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

February 2013

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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

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]
3.8-3: 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:

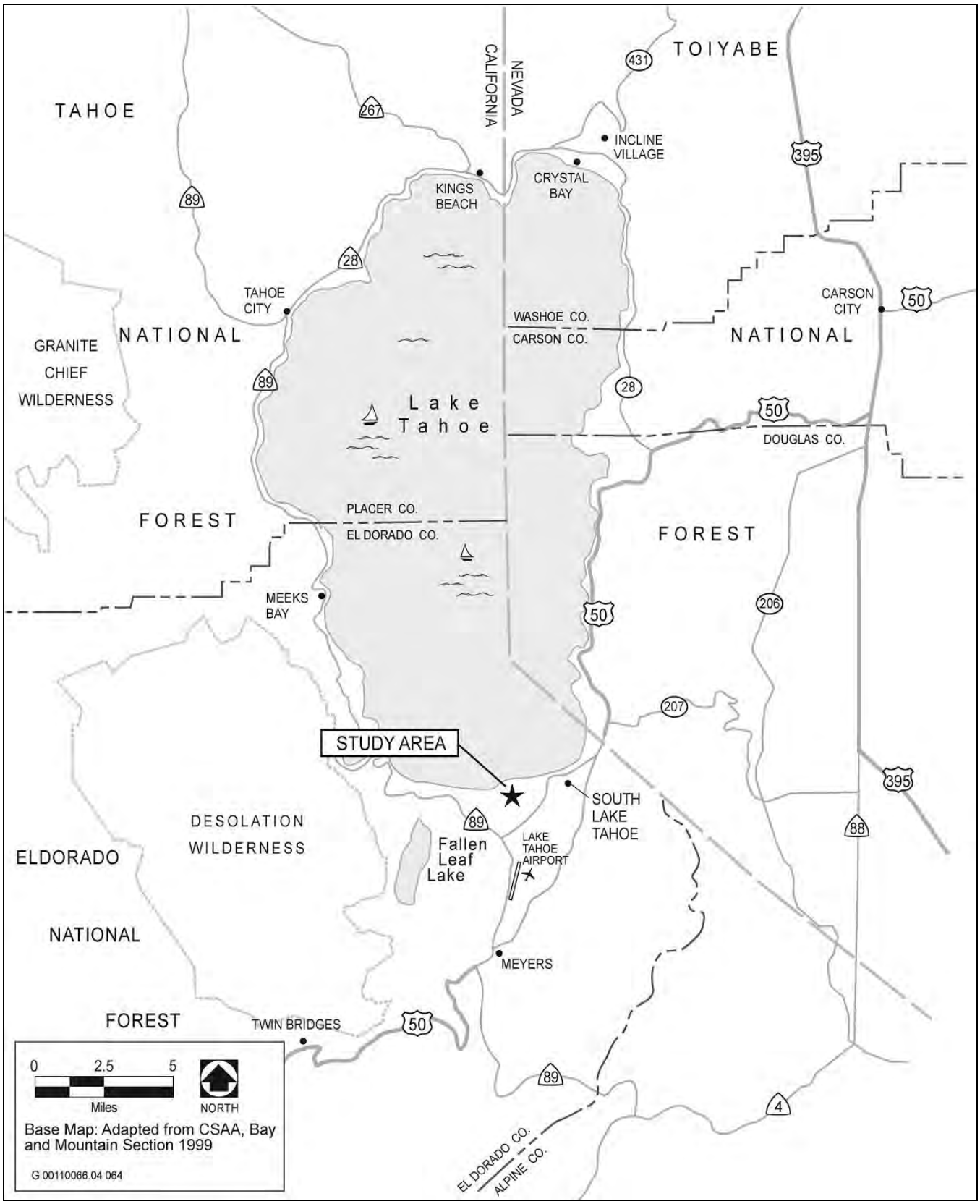
- California Public Resources Code (PRC) Sections 21000 et seq., which is CEQA;
- California Code of Regulations (CCR) Title 14, Division 6, Chapter 3 (State CEQA Guidelines), including Section 15222 (“Preparation of Joint Documents”);
- National Environmental Policy Act of 1969, as amended (Public Law [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.

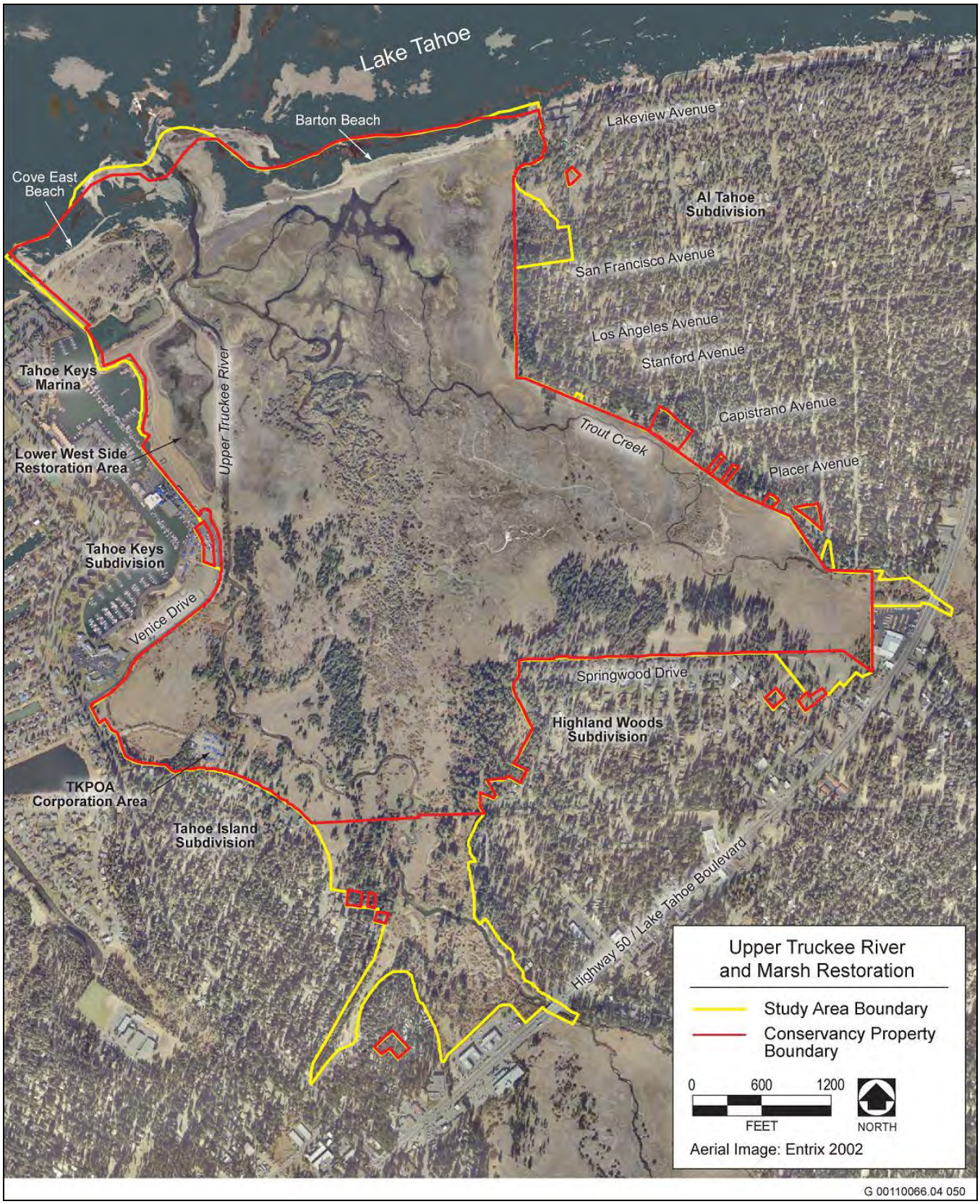
1.1 PROJECT REQUIRING ENVIRONMENTAL ANALYSIS

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	
µg/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.

Legend

- Existing 1000 ft. River Station
- Existing 100 ft. River Station - Upper Truckee
- Existing 100 ft. River Station - Trout Creek
- Existing Regional Bike Trail

Proposed Habitat Features

- Core Habitat Area
- Lagoon
- Restored Meadow
- Restored Dune
- Tahoe Yellow Cress Restricted Use Area

Proposed River and Floodplain Features

- Low and Bankful Flow Channel
- Partial Fill of Existing Channel
- Removal of Reserve Fill
- Active Floodplain

Proposed Engineered Features

- Lateral Grade Control
- Vertical Grade Control
- Bank Protection
- Bulkhead/Levee

Proposed Public Access Features

- Observation Area
- Viewpoint
- Kiosk
- Parking
- Bike Path
- Pedestrian Trail
- Bridge
- Boardwalk

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FEET
NORTH

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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)

Legend

- Existing 1000 ft. River Station
- Existing 100 ft. River Station - Upper Truckee
- Existing 100 ft. River Station - Trout Creek
- Existing Regional Bike Trail

Proposed River and Floodplain Features

- Low and Bankful Flow Channel
- Active Floodplain
- Removal of Reserve Fill
- Partial Fill of Existing Channel

Proposed Habitat Features

- Core Habitat Area
- Lagoon
- Restored Meadow
- Restored Dune and Beach
- Tahoe Yellow Cress Restricted Use Area

Proposed Engineered Features

- Lateral Grade Control
- Vertical Grade Control
- Bulkhead/Levee
- Bank Protection
- Storm Water Treatment Area

Proposed Public Access Features

- Viewpoint
- Pedestrian Trail
- Boardwalk
- Fishing Platform
- ADA Accessible
- Kiosk

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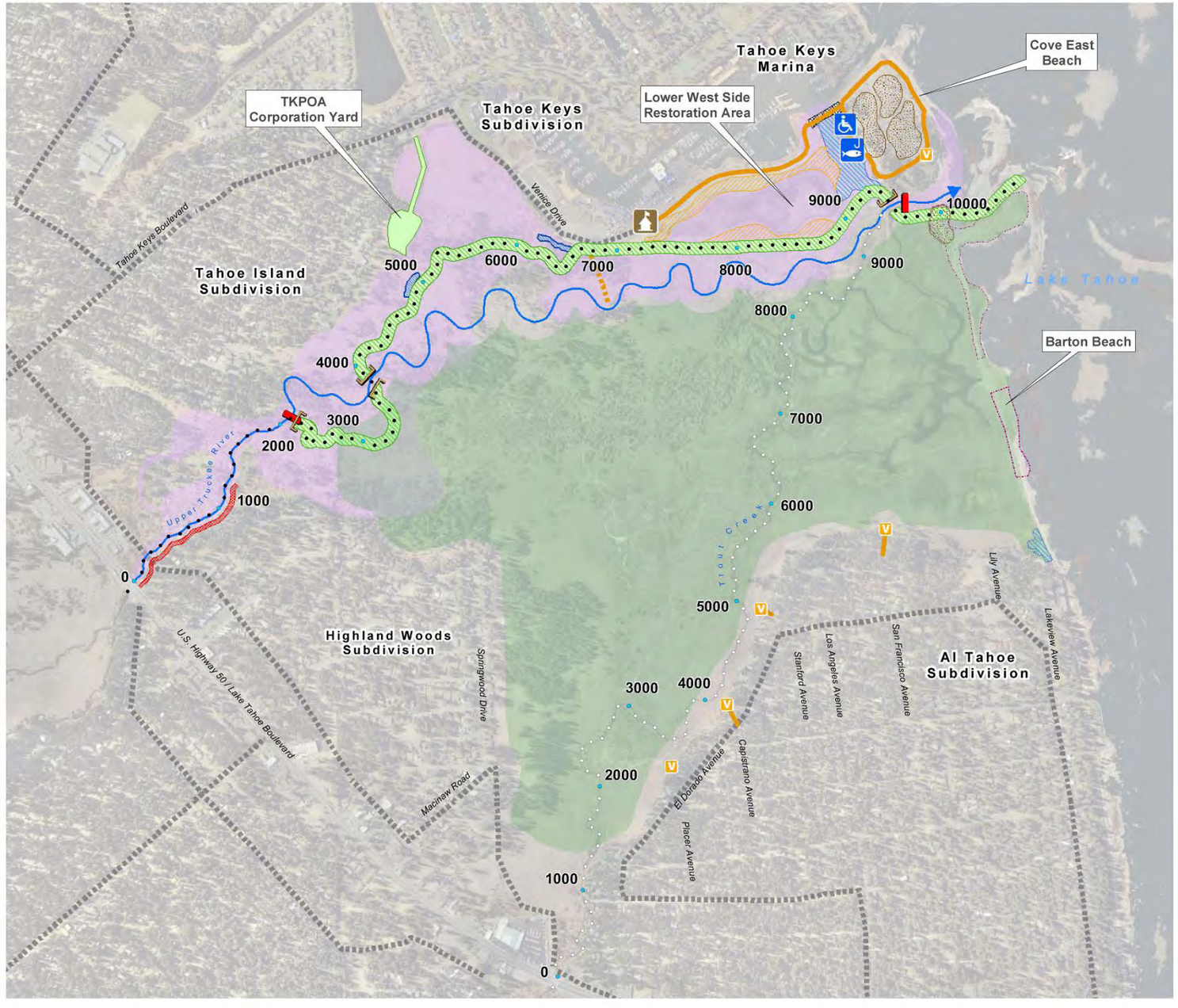

Source: Conservancy and DGS 2007a, adapted by AECOM in 2013

Exhibit 2-2

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

Legend

- Existing 1000 ft. River Station
- Existing 100 ft. River Station - Upper Truckee
- Existing 100 ft. River Station - Trout Creek
- Existing Regional Bike Trail

Proposed Habitat Features

- Core Habitat Area
- Lagoon
- Restored Meadow
- Tahoe Yellow Cress Restricted Use Area

Proposed River and Floodplain Features

- Low and Bankful Flow Channel
- Potential Low Flow Path
- Active Floodplain
- Removal of Reserve Fill
- Partial Fill of Existing Channel

Proposed Engineered Features

- Lateral Grade Control
- Vertical Grade Control
- Bulkhead/Levee
- Bank Protection
- Storm Water Treatment Area
- Overbank Conveyance Bridge Modification
- Channel Grade Control and Bank Protection

Proposed Public Access Features

- Viewpoint
- Boardwalk
- Bike Path
- Pedestrian Trail
- Fishing Platform
- ADA Accessible
- Parking
- Observation Area
- Kiosk

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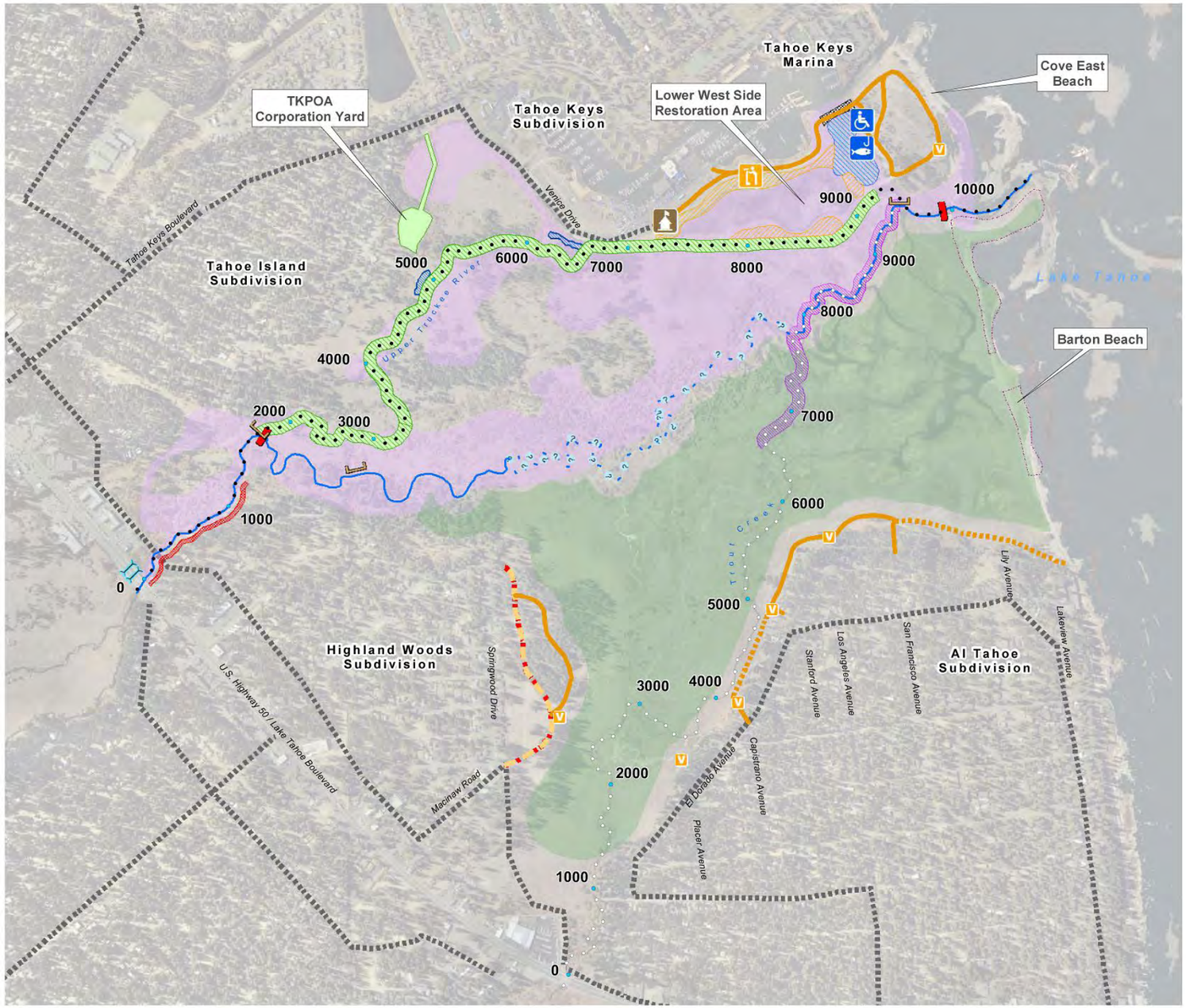

Source: Conservancy and DGS 2007a, adapted by AECOM in 2013

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

Legend

- 1000 ft. River Station
- 100 ft. River Station - Upper Truckee
- 100 ft. River Station - Trout Creek
- Existing Regional Bike Trail

Proposed Habitat Features

- Core Habitat Area
- Tahoe Yellow Cress Restricted Use Area

Proposed River and Floodplain Features

- Low and Bankful Flow Channel
- Active Floodplain
- Area of Inset Floodplain
- Removal of Reserve Fill
- Partial Fill of Existing Channel

Proposed Engineered Features

- Bank Protection

Proposed Public Access Features

- Viewpoint
- Observation Area
- Boardwalk
- Bike Path
- Pedestrian Trail
- Kiosk

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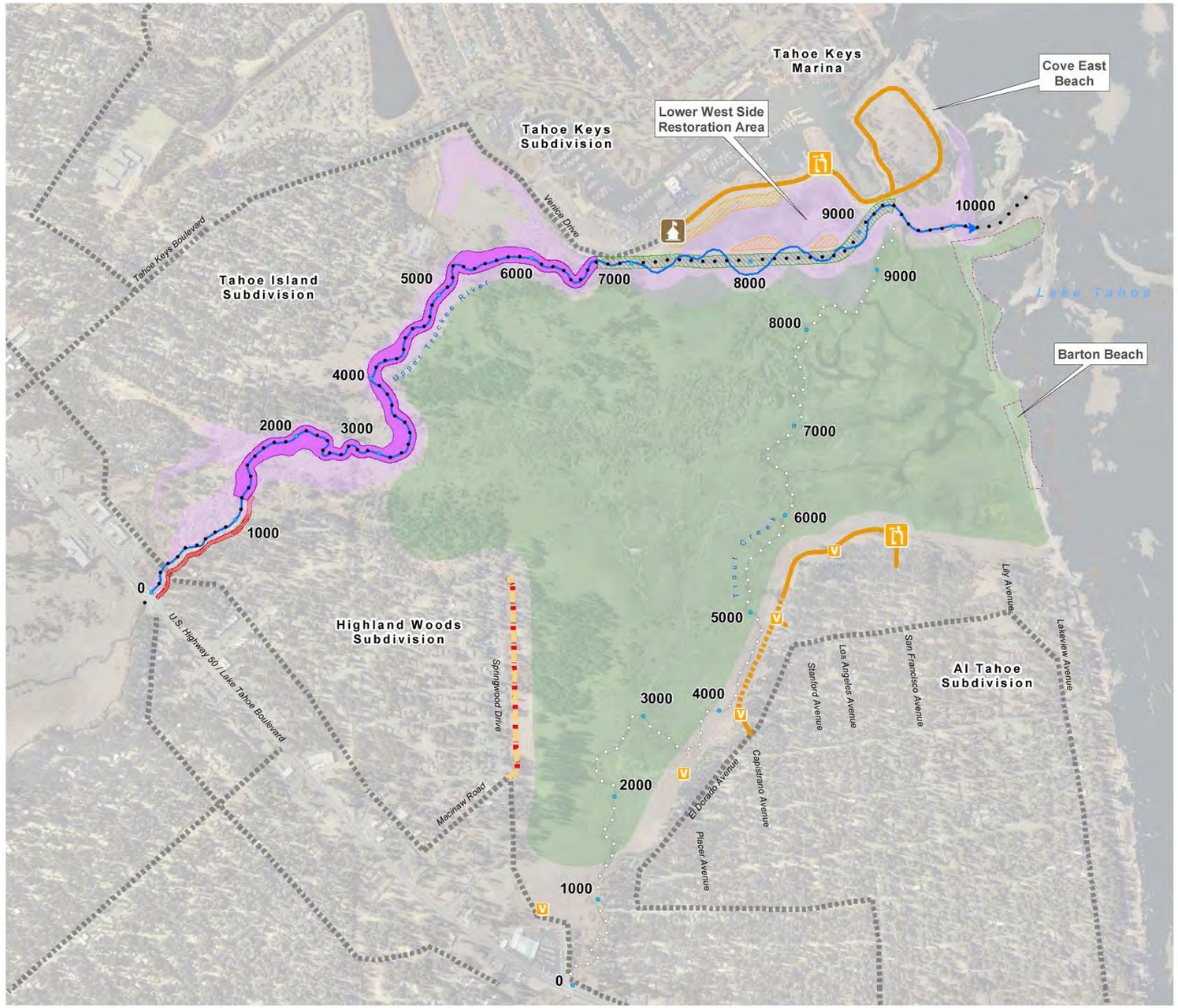


Source: Conservancy and DGS 2007a, adapted by AECOM in 2013

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					**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.
Length (feet)	3,000	5,700	3,800	–	**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.
Area (square feet)	150,000	285,000	190,000	–	**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					**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.
Length (feet)	1,200	1,700	4,000	–	**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.
Area (square feet)	26,000	50,000	120,000	–	**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					**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.
Area (square feet)	83,000	173,000	214,000	101,000	**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.

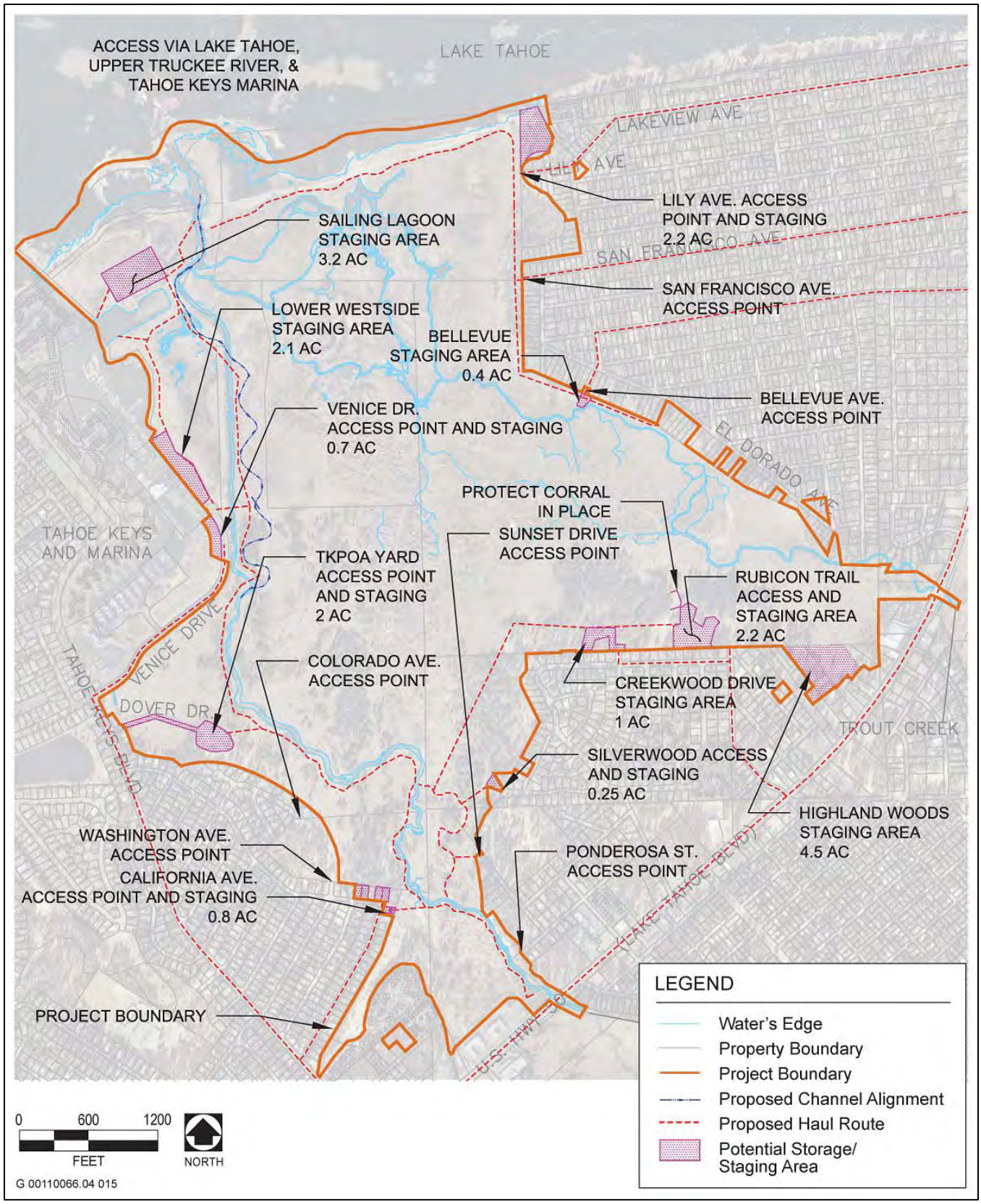
YEAR 4

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

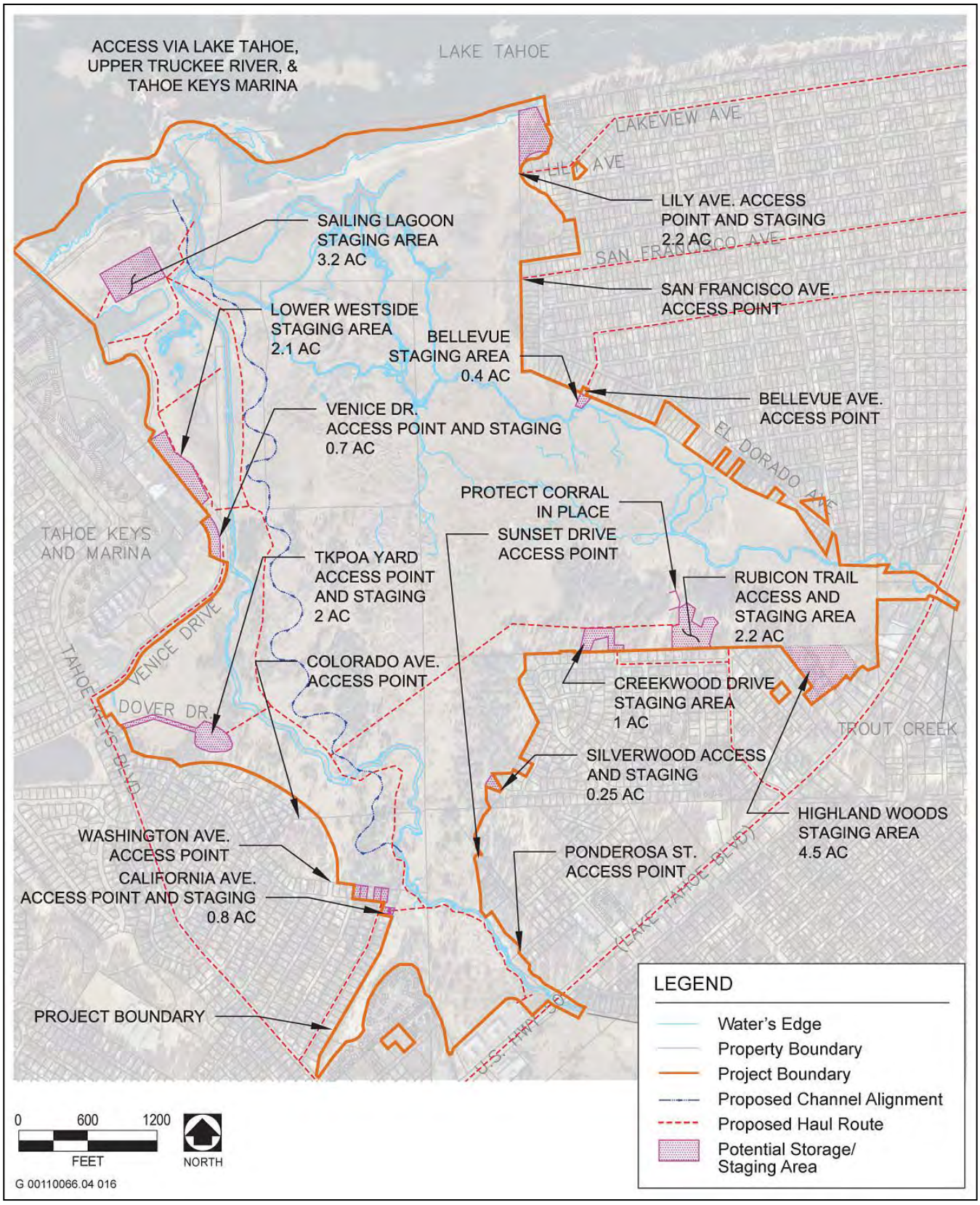
Proposed project alternatives include environmental commitments listed in Table 2-6 to avoid or minimize adverse effects on the environment. The environmental analysis assumes implementation of these commitments prior to determination of environmental impacts. In some instances these environmental commitments 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.



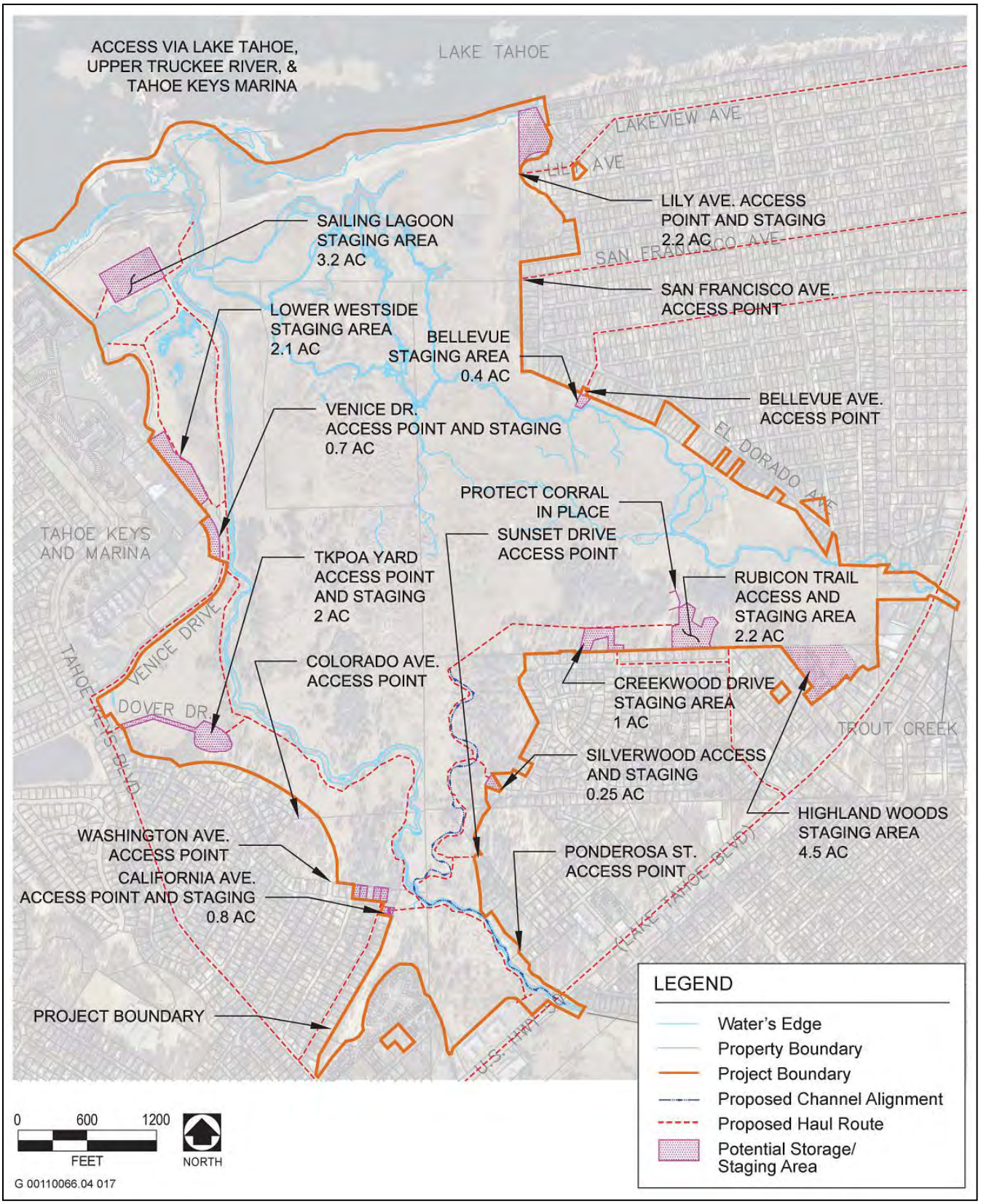
Source: Conservancy and DGS 2013 (aerial image from 2002), adapted by AECOM in 2013

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



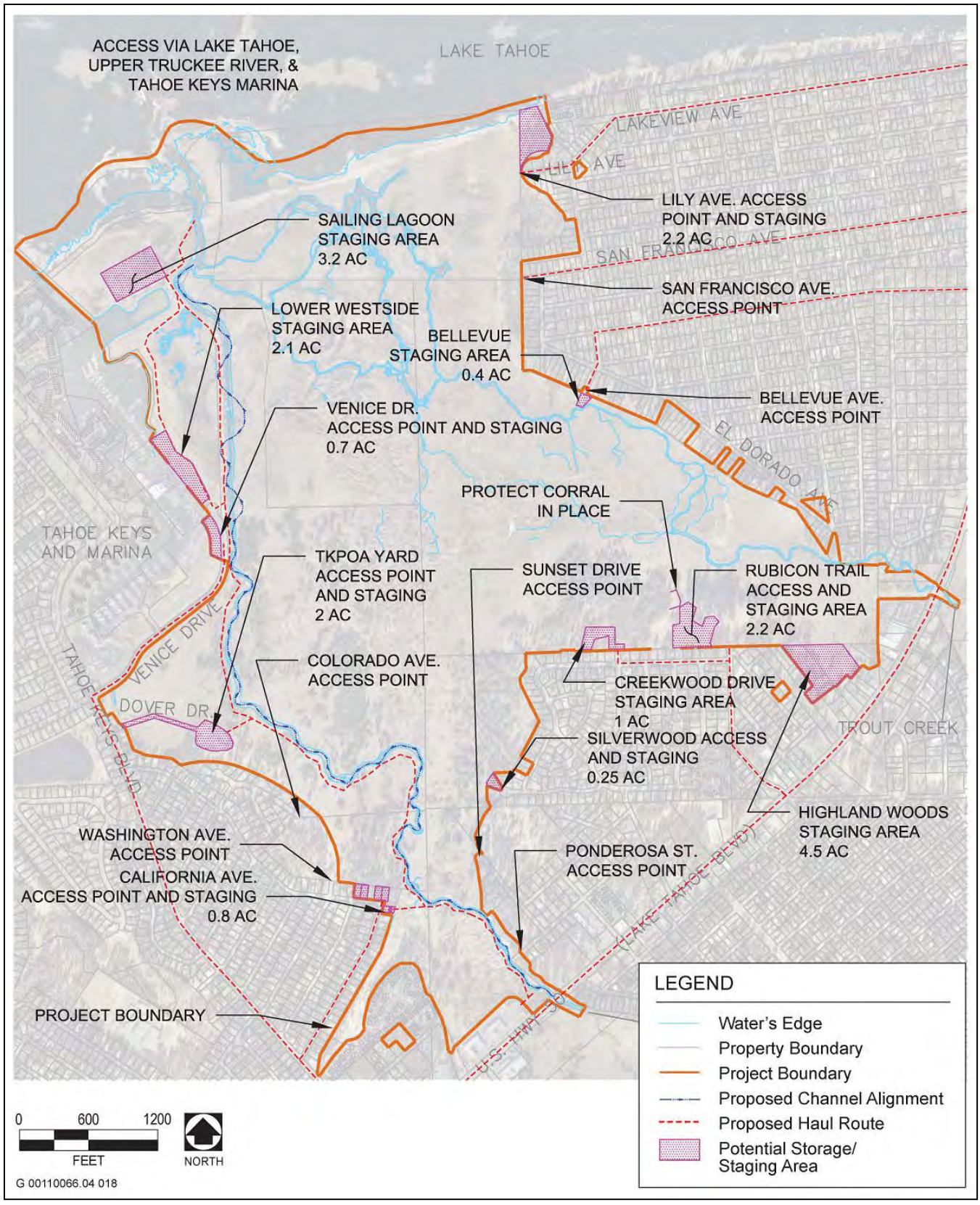
Source: Conservancy and DGS 2013 (aerial image from 2002), adapted by AECOM in 2013

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.

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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.

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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.

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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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