the 100-year floodplain) if that development would result in a material (more than one foot) increase in the flood elevation. In addition, no development is allowed in delineated floodways in regulatory floodplains.

In the study area, the CSLT implements federal floodplain regulations through Chapter 34 of the City Code and the zoning ordinance. The project's proposed changes to the Upper Truckee River must meet FEMA and CSLT requirements for floodplain management, and a revised Flood Insurance Rate Map would need to be developed and submitted to the CSLT and FEMA for approval. A design directive that is more stringent than federal policy was used to design the proposed project. It states that implementing the proposed project would result in "no net increase" in the base flood elevation for a 100-year event (Conservancy and DGS 2005:3-2). As discussed in Section 3.8, "Hydrology and Flooding," implementing the project would result in less-than-significant or beneficial effects on flood flows and flood hazards related to the existing floodplain, and the project would be in compliance with applicable floodplain regulations.

5.1.6 FEDERAL CLEAN AIR ACT

EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the Federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required EPA to establish national ambient air quality standards (NAAQS). EPA has established primary and secondary NAAQS for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, respirable particulate matter, fine particulate matter, and lead. The primary standards protect the public health, and the secondary standards protect public welfare. The CAA was enacted to protect and enhance the nation's air quality to promote public health and welfare and the productive capacity of the nation's population. It requires an evaluation of any federal action to determine its potential impact on air quality in the project region. California has a corresponding law that also must be considered during the EIR/EIS/EIS process. (Refer to Section 5.2.1, "California Clean Air Act.") Proponents of specific projects must demonstrate that their actions will conform to the CAA and the State Implementation Plan (SIP). A federal action conforms with an applicable SIP if (1) the total of direct and indirect emissions from the action are compliant and consistent with the requirements of the SIP and (2) one of a list of enumerated, pollutant-specific requirements is satisfied (such as accounting for the Federal action's projected emission of any criteria pollutant in the SIP or offsetting ozone or nitrogen dioxide emissions in the nonattainment area) (42 Code of Federal Regulations (CFR) 93.158(a)).

Section 3.2, "Air Quality and Climate Change," provides an evaluation of the potential impacts on air quality and Environmental Commitments to reduce those impacts. As described in Section 3.2, with the implementation of EC 6, "Obtain and Comply with Federal, State, Regional, and Local Permits" (Table 2-7), emissions from the proposed project would be within the budgets established by the SIP for all criteria air pollutants (Alternatives 1 - 5). Because Alternatives 1 - 5 were found to comply with the SIP and the project would not contribute substantially to a violation of the NAAQS, the proposed project would comply with the CAA.

5.1.7 SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT OF 1966, AS AMENDED (PUBLIC LAW 89-665, 80 STAT. 915, 16 USC SECTION 470 ET SEQ. AND 36 CFR 18, 60, 61, 63, 68, 79, 800)

The National Historic Preservation Act requires agencies to take into account the effects of their actions on properties listed in or eligible for listing in the National Register of Historical Places (NRHP). The Advisory Council on Historic Preservation has developed an implementing regulation (36 CFR 800) that allows agencies to develop agreements for consideration of these historic properties. Section 106 review includes the scoping, identification, assessment, and consultation called for in its implementing regulation (36 CFR 800) to determine impacts on properties listed in or eligible for listing in the NRHP. Consultation under Section 106 takes place during preparation of an EIS to determine whether historic resources would be adversely affected and, if so, whether measures could be implemented to reduce adverse effects to a less-than-significant level. Section 106 does not address impacts on all types of cultural resources or all cultural aspects of the environment; it deals only with impacts on properties listed in or eligible for listing in the NRHP.

Section 106 requires federal agencies to consider the effects of their actions, including those they fund or permit, on properties that may be eligible for listing or are listed in the NRHP. To determine whether an undertaking could affect NRHP-eligible properties, cultural resources (archaeological, historic, and architectural properties) must be inventoried and evaluated for listing in the NRHP. Although compliance with Section 106 is the responsibility of the lead Federal agency, a qualified representative of the lead agency can conduct the necessary steps. The Section 106 review process involves a four-step procedure:

- Establish the undertaking, develop a plan for public involvement, and identify other consulting parties.
- Identify historic properties by determining the scope of efforts, identifying cultural resources, and evaluating their eligibility for inclusion in the NRHP.
- Assess adverse effects by applying the criteria of adverse effect on historic properties (resources that are eligible for inclusion in the NRHP).
- Resolve adverse effects by consulting with the State Historic Preservation Officer (SHPO) and other consulting agencies, including the Advisory Council on Historic Preservation if necessary, to develop an agreement that addresses the treatment of historic properties.

In accordance with Section 106 requirements, the Washoe Tribe of Nevada and California was contacted regarding the proposed project, and surveys were conducted to identify cultural resources and evaluate their eligibility for inclusion in the NRHP.

Studies of the area of potential effect and consultation with the Washoe Tribe and the California SHPO determined that prehistoric and historic-era sites have been documented in the study area that could be affected by the proposed alternatives. The prehistoric resources, particularly CA-ELD-26, represent the intensive use of the lakeshore and the adjacent Upper Truckee River Marsh by the Washoe for fishing, the acquisition of numerous other lake and marsh resources, and general habitation. Although no subsurface investigations were conducted at CA-ELD-26, surface indications and detailed ethnographic and historic-era accounts of Washoe occupation at this location suggest that the site may retain important scientific information. Consequently, CA-ELD-26 appears to be eligible for listing in the NRHP. No other sites appear to be eligible. A representative of the Washoe Tribe (Daryl Cruz) has been involved in reviewing previous study findings, the results of archival and field research, and environmental commitments designed to reduce potential impacts on cultural resources to less-than-significant levels. Construction of some of the proposed recreational facilities, access/haul roads, and staging areas has the potential to affect portions of site CA-ELD-26 and/or artifacts and features possibly associated with this site that have not yet been documented on the landform (bluff) located above the marsh. As described in EC 2, the Conservancy would prepare and implement a cultural resources protection plan. As part of the plan, construction barriers would be installed around site CA-ELD-26, construction workers would be educated about site protection requirements, and a qualified cultural resource specialist would oversee initial grading activities in the vicinity of the bluff (Table 2-7). Furthermore, as part of the final design the bike path will completely avoid the bluff area and ELD-26/H. These measures have been proposed to address all potential adverse effects on the eligible resource.

In addition, Reclamation has initiated the Section 106 process for the proposed project and will complete consultation with the SHPO before the record of decision is issued. For these reasons, the project would comply with Section 106 of the National Historic Preservation Act.

5.1.8 INDIAN TRUST ASSETS

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States for Native American tribes or individuals. The Secretary of the Interior, acting as the trustee, holds many assets in trust. Examples of trust assets include lands, minerals, hunting and fishing rights, and water rights over which it has been determined

that tribes have a historical legal claim. The United States has an Indian trust responsibility to protect and maintain rights reserved by or granted to Native American tribes or individuals by treaties, statutes, and executive orders. This duty, founded in law and restated in departmental policy, requires Reclamation to carry out its activities in a manner that avoids adverse impacts on ITAs when possible. When adverse impacts cannot be avoided, appropriate mitigation or compensation will be provided. However, there are no such lands in or in the immediate vicinity of the study area. For this reason, it was determined that the proposed project would have no impact on ITAs.

5.1.9 FARMLAND PROTECTION POLICY ACT

The Farmland Protection Policy Act of 1981 requires federal agencies to include in an EIS an assessment of effects on Prime and Unique Farmland, as defined by the Natural Resources Conservation Service, and if this assessment identifies potential effects on the conservation of farmland, to consider alternatives with lesser effects. The study area is located on State property that is not designated as Prime or Unique Farmland or Farmland of Statewide Importance, and none of the land is under Williamson Act contract. For this reason, implementing the project would not result in loss of farmland acreage. Because no impacts on farmland have been identified, the proposed project would comply with the Farmland Protection Policy Act.

5.1.10 EXECUTIVE ORDER 11988 (FLOODPLAIN MANAGEMENT)

Executive Order 11988 requires federal agencies to avoid, to the extent possible, adverse impacts associated with the occupancy and modification of floodplains and to avoid development in floodplains whenever there is a practical alternative. If a project alternative is found to be in the applicable regulatory floodplain, the agency is required to prepare a floodplain assessment, known as a statement of findings. The executive order also directs federal agencies to restore and preserve the natural and beneficial values served by the floodplains (EPA 2010). Implementing the proposed project would restore portions of the Upper Truckee River floodplain and would not involve new development in a designated floodplain. In addition, implementing the proposed project would provide on-site storm drainage facilities and an accompanying stormwater drainage plan to prevent damage from increased stormwater runoff volumes. Therefore, the project would comply with Executive Order 11988.

5.1.11 EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS)

Executive Order 11990 established the protection of wetlands and riparian systems as the official policy of the federal government. It requires all Federal agencies to consider wetland protection as an important part of their policies and take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. As discussed above in Section 5.1.3, "Federal Water Pollution Control Act of 1977 (33 USC 1251 et seq.)," a wetland delineation would be prepared for the proposed project after a preferred alternative is selected, and a Section 404 permit would be obtained before construction begins. Because the location of sensitive habitats would be identified by a wetland delineation for the construction of all aspects of the project, Section 404 permit requirements would be complied with, and any losses would be compensated for, all impacts on wetlands would be avoided, minimized, or mitigated. In addition, implementing any of the action alternatives would result in a net increase in the amount of wetlands in the study area. Therefore, the proposed project would comply with Executive Order 11990.

5.1.12 EXECUTIVE ORDER 12898 (ENVIRONMENTAL JUSTICE)

Executive Order 12898 requires that federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their actions on minority and disadvantaged populations or communities. As discussed in Section 3.15, "Socioeconomics, Population and Housing, and Environmental Justice," the project would have no disproportionately high and adverse effects on minority or disadvantaged populations. For this reason, the project would comply with Executive Order 12898.

5.1.13 EXECUTIVE ORDER 13007 (INDIAN SACRED SITES)

Executive Order 13007 requires federal agencies with land management responsibilities to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners. It also requires that these agencies avoid adversely affecting the physical integrity of such sacred sites. Among other things, Federal agencies must provide reasonable notice of proposed actions or land management policies that may restrict future access to or ceremonial use of, or may adversely affect the physical integrity of, sacred sites. As described in Section 3.3, "Archaeological and Historical Resources," cultural resource investigations for the project consisted of a phased approach that included Native American consultation, prefield research, field reconnaissance surveys, and resource documentation. Based on the investigations, it was determined that no Indian sacred sites are located in the study area or its vicinity. Therefore, the proposed project would have no effect on any Indian sacred sites. Because there would be no impacts, the project would comply with Executive Order 13007.

5.1.14 EXECUTIVE ORDER 13112 (NATIONAL INVASIVE SPECIES MANAGEMENT PLAN)

Executive Order 13112 directs all federal agencies to prevent the introduction and control the spread of invasive, nonnative species in a cost-effective and environmentally sound manner to minimize economic, ecological, and human health impacts. It established a national Invasive Species Council made up of federal agencies and departments and a supporting Invasive Species Advisory Committee composed of State, local, and private entities. The Invasive Species Council and advisory committee oversee and facilitate implementation of the executive order. Because the invasive plant management practices included in EC 4, "Prepare and Implement Invasive Species Management Plan." would be implemented, the proposed project would comply with this executive order.

5.1.15 HAZARDOUS MATERIALS MANAGEMENT

EPA is the agency primarily responsible for enforcing and implementing federal laws and regulations pertaining to hazardous materials. Applicable federal regulations pertaining to hazardous materials are contained mainly in Titles 29, 40, and 49 of the CFR.

The proposed project involves implementing EC 9, "Develop and Implement a Construction Management Program," including a health and safety plan; providing qualified oversight of fill removal in the TKPOA Corporation Yard as part of Mitigation Measure 3.7-2a (Alts. 1–3); notifying the appropriate federal, state, and local agencies if contaminated soils are identified (Mitigation Measure 3.7-2b [Alts. 1–3]); and notifying the school district with jurisdiction within one-quarter mile of the study area regarding potential substances subject to California Health and Safety Code Section 25532 (EC 9). Furthermore, the Conservancy would continue to comply with all existing regulations related to hazardous materials management. Therefore, the proposed project would comply with regulations related to hazardous materials.

5.1.16 TRANSPORT OF HAZARDOUS MATERIALS

The U.S. Department of Transportation regulates hazardous materials transport between states and is responsible for protecting the public from dangers associated with transporting these materials. This responsibility is in part addressed through the training of persons responsible for regulatory compliance, enforcement, and response to accidents and incidents involving hazardous materials. The proposed project involves implementing EC 9, "Develop and Implement a Construction Management Program," including a health and safety plan; providing qualified oversight of fill removal in the TKPOA Corporation Yard as part of Mitigation Measure 3.7-2a (Alts. 1–3); notifying the appropriate federal, state, and local agencies if contaminated soils are identified (Mitigation Measure 3.7-2b (Alts. 1–3); and notifying the school district with jurisdiction within one-quarter mile of the study area regarding potential substances subject to California Health and Safety Code Section 25532 (EC 9). Furthermore, the Conservancy would continue to comply with all existing regulations related to hazardous

materials management. Therefore, the proposed project would comply with regulations related to hazardous materials.

5.1.17 WORKER SAFETY

As described in the Occupational Safety and Health Act of 1970 (29 USC 651 et seq.), the Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor is responsible at the federal level for ensuring worker safety in the handling and use of chemicals. OSHA has adopted numerous regulations pertaining to worker safety, contained in CFR Title 29. These regulations set standards for safe workplaces and work practices, including standards relating to hazardous material handling. The proposed project involves implementing EC 9, "Develop and Implement a Construction Management Program," including a health and safety plan; providing qualified oversight of fill removal in the TKPOA Corporation Yard as part of Mitigation Measure 3.7-2a (Alts. 1–3); notifying the appropriate federal, state, and local agencies if contaminated soils are identified (Mitigation Measure 3.7-2b [Alts. 1–3]); and notifying the school district with jurisdiction within one-quarter mile of the study area regarding potential substances subject to California Health and Safety Code Section 25532 (EC 9). Furthermore, the Conservancy would continue to comply with all existing regulations related to hazardous materials management. Therefore, the proposed project would comply with regulations related to hazardous materials.

5.1.18 WILDLIFE HAZARDS TO AIRSPACE SAFETY

Collisions between aircraft and wildlife compromise the safety of passengers and flight crews. Damage to an aircraft resulting from a wildlife collision can range from a small dent in the wing to catastrophic engine failure and destruction of the aircraft, along with potential loss of life.

The Federal Aviation Administration (FAA) is responsible for enforcing 14 CFR 139, which prescribes rules regarding the operation of airports used by aircraft with seating capacity of more than 30 passengers. FAA roles and responsibilities relating to wildlife hazards and their associated human health and safety concerns are addressed in 14 CFR 139.337, Wildlife Hazard Management. An ecological study must be prepared by the certificate holder and submitted to FAA when multiple birds or other wildlife are struck by aircraft or ingested into aircraft engines or if the number of birds or other wildlife in an airport flight pattern is sufficient to result in such hazards. FAA then determines whether a wildlife hazard management plan is needed. FAA's Office of Airport Safety and Standards has published advisory circulars and program policy and guidance directives that further clarify this information. An advisory circular dated August 28, 2007, and titled "Hazardous Wildlife Attractants on or Near Airports" (Advisory Circular 150/5200-33B) provides guidance on locating certain land uses having the potential to attract hazardous wildlife to or to the vicinity of public-use airports. FAA recommends the following separations when siting wildlife attractants (e.g., waste disposal operations, wastewater treatment facilities, and wetlands) (FAA 2007):

- 5,000 feet from airports serving piston-powered aircraft,
- 10,000 feet from airports serving turbine-powered aircraft, and
- 5 miles from airports where the wildlife attractant may cause hazardous wildlife movement into or across the approach or departure airspace.
- Implementing the proposed project would enhance or restore habitat for birds categorized as hazardous wildlife in terms of the potential for aircraft collisions. The restored habitat in the study area would be located approximately one mile or more from the airport, which would be outside of the approach/departure zone of the Lake Tahoe Airport but within the 10,000-foot-wide zone where FAA recommends that wildlife attractants be minimized. Restoration activities would improve the quality of existing habitat but would not increase the amount of habitat considered an attractant to wildlife and would not appreciably increase the

amount of wildlife using the area. Bird-attracting habitats are already present in these locations, and enhancement and restoration activities are not anticipated to substantially increase the attraction of hazardous wildlife.

- In addition, Stream Environment Zone restoration, timber management, range management, and management of fish and wildlife habitat are identified in the *Lake Tahoe Airport Comprehensive Land Use Plan* (CLUP) as compatible land uses for the clear, approach/departure, and overflight zones of the Lake Tahoe Airport (CSLT 2007:38). Thus, a wide range of management, enhancement, and restoration activities in nearby natural vegetation are considered compatible with the airport's operations.

- Furthermore, bird strikes have not historically affected aviation safety at the Lake Tahoe Airport. There are no records of bird-related air strikes in the FAA Birdstrike Database, and no airport staff members recall any bird-related air strikes (CDM 2007). With or without project implementation, the likelihood of wildlife-aircraft accidents associated with the Lake Tahoe Airport is considered low. Because an increase in wildlife-related hazards is not expected and the proposed land uses are compatible with the CLUP, the proposed project complies with 14 CFR 139 and 14 CFR 139.337.

5.1.19 EARTHQUAKE HAZARDS REDUCTION ACT OF 1977

The U.S. Congress passed the Earthquake Hazards Reduction Act in 1977 to "reduce the risks to life and property from future earthquakes in the United States" through the establishment and maintenance of an effective earthquake hazards and reduction program. To accomplish this reduction, the act established the National Earthquake Hazards Reduction Program Act (NEHRPA), which refined the descriptions of agency responsibilities, program goals, and objectives. The mission of the National Earthquake Hazards Reduction Program is to "develop, disseminate, and promote knowledge, tools, and practices for earthquake risk reduction—through coordinated, multidisciplinary, interagency partnerships among the NEHRP agencies and their stakeholders—that improve the Nation's earthquake resilience in public safety, economic strength, and national security." The NEHRPA designated FEMA as the program's lead agency and assigns several planning, coordinating, and reporting responsibilities. Other NEHRPA agencies are the National Institute of Standards and Technology, the National Science Foundation, and the U.S. Geological Survey. The proposed project will comply with NEHRPA through EC 8: Prepare a Final Geotechnical Engineering Report, and Implement All Applicable Recommendations.

5.2 STATE

5.2.1 CALIFORNIA CLEAN AIR ACT

The California Air Resources Board (ARB) is responsible for coordinating and providing oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards (CAAQS). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, lead, visibility-reducing particulate matter, and criteria air pollutants. In most cases, the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

Because implementing and of the action alternatives (Alternative 1- 4) would not contribute substantially to a violation of the CAAQS through EC 1: Reduce the Generation of Construction-Related Emissions of ROG, NO_X, and PM_{10}, the proposed project would comply with the CCAA.

5.2.2 CALIFORNIA ENDANGERED SPECIES ACT

The California Endangered Species Act (CESA) was written to protect plant and animal species. Species are listed as endangered or threatened when their continued existence in California is in jeopardy. CESA and Sections 2050 and 2097 of the California Fish and Game Code prohibit activities that would result in "take" of State-listed and candidate species without prior authorization from the California Department of Fish and Game (CDFG). Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species. Unlike under the federal ESA, the CESA definition of "take" does not include "harming" or "harassing"; therefore, habitat modification is not necessarily considered take under CESA.

CDFG authorization for take can be obtained through an incidental take permit under Section 2081(b) of the California Fish and Game Code. A 2081(b) permit will authorize take that is incidental to an otherwise lawful activity as long as the impacts of the authorized take are minimized and fully mitigated. Measures to minimize and fully mitigate impacts must (1) be roughly proportional in extent to the impact of the taking on the species, (2) maintain the applicant's objectives to the greatest extent possible, (3) be implementable, and (4) be adequately funded to allow implementation and monitoring of compliance.

As discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife," and Section 3.5, "Fisheries," potential effects on species that are state listed as endangered or threatened have been evaluated. Without mitigation, construction activities of the proposed project could potentially affect willow flycatcher (state listed as endangered), which has a moderate potential to nest in the study area, and Tahoe yellow cress (also state listed as endangered), which grows in the study area. This DEIR/DEIS/DEIS identifies two mitigation measures that are designed to avoid or fully mitigate the take of these State-listed plant and animal species: Mitigation Measure 3.4-8A (Alt. 1–4), "Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers If Necessary," and Mitigation Measure 3.4-3 (Alt. 1–4), "Conduct Protocol-Level Surveys and Avoid or Mitigate Impacts on Tahoe Yellow Cress Plants." In addition to implementing these two mitigation measures, the Conservancy is coordinating with CDFG and, if necessary, would consult with CDFG to obtain a Section 2081(b) permit. Because effects on listed species would be avoided or fully mitigated and a 2081(b) permit would be obtained before construction begins, the proposed project would comply with CESA.

5.2.3 CALIFORNIA FISH AND GAME CODE SECTION 1602—STREAMBED ALTERATIONS

Section 1602 of the California Fish and Game Code requires that a streambed alteration agreement be granted before any action is conducted that may divert or obstruct natural channel flow; substantially change the bed, channel, or bank of any river, stream, or lake designated by CDFG; or use any material from the streambed of a CDFG-designated waterway. Implementing the proposed project would require a streambed alteration agreement from CDFG for work on the bed and banks of the Upper Truckee River and Trout Creek. The Conservancy would obtain the streambed alteration agreement from CDFG and implement all terms required for permit compliance. Therefore, the project would be in compliance with California Fish and Game Code Section 1602.

5.2.4 CALIFORNIA FISH AND GAME CODE SECTIONS 3503–3503.5—PROTECTION OF BIRD NESTS AND RAPTORS

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., hawks, owls, eagles, and falcons), including their nests or eggs. Typical violations of these codes include destroying active nests by removing the vegetation in which the nests are located. Disturbance of nesting pairs by nearby project construction that results in the failure of active raptor nests could also violate Section 3503.5. As discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife," without mitigation,

the project's construction activities could affect nesting birds. This DEIR/DEIS/DEIS identifies mitigation measures designed to avoid potential impacts on the nests of special-status bird species and waterfowl, and these measures would also avoid or reduce effects on other nesting birds. In addition, as described above for the MBTA, a preconstruction survey for migratory bird nests would be conducted to locate and avoid or minimize the loss of active nests during construction. Through these measures, the project would comply with California Fish and Game Code Sections 3503–3503.5.

5.2.5 CALIFORNIA NATIVE PLANT PROTECTION ACT

In addition to CESA, the California Native Plant Protection Act (CNPPA) provides protection to endangered and rare plant species, subspecies, and varieties of wild native plants in California. The CNPPA preceded CESA, and its definitions of "endangered" and "rare" closely parallel the CESA definitions of endangered and threatened plant species. With the passage of CESA in 1984, plant species determined to be endangered under the CNPPA were converted to endangered status under CESA. However, as discussed in Section 3.4, "Biological Resources: Vegetation and Wildlife," implementation of the project would not involve potential take of plants listed as rare under the CNPPA.

5.2.6 CALIFORNIA STATE LANDS COMMISSION

The California State Lands Commission (CSLC) was given authority and responsibility to manage and protect the important natural and cultural resources on certain public lands in the state and the public's rights to access these lands. The public lands under the CSLC's jurisdiction are of two distinct types: sovereign lands and school lands. Sovereign lands, which encompass approximately four million acres, include the beds of California's naturally navigable rivers, lakes (including Lake Tahoe), streams, and the underlying beds, as well as the state's tidal and submerged lands along the coastline, extending from the shoreline to three miles offshore. These lands are owned by the State and held in trust for the benefit of all people. The rights protected include navigation, commerce, and fisheries uses, as well as the right to fish, hunt, bathe, swim, boat, and engage in general recreation. The trust also encompasses the right to preserve lands in their natural state for ecological study, as open space, and as bird and marine habitat. These public rights are inalienable and cannot be extinguished, except to further public trust purposes generally. In making these choices, the government has the power to make equitable adjustments among conflicting trust uses.

A project cannot use these state lands unless an easement is first obtained from CSLC. The public-trust easement in navigable waterways allows lateral access between the high-water line and the low-water line; at Lake Tahoe, this is the area between the adjudicated ordinary low-water mark, at elevation 6,223 feet Lake Tahoe Datum, and the ordinary high-water mark, at elevation 6,228.75 feet Lake Tahoe Datum.

Because the bed of Lake Tahoe in the study area is within CSLC jurisdiction, use of the bed of Lake Tahoe would require an easement from the CSLC. The Conservancy has been coordinating with CSLC as a responsible agency under CEQA during preparation of this DEIR/DEIS/DEIS.

5.2.7 CALIFORNIA SCENIC HIGHWAY PROGRAM

California's Scenic Highway Program, created by the California State Legislature in 1963, is managed by the California Department of Transportation (Caltrans). The goal of this program is to preserve scenic highway corridors and protect them from changes that would affect the aesthetic value of the land adjacent to highways. A highway may be designated "scenic," depending on how much of the natural landscape travelers can see, the scenic quality of the landscape, and the extent to which development intrudes on travelers' enjoyment of the view. Official designation requires a local jurisdiction to enact a scenic corridor protection program that protects and enhances scenic resources (Caltrans 2008). As discussed in Section 3.14, "Scenic Resources," portions of U.S. 50 and SR 89 visible from the study area are officially designated as scenic highways; however, the proposed project would have no significant effects on views from U.S. 50 and SR 89. Because the project would not have a

significant adverse effect on these designated scenic highways, it would comply with the California Scenic Highway Program.

5.2.8 PORTER-COLOGNE WATER QUALITY CONTROL ACT

The State Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.) requires the State of California to establish water quality objectives and standards to protect water quality for beneficial uses. The State Water Resources Control Board (SWRCB) is composed of nine RWQCBs that are responsible for preserving California's water quality. The RWQCBs issue waste discharge permits, take enforcement action against violators, and monitor water quality. SWRCB and the RWQCBs jointly administer most of the CWA regulations in coordination with EPA and USACE. Under the act, the appropriate RWQCB must prepare and periodically update a water quality control plan.

The proposed project is under the jurisdiction of the Lahontan RWQCB. The *Water Quality Control Plan for the Lahontan Region* (Basin Plan), adopted on March 31, 1995, and as amended, identifies the beneficial uses, water quality objectives, numerical standards, and waste discharge prohibitions for surface water and groundwater on the California side of the Lake Tahoe Basin (Lahontan RWQCB 1995:1-1). The Basin Plan incorporates water quality thresholds, programs, and regulations as developed and implemented by TRPA, along with state and federal regulations. It states specific water quality objectives for certain water bodies in the Lake Tahoe Hydrologic Unit. The objectives pertaining to water bodies in the study area are summarized in Table 3.9-2 of Section 3.9, "Geomorphology and Water Quality." To achieve those objectives, the Basin Plan identifies prohibitions against discharges and threatened discharges in 100-year floodplains or below the high-water rim of Lake Tahoe that apply to portions of the TRPA-defined shorezone. The Lahontan RWQCB has granted an "exemption to a waste discharge prohibition contained in the Water Quality Plan for the Lahontan Region" to specifically allow for potential turbidity elevation during the construction of stream restoration projects in the Lake Tahoe Basin. If necessary, the Conservancy would apply for this exemption.

The Lahontan RWQCB regulates discharge of stormwater from construction sites (as well as stormwater from municipal and industrial sites) under the CWA Section 402 NPDES program. Because implementing the proposed project would disturb more than one acre, the Lahontan RWQCB NPDES General Permit Number CAG616002, which addresses discharge of stormwater from construction sites, would be required. The Conservancy and its contractors would obtain and comply with this permit. The general types of measures that would be implemented are discussed as part of the project description, and the Conservancy would implement EC 5, "Prepare and Implement Effective Construction Site Management Plans to Minimize Risk of Water Quality Degradation and Impacts to Vegetation," and EC 6, "Obtain and Comply with Federal, State, Regional, and Local Permits," to protect water quality..

5.2.9 HAZARDOUS MATERIALS MANAGEMENT

The California Department of Toxic Substances Control, a division of the California Environmental Protection Agency (Cal/EPA), has primary regulatory responsibility over hazardous materials in California, working in conjunction with EPA to enforce and implement laws and regulations regarding hazardous materials. The Conservancy would comply with applicable Cal/EPA regulations through developing and implementing a Construction Management Program and complying with permit and regulatory requirements as described in EC 6, "Obtain and Comply with Federal, State, Regional, and Local Permits," and EC 9, "Develop and Implement a Construction Management Program," and also described in Section 5.1.15, "Hazardous Materials Management."

5.2.10 WORKER SAFETY

The California Occupational Safety and Health Administration (Cal/OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations in the state. Cal/OSHA standards are more stringent than federal OSHA regulations and are presented in Title 8 of the California Code of Regulations. Cal/OSHA conducts

on-site evaluations and issues notices of violation to enforce necessary improvements to health and safety practices. The Conservancy would comply with applicable Cal/OSHA regulations through developing and implementing a Construction Management Program and complying with permit and regulatory requirements as described in as described in EC 6 and EC 9, and also described in Section 5.1.15, "Hazardous Materials Management."

5.2.11 LAND USE AND AIRSPACE SAFETY

The State regulates airports under the authority of the Airport Land Use Commission Law, Section 21670 et seq. of the California Public Utilities Code. The *California Airport Land Use Planning Handbook,* published by the Caltrans Division of Aeronautics (Caltrans 2011), supports this law by providing compatibility planning guidance to airport land use commissions (ALUCs), counties and cities that have jurisdiction over airport area land uses, and airport proprietors.

The Airport Land Use Commission Law is implemented through ALUCs, which are required in every county with a public-use airport or with an airport served by a scheduled airline. Under the provisions of the law, the ALUC has certain responsibilities conferred upon it and specific duties to perform. Among these duties are preparing airport land-use plans for each of the airports in its jurisdiction (California Public Utilities Code Sections 21674[c] and 21675[a]). TRPA has been designated as the ALUC by El Dorado County. The CSLT Planning Commission, when augmented with two additional commission members, has been designated as the ALUC for the CSLT. The action alternatives (1–4) and Alternative 5 (No-Project/No-Action Alternative) are consistent with the compatible land uses identified in the CLUP for the clear, approach/departure, and overflight zones of the Lake Tahoe Airport (CSLT 2007:38).

5.2.12 WILDFIRE HAZARD MANAGEMENT

The California Department of Forestry and Fire Protection (CAL FIRE) implements statewide laws aimed at reducing wildfire hazards in wildland-urban interface areas. The laws are based on fire hazard assessment and zoning. The laws apply to State Responsibility Areas (SRAs). SRAs are defined as areas of the state in which the financial responsibility of preventing and suppressing fires has been determined by the State Board of Forestry, pursuant to California Public Resources Code Sections 4125 and 4102, to be primarily the responsibility of the State. Fire protection outside SRAs is the responsibility of federal or local jurisdictions. These areas are referred to by CAL FIRE as Local Responsibility Areas.

The study area is not within an SRA; however, fuel reduction activities initiated by the Conservancy on all Conservancy-owned lands, including the study area, are completed by Conservancy staff members according to CAL FIRE recommendations for reducing wildfire hazards. The Conservancy has a registered professional forester who flags vegetation for removal by Conservancy forestry crews or local fire districts contracted by the Conservancy. In addition to fuel removal, Conservancy forestry crews assist with prescribed fire projects and burning after hand piling. Fuel reduction in portions of the study area not under the management jurisdiction of the Conservancy is the responsibility of local entities. These management practices would continue under any of the action alternatives (1–4) and under Alternative 5 (No-Project/No-Action Alternative). The Conservancy would also prepare and implement a fire prevention and management plan in coordination with the appropriate local fire suppression agencies before the start of construction activities, as described in EC 9. Therefore, the Conservancy's management of the study area would remain consistent with statewide laws aimed at reducing wildfire hazards in wildland-urban interface areas.

5.3 CONSULTATION AND COORDINATION

Consultation and coordination for the Upper Truckee River and Marsh Restoration Project involved public and agency scoping and consultation with agencies and organizations, as described in the following sections. Future consultation and coordination are also described.

5.3.1 SCOPING

Scoping is an initial and critically important component of the environmental review process. It is intended to assist in identifying the final range of actions, alternatives, environmental resources, environmental issues, and mitigation measures that will be analyzed in an environmental document. The scoping process is used to help ensure that potential environmental problems are identified early and are properly studied.

Scoping is conducted as part of compliance with NEPA, CEQA, and TRPA ordinances. It can be conducted in various forms and may involve numerous participants, but it generally involves the solicitation of input from the public and interested agencies to determine the scope, focus, and contents of an environmental document.

NEPA REQUIREMENTS

NEPA requires a formal scoping process during preparation of an EIS. Under NEPA, scoping is the process by which a lead agency for EIS preparation solicits input on the nature and extent of issues and impacts to be addressed in the EIS and the methods by which they will be evaluated. NEPA specifically requires that the lead agency consult with federal agencies with jurisdiction by law over the proposed action and/or alternatives or agencies with special expertise regarding the action and to solicit information from the public during EIS preparation.

Section 1501.7 of the Council on Environmental Quality's NEPA regulations requires the lead agency's scoping process to:

- invite affected federal, state, and local agencies, Indian tribes, project proponents, and other interested persons to participate in the EIS process;
- determine the potential significant environmental issues to be analyzed in depth in the EIS;
- identify and eliminate issues determined to be insignificant or addressed in other documents;
- allocate assignments among the lead agency and any cooperating agencies regarding preparation of the EIS, including impact analysis and identification of mitigation measures;
- identify related environmental documents being prepared;
- identify other environmental review and consultation requirements; and
- indicate when the environmental document will be prepared and the lead agency's tentative planning and decision-making schedule.

Scoping should occur as early as possible after the lead agency decides to prepare an EIS. The NEPA lead agency is required to publish a notice of intent (NOI) in the *Federal Register* that announces its intent to prepare an EIS. Although not specifically required by NEPA, the lead agency may also hold scoping meetings. Scoping must occur after the NOI is issued but may occur earlier, as long as appropriate public notice is provided and enough project information is available to allow the public and relevant agencies to participate effectively.

Reclamation published the NOI for the proposed project in the *Federal Register* on October 19, 2006. The NOI provides a summary of the proposed project and project background; describes the proposed alternatives; presents information on the scoping meetings; and identifies Conservancy, Reclamation, and TRPA contacts. Information about how to obtain copies of the NOI was made available to scoping meeting attendees, and an electronic version of the document was posted on the project Web site (see below). The NOI is included in Appendix A.

CEQA REQUIREMENTS

Scoping is a less formalized process under CEQA than under NEPA but is encouraged in the statute and State CEQA Guidelines. Scoping is recognized as a means to help identify the range of actions, alternatives, environmental effects, methods of assessment, and mitigation measures to be analyzed in depth in an EIR, and it is used to eliminate from detailed study those issues that would not be affected by the project. Scoping is also an effective way to bring together and resolve the concerns of interested Federal, State, and local agencies; the proponent of the action; and other interested persons, including project opponents.

Tools used to determine the scope of an EIR include early public and interagency consultation, the notice of preparation (NOP) of an EIR, and scoping meetings with agencies and the public. Of these tools, only the NOP is a mandatory requirement under CEQA for the preparation of an EIR. Issuance of the NOP, similar to the issuance of the NOI under NEPA, serves as the trigger for soliciting comments on the proposed project. Scoping typically ends at the conclusion of a specified public comment period, which is 30 days for the CEQA process, although public involvement continues throughout the project review and approval effort. The NOP for the project is discussed below.

Under Section 21083.9 of the statute, a scoping meeting is required if a project qualifies as being of statewide, regional, or areawide significance. The Upper Truckee River and Marsh Restoration Project qualifies for this requirement. Notice of the scoping meeting is required to include specified recipients, including responsible agencies, trustee agencies, and members of the public who have requested notification. The scoping meetings held for the proposed project complied with these CEQA requirements.

The NOP provides notice of the scoping meetings, presents an overview of the proposed project and alternatives, presents a statement of the purpose of and need for and objectives of the project, summarizes the proposed alternatives, lists the issues anticipated to be addressed in this DEIR/DEIS/DEIS, and provides contact information. The Conservancy and TRPA filed the NOP for the proposed project with the California and Nevada State Clearinghouses and released it publicly on October 4, 2006. The NOP identified November 2, 2006, as the closing date for submitting scoping comments. In addition to State Clearinghouse distribution to potentially interested state agencies in both California and Nevada, copies of the NOP were mailed to property owners (within 300 feet of the study area boundaries) and other parties known to have an interest in the proposed project.

After concern was expressed that the circulation of the NOP in October did not meet all the requirements of CEQA, the NOP was filed with the California and Nevada State Clearinghouses again on March 16, 2007. Accompanying the NOP was a public notice announcing the extension of the comment period for the project to April 30, 2007. In addition to being filed with the State Clearinghouses, this notice and the NOP were also mailed to homeowners within a 700-foot radius of the study area, as well as to other parties known to have an interest in the project. This second mailing pertained only to the scoping period pursuant to CEQA and did not affect the scoping period for the project conducted by Reclamation for compliance with NEPA or by TRPA pursuant to its Code of Ordinances and Rules of Procedure. The NOP is included in Appendix A.

TRPA REQUIREMENTS

TRPA is required to consult with and obtain the comments of any federal, state, and local agency that has jurisdiction by law or special expertise with respect to environmental impacts associated with the project. Although TRPA rules and ordinances do not require the release of an NOP or mandate conducting formal public scoping meetings, TRPA typically releases an NOP early in the environmental review process and holds scoping meetings before the Advisory Planning Commission (APC) and Governing Board (GB) to provide opportunity for APC and GB members, agencies, and members of the public to provide input on the project. TRPA requirements were met with release of the NOI and NOP, discussed above.

5.3.2 AGENCIES AND ORGANIZATIONS CONSULTED

This section discusses agency consultation and coordination that occurred during the development of this DEIR/DEIS/DEIS and summarizes the agency involvement activities undertaken by Reclamation, the Conservancy, and TRPA to satisfy NEPA, CEQA, and TRPA requirements.

NEPA CONSULTATION

Reclamation invited eligible governmental entities to participate as cooperating agencies, in accordance with 40 CFR Part 46.225(3)(b), in developing the Upper Truckee River and Marsh Restoration Project EIR/EIS/EIS. Two agencies requested identification as cooperating agencies under NEPA: USACE and EPA. Reclamation responded to their requests for cooperating agency status in accordance with 43 CFR Part 46 and the U.S. Department of the Interior's Final Rule for implementation of NEPA. Other interested Federal agencies included USFWS, the U.S. Forest Service, and the U.S. Department of Transportation.

CEQA AND TRPA CONSULTATION

The Conservancy and TRPA contacted responsible agencies, as required under CEQA and TRPA regulations. Comments from responsible agencies were received from the Lahontan RWQCB and CDFG (a responsible and trustee agency). Other interested agencies that provided comments were CSLC, ARB, Caltrans, the SHPO, the Washoe Tribe of Nevada and California, the South Tahoe Public Utilities District, and the Tahoe Resource Conservation District.

5.3.3 PUBLIC OUTREACH EFFORTS FOR THE UPPER TRUCKEE RIVER AND MARSH RESTORATION PROJECT

Several outreach efforts have been undertaken to inform stakeholders about the Upper Truckee River and Marsh Restoration Project, including public meetings during early study phases and development of the project alternatives, as well as the scoping process.

SCOPING MEETINGS

As described above, scoping meetings are required for the environmental review process. Two public scoping meetings were held, in the afternoon and evening of October 24, 2006, to provide opportunities for interested parties to learn about the proposed project and alternatives and to provide input regarding the alternatives and scope of the environmental document. The project was also presented as an information item to TRPA's APC and GB during October 11 and October 25, 2006 meetings. The public, in addition to APC and GB members, was asked to provide input on the project at these two meetings.

During the October 24, 2006, public scoping meetings, comment cards[1] were made available to participants, and maps describing the alternatives were displayed and discussed. Each meeting included a presentation that described the project background and objectives, the proposed alternatives, the environmental review process and tentative schedule, the project website, and public participation opportunities. Meeting locations, dates, and times were as follows:

[1] Comment cards were used to submit written comments at the meetings. They were also preaddressed for submittal via U.S. mail.

Place	Address	Date	Time
North Tahoe Conference Center, TRPA Advisory Planning Commission meeting	8318 North Tahoe Boulevard, Kings Beach, CA 96143	Wednesday, October 11, 2006	Beginning at 9:30 a.m.
Inn by the Lake, public scoping meeting	3300 Lake Tahoe Boulevard, South Lake Tahoe, CA 96150	Tuesday, October 24, 2006	12 p.m. to 2 p.m.
Inn by the Lake, public scoping meeting	3300 Lake Tahoe Boulevard, South Lake Tahoe, CA 96150	Tuesday, October 24, 2006	6 p.m. to 8 p.m.
TRPA, Governing Board meeting	128 Market Street, Stateline, NV 89449	Wednesday, October 25, 2006	Beginning at 9:30 a.m.

A copy of the presentation from the October 24, 2006, scoping meetings is included in Appendix B.

SCOPING COMMENTS

Written comments were received, and comments were presented orally, at the scoping meetings. Comments were received from several state agencies, local agencies, organizations, and numerous members of the public. A scoping summary report (Conservancy, Reclamation, and TRPA 2007) was prepared for the proposed project. The report summarizes the results of the scoping process and is available in Appendix B. The comments received assisted Reclamation, the Conservancy, and TRPA in identifying the final range of actions, alternatives, and environmental issues that are analyzed in this DEIR/DEIS/DEIS.

OTHER MEETINGS

Although it was not a formal scoping meeting, the Conservancy, at the request of neighbors living in the Cove East/Al Tahoe area, held a meeting on the evening of April 24, 2007, to discuss the project with concerned citizens. Approximately 25 interested persons, most of them residents of the Cove East/Al Tahoe area, attended the discussion. During the meeting, attendees were given a short overview of the project, which was followed by a question-and-answer period. Because this meeting was not a formal scoping meeting, verbal comments expressed during the meeting were not recorded as scoping comments. Attendees to the meeting were aware that this was the case and were provided with information regarding the timeline for submitting comments and means by which they could submit comments for the record. Maps describing the alternatives were on display during the meeting.

UPPER TRUCKEE UPDATE

The Conservancy has distributed three issues of a newsletter about the project called *The Upper Truckee Update*. The project newsletters have included information about the project's history and background, project objectives, and proposed alternatives and presented an overview of the alternatives development process. The newsletter also described the environmental review process, solicited public input, and noticed the two public scoping meetings that were held in the afternoon and evening of October 24, 2006.

The first and second editions of the newsletter were mailed to property owners near the study area, agencies, organizations, and the general public in October 2002 and October 2006. The second edition was also made available at the public scoping meetings, the Conservancy office's front desk, and Upper Truckee Marsh public access points. The third edition has been made available at the Conservancy's front desk and Upper Truckee Marsh public access points. All newsletters were available on the project web site (see below) and are included in Appendix B.

NEWSPAPER

The Conservancy placed a newspaper display advertisement in the *Tahoe Daily Tribune*, the primary newspaper in the area of the restoration project, on October 20, 2006. The advertisement announced the lead agencies' intention to prepare an EIR/EIS/EIS, the places and times of the scoping meetings and the TRPA General Board meeting, Conservancy and TRPA contact information, and the availability of information on the Upper Truckee River and Marsh Restoration Project website.

WEB SITE

Until 2009, the Conservancy maintained a project website for the Upper Truckee River and Marsh Restoration Project (http://www.uppertruckeemarsh.com) that presented the project history and background, information about the study area, project objectives, alternatives descriptions, project schedule, and contact information. It also included an electronic form for submitting comments on the NOP and an electronic form for requesting being added to the project's mailing list. Scoping meeting information was posted on the website on October 4, 2006, the day on which the NOP was first published.

Since 2009, information regarding the Upper Truckee River and Marsh Restoration Project, and other Conservancy projects, has been available at the Conservancy's website (http://tahoe.ca.gov/upper-truckee-marsh-67.aspx).

5.3.4 ISSUES AND MAJOR AREAS OF CONTROVERSY IDENTIFIED DURING PUBLIC OUTREACH

During the scoping process and meetings with agencies and organizations, the public and federal, state, and local stakeholders identified the following areas of concern. Each area of concern listed below is described more fully in the *Scoping Summary Report for the Upper Truckee River and Marsh Restoration Project* (Conservancy, Reclamation, and TRPA 2007). The scoping summary report also includes a complete copy of the comments received, which is attached as Appendix B of this DEIR/DEIS/DEIS.

The State CEQA Guidelines require that the EIR identify the major areas of known concern or controversy. The following list identifies these major areas of concern or controversy:

- **CEQA/NEPA Process**
  - Providing adequate public noticing and opportunities to review and comment on the proposed project
  - Evaluation and ranking of alternatives, giving priority to low-impact components
- **Dogs/Pets**
  - Protecting sensitive areas from dogs
  - Designating specific areas for dogs/pets
- **Hydrology, Geomorphology, and Water Quality**
  - Increasing flood hazards on adjacent properties
  - Stabilizing the area in and around the U.S. 50 bridge
  - Quantifying the construction-related water quality impacts
  - Identifying sediment and nutrient loads resulting from implementing the action alternatives, compared to implementing the No-Project/No-Action Alternative

- **Noise**
  - Increasing noise resulting from increased recreational activity
- **Recreation and Public Access**
  - Increasing noise, trash, and illegal activity (vandalism and theft), resulting from increased public access
  - Increasing public access effects on the restoration process
  - Linking proposed trails with existing trails to improve access on both sides of the river
  - Posting signs to identify appropriate and inappropriate uses of the trail system and to protect sensitive environmental resources
- **Traffic, Circulation, and Parking**
  - Exacerbating existing neighborhood parking problems
  - Exacerbating existing traffic and roadway hazards by increasing the number of visitors
- **Hazards**
  - Increasing the fire hazard by increasing the extent of flammable vegetation
  - Increasing the presence of mosquitoes and the need for mosquito abatement
- **Cumulative Projects**
  - The proposed project as it relates to other restoration projects in the Upper Truckee River watershed
- **Other**
  - Retaining/restoring the Cove East trail
  - Water quality effects of the project on the Sailing Lagoon
  - Removal or restoration of the Tahoe Keys Corporation Yard

5.3.5 FUTURE PUBLIC INVOLVEMENT

In accordance with NEPA, CEQA, and TRPA requirements, this DEIR/DEIS/DEIS will be circulated for public and agency review and comment for a 60-day period following the date when EPA publishes the weekly notice of this DEIR/DEIS/DEIS in the *Federal Register* and the notice of completion is filed with the State Clearinghouse. Public hearings will be held during the review period to receive oral comments on the content and adequacy of this DEIR/DEIS/DEIS. In addition, written comments will be accepted during the review period. Hearings will be held at the following locations:

March 13, 2013
TRPA Advisory Planning Commission Meeting
Lower Kingsbury Grade
128 Market Street
Stateline, NV 89449

March 27, 2012
TRPA Governing Board Meeting
Lower Kingsbury Grade
128 Market Street
Stateline, NV 89449

Public information meeting will be held at the following locations:

February 27, 2013
Inn by the Lake
3300 Lake Tahoe Blvd
South Lake Tahoe, CA, 96150
1:30 – 4:00 PM and 6:00 – 8:30 PM

March 28, 2013
Lake Tahoe Community College Board Room
1 College Drive
South Lake Tahoe, CA, 96150
6:00 – 8:30 PM

Following lead agency consideration of all comments received during the public review period of this DEIR/DEIS/DEIS and circulation of the final EIR/EIS/EIS, the Conservancy, Reclamation, and TRPA will hold a public meeting to consider certification of the final EIR/EIS/EIS and decide whether to approve one of the alternatives. A record of decision under NEPA and a notice of determination under CEQA documenting the decision will then be issued. To support a decision on the proposed project, the Conservancy and TRPA must prepare and adopt written findings of fact for each environmental impact identified in this DEIR/DEIS/DEIS that would remain significant after mitigation; a statement of overriding considerations, if needed; and a mitigation monitoring and reporting program for implementing the mitigation measures and project revisions, if any, identified in this DEIR/DEIS/DEIS.

DISTRIBUTION LIST

The public distribution of this DEIR/DEIS/DEIS emphasizes the use of electronic media to ensure cost-effective, broad availability to the public and interested parties. This DEIR/DEIS/DEIS is available on the Internet at the Conservancy's website at http://tahoe.ca.gov/index.aspx. This DEIR/DEIS/DEIS is also available for review at the locations listed below.

All persons, agencies, and organizations listed in Appendix L have been informed of the availability of and locations to obtain this DEIR/DEIS/DEIS, as well as the timing of the 60-day public/agency comment period. These parties have received a hard copy of the full DEIR/DEIS/DEIS and an electronic copy of the appendices, a hard copy of the executive summary and an electronic copy of this DEIR/DEIS/DEIS and appendices, or a notification of availability of this DEIR/DEIS/DEIS.

Copies of this DEIR/DEIS/DEIS are available for public review at the following locations:

California Tahoe Conservancy
1061 Third Street
South Lake Tahoe, CA 96150

Tahoe Regional Planning Agency
128 Market Street
Stateline, NV 89449

U.S. Bureau of Reclamation
Mid-Pacific Regional Library
2800 Cottage Way
Sacramento, CA 95825

South Lake Tahoe Library front desk
1000 Rufus Allen Blvd.
South Lake Tahoe, CA 96150

6 LIST OF PREPARERS

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6.5 AECOM

Name	Qualifications	Role
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Stephanie Rasmussen	B.S., Environmental Biology and Management 7 years of experience	Assistant Project Manager/Land Use/Scenic Resources/Other Required Sections
Kendra Ryan	B.S., Landscape Architecture 20 years of experience	Environmental Review and Agency Consultation

Name	Qualifications	Role
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Heather Valentine	B.S., Ecology 8 years of experience	Vegetation and Wildlife Resources
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Name	Qualifications	Role
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6.6 CARDNO ENTRIX

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6.7 KD ANDERSON

Name	Qualifications	Role
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