3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

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

3.1 APPROACH TO THE ENVIRONMENTAL ANALYSIS

3.1.1 CEQA, NEPA, AND TRPA REQUIREMENTS

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

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

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

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

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

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

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

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

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

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

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

3.1.2 SECTION CONTENTS

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

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

The content of Sections 3.2 through 3.17 is described below.

CONTENT OF SECTIONS 3.2 THROUGH 3.17

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

Affected Environment

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

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

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

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

Environmental Consequences and Mitigation Measures

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

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

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

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

These subsections are described further below.

Significance Criteria

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

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

Methods and Assumptions

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

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

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

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

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

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

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

Effects Not Discussed Further in the EIR/EIS/EIS

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

Impact Analysis and Mitigation Measures

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

- temporary impacts would occur only during construction;

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

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

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

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

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

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

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

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

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

Relationship to TRPA Environmental Carrying Capacity Thresholds

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

CONTENT OF SECTION 3.18, "CUMULATIVE EFFECTS"

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

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

3.1.3 ISSUES ELIMINATED FROM DETAILED ANALYSIS

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

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

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

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3.2 AIR QUALITY AND CLIMATE CHANGE

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

3.2.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

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

Federal

Federal Clean Air Act

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

Criteria Air Pollutants

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

Table 3.2-1
Ambient Air Quality Standards

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

Table 3.2-1
Ambient Air Quality Standards

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

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

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

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

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

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

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

[f] Applicable in the Lake Tahoe Air Basin.

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

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

Sources: TRPA 2007a, ARB 2008a

Hazardous Air Pollutants

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

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

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

State

California Clean Air Act

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

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

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

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

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

Toxic Air Contaminants

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

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

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

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

Tahoe Regional Planning Agency

Goals and Policies

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

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

Code of Ordinances

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

Section 65.1—Air Quality Control

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

- Section 65.1.3, "Vehicle Inspection and Maintenance Program," states that to avoid duplication of effort in implementing an inspection/maintenance program for certain vehicles registered in the CO nonattainment area, TRPA shall work with the affected state agencies to plan for applying state inspection/maintenance programs to the Lake Tahoe region.

- Section 65.1.4, "Combustion Appliances," establishes emissions standards for wood heaters, as well as natural gas– or propane-fired water heaters and central furnaces.

- Section 65.1.6.A "Environmental Assessment," states that any new stationary source of air pollution that produces emissions for the peak 24-hour period beyond any of the limits in Table 65.1.6-1, reproduced as Table 3.2-2 below, shall be considered to have a significant adverse environmental impact. New stationary sources that have a significant adverse environmental impact shall be prohibited.

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

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

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

Section 65.2—Traffic and Air Quality Mitigation Program

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

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

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

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

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

El Dorado County Air Quality Management District

Overview

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

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

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

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

Rule 223-1—Fugitive Dust—Construction.

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

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

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

Toxic Air Contaminants

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

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

Odors

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

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

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

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

ENVIRONMENTAL SETTING

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

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

Climate, Meteorology, and Topography

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

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

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

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

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

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

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

Criteria Air Pollutants

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

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

Ozone

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

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

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

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

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

Carbon Monoxide

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

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

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

Nitrogen Dioxide

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

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

Sulfur Dioxide

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

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

Particulate Matter

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

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

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

Lead

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

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

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

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

Monitoring Station Data and Attainment Area Designations

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

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

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

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

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

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

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

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

Sources: ARB 2008d, ARB 2010

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

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

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

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

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

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

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

Emissions Inventory for Criteria Air Pollutants

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

Toxic Air Contaminants

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

Table 3.2-5
Summary of 2008 Estimated Emissions Inventory for Criteria Air Pollutants and Precursors (El Dorado County—Lake Tahoe Air Basin)

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

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

Diesel Particulate Matter

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

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

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

Naturally Occurring Asbestos

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

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

Odors

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

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

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

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

3.2.2 GREENHOUSE GAS EMISSIONS

REGULATORY BACKGROUND

Federal

Supreme Court Ruling on California Clean Air Act Waiver

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

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

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

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

U.S. Environmental Protection Agency Regulations

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

Mandatory Greenhouse Gas Reporting Rule

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

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

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

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

Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases

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

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

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

Council on Environmental Quality Draft NEPA Guidelines

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

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

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

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

State

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

Summary of Laws and Executive Orders

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

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

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

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

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

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

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

Climate Change Scoping Plan

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

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

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

Governor's Office of Planning and Research Technical Advisory

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

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

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

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

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

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

OPR CEQA Guidelines for GHG Emissions

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

California Climate Change Adaptation Strategy

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

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

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

CLIMATE CHANGE ENVIRONMENTAL SETTING

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

Global Climate Trends and Associated Impacts

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

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

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

Greenhouse Gas Emissions Sources and Inventory

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

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

California

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

3.2.3 Environmental Consequences and Mitigation Measures

Significance Criteria

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

CEQA Criteria

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

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

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

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

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

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

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

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

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

NEPA Criteria

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

TRPA Criteria

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

- substantial air pollutant emissions (TRPA 1);

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

- the creation of objectionable odors (TRPA3);

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

- increased use of diesel fuel (TRPA 5).

METHODS AND ASSUMPTIONS

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

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

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

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

Greenhouse Gases

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

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

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

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

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

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

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

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

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

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

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

IMPACT ANALYSIS AND MITIGATION MEASURES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

See Appendix F for modeling results.

[1] Area-source emissions include emissions from landscaping and were estimated based on default model settings.

[2] The total emissions threshold applies to the sum of area and mobile sources for EDCAQMD NO_X only.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Construction-Generated Greenhouse Gas Emissions

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

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

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

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

Notes: CO_2 = carbon dioxide.
Values may not appear to add exactly due to rounding.

[1] The values presented do not include the full life-cycle of GHG emissions that occur over the production/transport of materials used during construction of the project, solid waste that occurs over the life of the project, and the end-of-life of the materials and processes that indirectly result from the project. Estimation of the GHG emissions associated with these processes would be speculative, would require analysis beyond the current state of the art in impact assessment, and may lead to a false or misleading level of precision in reporting of project-related GHG emissions.

[2] Construction emissions were modeled with the URBEMIS 2007 computer model. The URBEMIS 2007 model does not account for CO_2 emissions associated with the production of concrete or other building materials used in project construction. It also does not estimate emissions for GHGs other than CO_2, such as CH_4 and N_2O, because the emission levels of these other GHGs are expected to be nominal in comparison to the estimated CO_2 levels despite their higher global warming potential.

See Appendix F, "Air Quality Modeling Results," for detailed model input, assumptions, and threshold calculations.
Source: Modeling conducted by EDAW (now AECOM) in 2012.

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

Operation-Related GHG Emissions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Alternative 5—No-Project/No-Action

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

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

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

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

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

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

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

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

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

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

IMPACT 3.2-6 (Alt. 5) **Short-Term or Long-Term Operational (Regional) Emissions of GHGs. (CEQA 7, CEQA 8)** *Under Alternative 5 no short-term or long-term emissions of GHGs would occur. As a result,* ***no impact*** *would occur.*

Alternative 5 would not result in any construction or operational activities in the study area. The study area would remain in its current undeveloped state. As a result, no short-term or long-term emissions of GHGs would occur. Therefore, **no impact** would occur.

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3.3 ARCHAEOLOGICAL AND HISTORICAL RESOURCES

This section analyzes the effects of the project on archaeological and historical resources located within or adjacent to the study area. This analysis does all of the following:

- describes the criteria for determining the significance of cultural resources, including standards provided in NEPA, Section 106 of the National Historic Preservation Act (referred to in this section as "Section 106"), CEQA, and the TRPA Code of Ordinances;
- provides an inventory of known archaeological and historical resources on the study area;
- summarizes previous archaeological investigations; and
- evaluates the potential impacts of the project on known and unknown significant archaeological and/or historical resources and identifies feasible mitigation measures that would reduce those impacts to less-than-significant levels.

For the purposes of this analysis, cultural resources include historic, prehistoric, and archaeological resources. Cumulative cultural resource impacts are addressed in Section 3.16, "Cumulative Impacts." Consistency with TRPA goals and policies is presented in Section 3.10, "Land Use," Table 3.10-1.

3.3.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

NEPA Guidelines

In accordance with NEPA, an agency must consider:

- unique characteristics of the geographic area, such as proximity to historic or cultural resources (40 Code of Federal Regulations [CFR] 1508), and
- the degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP) (40 CFR 1508.27[b][8]).

The following federal law related to archeological and historical resources is relevant to the project alternatives and is described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- Section 106 of the National Historic Preservation Act.

Regulations relevant to the proposed alternatives are described in detail in Chapter 5, "Compliance, Consultation, and Coordination."

State

CEQA offers directives regarding project-related impacts on historical resources and unique archaeological resources located within California. It states generally that if implementing a project would result in significant environmental impacts, public agencies should consider whether feasible mitigation measures or feasible alternatives can substantially lessen or avoid such impacts. This general mandate applies equally to significant environmental effects related to certain cultural resources.

Only significant cultural resources ("historical resources" and "unique archaeological resources") need to be addressed. The State CEQA Guidelines define a "historical resource" as, among other things, "[a] resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources" (CRHR) (State CEQA Guidelines, Section 15064.5[a][1]; see also Public Resources Code Sections 5024.1 and 21084.1.) A historical resource may be eligible for inclusion in the CRHR, as determined by the State Historical Resources Commission or the lead agency, if the resource:

- is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- is associated with the lives of persons important in our past;
- embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- has yielded, or may be likely to yield, information important in prehistory or history.

In addition, a resource is presumed to constitute a "historical resource" if it is included in a "local register of historical resources" unless "the preponderance of evidence demonstrates that it is not historically or culturally significant" (State CEQA Guidelines, Section 15064.5[a][2]).

CEQA (California Public Resources Code Section 21083.2) and the State CEQA Guidelines (Section 15064.5) also require consideration of unique archaeological sites. As stated in Section 21083.2 of the Public Resources Code, a "unique archaeological resource" is defined as "an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

(1) "Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information."

(2) "Has a special and particular quality such as being the oldest of its type or the best available example of its type."

(3) "Is directly associated with a scientifically recognized important prehistoric or historic event or person."

If an archaeological site does not meet any of the criteria for inclusion in the CRHR but does meet the definition of a unique archaeological resource as outlined in Public Resources Code Section 21083.2 of CEQA, it is entitled to special protection or attention under CEQA. Treatment options under Section 21083.2 include activities that preserve such resources in place in an undisturbed state. Other acceptable methods of mitigation include excavation and curation or study in place without excavation and curation (if the study finds that the artifacts would not meet one or more of the criteria for defining a "unique archaeological resource").

Section 15064.5(e) of the State CEQA Guidelines requires that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the Native American Heritage Commission (NAHC) must be contacted within 24 hours. At that time, in accordance with Section 15064.5(d), the lead agency must consult with the appropriate Native Americans as identified by the NAHC; under certain circumstances, the lead agency is to develop an agreement with the Native Americans for the treatment and disposition of the remains.

Tahoe Regional Planning Agency

Goals and Policies

The Goals and Policies document of the 1987 Regional Plan establishes an overall framework for development and environmental conservation in the Lake Tahoe region. Chapter IV (Conservation Element) of the Goals and Policies document considers ten subelements selected to cover the full range of Lake Tahoe's natural and historical resources. The sole goal (Goal #1) in the Cultural Subelement of this chapter calls for sites of historical, cultural, and architectural significance within the region to be identified and preserved. There are two policies under Goal #1: Policy 1 requires TRPA to establish a list of significant historical, cultural, and architectural sites and special-review criteria to protect such sites; and Policy 2 stipulates that these sites be given special incentives and exemptions to promote the preservation and restoration of such structures and sites.

Code of Ordinances

In compliance with federal and state laws, TRPA has adopted guidelines to determine cultural resources significance and impacts in the Tahoe Basin. Chapter 67 of the TRPA Code of Ordinances states that "sites, objects, structures, districts or other resources of historical, cultural, archaeological, paleontological, or architectural significance locally, regionally, state-wide, or nationally" shall meet at least one of the following criteria:

- resources that are associated with historically significant events and sites, such as an important community function in the past or a memorable happening in the past, or that contain qualities reminiscent of an early stage of development in the region (Section 67.6.1);
- resources associated with the lives of persons significant in history, including regional history, including buildings or structures associated with a locally, regionally, or nationally known person; notable examples or best surviving works of a pioneer architect, designer, or master builder; or structures associated with the life or work of significant persons (Section 67.6.2);
- resources that embody the distinctive characteristics of a type, period, or method of construction; that possess high artistic values; or that represent a significant or distinguishable entity but whose components may lack individual distinction (Section 67.6.3);
- archaeological or paleontological resources protected or eligible for protection under state or federal guidelines (Section 67.6.4); or
- prehistoric archaeological or paleontological resources that may contribute to the basic understanding of early cultural or biological development in the region (Section 67.6.5).

Section 67.3 of the TRPA Code of Ordinances requires the protection of sites, objects, structures, or other resources designated as historic resources or for which designation is pending. Such resources may not be demolished, disturbed, removed, or significantly altered unless TRPA has approved a resource protection plan to protect the historic resources. Section 67.3.3 requires that the resource protection plan be prepared by a qualified professional and states that the plan may provide for surface or subsurface recovery of data and artifacts and recordation of structural and other data. Section 67.3.4 requires that resources be protected during construction; grading, operation of equipment, or other soil disturbance is prohibited in areas where a designated historic resource is present or could be damaged, except in accordance with a TRPA-approved resource protection plan (TRPA 2011).

Section 33.3.7 of the TRPA Code of Ordinances addresses the discovery of historic resources during grading activities. This section requires project-related grading to cease and project proponents to notify TRPA if construction contractors encounter resources that appear to be 50 years old or older. TRPA would suspend

grading and consult with appropriate federal, state, or local entities to determine the significance of the resource, if any. The property owner is required to protect the materials during the investigation period (TRPA 2011).

ENVIRONMENTAL SETTING

Natural Setting

Recognizing that the study area has been disturbed by human activity for much of its history, it is unlikely that the floral and faunal communities seen today are representative of those that were present before extensive Euro-American settlement of the area. The introduction of exotic plant and animal species, the alteration of watercourse channels, and general habitat degradation that have occurred since Euro-American settlement have produced a landscape and biotic community likely quite different from its earlier state. Many native species still exist in the area, including some used by the native Washoe people; however, the diversity of plant and animal life in the marsh and surrounding area has changed, and in some regards has become more limited.

Prehistoric Archaeological Setting

The prehistory of the northern Sierra Nevada has been studied by numerous researchers, among them Ataman (1999), Heizer and Elsasser (1953), Elsasser (1960, 1978), Elston (1971, 1982, 1986), Elston et al. (1977, 1994, 1995), Miller and Elston (1979), Ingbar (1994), Moratto (1984), Pendleton et al. (1982), Kuffner (1987), Peterson (1984), Zeier and Elston (1986), Delacorte (1997), McGuire (1997), and Moore and Burke (1992). The cultural chronology of the region, based on the synthesis provided by Elston et al. (1994:11), is summarized in Table 3.3-1.

Table 3.3-1
Cultural Phases in the Central and Northern Sierra Nevada

Phase/Adaptive Strategy	Time Markers	Age (Years BP)	Climate
Late Kings Beach/ Late Archaic	Desert Series Projectile Points, chert cores, utilized flakes and other small chert tools, and possibly shallow saucer-shaped house pits	700–150	Neoglacial; wet and cool but with little summer precipitation
Early Kings Beach/ Late Archaic	Rosegate Series points; chert cores; utilized flakes and other small chert tools; hullers; M1a sequin beads; possibly small, shallow saucer-shaped house pits	1300–700	Neoglacial; dry, trees growing in former bogs, extended periods when Lake Tahoe may not have overflowed
Late Martis/Middle Archaic	Corner-notched and eared points of the Martis and Elko Series and large basalt bifaces	3000–1300	Neoglacial; wet but not necessarily cooler, increased summer rain
Early Martis/Middle Archaic	Contracting stem points of the Martis and Elko Series, Steamboat points, and large basalt bifaces	5000–3000	Beginning of Medithermal; Neoglacial; wet, but not necessarily cooler, increased summer precipitation; Lake Tahoe begins to overflow
Spooner/Early Archaic	No time markers defined	8000–4000	Altithermal; generally hot and dry; Lake Tahoe does not overflow for long periods
Tahoe Reach/ Pre-Archaic	Great Basin Stemmed Series points	>10,000–8000	Anathermal; warming trend, climate similar to the present

Source: Compiled by AECOM in 2012

Scant archaeological evidence of early occupation has been discovered thus far in the Sierra Nevada; however, east of the Sierra Nevada crest, in the western Great Basin, the Tahoe Reach Phase is seen by Elston et al. (1994) as an expression of early occupation. Dating from approximately 10,000 to 8000 years before present (BP), archaeological sites associated with this period are marked by the presence of Great Basin stemmed points with ground margins, bifaces, choppers, and crescent-shaped tools. The subsequent Spooner Phase of the Early Archaic (8000–4000 BP), originally proposed by Elston (1971), currently lacks diagnostic artifacts and remains generally undefined pending the results of future archaeological research.

Throughout the ensuing Archaic period, populations increased, the resource base broadened, and food gathering and tools used for processing plant materials became more complex, with new items and technologies added to existing ones. Flaked stone tools became simpler and smaller, with less stylistic variation, and during the Late Archaic, the bow and arrow replaced the atlatl and dart (Elston 1982:187; 1986). The intensified use of resources and the complexity of expanded tool kits are representative of the transition to the Late Archaic archaeological period. Much of this transition is thought to have been in response to population pressures, possibly spurred by a hot, dry climatic regime occurring between 1000 and 2000 years BP (Elston 1986).

Elston (1982:189) proposed a basic Archaic settlement pattern for the Great Basin with two variations: a dispersed and a restricted pattern. The former was the typical pattern in the more arid regions of the western Great Basin (central Nevada), where small residential groups frequently selected different winter habitations and base camp sites from year to year to take advantage of a relatively unpredictable and scarce resource base. The restricted pattern prevailed throughout the northern Sierra Nevada front (the area adjacent to and east of the crest) between 4000 and 2000 years BP At that time, greater effective moisture provided a resource base that was relatively more reliable and abundant in relation to population density. In the Middle Archaic, residential groups regularly occupied sites with access to a suite of subsistence resources. Thus, high-return resources could be procured more efficiently and at lower cost, with few residential moves (Elston 1982:196; Zeier and Elston 1986).

Moore and Burke (1992:21) define four artifact classes that characterize Middle Archaic period sites: large corner-notched and contracting-stem points, large bifaces used as scrapers rather than for cutting, flake tools made on large interior flakes (flakes not exhibiting cortical surfaces) with steep edge angles similar to those of the bifaces, and expedient gravers and perforators. Reduction of lithic materials was generalized and inefficient, producing a large amount of waste rock (Moore and Burke 1992:21–24). Elston (1986:141) proposed that Middle Archaic winter sites were located in optimal ecological locales. In the Truckee Meadows, it appears from the density of diagnostic artifacts that land use intensified during this period. However, there is no evidence for long-term occupation; base camps appear to have been visited frequently for limited periods.

During the Late Martis Phase of the Middle Archaic (3000–1300 BP), the archaeological assemblages associated with the disparate Great Basin and California cultural areas were distinct. These differences may reflect a cultural and physical barrier that persists throughout the Martis Phases of the Middle Archaic (Ataman 1999:10–11) and may have continued into later times, as suggested by research conducted by Deis (1999), who presents evidence for a discontinuity in the presence of Great Basin projectile point types along the western slopes of the Sierra Nevada during the Middle/Late Archaic transition. Abrupt technological, settlement, and subsistence changes are seen throughout the Tahoe Basin at the beginning of the Late Archaic, and these changes may be associated with the emergence of the ethnographic Washoe (Zeier and Elston 1986). Small projectile points, indicating a switch from atlatl and dart to bow and arrow technology, are evident throughout the region. The corresponding Early Kings Beach Phase (1300–700 BP) is characterized by the appearance of hullers and bedrock mortars, apparently associated with a northern population expansion and subsequent exploitation of pinyon pines. Fish and small game also become a major part of the diet. This phase is marked by a switch to a toolstone-efficient technology centered on the primary use of locally available cherts and sinter. In addition to the major shift to small Rosegate arrow points, other diagnostic traits include the use of large and small triangular bifaces made exclusively of chert, well-thinned bifaces with large width-to-thickness ratios. Gravers are absent during this period; retouched flakes are rare; and perforators, if present, tend to be made of recycled small corner-notched points.

Elston (1982:199) postulated a more dispersed settlement pattern with less regular occupation of optimal sites in the Late Archaic (Kings Beach Phase). He linked this shift to a changing subsistence pattern with progressively greater intensity of exploitation of diverse resources and ecozones. Zeier and Elston (1986:377–379) found that people continued to occupy the old sites but also began to occupy new sites in less optimal locations. Resources were being depleted faster at the old sites, necessitating more frequent moves, or demographic packing filled in the spaces between optimal locations. At the new sites, low-ranked resources were used intensively at higher cost. These new site locations may reflect exploitation of pinyon, which reached its northernmost expansion between 1200 and 710 BP (Raven 1990:78).

On the eastern Sierra Nevada front, the Late Kings Beach Phase of the Late Archaic (700–150 BP) is marked by flaked stone assemblages dominated by local cherts, with rare use of basalt and sinter (Elston et al. 1994:18). Although Elston et al. (1994) ascribe the beginning of this period with the appearance of small side-notched point types that replace the early corner-notched types, Moore and Burke (1992:23) propose that the corner-notched varieties persist until circa 500 BP, which is consistent with evidence presented by Clay (1996). Elston et al. (1994:18) state that the evidence is not compelling. Moore and Burke (1992:37) suggest that the dietary breadth decreases during this phase, and there appears to be a decrease in sites at upper elevations, with increased occupation at lower elevations, particularly along terraces of the Truckee River.

Ethnographic Setting

Although recent historic-era accounts of traditional Native American territories do not always reflect prehistoric patterns of native land use and occupation, the Tahoe Basin is unusual in that ethnographic, linguistic, and archaeological evidence supports a presence of the Washoe and their ancestors in the region for at least several thousand years. The following outline of Washoe culture and presence in the area is drawn from the recent work of Lindström (2004), unless otherwise noted.

The study area is located in the center of Washoe territory, which was used primarily by the Southern Washoe or *Hung a lel ti* (d'Azevedo 1956, 1984; Downs 1966; Nevers 1976; Stewart 1938). The rich environment of the Tahoe Basin afforded the Washoe a degree of isolation and independence from neighboring peoples and may account for their long tenure in the area (d'Azevedo 1984:466, 471). The Washoe are part of an ancient Hokan-speaking residual population that was subsequently surrounded by Numic-speaking peoples, such as the Northern Paiute (Jacobsen 1966).

The ethnographic record suggests that during the warmer months, small groups traveled through high mountain valleys collecting edible and medicinal roots, seeds, and marsh plants. In the higher elevations, men hunted large game (mountain sheep, deer) and trapped smaller mammals. Suitable tool stone (such as basalt) was quarried at various locales along the north side of Lake Tahoe. The lake and its tributaries were an important fishery. The Upper Truckee River and Trout Creek accommodated numerous established fishing areas where multiple family groups converged to harvest Lahontan cutthroat trout and whitefish from late spring through fall (Lindström and Rucks 2002, 2003). Archaeological evidence of these ancient Washoe subsistence activities, including temporary small hunting camps containing flakes of stone and broken tools, is found along the mountain flanks. In the high valleys, more permanent base camps have been found along lakes, streams, and springs and are represented by stone flakes, tools, grinding implements, and house depressions.

By the 1850s, Euro-Americans permanently occupied the Washoe territory and had changed traditional lifeways. Mining, lumbering, grazing, commercial fishing, tourism, and the growth of settlements disrupted traditional Native American relationships to the land. As hunting and gathering activities were increasingly restricted over time, the Washoe were often forced to become dependent on the Euro-American settlers. Because access to lands in the Tahoe Basin and throughout the Sierra Nevada was limited, Washoe families would return to the lake in the summers, where they negotiated work and camping privileges with various establishments, creating a postcontact settlement pattern where conditions were congenial. They were employed as domestic laborers around the resorts

and settlements and as basket weavers, commercial fishermen, and guides for backcountry sportsmen (Scott 1973:20).

Unlike Native Americans in many other regions of California, even into the 20th century, the Washoe were not completely displaced from their traditional lands. In 1917, the Washoe Tribe began reacquiring a small part of their traditional lands (Nevers 1976:90–91). The Washoe remain a tribe recognized by the U.S. government and have maintained an established land base. Its 1,200 tribal members are governed by a tribal council that consists of members of the Carson, Dresslerville, Woodfords, and Reno-Sparks Indian colonies, as well as members from nonreservation areas. The contemporary Washoe have developed a comprehensive land use plan (Washoe Tribal Council 1994) that identifies the goals of reestablishing a presence in the Tahoe region and revitalizing Washoe heritage and cultural knowledge, including the harvest and care of traditional plant resources and the protection of traditional properties in the cultural landscape (Rucks 1996:3).

Washoe Place Names

Lake Tahoe was both the spiritual and physical center of the Washoe world. The Washoe lived along its shores, referring to the lake as *Da ow a ga*, which means "edge of lake." The Washoe word *Da ow*, mispronounced by Euro-Americans as "Tahoe," gave rise to the lake's modern name. Freed (1966) and d'Azevedo (1956) reported the locations of several Washoe encampments in the Tahoe Basin. It is important to note that the names of these places are geographic references to camping destinations for multiple family groups and not necessarily the name of a single camp.

According to d'Azevedo (1956:19), the Washoe referred to the "delta" of the Upper Truckee River and Trout Creek as *mesuk malam*, which means "a swamp that is now a meadow." Trout Creek (*ma't'osawhu wa't'a*) and the Upper Truckee River (*imgi' wa't'a, t'sigolhu wa't'a*), drainages that form the Upper Truckee River delta, were also known as *mes a*, a term also applied to the entire Lake Valley (d'Azevedo 1956:85), perhaps indicating the traditional importance of the delta. Two of the most important fisheries and productive wetlands in the subsistence regimes of the Southern Washoe and their Carson Valley neighbors are located in the study area. The Upper Truckee River and Trout Creek have been identified as being among the most productive and desirable Washoe fisheries at Lake Tahoe of the 11 fisheries ranked in testimony gathered for the Washoe Lands Claim Case (Wright n.d.).

Freed (1966) lists two ethnographic camp sites associated with these fisheries:

- *ImgiwO'tha* (cutthroat trout + water course) was the name given to a fishing camp "east of the Upper Truckee River and about one and a half miles from [south] of the lake."

- *mathOcahuwO'tha* (whitefish + water course) was the name given to "an important fall camp on Trout Creek" that was noted as a particularly attractive destination in the late fall when families gathered on their way out of the basin en route to the Pine Nut Mountains or west into the Sierra Nevada foothills for acorns. This camp was also noted because families could spread out, camping near their fish blinds, which they could not do at other fisheries. Families drove whitefish into the shallows, scooped them from the water, and dried and processed them for winter stores. Late berries, another important winter staple, were also gathered at this location.

In his interviews with the Washoe, d'Azevedo (1956:19–20) was given the same names (recorded in varying orthography) as designations for the water course (Trout Creek) itself, although he was told that *mathOcahuwO'tha* was a recent name for Trout Creek, known formerly as *t'sigóhu w'át'a* (kidney [shaped] + water course), according to Roma James (the father of Washoe Elder Steven James, mentioned below) and George Snooks. d'Azevedo was also given this name for a tributary of Trout Creek located upstream "near Sierra House" (along Pioneer Trail). In addition, according to d'Azevedo, *Meshuk málam* (medicine + confluence) was the name for the delta or wetland where the Upper Truckee River and Trout Creek converge into a wetland (the Upper Truckee Marsh) before entering the lake.

Nevers (1976:6) gives the same names (with varying orthography) and locations of camps for the same areas as those given by Freed (1966), stating that the Carson Valley and Southern Washoe used the camps at Trout Creek, "catching plentiful whitefish" and that "at *Imigi Watah,* the Washoe caught cutthroat trout which were big enough to pull a man into the water." In addition, Scott (1957:187) presents pictures of two Washoe women, dating from October 19, 1901, and taken northeast of the Upper Truckee River, with a portion of the marsh in the background. The caption identifies the women as being "near their summer campground."

These camp locales have been confirmed in more recent ethnographic and oral history research. Steven James relates that his younger brother, Ivan, was born in the camp their family occupied close to Trout Creek, east of and adjacent to U.S. 50 (d'Azevedo 1956:18). James remembers that the area upstream was important "for many families" and believes that families would have had particular places along this river that they returned to each year. His family's camp (where Ivan was born) was near the present-day highway and located in a stand of lodgepole pine, "all cut down now." He recalls that the fishing was good along the river, up past Sierra House all the way to Star Lake. He also notes that there was an old trail, a shortcut that provided access to Lake Tahoe from Woodfords and passed by the Sierra House site. This trail was described to d'Azevedo (1956:18) as traversing up Willow Creek canyon to Sierra House, via Fountain Place, or *góbiba'* (and perhaps over Armstrong Pass).

The marsh not only was an important fishing location but provided other significant resources. For example, Washoe Elder Florine Conway recalls that there was a particular "gray willow" that grew from the trunks of downed shrubs growing in Trout Creek downstream of U.S. 50. The willows produced desirable long wands sought by weavers of large, ornate baskets (three rod *degiku*) (d'Azevedo 1956:18).

Knox Johnson (Johnson, pers. comm. with Susan Lindström, 2004), a descendant of a pioneer family that grazed cattle along Trout Creek, recalls that the Washoe harvested cutthroat trout in spring, with special emphasis on whitefish in Trout Creek in fall. He also remembers that Washoe Indians camped along Trout Creek near the U.S. 50 bridge as late as the 1950s while they worked summer jobs at the south end of the lake. Johnson further notes that the ten-acre parcel of land in the Highland Woods subdivision, north of U.S. 50 and off Sunset Drive, was a large Washoe Indian camp.

The area that Johnson refers to is likely part of archaeological site CA-ELD-26/H, a large Native American camp that extends along the bluff overlooking the Upper Truckee River/Trout Creek marsh, north of Springwood Drive and containing the former Mosher (Barton) cattle corrals and the Barton family ranch house at "Meadowedge." It is possible that a substantial portion of the surrounding Highland Woods and Sierra Tract subdivisions encompasses this large Native American encampment. Both residential subdivisions were likely constructed where the Washoe fishing camp (known as *Imigi Watah*) was located, as described in detail by Freed (1966), d'Azevedo (1956), and Nevers (1976). The developments are also located adjacent to Trout Creek, an important fall camp that remained a resource and camping area for several families well after contact until increased development and subdivision after World War II ended these arrangements.

Historic-Era Setting

Historic-era activities in the Tahoe Basin and specifically in and in the vicinity of the study area can be discussed in terms of several general trends or themes that have most influenced the current patterns of land use and development: transportation, cattle ranching and agriculture, timber harvesting, and the advent of resort and residential communities. Unless otherwise noted, the information presented below is drawn from the work of Lindström (2004).

Transportation

The opening of the Comstock silver mining boom in Nevada, beginning in mid-1859, prompted a surge in heavy wagon and freight traffic through the Tahoe Basin and the development of roadways and routes that allowed increased and quicker travel though the region. Lindström and Hall (1998) and Scott (1957, 1973) have described these various routes in detail. Those most relevant to the study area are discussed below.

Johnson Pass Road

Johnson Pass Road was one of the earliest road components in the Bonanza Road System between Placerville and the mines of the Comstock Lode. The Bonanza Road System was also known as the Johnson Cut-off, the Lake Road, the Placerville/Lake Tahoe Road, the Lake Bigler Toll Road, the Lake House Road, the Lincoln Highway, and, ultimately, U.S. 50 (Scott 1973:59, 64, 451; TRPA 1971:8). The Bonanza Road (more commonly referred to as the "Old Placerville Road") traversed the Johnson Cut-off over Echo Summit, down to Lake Valley, and then to Mormon Station (Genoa). Laid out in 1852 (probably as a narrow trail), it was passable for wagons sometime before 1854 (Hoover, Rensch, and Rensch 1966:76). The Lake House Road "dogleg" of the Johnson Pass Road branched northward through the present-day Sierra Tract and Highland Woods subdivisions.

The present-day Pioneer Trail, previously referred to as the "back road," was often preferred by freighting teams because it was less sandy than the Lake House Road (Scott 1957:380). Knox Johnson notes that the "Old" Lake House Road was really two roads that joined into a single route through the present-day Sierra Tract subdivision. One road branched from Pioneer Trail near the present fire station, and the other road left Pioneer Trail along Trout Creek, about two miles northeast of Meyers. The two roads merged into one due south of the Sierra Tract subdivision and passed through the subdivision near Carson Street, exiting to cross U.S. 50 at its intersection with O'Malley Drive at the present-day 7-Eleven convenience store.

The "Old" Lake House Road continued north of U.S. 50 through the current Highland Woods subdivision, exiting off Rubicon Trail. From there, the road crossed the marsh on an elevated causeway and entered the Al Tahoe subdivision along Argonaut Avenue. At Lily Street, the road turned east and followed Lakeview Avenue to El Dorado Beach, where it again joined the modern route of U.S. 50. This lakeshore "dogleg" is shown as a major route through Lake Valley on maps dating between 1861 and 1949. The modern route of U.S. 50, which bisects the Sierra Tract subdivision, did not assume prominence in the Lake Valley transportation system until 1949.

Portions of present-day U.S. 50 and Pioneer Trail were also part of the first designated coast-to-coast motor route referred to as the Lincoln Highway. The highway, consisting of a route patched together from preexisting roads and newly built "seedling miles" intended to spur economic growth, started in Times Square, New York City, and ended in Jack London Square in Oakland, California. At the time, the federal government was not involved with the designation and construction of the route. The people primarily responsible for establishing the Lincoln Highway Association in 1913 and conducting all its activities were Henry Joy, president of the Packard Motor Car Company, and Carl Fisher, owner of the Indianapolis Motor Speedway. Mr. Joy and Mr. Fisher, along with other automobile manufacturers and industrialists of the day, had a vested interest in the growth and improvement of roadways in the United States. A better and more extensive road network would lead to increased sales.

In 1921, the federal government passed the Federal Highway Act, which provided $75 million of matching funds to the states for highway construction. However, the act required each state to identify seven percent of its total mileage as "primary"; only these roads would be eligible for federal funds. The Lincoln Highway, already an established and maintained route, was ready for designation as a primary road worthy of federal funding. By the late 1920s, the Lincoln Highway in California was no longer a private enterprise and had been fully absorbed into the federal highway system.

Lake House

Lake Bigler House (referred to as "Lake House") was constructed by Seneca Dean, William W. Lapham, and Robert Garwood Dean on 320 acres they acquired in 1859. It was constructed on a dogleg of Johnson Pass Road that formerly fronted Lake Tahoe one-half mile northeast of the location where the Upper Truckee River empties into the lake. Lake House, Tahoe's first lakeshore hotel (Hoover et al. 1966:84), was erected near what are now Lakeview and Lily Avenues. It was known variously as Lake Bigler House, Lake House, Van Wagener's Hotel, and Dean and Martin's Station, until Thomas B. Rowland established the name Rowland's Lake House and

Station. Discovery of the Comstock Lode in 1859 and attendant construction of a series of toll roads through Tahoe's Lake Valley into the Carson Valley brought throngs of travelers past these doors.

Cattle Ranching and Agriculture

Ranching and farming endeavors that raised beef and dairy cattle and hay and grain in the meadows within and in the vicinity of the marsh were established beginning in the 1860s. Several pioneer ranching and dairy families in the Tahoe region, including the Barton and Johnson families, had land holdings on or near the lower reaches of the Upper Truckee River and Trout Creek drainages adjacent to the study area. In some cases, family ownership dates back to homesteads acquired in the 1860s; for most, however, lands were purchased as cut-over timber holdings in the early 1900s.

Barton Ranch

Barton Ranch was situated in the first meadow north of Yank's Station (Meyers). Homesteaded by cattleman Hiram Barton, who came to California in the 1850s, it served as his Lake Valley "home ranch" during the summer season. Although it supplied feed for the freighting teams and dairy products to the traveler, the holding was not strictly considered a way station in the 1860s. It also served as a lodging house when other establishments on the lakeshore leg of the Johnson Cut-off were filled to capacity. The bottomlands south of the Upper Truckee River's outlet passed through the ranch and milk house, which later would be known as "Meadowedge." The ranch house was located east of the study area and beyond Rubicon Trail. Barton was the father of two girls and seven boys. One of his sons, William D. Barton, was still active in the cattle business in 1955, with his headquarters in the Tahoe Valley (Scott 1957:379).

The ranching industry was seasonal, and Lake Valley (located just south of the study area) was typically used as summer range for livestock. Prior conversations with Barton relatives and friends, such as the Moshers, and the oral history recollections of Alva Barton provide general insights into the migratory dairy and beef enterprise ranching system practiced at Lake Tahoe (see Lindström and Rucks [2002] for additional details). Alva Barton pointed out that although the meadows were located in the mountains, they still needed to be irrigated during the dry season. They were irrigated using a network of water impounding and diverting dams and wing walls, water gates, and miscellaneous earthen water works. Some of these features have been recorded by Lindström (1995, 1996) and Lindström and Rucks (2002, 2003) along the Upper Truckee River within the study area and by Lindström and Hall (1998) along Trout Creek. To enhance pasture production, stock was periodically moved. More recently, the Moshers' grazing practices were modified by local regulations until grazing on the property was finally discontinued.

Johnson Ranch

Johnson family members were pioneers in the Lake Valley area and introduced irrigation practices to neighboring ranchers. Chris Johnson owned considerable land holdings in the vicinity of the study area. Although most of the Johnsons' holdings were centered around Bijou Meadows, the Johnsons also irrigated Trout Creek Meadows. In the early 1900s, in search of additional pastureland, Chris Johnson purchased acreage along the middle reach of Trout Creek in the eastern portion of the present-day Sierra Tract. To purchase the land, he paid $13,000 to the Jacques estate, a firm from Los Angeles that had been involved in developing the Al Tahoe subdivision.

According to Knox Johnson, grandson of Chris Johnson, the family stored water behind two dams on Trout Creek (Lindström, pers. comm., 1996, cited in Lindström and Hall 1998). The upper dam was located at the site of a present-day South Lake Tahoe Public Utility District facility and the lower dam was opposite Knox Johnson's former residence in the Sierra Tract at 1057 Blue Lake Road. Levees were built along both sides of Trout Creek to back up water and flood the meadow, and the family ice house was once located at the present-day muffler shop at 2774 Lake Tahoe Boulevard.

Timber Harvesting

A general history of Comstock-era logging in the Tahoe Basin, with additional information on lumbering in the Lake Valley area, is offered by Lindström and Hall (1998), Myrick (1992), and Scott (1957, 1973).

Several major lumber companies formerly operated in the Tahoe Basin. Each developed an impressive network of sawmills, railroads, tramways, flumes, and rafting operations that was designed to cut and move most of the lumber over the crest of the Carson Range and down to the Comstock mines. The Carson & Tahoe Lumber & Fluming Company (CTLFC) emerged as the chief operator, with holdings in the east-central, south, and southwestern portions of the Tahoe Basin. The company was formed by Bliss and Yerington in 1873, with headquarters at Glenbrook, Nevada.

One of the CTLFC's lumbering operations was centered near present-day Bijou at Taylor's Landing. In 1889, two years after the CTLFC installed its Lake Valley Railroad, it drove double rows of pilings to hold back the sand at the influx of the Upper Truckee River. Pilings were also driven at strategic points along the river, serving as "bumpers" to ease the passage of logs (site CA-ELD-739-H) (Lindström 2004). Logs were floated downstream at high water, and the timber was banked at the outlet. The "go-devil" barge became a familiar sight in the shallow water at the mouth of the river, where it was used to retrieve sunken logs. After the sunken logs were winched to the surface, they were moved to the Glenbrook Mill (Scott 1957:209).

During the 1890s, the CTLFC obtained timber rights to more than 6,000 acres along the south shore of the lake, acquiring rights on Barton family holdings, among others. As the timber business prospered, thousands of men found work as lumberjacks, log rollers, and cordwood splitters. Ranchers and dairymen who provisioned the lumber operations also benefited. Although the larger suppliers of hay and grain were Carson Valley ranchers, supplementary amounts of feed were provided by ranchers and dairymen, such as the Bartons (Lindström and Hall 1998:22).

By the mid-1890s, the South Lake Tahoe area had been stripped of its marketable timber, and large-scale logging in this region ceased.

Resort and Residential Community Development

With the demise of logging, title to land sections in and surrounding the study area could be obtained by paying the back taxes for the property or, at the most, $1.50 an acre. This incentive led to an era of resort and summer-home development that came to characterize much of South Lake Tahoe (Scott 1957:219). Lindström and Hall (1998) have summarized these events that occurred in the vicinity of the study area.

As the Tahoe Basin attracted more tourists, diverse resorts appeared along the shores of the lake. Growing numbers of eastern visitors joined the members of San Francisco's elite and the wealthy mining and business interests of the Comstock Lode at the lake's best hotels. People of more modest means vacationed in rustic hotels and cottages or camped at resort facilities such as Lakeside. The movement toward year-round use of the Tahoe Basin brought building and development to Tahoe's shores, with the need to house employees in addition to the vacationers. Lake Tahoe's south shore was heavily involved with this growth.

By 1908, Chris Johnson owned land along Trout Creek, including a triangular piece of property in the current Sierra Tract subdivision located adjacent to and south of the study area. During the late 1940s, the Johnsons subdivided their parcel, which was bounded on the north by U.S. 50, on the west by O'Malley Drive, and on the east by Trout Creek Marsh, calling it "Johnson Acres No. 2." As part of "Johnson Acres No. 1," they also subdivided property near "the big Indian camp" at Bijou into one-acre lots that sold for $1,100–1,600 each. In 1951 Knox Johnson built his "cabin" at 1057 Blue Lake Road. At this time, there was only one street in the subdivision. Development on the remaining property west of O'Malley Drive, known then as the Tahoe Sierra Subdivision No. 1, No. 3, and No. 4 (and currently known as the Sierra Tract Subdivision), began circa 1945–1946.

The Highland Woods subdivision is located at the southern extent of the Upper Truckee River Marsh, adjacent to and immediately north of U.S. 50. Before it was developed, the land was under the jurisdiction of the U.S. Forest Service (USFS). The earliest part of this subdivision was developed in 1959 as the "Country Crossroads Village." The ten-acre lot located off Sunset Drive, at the western end of the subdivision, was once a sawmill site that was operated during the 1940s by Gus Winkleman, a former supervisor for El Dorado County.

Previous Cultural Resources Investigations

Twenty-seven known cultural resources investigations have been conducted within one-quarter mile of the project area. Of these, nine are in or adjacent to the study area (Table 3.3-2). Many of these investigations have been conducted in relation to erosion control and wetland restoration projects proposed for locations within the study area or on adjacent parcels. Not all of these investigations included intensive field surveys, archival research, oral histories, and consultation with the Washoe Tribe of Nevada and California. An appendix prepared for this EIR/EIS/EIS contains information on the nature and location of cultural resources. In accordance with Section 9 of the Archaeological Resources Protection Act of 1979 (16 United States Code [USC] 470hh) and Section 304 of the National Historic Preservation Act of 1966 (16 USC 470w-3), this information is privileged and is intended for limited distribution only. Thus, that appendix is referred to in this section of the EIR/EIS/EIS as "Confidential Appendix."

Table 3.3-2
Previous Cultural Resources Investigations Conducted in and Adjacent to the Study Area

NCIC Number	Title	Author	Date
None	*Sierra Tract Erosion Control Project—Addendum Cultural Resources Inventory*	Brian Ludwig—EDAW (now AECOM)	2007
None	*Heritage Resource Inventory—Sierra Tract Erosion Control Project*	Susan Lindström	2004
None	*Phase I Addendum—Archaeological Field Inventory Upper Truckee River Wetlands Restoration Project, 400 Acres, South Lake Tahoe California, El Dorado County*	Susan Lindström	1996
8616	*Upper Truckee River Reclamation Project Heritage Resource Study*	Susan Lindström and Penny Rucks	2002
6786	*Archaeological Survey Report—AT&T Wireless Services, Site ID #959002021A—Lake Valley 2435 East Venice Drive, South Lake Tahoe, El Dorado County, California*	Ric Windmiller	2002
2861	*Phase I Literature Review and Preliminary Assessment of Known and Potential Heritage Resources—Upper Truckee River and Wetland Restoration Project*	Susan Lindström	1995
2856	*First Addendum—Historic Property Survey Report for Three Bridges within the Lake Tahoe Basin on State Route 50: El Dorado County, California*	PAR Environmental Services	1991
2869	*An Archeological Reconnaissance of the Lake Tahoe Community College–El Dorado County, California*	Daniel G. Foster—California Department of Forestry and Fire Protection	1982
2850	*An Archaeological Survey of the South Lake Tahoe Bike Trail Project, El Dorado County, California*	David Chavez	1981

Source: Compiled by EDAW (now AECOM) in 2007 and 2012 based on information from the North Central Information Center at California State University, Sacramento

Studies noted in Table 3.3-2 identified ten prehistoric and historic-era cultural resources in the study area. One of these has been recommended eligible for listing in the NRHP and the CRHR, seven are considered not eligible, and two are unevaluated resources (Table 3.3-3).

Table 3.3-3
Cultural Resources Previously Documented in the Study Area

Resource Number	Association	Site Type	Location		NRHP/CRHR Recommendation
			USGS Quadrangle	Section	
CA-ELD-26/H	Prehistoric/ historic	Habitation—lithic scatter—historic refuse	South Lake Tahoe	4	Prehistoric component eligible; historic component not eligible
CA-ELD-721H	Historic	Old Placerville Road	South Lake Tahoe	4, 31	Not eligible
CA-ELD-739H (Locus 1)	Historic	CTLFC pilings	South Lake Tahoe	4	Unevaluated, submerged
CA-ELD-739H	Historic	CTLFC pilings	Emerald Bay	31	Unevaluated, submerged
CA-ELD-2223H	Historic	"Old" Lake House Road	South Lake Tahoe	4	Not eligible
CA-ELD-2235H	Historic/ prehistoric	Dunlap Dam Complex—lithic scatter	South Lake Tahoe	4	Not eligible
CA-ELD-2238H	Historic	Sparse refuse scatter	South Lake Tahoe	31	Not eligible
CA-ELD-2239H	Historic	Fence lines	South Lake Tahoe	4, 31	Not eligible
CA-ELD-2240H	Historic	Roadway	South Lake Tahoe	4	Not eligible
UTR-IF-1	Prehistoric	Isolated chert flake	Emerald Bay	31	Not eligible

Notes: CRHR = California Register of Historical Resources; CTLFC = Carson & Tahoe Lumber & Fluming Company; NRHP = National Register of Historic Places; USGS = U.S. Geological Survey.
Sources: Search by EDAW (now AECOM) at the North Central Information Center in 2007 and 2012

These previously identified resources reflect the prehistoric and ethnographic occupation of the area by Native American peoples and the predominant themes of historic-era activity that occurred throughout much of the Tahoe Basin. The prehistoric resources, particularly the site of CA-ELD-26/H, represent the intensive use of the lakeshore and the adjacent Upper Truckee River Marsh by the Washoe for fishing, the acquisition of other numerous lake and marsh resources, and general habitation. Subsurface testing in 2012 by AECOM archaeologists at CA-ELD-26/H has identified buried prehistoric cultural deposits that appear relatively substantial and intact, suggesting that the site has good physical integrity. In addition, the location of CA-ELD-26/H appears to be consistent with the Washoe fishing camp *Imgiw O'tha*, and ethnographic accounts indicate that the site was used into the 1940s and 1950s. Ethnographic and locational information demonstrates that CA-ELD-26/H was especially important to the Washoe as a village, meeting place, and/or ceremonial site or important in some other capacity and is therefore recommended eligible under NRHP Criterion a and CRHR Criterion 1. The site does not appear to be directly associated with a significant person or persons (NRHP Criterion b, CRHR Criterion 2), nor is it distinctive or the work of a master (NRHP Criterion c, CRHR Criterion 3). Although a portion of the site has been affected by development, the portion in the project area appears to possess good to excellent integrity, indicating that the site retains important scientific information. Therefore, the prehistoric component of CA-ELD-26/H is recommended eligible for listing in the NRHP and CRHR under Criterion d and 4 (data potential), respectively.

Locus C of CA-ELD-26/H appears to be the remains of a short-term flaking event. Because of a lack of data potential, including sufficient quantities of obsidian that may be used for relative dating, and subsurface deposits, Locus C does not appear to contribute to the NRHP eligibility of CA-ELD-26/H under Criteria a and 1.

Because the historic refuse associated with CA-ELD-26/H cannot be associated with a particular activity, event, or theme, these remains are not eligible for inclusion in the NRHP or CRHR.

The single isolated prehistoric artifact (site UTR-IF-1) does not retain any significant data and thus is not eligible for listing in the NRHP and CRHR.

The activities of the early lumber industry are visible in the study area, including the pilings and structural remains in the channel of the Upper Truckee River and on the shore of Lake Tahoe (CA-ELD-739H and CA-ELD-739H Locus 1). These items have been attributed to the CTLFC and appear to be portions of the system used to transport sawed logs from the timber stands to the company's mills for processing. The bumper pilings, situated at a sharp bend in the river channel, were documented by Lindström in 1996 but only the top portions that were not submerged could be observed by AECOM archaeologists from a distance in 2007. The level of the river may have been higher at the time of the 2007 survey than it was in 1996. It is also possible that a collapse of the riverbank, which consists primarily of soft sediments, has obscured this site. The pilings on the shore of the lake at the mouth of the Upper Truckee River were documented by Herschel Davis of the USFS, Lake Tahoe Basin Management Unit, in 1990.

When the pilings on the shore of the lake were first recorded, the lake level was considerably lower at that time than it was in 2007 (California Department of Parks and Recreation Archaeological Site Record—CA-ELD-739H [Confidential Appendix]) when the EDAW (now AECOM) archaeologists conducted their investigations. As a result, only the very top portions of several of the pilings could be seen in 2007, and these were located approximately 100 feet from the present-day shoreline. Due to lack of accessibility no evaluations of the eligibility of either portion of CA-ELD-739H were made at the time of their recording.

Documented sections of the Old Placerville Road (CA-ELD-721H), the "Old" Lake House Road (CA-ELD-2223H), and a portion of an unnamed unpaved roadway (CA-ELD-2240H) all demonstrate the degree to which the area has been influenced by early transportation systems. Although the Upper Truckee River Marsh may not have necessarily been a destination on these roads, the gentle nature of the topography within and in the vicinity of the marsh made it a perfect location for the surveying and constructing early roads. The immediate surroundings of some of these roads have changed little since the roads were originally laid out during the Comstock mining era, but they are little more than wide footpaths now and represent only small portions of the original system. Consequently, none of them have been recommended eligible for listing on the NRHP and CRHR.

The Dunlap dam (CA-ELD-2235/H) is associated with a common historic-era development theme in the Tahoe Basin and is not directly associated with particularly important events in relation to these developments (NRHP Criterion a, CRHR Criterion 1). Although the dam and associated ditches may be associated with specific notable area individuals (Barton and Johnson families) (NRHP Criterion b, CRHR Criterion 2), the features no longer retain the integrity that sufficiently expresses their use and period of significance. They are also commonly encountered features, do not exhibit distinctive characteristics or high artistic values, and are not known to be the works of a recognized master (NRHP Criterion c, CRHR Criterion 3). Lastly, the data potential of these irrigation features (NRHP Criterion d, CRHR Criterion 4) has been fully realized through their documentation; no further important scientific data are likely to be present. Regarding the prehistoric component, the seven obsidian flakes appear to reflect a one-time event associated with tool production/retooling, and lack further data that would contribute to regional research issues. Therefore, the prehistoric component does not appear to be eligible for inclusion in the NRHP or CRHR under Criterion d or 4. Consequently, CA-ELD-2235/H is recommended not eligible for NRHP or CRHR listing.

Cultural resources such as a sparse scatter of 19th- and 20th-century debris (CA-ELD-2238H) and the fence lines (CA-ELD-2239H) are related to ranching, grazing, and general historic-era use of the marsh and the lakeshore. However, these are common historic-era development themes in the Tahoe Basin, and neither of these resources is directly associated with particularly important events in relation to these developments (NRHP Criterion a, CRHR Criterion 1). Although features may be associated with specific notable area individuals (Barton and Johnson families) (NRHP Criterion b, CRHR Criterion 2), they no longer retain the integrity that sufficiently expresses their period of significance. They are also commonly encountered features, do not exhibit distinctive characteristics or high artistic values, and are not known to be the works of a recognized master (NRHP Criterion c, CRHR Criterion 3). Lastly, their data potential (NRHP Criterion d, CRHR Criterion 4) has been fully realized through their documentation; no further important scientific data are likely to be present. Consequently, CA-ELD-2238H and CA-ELD-2239H are recommended not eligible for NRHP or CRHR listing.

2007 AND 2012 SURVEY RESULTS OF DOCUMENTED CULTURAL RESOURCES

In October and November 2007, EDAW (now AECOM) archaeologists conducted an intensive survey of portions of the study area that had not been covered under previous surveys or were subjected to only reconnaissance-level inventories (Exhibit 3.3-1). As a result of the EDAW (now AECOM) 2007 survey, six previously undocumented historic-era resources were recorded (Table 3.3-4). An additional inventory was conducted by AECOM archaeologists in June 2012. No additional previously undocumented cultural resources were recorded during this effort. However, new data were added to the descriptions of sites CA-ELD-26/H and CA-ELD-2235/H (Confidential Appendix).

Table 3.3-4
Cultural Resources Newly Documented in the Study Area

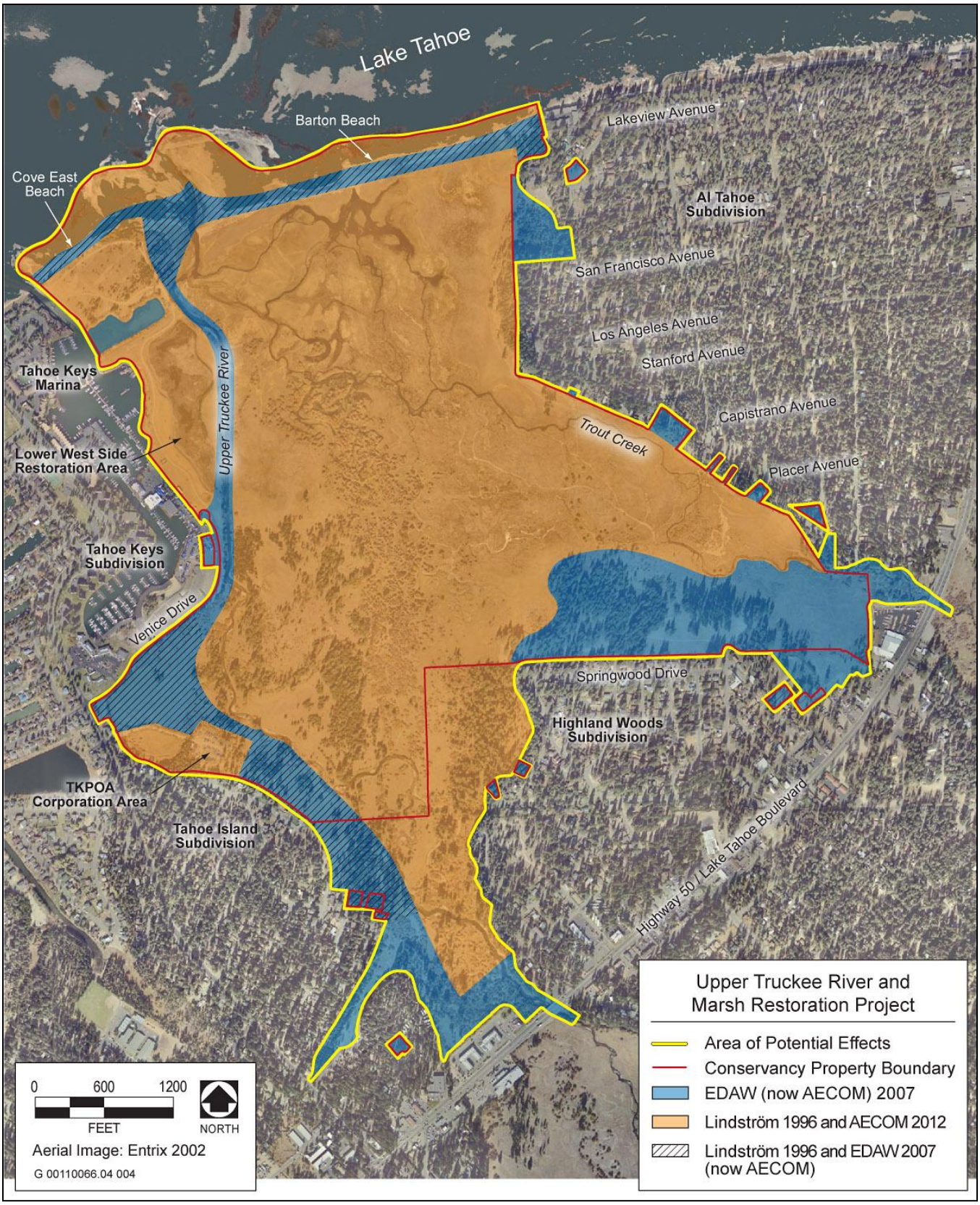
Temporary Resource Number	Association	Site Type	Location		NRHP/CRHR Recommendation
			USGS Quadrangle	Section	
UTRM-1	Historic	Mosher cattle corral	South Lake Tahoe	4	Not eligible
UTRM-2	Historic	Wagon	South Lake Tahoe	4	Not eligible
UTRM-3	Historic	Logging cable and debris	South Lake Tahoe	4	Not eligible
UTRM-4	Historic	Logging cable	South Lake Tahoe	4	Not eligible
UTRM-5	Historic	Boulder pile	South Lake Tahoe	4	Not eligible
UTRM-6	Prehistoric	Isolated obsidian biface	South Lake Tahoe	3	Not eligible

Notes: USGS Quadrangle = U.S. Geological Survey topographic quadrangle map; NRHP = National Register of Historic Places; CRHR = California Register of Historical Resources
Source: Data provided by EDAW (now AECOM) in 2007

Of the six newly recorded sites and features, two appeared related to cattle ranching that occurred in the study area from the middle decades of the 19th century until recent years. Most consisted of isolated features or artifacts, although a "site," a cattle corral and nearby structural remains, was also documented (Confidential Appendix).

UTRM-1

This site consists of a livestock corral identified by Susan Lindström as having been associated with the operations of the Mosher family, who were relatives of the Bartons. Other possible structural remains, including 20th-century poured-concrete footings, were noted adjacent to the corral. The corral features several hinged gates, a truck or wagon ramp for loading or unloading livestock for transportation, and interior fences dividing the main corral into several sections. In general, the entire structure remains in good condition. It appears to have been



Source: Data provided by EDAW (now AECOM) in 2008

Exhibit 3.3-1 **Cultural Resources Survey Map**

altered or repaired in recent years, as evidenced by the placement of several plywood segments or patches that exhibit minimally weathered surfaces. Some segments of the corral fencing, both exterior walls and interior dividers, have partially collapsed in place but have not been dismantled to any great extent. The corral appears to show several stages of construction using expedient materials over a long period. Railroad ties (some even retaining the tie plates and spikes), sawed logs, heavy tree branches or trunks, milled dimensional lumber, and plywood have all been incorporated into the corral. Iron hardware ranges from machine-produced and commercially available hinges, spikes, and wire nails to latches and square-cut nails that may date to as early as the later years of the 19th century. However, given the expedient and opportunistic nature of much of the corral, it is not possible to determine whether the hardware was installed strictly for corral use or whether it was simply attached to reused posts, boards, and other elements of the structure.

Other possible structural remains were noted adjacent to and within approximately 100 feet west of the corral. These remains consist of what may be a recently capped drilled well, two poured concrete blocks or footings, and a general scatter of mid-20th- to late 20th-century refuse. This area is wooded, and the footings and debris appear to be randomly scattered among the trees, all of which appear to be at least 40–50 years old. On the South Lake Tahoe U.S. Geological Survey topographic quadrangle map (photorevised in 1992), two possible buildings are shown in this general location. No other structural remains are present in the area of the corral, and it is assumed that one of the depicted buildings or structures is the Mosher corral.

Although the corral is associated with a notable Tahoe-area ranching family, it has clearly been altered numerous times since its original date of construction. Given the consistent incorporation of reused and expedient materials into the corral, it would be difficult to date specific portions of the structure based on materials and construction methods. In addition, although the corral was built according to functional needs unique to the ranching business, it was not the work of a master (per NRHP and CRHR criteria), nor does it appear to be a particularly early example or a unique structure. Consequently, because of a lack of integrity and significant historical association, this resource is recommended not eligible for listing in the NRHP and CRHR.

UTRM-2

This isolated resource consists of the remains of a farm or ranch wagon possibly dating to as early as the late 19th century. All that remains is the frame, portions of the bed, the front end, side braces, and a portion of the tongue. Although heavily weathered, the wood and iron parts remain in good condition and reflect an early period of construction with the subsequent addition of later hardware. A mix of machine-produced, commercially cast, and hand-forged hardware demonstrates that the wagon was probably used over a long period of time, from a time when hinges, straps, spikes, and brackets were entirely or partially forged by a blacksmith to when such elements were almost exclusively produced in a commercial factory setting.

It is not possible to determine exactly who used this wagon and for what specific purposes. Given its robust construction, it does not appear to have been intended primarily as a vehicle for transporting people. More likely, it was intended to haul material, such as the equipment, supplies, and feed necessary for the daily operation of a ranching enterprise. Given the present location of the wagon, it likely was owned and used by the Barton or Mosher operations.

The wagon is an interesting artifact from a time when ranching was one of the predominant commercial activities in the South Lake Tahoe region, and it may be associated with notable area families; however, it cannot be linked with any specific important historical event or person(s). In addition, much of the original structure of the wagon including the wheels and tires, axles, superstructure, seat, and tongue, are missing. Although what remains is in fairly good condition, much of its structural integrity has been compromised. Consequently, this isolated artifact is recommended not eligible for NRHP/CRHR listing.

UTRM-3 and UTRM-4

These two isolated artifacts consist of 1-inch steel logging cables, or "chokers," most likely used during commercial logging operations within and near the study area. The location of UTRM-3 also includes a sparse scatter of probably related debris, such as the remains of a rubber (not steel-belted) truck tire, and a section of galvanized steel box beam that may have served as a truck bumper. None of these isolated items appears to date to before the 1950s or 1960s. They may be related to expedient lumbering and/or hazardous tree removal that may have been conducted in relation to the construction of nearby houses. Because of their recent vintage and lack of historical association, neither of these artifacts is recommended eligible for NRHP or CRHR listing.

UTRM-5

Situated on the west bank of the Upper Truckee River, this feature consists of a boulder pile partially buried in the bank and extending partially into the river channel. The water-worn boulders incorporated into this pile range from approximately 12 inches to more than 18 inches in diameter and appear to have been purposefully deposited at this location. No other similar deposits were noted along the river channel, and such boulders do not appear to occur naturally within the study area. No other structures, buildings, or other signs of construction are present in the area. Although these boulders are clearly not a natural feature, it is not known why they were placed in this spot. They may represent a localized attempt at riverbank stabilization or the beginnings of a dam or channel diversion project intended to store or reroute water in relation to cattle ranching. Regardless, this feature does not appear to be associated with any significant event, and it clearly does not represent the work of a master or a unique structure. Consequently, it is recommended not eligible for listing in the NRHP and CRHR.

UTRM-6

This isolated artifact consists of a small midsection of an obsidian projectile point. It is not possible to determine a specific projectile point style, although the thin blade and the approximate angle of the edges suggest that it may be an arrow point characteristic of the later prehistoric or early ethnographic periods. Because this artifact is isolated, is not associated with any significant event, and cannot provide further scientific data, it is recommended not eligible for NRHP and CRHR listing.

Paleontological Setting

The study area is located within Holocene-age (11,000 years BP and younger) alluvial fill and Holocene flood plain deposits (Saucedo 2005). To be considered a fossil, an object must be more than 11,000 years old. Therefore, no fossils exist within the study area.

3.3.2 Environmental Consequences and Mitigation Measures

Significance Criteria

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

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to archaeological and historical resources if it would:

- cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the State CEQA Guidelines (CEQA 1);

- cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the State CEQA Guidelines (CEQA 2); or

- disturb any human remains, including those interred outside of formal cemeteries (CEQA 3).

Section 15064.5 generally defines historical resources as (1) a resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR; (2) a resource included in a local register of historical resources or identified as significant in a historical resource survey; and (3) any other object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant, provided that the lead agency's determination is supported by substantial evidence. A substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the historical resource would be materially impaired.

A cultural resource may be eligible for listing in the CRHR if it:

- is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

- is associated with the lives of persons important in our past;

- embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of an important creative individual or possesses high artistic values; or

- has yielded, or may be likely to yield, information important in prehistory or history.

Section 15064.5 generally defines a significant archaeological site as one that is a historical resource or one that meets the definition of a unique archaeological resource in Section 21083.2 of the California Public Resources Code.

NEPA Criteria

Under the National Historic Preservation Act and the regulations in 36 CFR Part 800, the criteria for assessing adverse effects on cultural resources is guided by the specific legal context of the site's significance as set out in Section 106 of the National Historic Preservation Act (16 USC 470), as amended. A property may be listed in the NRHP if it meets criteria for evaluation defined in 36 CFR 60.4:

> The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) that are associated with the lives of persons significant in our past; or
>
> (c) that embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess a artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) that have yielded, or may be likely to yield, information important in prehistory or history.

Most prehistoric archaeological sites are evaluated with regard to Criterion (d) of the NRHP, which refers to site data potential. Such sites typically lack historical documentation that might otherwise adequately describe their important characteristics. Archaeological methods and techniques are applied to gain an understanding of the types of information that may be recovered from deposits at the site. Data sought are those recognized to be applicable to scientific research questions or to other cultural values. For example, shellfish remains from an archaeological deposit can provide information about the nature of prehistoric peoples' diet, foraging range, exploited environments, environmental conditions, and seasons during which various shellfish species were taken. These are data of importance to scientific research that can lead to the reconstruction of prehistoric lifeways. Some archaeological sites may be of traditional or spiritual significance to contemporary Native Americans or other groups, particularly those sites that are known to contain human burials.

Site integrity is also a consideration for the NRHP eligibility of an archaeological locale. The aspects of prehistoric resources for which integrity is generally assessed are location, setting design, workmanship, feeling, and association. These may be compromised to some extent by cultural and postdepositional factors (e.g., highway construction, erosion, bioturbation), yet the resource may still retain its integrity for satisfying Criterion (d) if the important information residing in the site survives. Conversely, archaeological materials such as shells may not be present in sufficient quantity or may not have adequate preservation for accurate identification. Thus, their potential as data to address important research questions is significantly reduced. Assessment of these qualities is particularly important for archaeological properties where the spatial relationships of artifacts and features are necessary to determine the patterns of past human behavior.

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

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative would result in a significant impact on archeological or historical resources if it would:

- result in an alteration of or adverse physical or aesthetic effect to a significant archaeological or historical site, structure, object, or building (TRPA 1);
- have the potential to cause a physical change that would affect unique ethnic cultural values (TRPA 2); or
- restrict historic or prehistoric religious or sacred uses within the potential impact area (TRPA 3).

The TRPA Initial Environmental Checklist also includes criteria that identify the potential for significant impacts if a project is located on a property with known cultural, historical, and/or archaeological resources, or associated with any historically significant events and/or sites or persons. In this EIR/EIS/EIS, these criteria were considered to be included in the other TRPA criteria listed above.

METHODS AND ASSUMPTIONS

Impacts on archaeological and historical resources that would result from the project were identified by considering how implementation of the project alternatives would affect the integrity of cultural resources and human remains identified within or immediately adjacent to the study area. Evaluation of potential impacts on archaeological and historical resources was based on a review of archaeological reports, historic maps, and other documents relevant to the study area, and consultation with the Native American community. This evaluation also included an intensive field inventory with limited testing of portions of the study area not previously subjected to archaeological surveys.

EFFECTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Restrict religious or sacred uses within the potential impact area (TRPA 3)—The proposed alternatives would not physically restrict religious or sacred uses in the study area, nor would the alternatives change future management of the study area. Consequently, there would be no impacts to religious or sacred uses.

IMPACT ANALYSIS AND MITIGATION MEASURES

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

IMPACT 3.3-1 (Alt. 1) **Damage to or Destruction of Documented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *One potentially significant cultural resource (CA-ELD-26/H) has been identified within the study area and could be adversely affected during construction. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in areas that could have the potential to find significant resources in the vicinity of CA-ELD-26/H. Additionally, project construction personnel would be trained on the possibility of encountering potentially significant resources; if such resources were encountered, proper measures would be taken to protect them. Furthermore, final design of the bike path will completely avoid the CA-ELD-26/H site and the adjacent areas. Therefore, this impact would be* ***less than significant****.*

A total of 16 prehistoric and historic-era sites, features, and artifacts have been identified within the study area. Of these, only one prehistoric site, CA-ELD-26/H, is recommended as significant under CEQA, NEPA, and TRPA criteria. Site CA-ELD-26/H is recommended as eligible for listing in the NRHP and CRHR because of its importance to the Washoe people as a fishing camp and for its data potential; future research could provide information important to researching issues related to prehistoric and ethnographic Washoe occupation of the Tahoe Basin. Under Alternative 1, several proposed bike paths and viewpoints, as well as staging areas and haul roads, have the potential to affect portions of the landform in the vicinity of the Highland Woods subdivision, where materials associated with site CA-ELD-26/H have been documented. As evidenced by archaeological and ethnographic information, the edge of this landform (a low bluff situated above the marsh) would have been an important habitation and activity locale for the Washoe during prehistoric periods and into the historic era. Proposed staging areas and haul roads in the vicinity of the Rubicon Trail access points (to the study area) have the potential to uncover in-situ artifacts and features directly related to site CA-ELD-26/H.

As described in Environmental Commitment (EC) 2, "Prepare and Implement a Cultural Resources Protection Plan" (Table 2-6), the Conservancy would install construction barriers around site CA-ELD-26/H, educate construction workers about site protection requirements, and ensure that a qualified cultural resource specialist would oversee initial grading activities within the vicinity of the bluff. The purpose of monitoring would be to ensure that cultural resources potentially uncovered during ground-disturbing activities are identified, evaluated for significance, and treated in accordance with their possible NRHP and CRHR status. Furthermore, because the proposed bike path loop on the bluff cannot be redesigned around the CA-Eld-26/H site, the facility will be removed from the final design. To avoid further disturbance of this area, no user-created trails would be removed from the area. The bike path, on the far end of the bluff, crossing Trout Creek to the Al Tahoe neighborhood would remain in the proposed project. The Conservancy, through the cultural resources protection plan, would ensure that a cultural resource specialist would oversee initial grading to make certain that any cultural resource discovered are identified, evaluated for significance, and treated in accordance with their possible NRHP and CRHR status.

Potential treatment methods for significant and potentially significant resources may include but would not be limited to taking no action (i.e., resources determined not to be significant), avoiding the resource by changing construction methods or project design, and implementing a program of testing and data recovery, in accordance with all applicable federal and state requirements. With implementation of EC 2, this impact would be **less than significant**.

IMPACT 3.3-2 (Alt. 1) **Damage to or Destruction of Undocumented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *Although the study area has been surveyed for cultural resources, significant buried archaeological materials may be present that could be adversely affected by project grading and excavation. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in known resource areas and training of project construction personnel on the possibility of encountering significant resources; if such resources were encountered, proper measures would be taken to protect them. This impact would be* ***less than significant.***

The potential exists for previously unidentified prehistoric and historic-era archaeological sites, features, and artifacts within the study area to be uncovered prior to or during construction-related ground-disturbing activities. Although the study area has been intensively surveyed for surface and near-surface traces of early Native American and historic-era activities and remains, if such traces are present below ground but obscured, they would not have been documented with the surface inventories performed within the study area. Because such resources could be uncovered during project implementation (e.g., construction of new river channels, recreational facilities, and paths) and could be determined to represent significant cultural resources in accordance with CEQA, NEPA, and TRPA criteria.

As described in EC 2 (Table 2-6), the Conservancy would prepare and implement a cultural resources protection plan. The plan would include training project construction personnel on the possibility of encountering significant resources; if such resources were encountered, proper measures would be taken to protect those resources until further determination could be made. The Conservancy would retain a qualified cultural resources specialist to educate personnel on how to identify prehistoric and historic-era archaeological remains. If unusual amounts of stone, bone, or shell or significant quantities of historic-era artifacts such as glass, ceramic, metal, or building remains were to be uncovered during construction activities, work in the vicinity of the specific construction site at which the suspected resources were uncovered would be suspended, and the Conservancy would be contacted immediately. The education of construction personnel on the character of potential cultural resources discoveries increases the likelihood that if potentially significant sites, features, or artifacts were to be encountered, they would be identified early in construction activities. As described by Impact 3.3-1 (Alt. 1), the Conservancy would also hire a qualified cultural resource specialist to oversee initial grading and construction activities in the vicinity of CA-ELD-26/H, where proposed grading has the potential to uncover in-situ artifacts and features directly related to site CA-ELD-26/H or other general prehistoric and ethnographic occupations of the bluff. Oversight, training, and early discovery would result in their documentation and preservation, and impacts on them would be reduced or avoided. Consequently, this impact would be **less than significant**.

IMPACT 3.3-3 (Alt. 1) **Damage to or Destruction of Previously Undocumented Human Remains during Construction. (CEQA 3)** *Project-related construction activities could uncover or otherwise disturb previously undiscovered prehistoric or historic-era human remains. However, as described in Environmental Commitment 3, the Conservancy and its contractor would stop work and inform the El Dorado County Coroner of the discovery of human remains if uncovered during project construction. This impact would be* ***less than significant****.*

Although no human remains have been listed or recorded within or in the immediate vicinity of the study area, previously undiscovered human remains could be uncovered by project construction activities. However, as described in EC 3, "Stop Work Within an Appropriate Radius Around the Discovered Human Remains, Notify the El Dorado County Coroner and the Most Likely Descendants, and Treat Remains in Accordance With State and Federal Law" (Table 2-6), the Conservancy would inform the El Dorado County Coroner of the discovery of human remains if uncovered during project construction. If Native American remains were to be discovered, they would be protected until consultation with the MLD has taken place and recommendations made. Adherence to Section 7050.5(b) of the Health and Safety Code and Section 5097.9 would result in treatment and disposition of human remains in accordance with state law and/or the wishes of the MLD in the case of the discovery of Native American human remains. Consequently, this impact would be **less than significant**.

IMPACT 3.3-4 (Alt. 1) **Damage to or Destruction of Documented Potentially Significant Cultural Resources Resulting from Public Access Features. (CEQA 1, 2; TRPA 1, 2)** *The proposed bicycle path loop would be located close to CA-ELD-26/H. However, due to the fact the bike path loop could not be redesigned to avoid the CA-ELD-26/H site the path will be removed from the final design. The bike path from the Rubicon trail access point to the Al Tahoe neighborhood would remain due to the fact it is not in the vicinity of the CA-ELD-26/H site. However, with the implementation of Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include assurances that final design placement and orientation of recreation facilities would incorporate features to minimize visibility and access that could otherwise lead to damage or destruction of prehistoric site CA-ELD-26/H. This impact would be* ***less than significant****.*

Implementation of Alternative 1 would eliminate user-created trails at and near prehistoric site CA-ELD-26/H and UTRM-1. The removal of these trails would reduce existing adverse effects on the integrity of these sites. The long-term use of the bike path proposed in the immediate vicinity of site CA-ELD-26/H has the potential to draw attention to the location and character of these potentially significant sites, and to facilitate looters or casual souvenir hunters removing surface artifacts or engaging in illicit subsurface excavation. Such activities could affect the integrity of this site over time, dramatically reducing the data potential, and physical integrity and setting of CA-ELD-26/H. Such losses of data potential and integrity could cause this resource to be determined no longer eligible for listing on the NRHP/CRHR. Because of these potential effects and the fact the bike path loop cannot be redesigned, this facility will be removed from the final design. The bike path that is proposed to connect the Rubicon Trail access point to the Al Tahoe neighborhood will remain in the project because it is not in the vicinity of site CA-ELD-26/H. Furthermore, as described in EC 2 (Table 2-6), the Conservancy would prepare a cultural resources protection plan that would include assurances that final design placement and orientation of recreation facilities would incorporate features to minimize visibility and access that could otherwise lead to damage or destruction of prehistoric site CA-ELD-26/H. Therefore, this impact would be **less than significant**.

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

IMPACT 3.3-1 (Alt. 2) **Damage to or Destruction of Documented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *One potentially significant cultural resource (CA-ELD-26/H) has been identified within the study area and could be adversely affected during construction. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in staging areas that are in the vicinity of significant resources. Furthermore, staging proposed on the bluff will completely avoid the CA-ELD-26/H site. Therefore, this impact would be* ***less than significant****.*

A total of 16 prehistoric and historic-era sites, features, and artifacts have been identified within the study area. Of these, only one prehistoric site, CA-ELD-26/H, is recommended as significant under CEQA, NEPA, and TRPA criteria. Site CA-ELD-26/H is recommended as eligible for listing in the NRHP and CRHR because of its importance to the Washoe people as a fishing camp and for its data potential; future research could provide information important to researching issues related to prehistoric and ethnographic Washoe occupation of the Tahoe Basin. Under Alternative 2, no permanent features are proposed in the vicinity of CA-ELD-26/H; however, staging areas and haul roads have the potential to affect portions of the landform in the vicinity of the Highland Woods subdivision, where materials associated with site CA-ELD-26/H have been documented. As evidenced by archaeological and ethnographic information, the edge of this landform (a low bluff situated above the marsh) would have been an important habitation and activity locale for the Washoe during prehistoric periods and into the historic era. Proposed staging areas and haul roads in the vicinity of the Rubicon Trail access points (to the study area) have the potential to uncover in-situ artifacts and features directly related to site CA-ELD-26/H.

As described in EC 2, "Prepare and Implement a Cultural Resources Protection Plan" (Table 2-6), the Conservancy would install construction barriers around site CA-ELD-26/H, educate construction workers about site protection requirements, and ensure that a qualified cultural resource specialist would oversee initial grading

activities within the vicinity of the bluff. The purpose of this monitoring would be to ensure that cultural resources potentially uncovered during ground-disturbing activities are identified, evaluated for significance, and treated in accordance with their possible NRHP and CRHR status. Potential treatment methods for significant and potentially significant resources may include but would not be limited to taking no action (i.e., resources determined not to be significant), avoiding the resource by changing construction methods or project design, and implementing a program of testing and data recovery, in accordance with all applicable federal and state requirements. With implementation of EC 2, this impact would be **less than significant**.

IMPACT 3.3-2 (Alt. 2) **Damage to or Destruction of Undocumented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *Although the study area has been surveyed for cultural resources, significant buried archaeological materials may be present that could be adversely affected by project grading and excavation. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in known resource areas and training of project construction personnel on the possibility of encountering significant resources; if such resources were encountered, proper measures would be taken to protect them. This impact would be* ***less than significant.***

This impact would be the same as Impact 3.3-2 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.3-3 (Alt. 2) **Damage to or Destruction of Previously Undocumented Human Remains during Construction. (CEQA 3)** *Project-related construction activities could uncover or otherwise disturb previously undiscovered prehistoric or historic-era human remains. However, as described in Environmental Commitment 3, the Conservancy and its contractor would stop work and inform the El Dorado County Coroner of the discovery of human remains if uncovered during project construction. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.3-3 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.3-4 (Alt. 2) **Damage to or Destruction of Documented Potentially Significant Cultural Resources Resulting from Public Access Features. (CEQA 1, 2; TRPA 1, 2)** *Alternative 2 does not include public access features that could draw attention to the location and character of significant cultural resources, or that could facilitate access to areas where significant cultural resources have been documented. This impact would be* ***less than significant****.*

An increase in public attention or access, with accompanying increased risks for looting or artifact collecting, would constitute a potentially significant impact. Because Alternative 2 does not include operating paths or viewpoints in the immediate vicinity of significant cultural resources, there would not be an increase in public attention or access to significant cultural resources documented within the study area. Consequently, Alternative 2 does not pose a long-term threat to the integrity of sites, features, or artifacts recommended as eligible for listing in the NRHP and CRHR. This impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.3-1 (Alt. 3) **Damage to or Destruction of Documented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *One potentially significant cultural resource (site CA-ELD-26/H) has been identified within the study area and could be adversely affected by construction and/or implementation of Alternative 3. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in areas that could have the potential to find significant resources. Additionally, project construction personnel would be trained on the possibility of encountering potentially significant resources; if such resources were encountered, proper measures would be taken to protect them. Furthermore, final design of the bike path/pedestrian trail will completely avoid the bluff area and CA-ELD-26/H. Therefore, this impact would be* ***less than significant****.*

Alternative 3 proposes the construction of a bike path within the boundaries of and in the vicinity of site CA-ELD-26/H. Alternative 3 also proposes to construct access haul roads and staging areas immediately adjacent to the CA-ELD-26/H site. Construction of the proposed recreational facilities, access/haul roads, and staging areas has the potential to affect portions of site CA-ELD-26/H (recommended eligible for listing in the NRHP and CRHR) and/or artifacts and features possibly associated with this site that have not yet been documented on the landform located above the marsh. As described in EC 2 (Table 2-6), the Conservancy would prepare and implement a cultural resources protection plan. As part of the plan, construction barriers would be installed around site CA-ELD-26/H, construction workers would be educated about site protection requirements, and a qualified cultural resource specialist would oversee initial grading activities in the vicinity of the bluff. Furthermore, because the proposed bike path/pedestrian trail loop on the bluff cannot be redesigned around the CA-Eld-26/H site, the facility will be removed from the final design.

Potential treatment methods for significant and potentially significant resources may include but would not be limited to taking no action (i.e., resources determined not to be significant), avoiding the resource by changing construction methods or project design, and implementing a program of testing and data recovery, in accordance with all applicable federal and state requirements. With implementation of EC 2, this impact would be **less than significant**.

IMPACT 3.3-2 (Alt. 3) **Damage to or Destruction of Undocumented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *Although the study area has been surveyed for cultural resources, significant buried archaeological materials may be present that could be adversely affected by project grading and excavation. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in known resource areas and training of project construction personnel on the possibility of encountering significant resources; if such resources were encountered, proper measures would be taken to protect them. This impact would be* ***less than significant.***

This impact would be the same as Impact 3.3-2 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.3-3 (Alt. 3) **Damage to or Destruction of Previously Undocumented Human Remains during Construction. (CEQA 3)** *Project-related construction activities could uncover or otherwise disturb previously undiscovered prehistoric or historic-era human remains. However, as described in Environmental Commitment 3, the Conservancy and its contractor would stop work and inform the El Dorado County Coroner of the discovery of human remains if uncovered during project construction. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.3-3 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.3-4 (Alt. 3) **Damage to or Destruction of Documented Potentially Significant Cultural Resources Resulting from Public Access Features. (CEQA 1, 2; TRPA 1, 2)** *Increased public access over time has the potential to lead to damage or destruction of site CA-ELD-26/H. The proposed bicycle path/pedestrian trail loop would be located in and adjacent to CA-ELD-26/H. Because this facility cannot be redesigned to avoid the CA-ELD-26/H site, it will be removed from the final design. This impact would be* ***less than significant****.*

This impact would be similar to Impact 3.3-4 (Alt. 1) except for the fact there would be no bike path connecting the Rubicon Trial access point to the Al Tahoe neighborhood and therefore would not need special design features to reduce potential impacts to the CA-ELD-26/H site. Therefore, this impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.3-1 (Alt. 4) ***Damage to or Destruction of Documented Potentially Significant Cultural Resources during Construction.*** **(CEQA 1, 2; TRPA 1, 2)** *One potentially significant cultural resource (site CA-ELD-26/H) has been identified within the study area and could be adversely affected by project implementation. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include oversight of grading in areas that could have the potential to find significant resources. Additionally, project construction personnel would be trained on the possibility of encountering potentially significant resources; if such resources were encountered, proper measures would be taken to protect them. Furthermore, final design of the bike path will completely avoid the bluff area and CA-ELD-26/H. This impact would be* ***less than significant****.*

Alternative 4 proposes the construction of a bike path either on or within the immediate vicinity of site CA-ELD-26/H. Ground-disturbing activities associated with the construction of this path have the potential to physically disturb or destroy site CA-ELD-26/H. Alternative 4 would also include several staging areas; two would be placed north of the Sunset Drive Access Point and one on the Conservancy parcel south of U.S. 50. Construction of the proposed bike path and staging areas has the potential to affect portions of the landform in the vicinity of the Highland Woods subdivision, where materials associated with site CA-ELD-26/H have been documented. As evidenced by archaeological and ethnographic information, the edge of this landform (a bluff situated above the marsh) would have been an important habitation and activity locale for the Washoe during prehistoric periods and into the historic era. Ground-disturbing activities associated with the construction of the bike path and staging areas has the potential to uncover significant archaeological materials associated with site CA-ELD-26/H.

However, as described in EC 2 (Table 2-6), the Conservancy would prepare and implement a cultural resources protection plan. As part of the plan, construction barriers would be installed around site CA-ELD-26/H, construction workers would be educated about site protection requirements, and a qualified cultural resource specialist would oversee initial grading activities in the vicinity of the bluff. Furthermore, because the proposed bike path on the bluff cannot be redesigned around the CA-Eld-26/H site, the facility will be removed from the final design.

Potential treatment methods for significant and potentially significant resources may include but would not be limited to taking no action (i.e., resources determined not to be significant), avoiding the resource by changing construction methods or project design, and implementing a program of testing and data recovery, in accordance with all applicable Federal and State requirements. With implementation of EC 2, this impact would be **less than significant.**

IMPACT 3.3-2 (Alt. 4) **Damage to or Destruction of Undocumented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *Although the study area has been surveyed for cultural resources, significant buried archaeological materials may be present that could be affected by project grading and excavation. However, as described in Environmental Commitment 2, the Conservancy would prepare a cultural resources protection plan that would include training project construction personnel to the possibility that significant resources could be encountered, and if encountered, proper measures would be taken to protect those resources. This impact would be* ***less than significant.***

This impact would be the same as Impact 3.3-2 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.3-3 (Alt. 4) **Damage to or Destruction of Previously Undocumented Human Remains during Construction. (CEQA 3)** *Project-related construction activities could uncover or otherwise disturb previously undiscovered prehistoric or historic-era human remains. However, as described in Environmental Commitment 3, the Conservancy and its contractor would stop work and inform the El Dorado County Coroner of the discovery of human remains if uncovered during project construction. This impact would be* ***less than significant****.*

This impact would be the same as Impact 3.3-3 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.3-4 (Alt. 4) **Damage to or Destruction of Documented Potentially Significant Cultural Resources Resulting from Increased Public Access. (CEQA 1, 2; TRPA 1, 2))** *Increased public access over time has the potential to lead to damage or destruction of site CA-ELD-26/H. The proposed bicycle path loop would be located in and adjacent to CA-ELD-26/H. Because this facility cannot be redesigned to avoid the CA-ELD-26/H site, it will be removed from the final design. This impact would be* ***less than significant****.*

This effect would be the same as Impact 3.3-4 (Alt. 3). For the same reasons as described above, this effect would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.3-1 (Alt. 5) **Damage to or Destruction of Documented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *One potentially significant cultural resource has been identified within the study area. However, because no construction activities are foreseeable under this alternative, these resources would not be affected.* ***No impact*** *would occur.*

One potentially significant cultural resource (site CA-ELD-26/H) has been identified within the study area. However, because no construction activities are foreseeable within the study area, this documented potentially significant cultural resource would not be affected by construction activities. **No impact** would occur.

IMPACT 3.3-2 (Alt. 5) **Damage to or Destruction of Undocumented Potentially Significant Cultural Resources during Construction. (CEQA 1, 2; TRPA 1, 2)** *Significant buried archaeological materials may be present in the study area. However, no construction activities are foreseeable under this alternative. Therefore,* ***no impact*** *would occur.*

Although the study area has been surveyed for cultural resources, significant buried archaeological materials may be present and could be adversely affected by project grading and excavation. However, under Alternative 5 no construction activities are foreseeable in the study area. Therefore, **no impact** would occur.

IMPACT 3.3-3 (Alt. 5) **Damage to or Destruction of Previously Undocumented Human Remains during Construction. (CEQA 3)** *No construction activities would occur. Thus, human remains would not be disturbed.* ***No impact*** *would occur.*

No construction activities would occur in the study area under Alternative 5. Thus, previously undiscovered prehistoric or historic-era human remains would not be uncovered or otherwise disturbed by construction activities. **No impact** would occur.

IMPACT 3.3-4 (Alt. 5) **Damage to or Destruction of Documented Potentially Significant Cultural Resources Resulting from Increased Public Access. (CEQA 1, 2; TRPA 1, 2)** *Continued public access has the potential to lead to damage or destruction of site CA-ELD-26/H over time. However, under this alternative, no additional recreation infrastructure is proposed in the vicinity of CA-ELD-26/H and thus, a substantial adverse effect on these potentially significant cultural resources would be similar to existing conditions. Thus, this impact would be* ***less than significant****.*

Looting and souvenir collecting can be inadvertently encouraged by public access and can severely affect the integrity of a site or feature that has been recommended eligible for listing in the NRHP and CRHR. Public access along existing user-created trails in the vicinity of CA-ELD-26/H has the potential to lead to damage or destruction of site CA-ELD-26/H over time. However, under this alternative, no additional recreation infrastructure is proposed in the vicinity of CA-ELD-26/H. Therefore, substantial adverse effects on these cultural resources caused by looting and souvenir-collecting related to the project would be similar to existing conditions. This impact would be **less than significant**.

3.4 BIOLOGICAL RESOURCES: VEGETATION AND WILDLIFE

This section describes the vegetation and wildlife (terrestrial biological) resources that are known or have the potential to occur in the study area and the project vicinity. These resources include common vegetation, wildlife, and sensitive habitats; and special-status plant and animal species. Aquatic resources are discussed in Section 3.5, "Fisheries." Cumulative vegetation and wildlife impacts are addressed in Section 3.16, "Cumulative Impacts." Consistency with TRPA goals and policies is presented in Section 3.10, "Land Use," Table 3.10-1. The project's effects on thresholds are described in Section 4.5, "Consequences for Environmental Threshold Carrying Capacities."

3.4.1 AFFECTED ENVIRONMENT

REGULATORY SETTING

Federal

The following federal laws related to vegetation and wildlife are relevant to the proposed alternatives and are described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- Federal Endangered Species Act (ESA)
- Migratory Bird Treaty Act (MTBA)
- Section 404 of the Clean Water Act (CWA)

State

The following state laws related to vegetation and wildlife are relevant to the proposed alternatives and are described in detail in Chapter 5, "Compliance, Consultation, and Coordination":

- California Endangered Species Act (CESA)
- California Fish and Game Code Section 1602—Streambed Alterations
- California Fish and Game Code Sections 3503–3503.5—Protection of Bird Nests and Raptors
- Section 401 Water Quality Certification/Porter-Cologne Water Quality Control Act

Tahoe Regional Planning Agency

Goals and Policies

The Conservation Element (Chapter IV) of the TRPA Goals and Policies establishes goals for the preservation, development, utilization, and management of natural resources within the Tahoe Basin (TRPA 2006). These policies and goals are designed to achieve and maintain adopted environmental threshold carrying capacities and are implemented through the TRPA Code of Ordinances.

The Conservation Element includes ten subelements that address the range of Lake Tahoe's natural and historical resources. The Vegetation, Wildlife, and Stream Environment Zone subelements are discussed in this section, and the goals related to each of these subelements are identified below.

Chapter IV of the Goals and Policies identifies the following five goals for vegetation:

- Provide for a wide mix and increased diversity of plant communities.

- Provide for maintenance and restoration of such unique ecosystems as wetlands, meadows, and other riparian vegetation.

- Conserve threatened, endangered, and sensitive plant species and uncommon plant communities.
- Provide for and increase the amount of late seral/old-growth stands.
- Retain appropriate stocking levels and distribution of snags and coarse woody debris in the region's forests to provide habitat for organisms that depend on such features and to perpetuate natural ecological processes.

The two goals identified for wildlife are as follows:

- Maintain suitable habitats for all indigenous species of wildlife without preference to game or nongame species through maintenance of habitat diversity.
- Preserve, enhance, and where feasible, expand habitats essential for threatened, endangered, rare, or sensitive species found in the Basin.

The Stream Environment Zone (SEZ) subelement contains an additional goal:

- Provide for the long-term preservation and restoration of SEZs.

In addition to these broader goals identified within the Conservation Element, special attainment goals have been developed to further focus management efforts and provide a measure of progress. These attainment goals are defined by the TRPA Thresholds. The Conservation Element specifically identifies several attainment goals or thresholds for certain vegetation and wildlife resources. TRPA thresholds are discussed in the "TRPA Environmental Threshold Carrying Capacities" section below.

Code of Ordinances

The applicable provisions of the TRPA Code of Ordinances regarding vegetation and wildlife are summarized below.

Protection and Management of Vegetation

The Code of Ordinances requires the protection and maintenance of all native vegetation types. Section 61.3, "Vegetation Protection and Management," provides for the protection of SEZ vegetation, other common vegetation, uncommon vegetation, and sensitive plants (TRPA 2011). TRPA defines an SEZ as an area that owes its biological and physical characteristics to the presence of surface water or groundwater. The term SEZ includes perennial, intermittent, or ephemeral streams; meadows and marshes; and other areas with near-surface water influence within the Tahoe Basin. No project or activity may be implemented within the boundaries of an SEZ except as otherwise permitted for habitat improvement, dispersed recreation, vegetation management, or as provided in Chapter 30 of the Code of Ordinances.

Protection of Sensitive and Uncommon Plants

Section 61.3.6, "Sensitive and Uncommon Plant Protection and Fire Hazard Reduction," of the TRPA Code of Ordinances establishes standards for preserving and managing sensitive plants and uncommon plant communities. Projects and activities that are likely to harm, destroy, or otherwise jeopardize sensitive plants or their habitat must fully mitigate their significant adverse effects. Measures to protect sensitive plants and their habitat include:

- fencing to enclose individual populations or habitat;
- restricting access or intensity of use;
- modifying project design as necessary to avoid adverse impacts;
- dedicating open space to include entire areas of suitable habitat; or
- restoring disturbed habitat.

Tree Removal

TRPA regulates the management of forest resources in the Tahoe Basin to achieve and maintain the environmental thresholds for species and structural diversity, to promote the long-term health of the resources, and to create and maintain suitable habitats for diverse wildlife species. Provisions for tree removal are provided in Section 61.1 of the Code of Ordinances. Chapter 36 and Sections 33.6, 61.3.6, and 61.4 also include provisions for tree protection during project design and implementation. Tree removal requires the review and approval of TRPA (TRPA 2011).

Project proponents must obtain a tree permit from TRPA for all cutting of trees greater than 14 inches in diameter at breast height (dbh). (At its November 2007 meeting, the TRPA Governing Board approved an increase in the tree-diameter threshold for a permit from 6 inches to 14 inches; the revised ordinance that reflects this change is currently in effect [Thayer, pers. comm., 2008].) However, trees of any size marked as a fire hazard by a fire protection district or fire department that operates under a memorandum of understanding with TRPA can be removed without a separate tree permit.

Trees greater than 30 inches dbh must be retained, except under circumstances specified in the Code of Ordinances. As stated in Section 61.1.4.B of the TRPA Code of Ordinances:

> Within non-SEZ urban areas, individual trees larger than 30 inches dbh that are healthy and structurally sound shall be retained as desirable specimen trees having aesthetic and wildlife value, unless no reasonable alternative exists to retain the tree, including reduction of parking areas or modification of the original design.

In addition, trees and vegetation not scheduled to be removed must be protected during construction in accordance with Section 33.6 of the TRPA Code of Ordinances.

If a project would result in substantial tree removal (as defined by TRPA Code Section 61.1.8), a tree removal or harvest plan must be prepared by a qualified forester for approval by TRPA. The required elements of this plan are described in Section 61.1.5.C of the Code of Ordinances.

The Code of Ordinances (Chapter 62) also provides quantitative requirements for snag and coarse woody debris retention and protection by forest type in terms of size, density, and decay class.

Wildlife

TRPA sets standards for preserving and managing wildlife habitats, with special emphasis on protecting or increasing habitats of special significance, such as deciduous trees, wetlands, meadows, and riparian areas (TRPA Code of Ordinances, Chapter 62). Specific habitats that are protected include riparian areas, wetlands, and SEZs; wildlife movement and migration corridors; important habitat for any species of concern; critical habitat necessary for the survival of any species; nesting habitat for raptors and waterfowl; fawning habitat for deer; and snags and coarse woody debris. In addition, TRPA special-interest species, which are locally important because of rarity or other public interest, and species listed under the ESA or CESA are protected from habitat disturbance by conflicting land uses.

Section 62.3.2 of the TRPA Code of Ordinances includes the following requirements for protection of wildlife movement and migration corridors:

- SEZs adjoining creeks and major drainages link islands of habitat and shall be managed, in part, for use by wildlife as movement corridors. Structures, such as bridges, proposed within these movement corridors shall be designed to not impede the movement of wildlife.

- Projects and activities in the vicinity of deer migration areas shall be required to mitigate or avoid significant adverse impacts. The location of deer migration areas shall be verified by the appropriate state wildlife or fish and game agencies.

The Code of Ordinances also contains several provisions regarding "critical habitat." TRPA defines critical habitat as any element of the overall habitat for any species of concern that, if diminished, could reduce the existing population or impair the stability or viability of the population. This applies also to habitat for special-interest species native to the Tahoe Basin whose breeding populations have been extirpated, but could return or be reintroduced. Section 62.2.3 of the TRPA Code of Ordinances includes the following critical-habitat provisions:

- No project or activity shall cause, or threaten to cause, the loss of any habitat component considered critical to the survival of a particular wildlife species.
- No project or activity shall threaten, damage, or destroy nesting habitat of raptors and waterfowl or fawning habitat of deer.
- Wetlands shall be preserved and managed for their ecological significance, including their value as nursery habitat to fishes, nesting and resting sites for waterfowl, and as a source of stream recharge, except as permitted pursuant to Chapter 30 of the Code of Ordinances.
- Projects or activities within wetlands may include the creation of artificial nesting sites for waterfowl.

ENVIRONMENTAL SETTING

To evaluate and describe the presence and quality of common and sensitive biological resources in the study area, and to identify potential effects of project implementation on those resources, EDAW (now AECOM) biologists conducted reconnaissance surveys of the site and reviewed the following existing data sources for the Conservancy:

- *Processes and Functions of the Upper Truckee Marsh* (Conservancy and DGS 2003);
- *Upper Truckee River and Wetland Restoration Project: Final Concept Plan Report* (Conservancy and DGS 2006a);
- California Department of Fish and Game (CDFG) California Natural Diversity Database (CNDDB 2010);
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS 2010);
- *List of Endangered and Threatened Species that Occur or May be Affected by Projects in the South Lake Tahoe (522B) USGS 7.5 Minute Quad* (USFWS 2010);
- *Wildlife Inventory and Monitoring in the Lake Tahoe Basin, California: Pre-Restoration* (Borgmann and Morrison 2004);
- *Riparian Biological Diversity in the Lake Tahoe Basin* (Manley and Schlesinger 2001);
- *Lake Tahoe Watershed Assessment* (Murphy and Knopp 2000); and
- other technical sources referenced in this section.

Several focused and reconnaissance-level surveys for wildlife resources have been conducted by ecologists (e.g., Borgmann and Morrison 2004), since restoration planning was initiated in the mid-1990s.

In support of the project, AECOM botanists conducted a survey for special-status plants in the study area on July 25–27, 2007, following CDFG's *Guidelines for Assessing the Effects of Proposed Development on Rare, Threatened, and Endangered Plants and Plant Communities* (CDFG 2000) and the U.S. Fish and Wildlife Service's (USFWS's) *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants* (USFWS 1996). This is considered a "protocol-level" survey (i.e., a survey following specific protocols as determined by appropriate resource agencies). A letter report discussing the findings of this survey is included as an appendix to this document (Appendix G). In conjunction with the special-status plant survey, reconnaissance surveys for vegetation were also conducted by AECOM botanists Mark Bibbo and Richard Dwerlkotte on July 25–27, 2007.

Overview

The study area is approximately 592 acres, excluding the lake area and approximately 40 acres of upland adjacent to the marsh proper. The study area is bordered on the east, south, and west by residential or commercial development; Lake Tahoe borders the study area on the north.

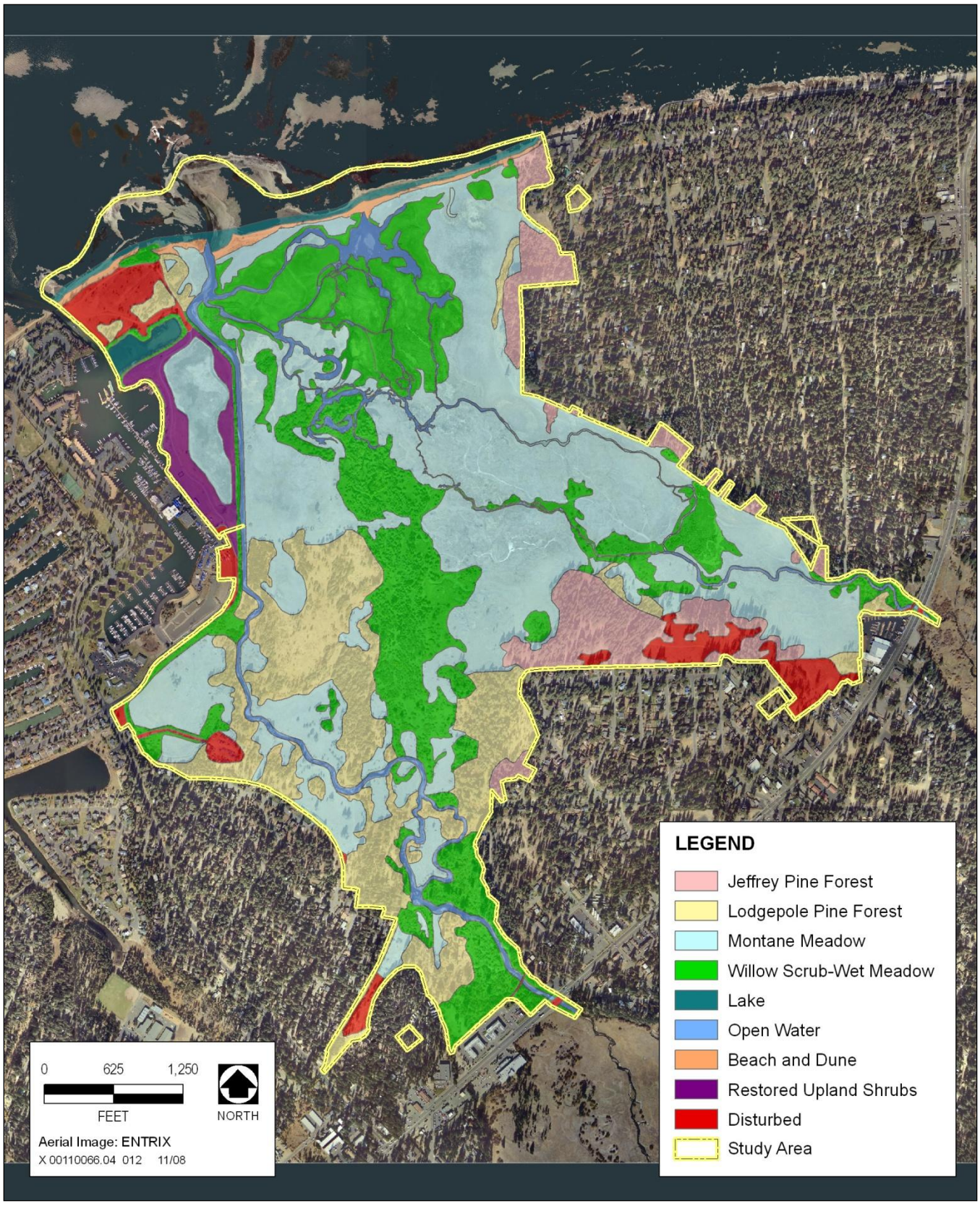
The study area contains the largest remaining wetland in the Tahoe Basin and is a significant conservation area on the south shore of Lake Tahoe. A substantial portion of the study area is cited by Murphy and Knopp (2000) as one of five Ecologically Sensitive Area marshes in the basin because of its size, uniqueness, and potential to support high levels of biodiversity. Wetlands and riparian areas such as those found in the study area provide important habitat for wildlife. The soil and vegetation complexes of riparian and wetland systems produce structurally heterogeneous vegetation and aquatic ecosystems, frequently resulting in diverse biological communities. Many of the wildlife species found in the Tahoe Basin are dependent on aquatic or riparian communities or use riparian environments for some aspect of their life history (Manley and Schlesinger 2001). Most of the study area is designated as a TRPA threshold site (Upper Truckee Marsh threshold site) for waterfowl and wintering bald eagles and uncommon plant communities. Therefore, a nondegradation standard applies to this site, which means that no disturbance is permitted on the site that would reduce habitat quality for these species.

Recreation in the study area is of particular concern because of its potential effects on wildlife (Conservancy 2001). Existing patterns of recreation are described in Section 3.13, "Recreation." Recreational activities reported in the study area include hiking, jogging, mountain biking, cross-country skiing, snowshoeing, dog-walking, hot-air ballooning, tube or raft floating, boating, canoeing, kayaking, fishing, and beach access (Conservancy 2001). Unauthorized recreation activities are known to occur in the study area, including camping and unleashed dog walking. Unauthorized recreational activities in the marsh are an existing source of wildlife disturbance. Unauthorized recreation has also resulted in a user-created network of trails and other disturbed areas throughout the study area. (These trails are described in Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage," and in Section 3.13, "Recreation.")

The following sections describe the vegetation types and the primary wildlife habitat functions provided in the study area.

Vegetation

The study area is characterized by a continuum of plant communities, ranging from predominantly forested areas at the highest elevations to wet meadow and riparian areas along the Upper Truckee River and Trout Creek, to lagoon and sandy barrier beach along the shores of Lake Tahoe. Vegetation types in the study area have been previously described and mapped in technical reports prepared for the project. Vegetation was most recently mapped and described in detail in *Processes and Functions of the Upper Truckee Marsh* (Conservancy and DGS 2003). The vegetation map created for that report was updated in the field during the special-status plant survey conducted by AECOM botanists in July 2007 (Appendix G). Updates and changes to the location and extent of vegetation communities on the study area were recorded with a Global Positioning System (GPS) in the field, digitized for entry into a geographic information system (GIS), and used to create an updated vegetation map that



Source: Data provided by EDAW (now AECOM) in 2008

Exhibit 3.4-1 **Location and Extent of Plant Communities on the Study Area**

accurately reflects current conditions (Exhibit 3.4-1). Plant community names shown on the maps and described below are a combination of names used in previous reports describing vegetation (Conservancy and DGS 2003; WBS 1995, 1999) and other Californian and Sierran vegetation classifications (Elliott-Fisk et al. 1997; Holland 1986; Sawyer and Keeler-Wolf 1995; Fites-Kaufman 2007).

Jeffrey Pine Forest

This upland plant community occurs around the edges of the study area at the highest elevations. These upland locations are relatively well drained, and growing conditions are drier than elsewhere in the study area. The canopy of the Jeffrey pine community is dominated by Jeffrey pine (*Pinus jeffreyi*), but white fir (*Abies concolor*) also occurs. In California, Jeffrey pine is found as a dominant species in a wide range of physical conditions and from elevations as low as 500 feet to as high as 9,500 feet (Sawyer and Keeler-Wolf 1995). In the Sierra Nevada, communities dominated by Jeffery pine typically occur at about 6,000–8,000 feet in elevation (Holland 1986). The composition of understory species on the west slope of the Sierra Nevada differs from that on the east slope, and stands in the study area show east-slope affinities. Common species in the study area in the shrub layer include wax currant (*Ribes cereum*), tobacco brush (*Ceanothus velutinus*), bitterbrush (*Purshia tridentata*), rubber rabbitbrush (*Chrysothamnus nauseosus*), greenleaf manzanita (*Arctostaphylos patula*), and wood rose (*Rosa woodsii*). The herbaceous understory is typically dominated by nonnative grasses, including Kentucky bluegrass (*Poa pratensis*), domestic timothy (*Phleum pratense*), and creeping bent grass (*Agrostis stolonifera*), but can also include native sedges (*Carex* spp.) and rushes (*Juncus* spp.) in moister, lower elevation areas within the uplands.

Lodgepole Pine Forest

Lodgepole pine occurs on lower, more mesic (i.e., wet) sites than Jeffrey pine, especially in areas that are transitional to montane meadow. The largest stands of lodgepole pine in the study area occur on the southern half of the property. This plant community is characterized by open canopies of lodgepole pine (*Pinus contorta* var. *murrayana*) with an understory that may include willow and herbaceous species. Willow species present include Lemmon's willow (*Salix lemmonii*), shining willow (*S. lucida* ssp. *lasiandra*), and Geyer's willow (*S. geyeriana*). Dominant herbs include Kentucky bluegrass, woolly sedge (*Carex lanuginosa*), Baltic rush (*Juncus balticus*), aster (*Aster occidentalis*), yarrow (*Achillea millefolium*), and checker mallow (*Sidalcea oregana*). Relatively open-canopied stands can have well-developed understories with an abundance of wildflowers such as ranger's buttons (*Sphenosciadium capitellatum*), lupine (*Lupinus polyphyllus*), hedge nettle (*Stachys ajugoides*), scarlet gilia (*Ipomopsis aggregata*), western buttercup (*Ranunculus occidentalis*), cinquefoil (*Potentilla* spp.), and Indian paintbrush (*Castilleja miniata*).

Montane Meadow

Montane meadow is an herbaceous plant–dominated community that encompasses a range of moisture and soil conditions that result in differences between dominant plant species. The location of these varying clusters of species is dynamic, based on changing lake and groundwater levels, and no attempt has been made to map meadow subtypes. Areas mapped as montane meadow also include the recently restored and still developing vegetation of the wetland portion of the Lower West Side (LWS) Restoration Project area. Montane meadows are scattered within forests throughout the Sierra Nevada at low-lying landscape positions (Holland 1986). Plants in this community are "hydrophytes," meaning they are specially adapted to tolerating and persisting in saturated soil conditions. The hydrophytic vegetation of montane meadows is maintained by high groundwater levels, typically supported by streams that flow through the meadow. Soils are usually fine-textured and are typically saturated for most of the growing season. Plant cover is generally high.

A suite of sedges, rushes, and grasses dominates in various locations within the montane meadow in the study area. Important species include Baltic rush, Nevada rush (*Juncus nevadensis*), straight-leaved rush (*J. orthophyllus*), field sedge (*Carex praegracilis*), beaked sedge (*Carex utriculata*), water sedge (*C. aquatilis*), common spikerush (*Eleocharis macrostachya*), tufted hairgrass (*Deschampsia cespitosa*), domestic timothy, and

Kentucky bluegrass. Characteristic forbs include aster, arnica, cinquefoil, and Douglas' knotweed (*Polygonum douglasii*). Some areas support large stands of a single species, typically domestic timothy, spikerush, field sedge, or Baltic rush. Baltic rush appears particularly adaptable, persisting in relatively dry areas, such as the fringes of the meadow, and in areas subject to periodic sustained flooding, such as behind the barrier beaches (Barton and East Barton Beaches).

Willow Scrub–Wet Meadow

In the study area, willow scrub–wet meadow occurs primarily in association with stream channels and as scattered patches within the floodplain of streams. Individual willows may be found outside of riparian flood zones, but areas dominated by willows are always closely associated with the floodplain. The large area of willow scrub–wet meadow in the center of the study area appears to be associated with old, abandoned stream channels. The canopy of willow scrub can be dense to open and is dominated by Lemmon's willow, Geyer's willow, and shining willow. Dense stands of willow scrub typically lack an understory. In more open stands, the understory is dominated by montane meadow herbaceous species such as sedges, creeping bent grass, domestic timothy, and slender wheatgrass (*Elymus trachycaulus* var. *trachycaulus*). The following forbs are also common: cinquefoil, aster, arnica (*Arnica chamissonis* var. *foliosa*), and slender willow-herb (*Epilobium ciliatum* var. *ciliatum*).

Lagoon and Open Water

Periodically, additional open-water habitat is created by high lake levels, high groundwater levels, and the pooling of surface water behind the barrier beaches. The presence and size of an extensive lagoon currently depends largely on the lake level, although this was not necessarily the case in the past. The lagoon was largely absent in 1995 surveys but extensive in 1998 because of a higher lake level (Conservancy and DGS 2003). A small portion of the study area was reported as flooded in 1995, but the location was not mapped. A small area of lagoon was also present in summer 2002, after two dry winters resulted in a lower lake level. The lagoon area present in 2002 was formed by pooling of Trout Creek behind the barrier beaches. By 2007, after 5 years of higher lake levels, the lagoon was extensive. The lagoon is characterized by aquatic and emergent plant species including yellow pond-lily (*Nuphar luteum* ssp. *polysepalum*), yellow water buttercup (*Ranunculus flabellaris*), white water buttercup (*R. aquatilis* var. *capillaceus*), pondweed species (*Potamogeton* spp.), common waterweed (*Elodea canadensis*), common bladderwort (*Utricularia vulgaris*), water smartweed (*Polygonum amphibium* var. *stipulaceum*), Baltic rush, and beaked sedge.

In addition to the natural lagoons that exist in the study area, a human-made lagoon feature exists in the northwestern portion of the study area. This lagoon is part of the Tahoe Keys Marina and is commonly referred to as the "Sailing Lagoon." Unlike the natural lagoons associated with Barton and East Barton Beaches, which are affected by lake level, groundwater level, and condition of the barrier beaches, the Sailing Lagoon is connected to a marina that is actively dredged to provide a clear channel for motorized boats to access Lake Tahoe. The Sailing Lagoon is a highly disturbed area and provides limited biological values. Stabilization features (e.g., riprap) border much of the lagoon. The vegetation characteristics of the Sailing Lagoon differ significantly from those in natural lagoon habitat. Aquatic vegetation is dominated primarily by the nonnative Eurasian watermilfoil, *Myriophyllum spicatum*, and willow species grow along the edge, between the Sailing Lagoon's open water and the adjacent upland habitat.

Beach and Dune

A series of plant communities occur along the sandy barrier beach and dune ridge that separates other plant communities on the study area from the open water of Lake Tahoe. "Beach" is defined here as the area of sandy substrate subject to wave action and exposed between high and low lake levels. Above the elevation of the current maximum lake level is a ridge of sand, largely stabilized by vegetation. In keeping with terminology frequently used for barrier beach complexes, this area is referred to as "dune." Barbour and Major (1988: 223–262), describing California oceanic beaches, define dunes as the "sandy, open habitat which extends from the foredune

(or the furthest inland reach of storm waves) to typically inland vegetation on stabilized substrate." This pattern is analogous to what is observed in the study area, where the lakeside vegetation is highly dynamic, but the lagoon-side vegetation consists largely of montane meadow species.

The beach and dune system is dynamic, as it is continually reshaped by erosion from wave action and affected by wind, storm events, and lake level. The highest dune areas are less frequently disturbed and more densely vegetated. The dune ridge is typically covered by a dense sod of water sedge and Nebraska sedge (*Carex nebrascensis*), with some creeping wildrye (*Leymus triticoides*), meadow barley (*Hordeum brachyantherum*), and silverleaf phacelia (*Phacelia hastata*). In contrast, the beach is more dynamic because it is more frequently disturbed by wave action. The sandy beach area is continually subject to erosion and deposition. Plants establish as the lake level retreats. This establishment often occurs at the elevational edge of a recent lake boundary, creating progressive lines of vegetation.

The dynamic lakeside beach in the study area supports occurrences of the rare Lake Tahoe endemic, Tahoe yellow cress (TYC) (*Rorippa subumbellata*). Tahoe yellow cress may be found growing alone or in association with species such as silverleaf phacelia, cinquefoil, cudweed (*Gnaphalium palustre*), bur-marigold (*Bidens laevis*), curly dock (*Rumex crispus*), monkeyflower (*Mimulus primuloides*), lupine, field mint (*Mentha arvensis*), and beautiful spikerush (*Eleocharis acicularis* var. *bella*). The distribution of this rare plant is highly dynamic because available habitat varies with lake level. Available habitat increases during dry periods as additional sand is exposed and decreases during wetter periods (Conservancy and DGS 2006).

Restored Upland Shrubs

This vegetation type occurs only in the upland areas surrounding the restored montane meadow at the LWS Restoration Area, in the northwestern portion of the study area. Shrubs typical of the understory of the study area's Jeffrey pine community were planted here in fall 2002. (Jeffrey pine itself was not planted).

Disturbed Areas

At several locations within the study area, vegetation has been removed or has been otherwise affected by human activities, such as placement of fill. In addition to the disturbed areas shown in Exhibit 3.4-1, there is a user-created network of trails and small disturbed areas throughout most vegetation types that has resulted from unauthorized recreational activities. (These trails are described in Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage," and in Section 3.13, "Recreation.")

The species composition of these disturbed areas varies. In most areas, herbaceous species dominate. Percent cover varies widely depending on the level of disturbance. Among the species present are herbs such as yarrow, slender willow-herb, aster, beardtongue (*Penstemon speciosus*), and dwarf lupine (*Lupinus lepidus* var. *ramosus*), and grasses such as Kentucky bluegrass.

In the Cove East Beach area, west of the Upper Truckee River and north of the LWS Restoration Area, extensive deposition of fill material and other human modifications of the substrate and vegetation have occurred. A portion of this area is dominated by rubber rabbitbrush (*Chrysothamnus nauseosus*). Areas dominated by rubber rabbitbrush are typically maintained by disturbance such as fire, grazing, or soil tilling (Holland 1986). Herbaceous species that occur in areas dominated by rubber rabbitbrush include mountain tarweed (*Madia glomerata*), ground smoke (*Gayophytum diffusum* var. *parviflorum*), and cheatgrass (*Bromus tectorum*). Cheatgrass is considered a widespread, aggressive invasive weed species by the California Invasive Plant Council (Cal-IPC) (2006), with a "High" overall rating (species that have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure). In addition, infestations of perennial pepperweed (*Lepidium latifolium*), another Cal-IPC species with a rating of "High," are present near Trout Creek in the southern portion of the study area.

Wildlife Habitat Functions

Wetlands and riparian areas often support diverse wildlife communities. Many of the wildlife species found in the Tahoe Basin depend on aquatic or riparian communities or use riparian environments for some aspect of their life history (Manley and Schlesinger 2001). As the largest remaining wetland adjacent to Lake Tahoe, much of the study area contains important habitat for wildlife. The mix of terrestrial and aquatic habitats that exist in the study area support a variety of common wildlife species. The site is also known or is likely to support some special-status wildlife species (see "Sensitive Biological Resources" below).

Appendix H, "Wildlife Species and Associated Terrestrial and Aquatic Habitats at the Upper Truckee Marsh," provides a list of approximately 200 amphibian, reptile, bird, and mammal species that have been observed or are likely to occur in the study area. This list was compiled from the following sources:

- survey data from the study area from 1999–2004 (TRPA 2002b, Borgmann and Morrison 2004),
- Conservancy survey data from the study area from 2002 (Conservancy 2002), and
- previous ecological studies within the study area (Conservancy 1997).

A general list of species occurrences in the Tahoe Basin was also reviewed (Murphy and Knopp 2000).

The wildlife species typically associated with each terrestrial or aquatic habitat are briefly described below. The vegetation communities form a continuum of habitats (Exhibit 3.4-1) along hydrologic, elevation, and land use gradients. Annual variability in environmental conditions influences the abundance and distribution of the communities. Many wildlife species use several of the communities. In addition, the proximity of one community to another may be essential for some species (e.g., willow flycatchers [*Empidonax traillii*] are associated with willow scrub with areas of open water or saturated soils nearby). The following sections describe the conditions and functions of these habitats.

Jeffrey Pine Forest

The Jeffrey pine community supports a variety of birds, including woodpeckers, nuthatches, and kinglets. The trees provide perching habitat for many other species of birds, including bald eagles (*Haliaeetus leucocephalus*) and great horned owls (*Bubo virginianus*). This community also supports small mammals such as vagrant shrew (*Sorex vagrans*), yellow-pine chipmunk (*Tamias amoenus*), Douglas squirrel (*Tamiasciurus douglasii*), and golden-mantled ground squirrel (*Spermophilus lateralis*).

Lodgepole Pine Forest

The lodgepole pine community provides perch sites for raptors that may use the meadow for foraging, such as red-tailed hawk (*Buteo jamaicensis*) and American kestrel (*Falco sparverius*). Kestrels may also nest in cavities in these trees. Other cavity-nesting species such as tree swallows (*Tachycineta bicolor*), white-breasted nuthatches (*Sitta carolinensis*), and red-breasted sapsuckers (*Sphyrpicus ruber*) may nest in this community. Some of the species found in the Jeffrey pine or willow scrub–wet meadow communities may use the lodgepole pines as well, but in general, species in this community include ones that prefer more open areas than a Jeffrey pine community, and drier conditions than found in a willow scrub–wet meadow community.

Willow Scrub–Wet Meadow

The willow scrub–wet meadow community provides cover and forage for many species of songbirds. The willow scrub–wet meadow community in the study area is also part of a TRPA threshold site for wintering bald eagle and waterfowl. In general, this community can provide foraging and nesting habitat for flycatchers, warblers, and sparrows. Riparian-associated species documented in willow scrub–wet meadow communities in the study area during the breeding season include Wilson's warbler (*Wilsonia pusilla*), song sparrow (*Melospiza melodia*), and orange-crowned warbler (*Vermivora celata*). Yellow warbler (*Dendroica petechia*), a CDFG species of special

concern, also nests in willow scrub vegetation in the study area (Borgmann and Morrison 2004). Other species, such as mountain chickadee (*Poecile gambeli*), ruby-crowned kinglet (*Regulus calendula*), and yellow-rumped warbler (*Dendroica coronata*), use the willow scrub–wet meadow community as foraging habitat. The willows provide especially important foraging habitat during migration, when birds require stopover habitats to rest and forage.

Other avian species restricted to riparian or scrub habitats, including willow flycatcher and MacGillivray's warbler (*Oporornis tolmiei*), have the potential to breed in this community in the study area. MacGillivray's warbler and willow flycatcher are expected to nest in dense willow thickets, and they are known to nest elsewhere in the Tahoe Basin, but they have not been detected in the study area during recent breeding-season surveys (TRPA 2002a, Conservancy 2002, Borgmann and Morrison 2004).

The structure of willows is an important component of nesting habitat for many birds. A possible explanation for why these species are not breeding in the study area may be that the structure of the willows is unsuitable. Grazing occurred in the study area in the past and has prevented the growth of young willows. The willow thickets in the study area consist of very dense and mature trees. There is very little evidence of recruitment in past years, resulting in even-aged stands. The monotypic structure and age may affect the suitability of the willows to support these breeding songbirds. The nesting habitat of willow flycatcher is described in detail in the "Sensitive Biological Resources" section to illustrate specific structural habitat requirements.

Several bat species have been detected on the site, and they likely forage in the willow scrub–wet meadow communities. These species include hoary bat (*Lasiurus cinereus*), long-eared myotis (*Myotis evotis*), little brown bat (*M. lucifigus*), and Mexican free-tailed bat (*Tadarida brasiliensis*) (Borgmann and Morrison 2004). Amphibian and reptile species that are known to occur in the study area, and that are likely to use willow scrub–wet meadow communities, include Pacific tree frog (*Hyla regilla*) and western terrestrial garter snake (*Thamnophis elegans*).

Montane Meadow

The montane meadow community is contained within a TRPA threshold site for nesting waterfowl, which include species such as mallard (*Anas platyrhynchos*), cinnamon teal (*Anas cyanoptera*), and gadwall (*Anas strepera*). The meadow is also part of a threshold site designated for wintering bald eagle.

The montane meadow in the study area provides habitat for many species of ground-nesting birds, supports populations of small mammals, and provides foraging opportunities for raptors. Different species use different aspects of the meadow as habitat. Water level is the primary factor that modifies habitats within the meadow; some species prefer drier areas, others require moister conditions. For example, under drier conditions, the meadow provides ideal nesting habitat for savannah sparrows (*Passerculus sandwichensis*) and western meadowlarks (*Sturnella neglecta*), which nest near or on the ground. Small-mammal populations may increase under moderately dry conditions, as long as seed production can support them. During wet years or under conditions that promote water retention in the study area, the lagoon increases in size, and nesting sites for savannah sparrows and meadowlarks may be limited to only the upland edges of the meadow. Suitable areas for dry burrows may also limit populations of small mammals. Decreased populations of small mammals may result in fewer foraging opportunities for raptors. However, the wetter conditions may favor red-winged blackbirds (*Agelaius phoeniceus*), which prefer to nest in wet or moist areas where emergent vegetation is present. Species such as Pacific treefrogs and long-toed salamanders (*Ambystoma macrodactylum*) may breed successfully only when conditions are wet enough for a sufficient length of time to maintain ponded areas for eggs to develop and metamorphose.

Several mammal species that use montane meadow habitat have been documented on the site: montane vole (*Microtus montanus*), vagrant shrew, deer mouse (*Peromyscus maniculatus*), California ground squirrel (*Spermophilus beecheyi*), coyote (*Canis latrans*), and black bear (*Ursus americanus*) (Borgmann and Morrison 2004). In Borgmann and Morrison's 2004 study, montane vole was the most commonly detected small mammal

in the study area. Other small mammal species likely to occur in montane meadow habitat in the study area include harvest mouse (*Reithrodontomys megalotis*) and western jumping mouse (*Zapus princes*). Small-mammal populations provide foraging opportunities for raptors, such as northern harrier (*Circus cyaneus*) and American kestrel.

Beach and Dune

The beach provides migration foraging habitat for shorebirds, such as western sandpiper (*C. mauri*), long-billed dowitcher (*Limnodromus scolopaceus*), and willet (*Catoptophorus semipalmatus*). Shorebirds are more commonly observed in the study area in the fall during their southerly migration (Orr and Moffitt 1971). The beach and dune provide resting and nesting habitat for many species that use adjacent aquatic habitats for foraging: gulls, terns, geese, and ducks. Species that may nest on the beach or in sparse vegetation within the dune include Forster's tern (*Sterna forsteri*), Wilson's phalarope (*Phalaropus tricolor*), killdeer (*Charadrius vociferus*), and spotted sandpiper (*Actitis macularia*).

Stream

In shallow-water areas at the stream edges, wading birds, such as great blue heron (*Ardea herodias*) and snowy egret (*Egretta thula*), and shorebirds, such as spotted sandpiper, may be present. In areas where the river floods its banks and creates fish-free ponds, suitable habitat for long-toed salamander is created. American beavers (*Castor canadensis*) are active in the streams, and muskrats (*Ondatra zibethicus*) have been observed within the study area in the past. American beaver is not native to the Tahoe Basin (Schlesinger and Romsos 2000) and is a serious management concern.

Borgmann and Morrison (2004) documented the occurrence of bullfrog (*Rana catesbeiana*) in the study area. In the western United States, bullfrog is a nonnative species and a serious management concern. Where it occurs, this species preys on and reduces the population viability of native amphibians, snakes, rodents, and other species.

Lagoon

The lagoon creates habitat for waterfowl and other aquatic wildlife. Waterfowl and shorebirds are strongly associated with lagoon habitats. Dabbling ducks, such as American widgeon (*Anas americana*), northern pintail (*Anas acuta*), northern shoveler (*Anas clypeata*), cinnamon teal, gadwall, and mallard typically skim food from the surface or tip forward to submerge their heads and necks. Most species of dabbling ducks forage in areas of 6–10 inches of water or less. Diving ducks and other aquatic birds that actively dive to feed on submergent vegetation or to pursue prey, such as ring-necked duck (*Aythya collaris*), common merganser (*Mergus merganser*), pied-billed grebe (*Podilymbus podiceps*), and Forster's tern, may require depths of 3–10 feet (Grassland Water District 2001, cited in Conservancy and DGS 2003). Around the fringes of the lagoon where tules (*Typha* sp.) and cattails (*Scirpus* sp.) grow, yellow-headed blackbirds (*Xanthocephalus xanthocephalus*) may nest. American beavers and muskrats may also be present in lagoon areas. Black terns (*Chlidonias niger*) historically have nested in this area, but have not been reported in recent years (Shuford 1998).

The lagoon and adjacent terrestrial and aquatic habitats form a continuum of habitats in the study area, and as the amount of one habitat increases the amount of another may decrease. If more water is retained in the marsh, a larger lagoon will form and more nesting and foraging habitat may be available for grebes, ducks, geese, terns, and yellow-headed blackbirds. As a consequence of a larger lagoon, however, there will be less meadow or willow scrub–wet meadow area to support species associated with those communities.

Lake

The lake zone provides habitat for fish-eating birds such as grebes, mergansers, double-crested cormorants (*Palacrocorax auritas*), terns, ospreys (*Pandion haliaetus*), and bald eagles. Other species that forage over open water, such as swallows, may also be present. Geese and other waterbirds may roost on the lake as well.

Sensitive Biological Resources

In this analysis, sensitive biological resources include those that receive special protection through the TRPA Code of Ordinances, ESA, CWA, U.S. Forest Service (USFS) Manual, or local plans, policies, and regulations; or that are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. These resources are addressed in the sections below.

Special-Status Species

Special-status species are plants and animals that are legally protected or otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. In this document, special-status species are defined as:

- species listed or proposed for listing as threatened, rare, or endangered under the ESA or CESA;
- species considered as candidates for listing under the ESA or CESA;
- wildlife species identified by CDFG as species of special concern;
- animals fully protected under California Fish and Game Code;
- species designated as sensitive, special interest, or threshold species by TRPA;
- species designated as sensitive by the USFS Regional Forester in Region 5; or
- plants on CNPS List 1B (plants that are rare, threatened, or endangered in California and elsewhere) or List 2 (plants that are rare, threatened, or endangered in California but more common elsewhere) (CNPS 2010).

Federal "species of concern" are no longer designated or recognized by USFWS; therefore, species previously designated as such are not addressed in this section.

Special-Status Plants

A preliminary list of special-status plant species with potential to occur in the study area was developed based on a review of the following:

- the CNPS Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2010);
- a list of special-status species known to occur within the South Lake Tahoe and eight surrounding U.S. Geological Survey (USGS) 7.5-minute quadrangles obtained from the CNDDB (2010);
- a list of species in the USFS Lake Tahoe Basin Management Unit designated as sensitive species (USFS 2005);
- a list of taxa designated by TRPA as sensitive or threshold species (TRPA 2002b); and
- a list of federally endangered, threatened, or candidate species that may be affected by projects in the Tahoe Basin (USFWS 2010).
- The initial data review preliminarily identified 44 special-status plant, lichen, and fungi species that could occur in the region. Table 3.4-1 contains information on all special-status plant species previously recorded in the southern Tahoe Basin. Based on review of existing documentation and discussion with local botanists with extensive experience with the site, 24 of these special-status plant species have the potential or are known to occur in the study area.

Table 3.4-1
Special-Status Plant Species Known From or With Potential to Occur in the Upper Truckee River and Wetlands Restoration Project Study Area

Scientific and Common Name	Listing Status[1]			Habitat and Flowering Period	Potential for Occurrence
	Federal	State	Local/CNPS		
Arabis rectissima var. *simulans* Washoe tall rockcress	I			Dry, sandy granitic or andesitic soils on gentle slopes within open mature Jeffery pine dominated forests, often on recovering lightly disturbed soils; 6,033 to 7,349 ft. Blooming period: May–July	**Not expected to occur**. Suitable habitat on the site is highly disturbed.
Arabis rigidissima var. *demota* Galena Creek rockcress	S		TRPA/1B	Fir- pine-quaking aspen associations, meadow edges, usually on north-facing slopes and rocky outcrops; 7,021–10,019 ft. Blooms August	**Not expected to occur.** Suitable habitat on the site is highly disturbed. No occurrences known from south shore of Lake Tahoe.
Arabis tiehmii Tiehm's rock cress	S		1B	Granitic alpine boulder and rock fields; 9,744 to 11,778 ft. Blooming period: July–August	**Not expected to occur.** Elevations of known occurrences exceed elevations of study area, and no boulder or rock fields in study area.
Botrychium ascendens Upswept moonwort	S		2	Grows in mesic lower montane coniferous forest; 4,921 to 7,496 ft. Blooming period: July–August	**Could occur**. Suitable mesic habitat occurs in the study area.
Botrychium crenulatum Scalloped moonwort	S		2	Freshwater marshes and swamps, meadows and seeps, bogs and fens, and lower montane coniferous forest; 4,921 to 10,761 ft. Blooming period: June–September	**Could occur**. Suitable mesic habitat occurs in the study area.
Botrychium lineare Slender moonwort	S		1B	Often disturbed upper montane coniferous forest; 8,530 ft. Blooming period: unknown	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and no upper montane forest in study area.
Botrychium lunaria Common moonwort	S		2	Upper montane coniferous forest, subalpine coniferous forest, and meadows and seeps; 7,480 to 11,154 ft. Blooming period: August	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and study area does not include upper montane or subalpine coniferous forest.
Botrychium minganense Mingan moonwort	S		2	Lower and mesic upper montane coniferous forest and bogs and fens; 4,921 to 6,742 ft. Blooming period: July–September	**Could occur**. Suitable mesic habitat occurs in the study area.

Table 3.4-1
Special-Status Plant Species Known From or With Potential to Occur in the Upper Truckee River and Wetlands Restoration Project Study Area

Scientific and Common Name	Listing Status[1]			Habitat and Flowering Period	Potential for Occurrence
	Federal	State	Local/CNPS		
Botrychium montanum Western goblin	S		2	Lower and mesic upper montane coniferous forest; 4,921 to 6,988 ft. Blooming period: July–September	**Could occur**. Suitable mesic habitat occurs in the study area.
Carex limosa Shore sedge			2	Grows in upper and lower montane coniferous forest, meadows and seeps, and bogs and fens; 3,937 to 8,858 ft. Blooming period: June–August	**Could occur**. Suitable mesic habitat occurs in the study area.
Carex mariposana Mariposa sedge (name changed from *C. paucifructus*)			TRPA	Red fir and subalpine coniferous forest, montane meadows; 3,960 to 10,560 ft. Blooming period: unknown	**Not expected to occur.** Known occurrences in the Tahoe Basin are at higher elevations than the study area.
Chaenactis douglasii var. *alpine* Alpine dusty maidens			2	Granitic alpine boulder and rock fields; 9,842 to 11,154 ft. Blooming period: July–September	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and no boulder or rock fields in the study area.
Cryptantha crymophila Subalpine cryptantha			1B	Volcanic and rocky subalpine coniferous forest; 8,530 to 10,498 ft. Blooming period: July–August	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and no subalpine coniferous forest in the study area.
Draba asterophora var. *asterophora* Tahoe draba	S		TRPA/1B	Grows in subalpine coniferous forest and alpine boulder and rock fields; 8,250 to 11,499 ft. Blooming period: July–August /September	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and no subalpine conifer forest, or boulder or rock fields, in study area.
Draba asterophora var. *macrocarpa* Cup Lake draba	S		TRPA/1B	Grows in rocky subalpine coniferous forest; 8,202 to 9,235 ft. Blooming period: July–August	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and no subalpine conifer forest in the study area.
Epilobium howellii Subalpine fireweed	S		1B	Mesic subalpine coniferous forest and meadows and seeps; 6,561 to 8,858 ft. Blooming period: July–August	**Could occur**. Suitable mesic habitat occurs on the study area.
Epilobium oreganum Oregon fireweed			1B	Mesic upper and lower montane coniferous forest and bogs and fens; 1,640 to 7,349 ft. Blooming period: June–September	**Could occur**. Suitable mesic habitat occurs on the study area.

Table 3.4-1
Special-Status Plant Species Known From or With Potential to Occur in the Upper Truckee River and Wetlands Restoration Project Study Area

Scientific and Common Name	Listing Status[1]			Habitat and Flowering Period	Potential for Occurrence
	Federal	State	Local/CNPS		
Epilobium palustre Marsh willowherb			2	Meadows and seeps and bogs and fens; 7,217 ft. Blooming period: July–August	**Could occur**. Suitable mesic habitat occurs on the study area.
Erigeron miser Starved daisy	S		1B	Rocky upper montane coniferous forest; 6,036 to 8,595 ft. Blooming period: June–October	**Not expected to occur**. Suitable habitat in the study area is highly disturbed and typically found at higher elevations in the Tahoe Basin
Eriogonum umbellatum var. *torreyanum* Donner Pass buckwheat	S		1B	Volcanic, rocky upper montane coniferous forest and meadows and seeps; 6,085 to 8,595 ft. Blooming period: July–September	**Not expected to occur**. Minimal suitable habitat in the study area.
Glyceria grandis American mannagrass			2	Bogs and fens, meadows and seeps, and streambanks and lake margins of marshes and swamps; 49 to 6,496 ft. Blooming period: June–August	**Known to occur.** Observed at Upper Truckee Marsh (EDAW and ENTRIX 2003) and during the 2007 rare plant survey.
Hulsea brevifolia Short-leaved hulsea	S		1B	Granitic or volcanic, gravelly or sandy upper montane coniferous forest and lower montane coniferous forest; 4,921 to 10,498 ft. Blooming period: May–August	**Not expected to occur**. Suitable habitat in the study area is highly disturbed.
Lewisia kelloggii ssp. *hutchisonii* Hutchison's lewisia	S		3	Openings and slate in upper montane coniferous forest; 4,799 to 7,004 ft. Blooming period: June–August	**Not expected to occur**. Suitable habitat in the study area is highly disturbed.
Lewisia kelloggii ssp. *kelloggii* Kellogg's lewisia	S			Sandy or gravelly, usually granitic or volcanic substrates; 4,265 to 7,874 ft. Blooming period: May–July	**Not expected to occur**. Suitable habitat in the study area is highly disturbed.
Lewisia longipetala Long-petaled lewisia	S		TRPA/1B	Grows in granitic subalpine coniferous forest and alpine boulder and rock fields; 8,202 to 9,596 ft. Blooming period: July–August	**Not expected to occur.** Known occurrences are at higher elevations than the study area, and no subalpine forest, or boulder or rock fields in the study area.
Polystichum lonchitis Holly fern			3	Grows in granitic or carbonate upper montane coniferous forest and subalpine coniferous forest; 5,905 to 8,530 ft. Blooming period: June–September	**Could occur**. Suitable mesic habitat occurs on the study area.

Table 3.4-1
Special-Status Plant Species Known From or With Potential to Occur in the Upper Truckee River and Wetlands Restoration Project Study Area

Scientific and Common Name	Listing Status[1]			Habitat and Flowering Period	Potential for Occurrence
	Federal	State	Local/CNPS		
Rorippa subumbellata Tahoe yellow cress	C/S	E	TRPA/1B	Grows in decomposed granitic beaches of meadows and seeps and in lower montane coniferous forests; 6,217 to 6,233 ft. Blooming period: May–September	**Known to occur**. Suitable habitat present. Observed at the Upper Truckee Marsh (EDAW 2003) Barton Beach and Cove East populations are monitored annually when lake level is above 6,226 feet, and every other year when lake level is below 6,226 feet.
Schoenoplectus subterminalis Water bulrush			2	Grows in montane lake margins of marshes and swamps and in bogs and fens; 2,460 to 7,381 ft. Blooming period: July–August	**Could occur**. Suitable mesic habitat occurs in the study area.
Scutellaria galericulata Marsh skullcap			2	Lower montane coniferous forest, meadows and seeps, and marshes and swamps; 0 to 6,889 ft. Blooming period: June–September	**Could occur**. Suitable mesic habitat occurs in the study area.
Stuckenia filiformis Slender-leaved pondweed			2	Grows in assorted shallow freshwater marshes and swamps; 984 to 7,053 ft. Blooming period: May–July	**Could occur**. Suitable mesic habitat occurs in the study area.
Utricularia ochroleuca Cream-flowered bladderwort			2	Lake margins of marshes and swamps and mesic meadows and seeps; 4,708 to 4,724 ft. Blooming period: June–July	**Could occur**. Suitable mesic habitat occurs in the study area.
Moss					
Bruchia bolanderi Bolander's candle moss	S		2	Damp soil in upper montane coniferous forest, meadows and seeps, and lower montane coniferous forest; 5,577 to 9,186 ft.	**Could occur**. Suitable mesic habitat occurs in the study area.
Helodium blandowii Blandow's bog moss	S		2	Meadows and seeps and damp soil in subalpine coniferous forests; 6,108 to 8,858 ft.	**Could occur**. Suitable mesic habitat occurs in the study area.
Meesia longiseta Long-stalked hump-moss	I			Usually in fens, but sometimes along freshwater streams at high elevations.	**Could occur**. Suitable mesic habitat occurs in the study area.
Meesia triquetra Three-ranked hump-moss	S		4	Grows in mesic and soil upper montane coniferous forest, subalpine coniferous forest, meadows and seeps, and bogs and fens; 4,265 to 9,688 ft.	**Could occur**. Suitable mesic habitat occurs in the study area.
Meesia uliginosa Broad-nerved hump-moss	S		2	Grows in damp soil of upper montane coniferous forest, subalpine coniferous forest, meadows and seeps, and bogs and fens; 4,265 to 9,199 ft.	**Could occur**. Suitable mesic habitat occurs in the study area.

Table 3.4-1
Special-Status Plant Species Known From or With Potential to Occur in the Upper Truckee River and Wetlands Restoration Project Study Area

Scientific and Common Name	Listing Status[1]			Habitat and Flowering Period	Potential for Occurrence
	Federal	State	Local/CNPS		
Myurella julacea Myurella moss	I		2	Alpine boulder and rock fields and damp rock and soil of subalpine coniferous forest; 8,858 to 9,842 ft.	**Not expected to occur**. Known occurrences are at higher elevations than the study area, and no subalpine forest, or boulder or rock fields in the study area.
Orthotrichum praemorsum Orthotrichum moss	I			Shaded, moist habitats of Eastern Sierra Nevada rock outcrops; up to 8,202 ft.	**Not expected to occur**. Known occurrences at higher elevations than the study area, and no extensive rock outcrops in study area.
Orthotrichum shevockii Shevock's moss	I		1B	Lower montane coniferous forest, pinyon and juniper woodland, subalpine coniferous forest, and granitic and rock of upper montane coniferous forest; 6,889 to 7,874 ft.	**Not expected to occur**. Known occurrences are at higher elevations than the study area.
Orthotrichum spjuttii Spjut's bristlemoss	I		1B	Lower montane coniferous forest, pinyon and juniper woodland, subalpine coniferous forest, and granitic and rock of upper montane coniferous forest; 6,889 to 7,874 ft.	**Not expected to occur**. Typically found at higher elevations than the study area.
Pohlia tundrae Tundrae pohlia moss	I		2	Gravelly, damp soil of alpine boulder and rock fields; 8,858 to 9,842 ft.	**Could occur**. Precise microhabitat required are unknown (Gross pers. comm.) Suitable habitat unlikely.
Sphagnum spp. Sphagnum mosses	I			Usually in fens and bogs; sometimes very wet, nonacidic habitats that remain saturated.	**Could occur**. Suitable mesic habitat occurs in the study area.
Lichen					
Veined water lichen *Peltigera hydrothyria*	S			Lower to mid-montane elevations in small, fresh water, perennial streams with little fluctuation in water level and scouring.	**Could occur**. Suitable perennial stream habitat present on the study area.
Fungi					
Branched collybia *Dendrocollybia racemosa*	S			Older mixed coniferous forest.	**Could occur**. Suitable habitat present in the study area.

Table 3.4-1
Special-Status Plant Species Known From or With Potential to Occur in the Upper Truckee River and Wetlands Restoration Project Study Area

Scientific and Common Name	Listing Status[1]			Habitat and Flowering Period	Potential for Occurrence
	Federal	State	Local/CNPS		

[1]Legal Status Definitions

Federal

U.S. Fish and Wildlife Service (USFWS):

T Federal Threatened
E Federal Endangered
C Candidate

Lake Tahoe Basin Management Unit:

S Sensitive Species
I Species of Interest

State

California Department of Fish and Game (DFG):

R Rare
T Threatened
E Endangered

Local/California Native Plant Society (CNPS)

CNPS Listing Categories:

1B Plants rare, threatened, or endangered in California and elsewhere
2 Plants rare, threatened, or endangered in California but more common elsewhere
3 Plants for which more information is needed – a review list
4 Plants of limited distribution – a watch list

During the special-status plant survey of the study area, one special-status plant species, American mannagrass (*Glyceria grandis*), a CNPS List 2 species, was encountered that had not been previously reported from the study area (Table 3.4-1). The known populations of TYC at Cove East and Barton Beaches were visited during this survey. The locations of these populations of special-status species are shown in Exhibit 3.4-2 and are discussed in more detail below.

American Mannagrass

American mannagrass is a rhizomatous grass (i.e., a grass with some below-ground stems) that is on CNPS List 2 (plants that are rare, threatened, or endangered in California but more common elsewhere) (CNPS 2010). The species is much more common outside of California; it is found from Alaska to Newfoundland in the north (including all of the northwestern, midwestern, mid-Atlantic, and northeastern states), in the mountains of Arizona and New Mexico in the southwest, and north of North Carolina and Tennessee in the southeastern United States. In California it is known from Fresno, Humboldt, Mendocino, Mono, Placer, and Tuolumne Counties. There are no previously documented occurrences of American mannagrass in El Dorado County.

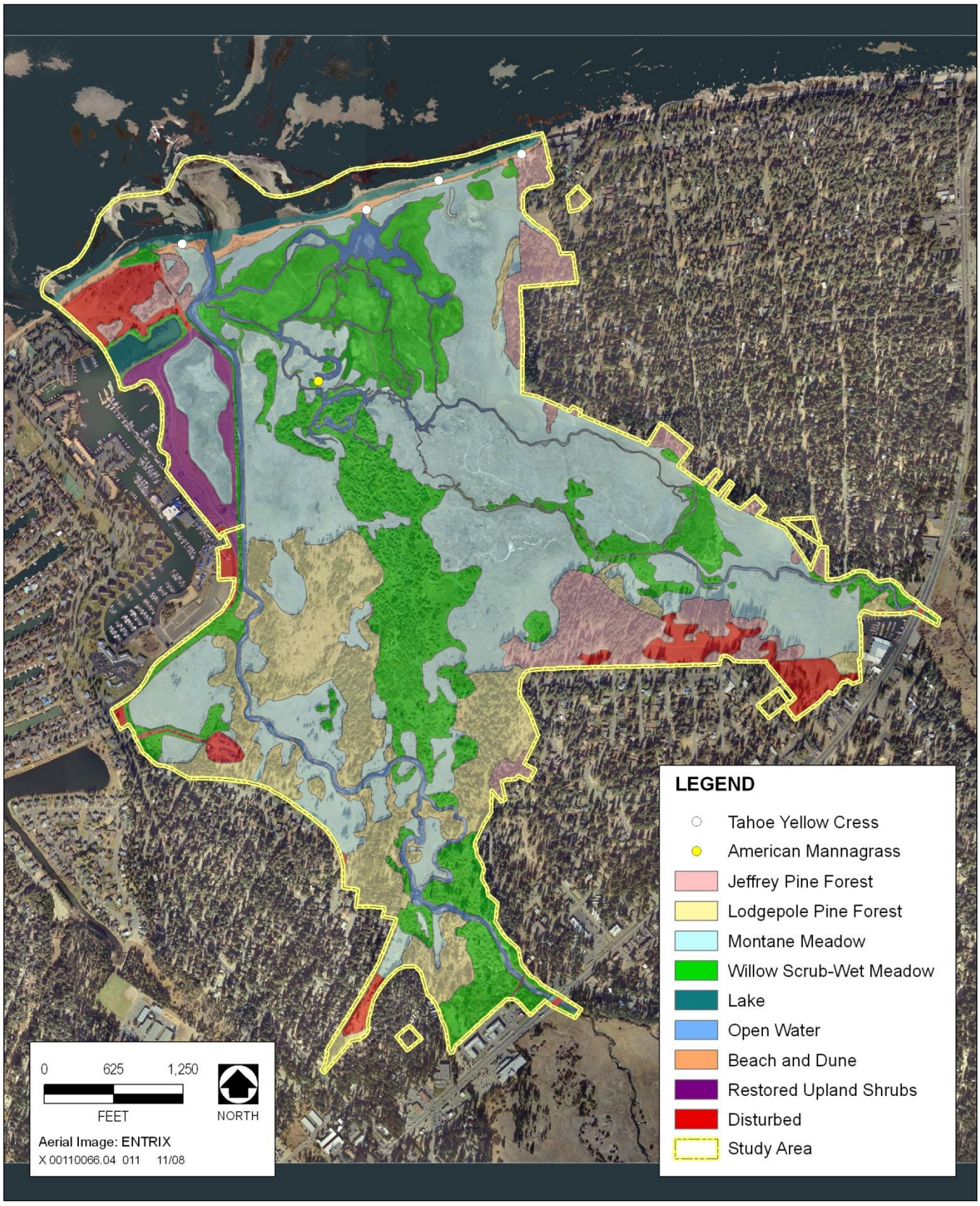
American mannagrass grows in riparian habitats, on streambanks, at lake margins, in meadows, and in bogs and fens. It grows to a height of three feet tall and has a 7- to 15-inch-long, egg-shaped inflorescence (i.e., arrangement of flowers) bearing small spikelets (i.e., small groups of inconspicuous flowers). The grass flowers between June and August. It is similar in overall appearance to fowl mannagrass (*Glyceria elata*), which is much more common throughout the Sierra Nevada. It can also be confused with pale fake mannagrass (*Torreyochloa pallida*). Photographs of American mannagrass can be found in Appendix G.

During AECOM's special-status plant survey of the study area (July 25–27, 2007), American mannagrass was found in one location growing on a low mud bench within one of the active channels of Trout Creek just above the surface water. Associated species on the mud bench were pale fake mannagrass (*Torreyochloa pallida*), beaked sedge, Baltic rush, fringed willow herb (*Epilobium ciliatum*), and wild mint (*Mentha arvense*). Approximately 35 flowering stems were observed in a ten-square-foot area. Nearby mannagrass species, thought to be fowl mannagrass, had a very different appearance characterized by much greener lemmas and inflorescence, a slightly smaller inflorescence, and smaller, more rounded glumes.

Tahoe Yellow Cress

Tahoe yellow cress is a perennial herb with yellow flowers that is endemic to the sandy beaches of Lake Tahoe. Part of the mustard family, TYC is a candidate for listing by USFWS, listed as endangered by the State of California, and a TRPA threshold special-status species. It emerges above ground from perennial underground roots between March and June and flowers between June and October. The sandy beach margin of Lake Tahoe is the only known location of the species.

Tahoe yellow cress is thought to be very sensitive to disturbance by human activity (e.g., walking, running, dog-walking) (Pavlik, Murphy, and TYCTAC 2002:11 and 78; Conservancy and DGS 2006:15). It is also very sensitive to lake level, with more occurrences present during low lake levels when more beach-zone habitat is available for colonization (Pavlik, Murphy, and TYCTAG 2002; Stanton and Pavlik 2006). In response to low numbers of TYC occurrences in the mid-1990s, a multiagency technical advisory group (TAG) was formed by TRPA to develop and implement a conservation strategy for the species. The conservation strategy was written in 2002 (Pavlik, Murphy, and TYCTAC 2002), and a memorandum of understanding and conservation agreement was signed by 13 state and local agencies and organizations to implement the strategy. Several studies have been initiated since 2001, including TYC seed collection and trial outplantings.



Source: Data provided by EDAW (now AECOM) in 2008

Exhibit 3.4-2 **Location of Special-Status Plant Species in the Study Area**

In 2005, members of the TAG transitioned to being members of an adaptive management working group (AMWG), and the TAG is now a subcommittee of the AMWG. Part of implementing the conservation strategy is ensuring that entities that manage properties with TYC occurrences have submitted a management plan or information sheet to the AMWG (Stanton and Pavlik 2006). As a condition of TRPA approval for the Lower West Side Wetland Restoration Project on Conservancy land, a TYC management plan was drafted for the populations of TYC occurring on Cove East Beach (west of the Upper Truckee River mouth) and on Barton and East Barton Beaches (east of the Upper Truckee River mouth) (Conservancy and DGS 2006). For monitoring purposes, these populations have been separated into two segments. The segment of the population located on Cove East Beach has been called Upper Truckee West, and the remaining part of the population on Barton and East Barton Beaches has been called Upper Truckee East. The Upper Truckee West and Upper Truckee East populations are two of the 26 TRPA threshold population sites for TYC. The Upper Truckee East site is thought to support approximately three-quarters of the total TYC population. The Conservancy maintains an exclosure that protects much of the Upper Truckee East population from human activity.

The goals of the Conservancy's TYC management plan are to:

- manage the collective Upper Truckee West and Upper Truckee East TYC population on Cove East, Barton, and East Barton Beaches within its natural range of variation so that it is stable or growing and not decreasing in size as a result of effects from human use and/or Conservancy land management decisions;
- base management decisions on the best scientific information available;
- incorporate adaptive management strategies into the plan so that the Conservancy is both proactive in researching TYC biology, possible effects on the population, and the best education and outreach approaches, and reactive in terms of incorporating that research into new management policies; and
- provide a consistent management framework over time.

Special-Status Wildlife

A preliminary list of special-status wildlife species known or with potential to occur in the study area was developed based on a review of:

- USFWS's Federal Endangered and Threatened Species that Occur or May be Affected by Projects in the South Lake Tahoe (522B) USGS 7.5 Minute Quad (USFWS 2010);
- CDFG's Special Animals report (CDFG 2009), which is a list of federally listed and state-listed taxa, CDFG species of special concern, and other special-status animals;
- a list of special-status species known to occur within the South Lake Tahoe and eight surrounding USGS 7.5-minute quadrangles obtained from the CNDDB (2007);
- a list of species designated as sensitive by the USFS Regional Forester in Region 5 (USFS 2005); and
- a list of taxa designated by TRPA as special-interest or threshold species (TRPA 2007).

The initial data review preliminarily identified 27 special-status wildlife species that could occur in or near the study area. Twelve of the species evaluated are not expected or have a low potential to occur in the study area, and 15 have a moderate to high likelihood to occur in the study area and vicinity. This determination was based primarily on three factors: the types, extent, and quality of habitats in the study area; the proximity of the study area to known extant occurrences of the species; and the regional distribution and abundance of the species.

Table 3.4-2 summarizes the potential for occurrence of each special-status wildlife species evaluated during this analysis. Species with a moderate to high potential to occur in the study area, or that are known to occur, are described below.

Bald Eagle

TRPA considers most of the study area a population threshold site for wintering bald eagles (as shown in Exhibit 3.4-3). The bald eagle is listed as endangered under the CESA, designated as a sensitive species by USFS, and designated as a special-interest species by TRPA; it is also fully protected under the California Fish and Game Code. Effective August 8, 2007, the bald eagle was removed from the federal ESA by USFWS because of the species' population recovery throughout most of its range.

Bald eagles require large bodies of water or free-flowing streams with abundant fish and adjacent snags or other perches for hunting. They generally nest in undisturbed coniferous forests, usually within a mile of a lake or reservoir. Bald eagle habitat typically consists of several components—most significantly, close proximity to large bodies of water and wetlands associated with lakes, mature coniferous stands with presence of dominant trees, and adequate protection from human disturbance.

Bald eagles are known to nest in a few areas within the Tahoe Basin, including Emerald Bay and Marlette Lake (USFS 2000). They are not expected to nest in the study area. In 1991, a study was conducted by Humboldt State University to evaluate the Tahoe Basin for the support of nesting and wintering bald eagles. The study identified ten areas on the California side of Lake Tahoe that could provide the necessary nesting structure for bald eagles. Nine of the ten areas were determined to be unsuitable for nesting bald eagles.

The only site determined to be suitable was Emerald Bay, which has supported a nesting pair since 1997 (USFS 2000). Resident eagles and young produced in the Tahoe Basin, as well as migrants from other areas, are known to use portions of the study area during the winter. During surveys conducted from 1998 to 2002, the population of wintering bald eagles ranged between seven and 13 adults and zero to four juveniles (Sanchez, pers. comm., 2004). Bald eagles are frequently observed during the summer foraging over the study area (Robinson, pers. comm., 2003). Because only one pair is currently known to nest in the South Lake Tahoe area (USFS 2000), it is assumed that the eagles observed are from the nesting territory at Emerald Bay, or are migrant visitors. They use the conifers on the periphery of the study area for perching and roosting and the meadow, lagoon, and lake for foraging. The shorezone is a critical habitat feature for bald eagles at Lake Tahoe (USFS 2000).

Bald eagles tend to favor lodgepole and Jeffrey pines as perching trees, but will also use aspen or willows. Preferred perches typically are bordered by open areas, have stout horizontal branches, are tall and of large diameter, are close to water and feeding areas, and provide a good view of the surrounding area. Trees used by wintering bald eagles in the Tahoe Basin usually have open branches and either dead standing, dead topped, or some dead lateral branches in a live crown. The trees favored for perches ranged from approximately 80 feet to 100 feet tall and were at least 40 feet taller than the understory of the surrounding stand (Laves and Romsos 2000).

Several known perch sites exist in the study area (as shown in Exhibit 3.4-3). These perch sites are regulated by TRPA and are not to be disturbed. The proximity of these perches to foraging areas makes them particularly valuable to eagles. Although TRPA establishes a buffer zone of 0.5 mile to protect bald eagle nests, the 2001 and 2006 TRPA threshold evaluation reports have not defined a recommended buffer around perch sites (TRPA 2002b, 2007). However, the threshold evaluations state that perching trees and nesting sites shall not be physically disturbed; nor shall the habitat within the disturbance (buffer) zone around nest sites be manipulated in any manner, unless needed to enhance habitat quality. Laves and Romsos (2000) recommend a buffer of 820 feet around perch sites. Changes in water levels in the study area or changes in the river mouth and beach and dune formation may affect the suitability and condition of the perch trees.

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
Amphibians					
Yosemite toad *Bufo canarus*	FC	SC		Endemic California toad found in wet meadows between 4,000–12,000 feet in the Sierra Nevada from Alpine County south to Fresno County.	**Not expected to occur**. The study area is outside the known range of this species.
Mountain yellow-legged frog *Rana muscosa*	FC, FSS	SC	P	Occurs in upper elevation lakes, ponds, bogs, and slow-moving alpine streams. Most Sierra Nevada populations are found between 6,000 and 12,000 feet elevation. Almost always found within three ft. of water, and associated with montane riparian habitats in lodgepole pine, ponderosa pine, Jeffrey pine, sugar pine, white fir, whitebark pine, and wet meadow vegetation types. Alpine lakes inhabited by mountain yellow-legged frogs generally have grassy or muddy margin habitat, although below treeline sandy and rocky shores may be preferred. Suitable stream habitat can be highly variable, from high gradient streams with plunge pools and waterfalls, to low gradient sections through alpine meadows, but low gradient streams are preferred. Small streams are generally unoccupied and have no potential breeding locations due to the lack of depth for overwintering and refuge (i.e., depths of several feet or more).	**Low potential to occur.** Potentially suitable habitat is present in the study area. However, the distance to known populations, presence of predators (e.g., bullfrogs), and high level of disturbance in the study area cause the potential of occurrence to be low.
Northern leopard frog *Rana pipiens*	FSS	SC		Usually occurs in permanent water with abundant aquatic vegetation. Associated with wet meadows, marshes, slow-moving streams, bogs, ponds, potholes, and reservoirs.	**Not expected to occur.** Potentially suitable habitat is present in the study area. However, there have been no documented occurrences in the region.
Birds					
Bald eagle *Haliaeetus leucocephalus*	FSS	SE, FP	SI	Uses ocean shorelines, lake margins, and river courses for both nesting and wintering. Most nests are within one mile of water in large trees with open branches. Roosts communally in winter.	**Observed in study area (foraging).** Resident eagles and young produced in the Basin, as well as migrants from other areas, are known to perch in the study area during winter months. The breeding pair from Emerald Bay has also been observed foraging over the study

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
					area in the summer. The study area has been identified as a Bald Eagle Threshold Area by the TRPA, and several known perch sites exist in the study area.
Golden eagle *Aquila chrysaetos*		FP	SI	Mountains and foothills throughout California. Nests on cliffs and escarpments or tall trees.	**Not expected to occur**. Suitable habitat not present in the study area.
Osprey *Pandion haliaetus*		SC	SI	Associated strictly with large fish-bearing waters. Nest usually within 0.25 mile of fish-producing water, but may nest up to 1.5 mile from water. In the Tahoe Basin, osprey nests are distributed primarily along the Lake Tahoe shoreline at the northern portion of the east shore and southern portion of the west shore. Other osprey nest sites in the Basin occur along the shorelines of smaller lakes (e.g., Fallen Leaf Lake), and in forest uplands up to 1.5 miles from lakes.	**Observed in study area (Foraging)**. Osprey have been observed in the study area. They are not known to nest in the study area, however good foraging habitat and perch sites are present in the area.
Northern goshawk *Accipiter gentilis*	FSS		SI	In the Sierra Nevada, generally requires mature conifer forests with large trees, snags, downed logs, dense canopy cover, and open understories for nesting; aspen stands are also used for nesting. Foraging habitat includes forests with dense to moderately open overstories, and open understories interspersed with meadows, brush patches, riparian areas, or other natural or artificial openings. Goshawks reuse old nest structures and maintain alternate nest sites.	**Observed in study area (foraging).** Potential foraging habitat is present in the study area. However the lack of suitable nesting habitat and high disturbance levels in the surrounding area (e.g., residential and commercial development) cause the study area to be rarely used and northern goshawk to have a low potential to occur in a given year. A northern goshawk was observed in the study area previously (1994–1996). However, the detection was made in September when individuals tend to be moving from summer areas (Global Environmental 1997). It could have been a young bird produced elsewhere in the Basin or a migrating bird. No northern goshawks have been documented in the study area in recent years (1997–2007).

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
Cooper's hawk *Accipiter cooperii*		SC		Nests in oak woodlands, other mixed evergreen forest, or coniferous forest. Forages in a variety of habitats-from open areas to dense forests.	**Observed in study area**. Potential nesting and foraging habitat exists within upland areas in the study area. The species has been documented foraging in the study area as recently as 2000 but has not been observed nesting (TRPA 2002). The level of disturbance in the study area reduces the potential for this species to use the area for nesting to a low level.
Sharp-shinned hawk *Accipiter striatus*		SC		Nests in coniferous or mixed forests, usually selecting a conifer for the nest tree. Forages in a wide variety of coniferous, mixed, or deciduous woodlands.	**Observed in study area (Foraging).** Potential nesting and foraging habitat exists within the upland areas in the study area. The species has been observed foraging in the study area as recently as 2000 but has not been observed nesting (TRPA 2002). The level of disturbance in the study area reduces the potential for this species to use the study area for nesting to a low level.
Northern harrier *Circus cyaneus*		SC		Found in a variety of open grassland, wetland, and agricultural habitats. Open wetland habitats used for breeding include marshy meadows, wet and lightly grazed pastures, and freshwater and brackish marshes. Breeding habitat also includes dry upland habitats, including grasslands, croplands, drained marshlands, and shrub-steppe in cold deserts. Winters throughout California where suitable habitat occurs. Wintering habitat includes open areas dominated by herbaceous vegetation, including grasslands, pastures, croplands, coastal sand dunes, brackish and freshwater marsh, and estuaries (Grinnel & Miller 1944, Martin 1987, and MacWhirter & Bildstein 1996).	**Observed in study area.** Suitable habitat is present in the study area and the species has been documented using the area for foraging. No harrier nests have been documented in the study area to date, and the level of disturbance has likely resulted in a low potential for nesting to occur in the study area.
Peregrine falcon *Falco peregrines*	FSS	SE, FP	SI	Nests and roosts on protected ledges of high cliffs, usually adjacent to water bodies and wetlands that support abundant avian prey.	**Not expected to occur**. Suitable habitat not present in the study area.

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
Long- eared owl *Asio otus*		SC		Found in a variety of habitat types throughout its range. Nests in woodland, forest, and open (e.g., grassland, shrubsteppe, desert) settings. Occupies wooded and nonwooded areas that support relatively dense vegetation (trees, shrubs) adjacent to or within larger open areas such as grasslands or meadows (i.e., habitat edges) (Bloom 1994, Marks et al. 1994). This species has also been documented breeding in contiguous conifer forest habitat with heavy mistletoe infestation (Bull et al. 1989). Trees and shrubs used for nesting and roosting include oaks, willows, cottonwoods, conifers, and junipers (Marks et al. 1994).	**Moderate potential to occur.** Since a variety of habitat types (e.g., open and forested) are present in the study area, it is likely that suitable habitat exists in the study area for this species. However, the species is known to nest in different habitats throughout its range and preferred nesting habitat for long-eared owls in the Lake Tahoe Basin has not been well documented. However, the species has been documented in the Lake Tahoe Basin during the breeding season as recently as 2005.
California spotted owl *Strix occidentalis occidentalis*	FSS	SC	P	Occurs in several forest vegetation types, including mixed conifer, ponderosa pine, red fir and montane hardwood. Nesting habitat is generally characterized by dense canopy closure (i.e., >70%) with medium to large trees and multistoried stands (i.e., at least two canopy layers). Foraging habitat can include intermediate to late-successional forest with greater than 40% canopy cover.	**Low potential to occur.** Potential foraging habitat is present in the study area. However the lack of suitable nesting habitat and high disturbance levels in the surrounding area (e.g., residential and commercial development) cause the potential for occurrence to remain low.
Great gray owl *Strix nebulosa*	FSS	SE		Found in Central Sierra mature mixed conifer forests near meadows. Scattered along the west slope of the Sierra between 4,500 and 7,500 ft from Plumas County to Yosemite National Park.	**Not expected to occur.** Suitable habitat is present in the study area. However, the area experiences high disturbance levels, especially in the surrounding area [e.g., residential and commercial development]; and the historic or present occurrence of great gray owl in the Tahoe Basin has not been confirmed.
Willow flycatcher *Empidonax traillii*	FSS	SE	P	In the Sierra Nevada, suitable habitat typically consists of montane meadows that support riparian deciduous shrubs (particularly willows) and remain wet through the nesting season (i.e., mid-summer). Important characteristics of suitable meadows include a high water table that results in standing or slow-moving water,	**Moderate potential to occur.** Suitable habitat for willow flycatchers is currently limited in the study area, primarily due to the hydrology present. Willow flycatchers were formerly known to nest by Trout Creek in the study area (Orr and Moffitt 1971), however in recent years very few sightings have been

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
				or saturated soils (e.g., "swampy" conditions), during the breeding season; abundant riparian deciduous shrub cover (particularly willow); and riparian shrub structure with moderate to high foliar density that is uniform from the ground to the shrub canopy. Most breeding occurrences are in meadows larger than 19 acres, but average size of occupied meadows is approximately 80 acres. Although less common in the Sierra Nevada, riparian habitat along streams can also function as suitable habitat for willow flycatcher. However, those areas must support the hydrologic and vegetation characteristics described for suitable meadows (e.g., standing or slow-moving water, abundant and dense riparian vegetation).	documented. Willow flycatchers may use the study area, particularly in years when overbanking occurs in May and/or June, however, protocol level surveys have not been conducted in recent years and no detections have been made via other methods (e.g., point counts). The restoration proposed for the study area will likely improve the suitability of the habitat present as well as expand it. Therefore the potential for willow flycatcher to occur in the study area will likely increase as a result of the restoration.
Yellow warbler *Dendroica petechia*		SC	P	In the Sierra Nevada, yellow warblers typically breed in wet areas with dense riparian vegetation. Breeding habitats primarily include willow patches in montane meadows, and riparian scrub and woodland dominated by willow, cottonwood, aspen, or alder with dense understory cover. Localized breeding has been documented recently in more xeric sites, including chaparral, wild rose (*Rosa* spp.) thickets, and young conifer stands (Sisegel and DeSante 1999, RHJV 2004).	**Observed in study area**. This species has been documented as present and breeding in the study area (Borgmann and Morrison).
Waterfowl species (collectively)			SI	Wetlands and waters such as lakes, creeks, drainages, marshes, and wet meadows.	**Observed in study area.** Several waterfowl species have been documented foraging, resting, and nesting in the study area (Borgmann and Morrison 2004, TRPA 2002a, TRPA 2002, Conservancy 2002, and Global Environmental 1997).

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
Mammals					
Pale Townsend's big-eared bat *Corynorhinus townsendii pallescens*	FSS	SC	SI	Ranges throughout California mostly in mesic habitats. Limited by available roost sites, such as caves, tunnels, mines, and buildings.	**Not expected to occur.** Suitable habitat not present in the study area. No occurrences reported within the Lake Tahoe Basin (Schlesinger and Romsos 2000).
Western red bat *Lasiurus blossevillii*	FSS	SC		Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. There may be an association with intact riparian habitat (particularly willows, cottonwoods, and sycamores).	**High potential to occur.** Suitable habitat is present in the study area and the species has been documented within 4 miles of the study area as recently as 2004 (Borgmann and Morrison).
Hoary bat *Lasiurus cinereus*		SC		Diverse forest habitats with a mixture of forest and small open areas that provide edges. Solitary and primarily roost in foliage of both coniferous and deciduous trees.	**Observed in study area.** Suitable habitat is present and the species has been documented on the study area (Borgmann and Morrison).
California wolverine *Gulo gulo luteus*	FSS	ST, FP	P	Inhabits upper montane and alpine habitats of Sierra Nevada, Cascades, Klamath, and north Coast Ranges. Needs water source and denning sites. Rarely seen. Sensitive to human disturbance.	**Not expected to occur.** Suitable habitat not present in the study area. Very few documented occurrences in the region.
American marten *Martes Americana*	FSS		P	Dense canopy conifer forest with large snags and downed logs. Prefers old growth stands with multiple age classes in vicinity.	**Not expected to occur**. Suitable habitat not present in the study area.
Pacific fisher *Martes pennanti pacifica*	FC, FSS	SC	P	Inhabits stands of pine, Douglas fir, and true fir, in northwestern California and Cascade-Sierra ranges. Fishers are considered extirpated throughout much of the Central and Northern Sierra Nevada (Zielinski et al. 1995).	**Not expected to occur**. No suitable habitat present. Species is considered extirpated from the Lake Tahoe Basin.
Sierra Nevada red fox *Vulpes vulpes necator*	FSS	ST		Inhabits upper montane and alpine habitats of Sierra Nevada, Cascades, Klamath, and north Coast Ranges. Needs water source and denning sites. Rarely seen. Sensitive to human disturbance.	**Not expected to occur.** Presumed extirpated from the Lake Tahoe Basin (Schlesinger and Romsos 2000).

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
Sierra Nevada mountain beaver *Aplodontia rufa californica*		SC	P	Sierra Nevada mountain beavers use riparian habitats with soft, deep soils for burrowing, lush growth of preferred food sources such as willow and alder, and a variety of herbaceous species for bedding material. Vegetation types include wet meadows and willow-alder dominated riparian corridors, typically near water sources. Suitable riparian habitats are typically characterized by dense growth of small deciduous trees and shrubs near permanent water. Mountain beavers are generally solitary except during their short breeding season, and spend a high proportion of their time in extensive underground burrow systems with multiple openings, tunnels, and food caches.	**Not expected to occur.** No suitable habitat present in the study area.
Sierra Nevada snowshoe hare *Lupus americanus tahoensis*		SC		In the Sierra Nevada, found only in boreal zones, typically inhabiting riparian communities with thickets of deciduous trees and shrubs such as willows and alders.	**Low potential to occur.** Suitable habitat is present in the study area and the species has been documented in the region. However, the level of disturbance and the distance of the study area from additional suitable habitat, and it being relatively isolated from other suitable habitat limit the potential of this species to occur in the study area.
Mule deer *Odocoileus hemionus*			SI	Yearlong resident or elevational migrant, prefers a wide distribution of various-aged vegetation for cover, meadow and forest openings, and free water. In the Sierra Nevada, early to mid-successional forests, woodlands, and riparian and brush habitats are preferred due to the greater diversity of shrubby vegetation and woody cover. In addition to forage, vegetative cover is critical for thermoregulation. Suitable habitat includes a mosaic of vegetation including forest or meadow openings, dense woody thickets and brush, edge habitat, and riparian areas. Fawning habitat, used by does during birth and by	**Low potential to occur.** Suitable habitat is present in the study area. However, there is much development, both residential and commercial, that exists between the study area and other areas of suitable habitat, creating a significant gap in contiguous habitat.

Table 3.4-2
Special-Status Wildlife Species Evaluated for the Upper Truckee River and Marsh Project

Common Name and *Scientific Name*	Regulatory Status			Habitat Associations[1]	Potential for Occurrence[2]
	Federal	State	TRPA		
				newborn fawns is of critical importance for reproductive success. A diversity of thermal cover, hiding cover, succulent forage, and water are needed during fawning. Optimal deer fawning habitat has been described as having moderate to dense shrub cover near forest cover and water, such as riparian zones. A source of surface water (e.g., creek or river) is especially important to mule deer. Typical fawning habitat varies in size, but an area of 5–26 acres is adequate, with optimal fawn-rearing habitat of around 400 acres.	

[1] **Regulatory Status Definitions**

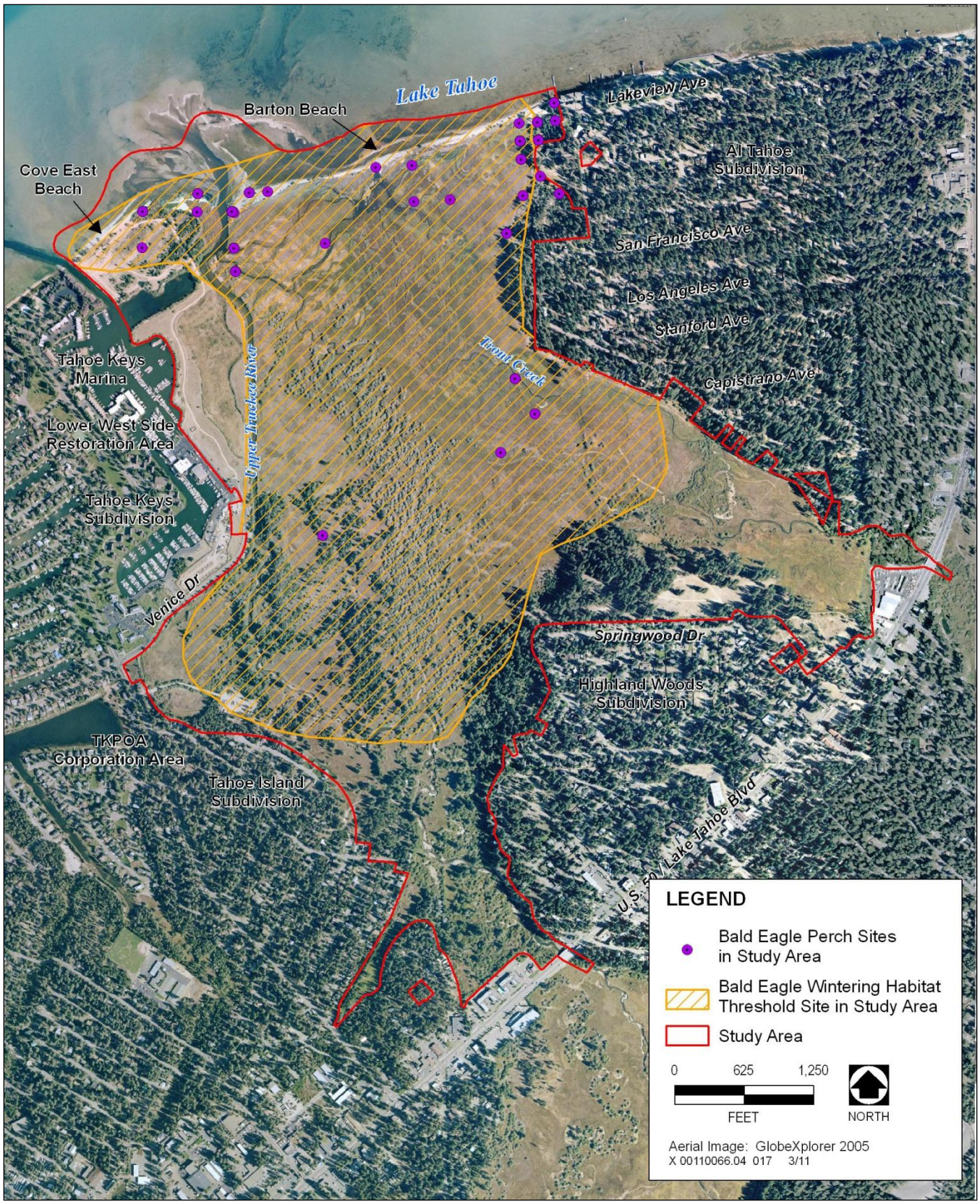
Federal–U.S. Fish and Wildlife Service (USFWS):
FC = Candidate for listing under the federal Endangered Species Act
FSS = USDA Region 5 Sensitive Species (FSM 2672)

TRPA
SI = Special interest/threshold species
P = Proposed by TRPA to be added as a special interest/threshold species (TRPA 2007)

State–California Department of Fish and Game (DFG):
ST = Threatened
SE = Endangered
FP = Fully Protected
SC = Species of Special Concern

[2] **Potential for Occurrence Definitions**

Observed in study area—Species was observed on the site during site visits or was documented on the site by another reputable source.
High potential to occur—All of the species' specific life history requirements can be met by habitat present on the site, and populations are known to occur in the immediate vicinity.
Moderate potential to occur—Some or all of the species life history requirements are provided by habitat on the site; populations may not be known to occur in the immediate vicinity, but are known to occur in the region.
Low potential to occur—Species not likely to occur due to marginal habitat quality or distance from known occurrences.
Not expected to occur—None of the species' life history requirements are provided by habitat on the site and/ or the site is outside of the known distribution for the species. Any occurrence would be very unlikely.



Sources: USFS 2001, TRPA 2006

Exhibit 3.4-3 **Bald Eagle Wintering Habitat Threshold Site and Perch Sites in Study Area**

Recreational activities may adversely affect wintering bald eagles (TRPA 2002a). The disturbance from recreational activities may range in severity from distraction from normal activity to abandonment of wintering areas. In 2002, TRPA considered the threshold and nondegradation standard for wintering bald eagle habitat to be unattained because of documented observations of recreational disturbances (TRPA 2002b). In 2006, the threshold for wintering bald eagle remained unattained (TRPA 2007).

The USFS has prepared a draft bald eagle management plan for the Tahoe Basin (USFS 2000). The plan recommends educating the public regarding the ecology and sensitivity of bald eagles to disturbance, seasonally or temporarily closing areas where eagles may be affected by recreational activities, and prohibiting construction of new trails through areas considered important to eagles.

Osprey

The osprey is designated as a species of concern by CDFG and as a special-interest species by TRPA. Ospreys are associated strictly with large fish-bearing waters and are known to forage in Lake Tahoe and in several other fish-bearing lakes within the basin. In the Tahoe Basin, osprey nests are distributed primarily along the northern portion of the east shore and southern portion of the west shore of Lake Tahoe. Other osprey nests in the basin are located along the shorelines of smaller lakes (e.g., Fallen Leaf Lake), and in forest uplands up to 1.5 miles from water.

Ospreys have been documented flying over the study area. They are not known to nest in the study area, but good foraging and perch sites exist there. Because potential nest trees in the study area are located at the wet meadow/upland edge and this habitat is relatively close to residential development throughout the study area, the quality of nesting habitat for ospreys is considered low. However, the quality of foraging habitat in the study area is relatively high, especially at the mouth of the Upper Truckee River. Ospreys may also use the river for foraging occasionally.

Northern Goshawk, Cooper's Hawk, and Sharp-Shinned Hawk

The northern goshawk (*Accipiter gentilis*), Cooper's hawk (*A. cooperii*), and sharp-shinned hawk (*A. striatus*) are forest raptor species that have been detected in the study area. Each of these species is designated as a species of special concern by CDFG. The northern goshawk is also considered sensitive by USFS Region 5 and is considered a special-interest species by TRPA.

Northern goshawks generally require mature conifer forests with large trees, snags, downed logs, dense canopy cover, and open understories for nesting. Foraging habitat for this species includes forests with dense to moderately open overstories, and open understories interspersed with meadows, brush patches, riparian areas, or other natural or artificial openings. Forest habitat in the study area lacks the characteristics of suitable nesting habitat. A northern goshawk was previously observed in the study area. However, the detection was made in September, when individuals tend to move from summer areas (Conservancy 1997). Therefore, this bird may have been a dispersing juvenile or migrant. Although the goshawk has been observed in the study area, the lack of suitable nesting habitat in the study area and the high level of disturbance in the upland area limit the potential for the northern goshawk to nest there.

Cooper's hawks and sharp-shinned hawks nest and forage in a variety of coniferous and mixed forest habitat types. Cooper's hawks will also forage in more open areas. Suitable foraging habitat exists in the study area in upland areas, as well as in willow scrub–wet meadow. However, the small patches of forested habitat in the study area may not be adequate for nesting. In addition, the level of disturbance, especially in and around the upland area, limits the potential for these two species to use the site for nesting. The Cooper's hawk and sharp-shinned hawk have been detected in the study area as recently as 2000 (TRPA 2002a).

Northern Harrier

The northern harrier is designated as a species of concern by CDFG. It breeds in a variety of open grassland, wetland, and agricultural habitats. Open wetland habitats used for breeding include marshy meadows, wet and lightly grazed pastures, and freshwater and brackish marshes. Breeding habitat also includes dry upland habitats, including grasslands, croplands, drained marshlands, and shrub-steppe in cold deserts. Vegetation height and structure particularly affect the quality of northern harrier habitat, especially because this species is a ground nester.

Northern harriers winter throughout California where suitable habitat occurs, which includes open areas dominated by herbaceous vegetation, including grasslands, pastures, croplands, coastal sand dunes, brackish and freshwater marsh, and estuaries. The species is rarely known to occur in forested areas (Grinnell and Miller 1944, Martin 1987, MacWhirter and Bildstein 1996).

Northern harriers have been observed periodically in the study area. It is not known whether they nest within the study area, but they have been observed foraging over the site in both spring and fall (Conservancy 1997). Northern harriers typically nest in areas that remain undisturbed during the nesting season. The level of recreational activity in the study area throughout the summer months may limit its suitability for nesting.

Long-Eared Owl

The long-eared owl (*Asio otus*) is designated as a species of concern by CDFG. Specific habitat associations of long-eared owl vary over the species' range, and there has been confusion over whether it is a forest or open-country species (Holt 1997). Long-eared owls nest in woodland, forest, and open (e.g., grassland, shrubsteppe, desert) settings. Wooded and nonwooded areas that are occupied by long-eared owls often support relatively dense vegetation (trees, shrubs) adjacent to or within larger open areas such as grasslands or meadows (e.g., habitat edges) (Bloom 1994; Marks, Evans, and Holt 1994; Small 1994). However, this species has also been documented breeding in contiguous conifer forest habitat with heavy mistletoe infestation (Bull, Wright, and Henjum 1989). In California, this species occurs in medium-aged and mature live oak and riparian woodlands. Long-eared owls also breed in oak thickets and conifer forests at higher elevations (Zeiner et al. 1990).

Long-eared owls have been documented in the Tahoe Basin (Smith 2002), but their habitat use has not been well studied. They have been detected during the breeding season, which indicates that they may breed in the area, but their preferred habitat is not known. Long-eared owls have not been documented in the study area, but suitable habitat may exist there in upland forests, willow scrub–wet meadow, or both.

Willow Flycatcher

Three subspecies of willow flycatcher occur in the Sierra Nevada: *Empidonax traillii brewsteri*, *E. t. adastus*, and *E. t. extimus*. The willow flycatcher (all subspecies) is designated as sensitive by the Regional Forester and listed as endangered under the CESA; additionally, *E. t. extimus* (southwestern willow flycatcher) is listed as endangered under the ESA. The willow flycatcher was identified in the notice of intent for the Sierra Nevada Forest Plan Amendment as one of seven aquatic, riparian, and meadow–dependent vertebrate species at risk in the Sierra Nevada bioregion. This species is recognized by USFS Region 5 as the highest priority landbird species in the Sierra Nevada bioregion, and is considered to have the highest likelihood of being extirpated from the Sierra Nevada in the near future.

Willow flycatchers are migratory songbirds that nest in shrubby, wet habitats. In the Sierra Nevada, willow flycatchers tend to prefer willow stands interspersed with open meadow and near standing or running water, often associated with beaver meadows (Sedgwick 2000). Important characteristics of meadows suitable for breeding willow flycatchers are a high water table that results in standing or slow-moving water, or saturated soils (e.g., "swampy" conditions); abundant cover of riparian deciduous shrubs (particularly willow); and riparian shrub structure with moderate to high foliar density that is uniform from the ground to the shrub canopy (Sanders and Flett 1989; Bombay 1999; Green, Bombay, and Morrison 2003). One study in the Sierra Nevada documented that

nests are typically located in willows with about 70 percent foliage cover. Nests are also typically found about 3–4 feet above the ground and within about 7 feet from the edge of the clump (Sanders and Flett 1989).

Riparian habitat along streams can also function as suitable habitat for the willow flycatcher, although this is less common in the Sierra Nevada. Those areas must support the hydrologic and vegetation characteristics described for suitable meadows (e.g., standing or slow-moving water, abundant and dense riparian vegetation). Stream channels that are high-gradient, deeply incised, and lacking a floodplain (e.g., potential for saturated soils or standing water) and are characterized by a sparse or narrow riparian vegetation corridor are not suitable for breeding willow flycatchers.

Although willow flycatchers have nested in meadows less than one acre in size, most nest in much larger meadows. Harris, Sanders, and Flett (1987, 1988) reported that more than 80 percent of occurrences were in meadows larger than about 20 acres. An area of approximately 2.5 acres was estimated as the minimum size required to support a nesting pair of willow flycatchers in the Sierra Nevada (Sanders and Flett 1989). However, another study of 125 meadows in the Sierra Nevada showed that willow flycatchers were found only in meadows ten acres or larger, although meadows as small as 0.6 acre have supported successful breeding flycatchers in the past (Harris, Sanders, and Flett 1987). A recent summary of willow flycatcher occurrence data for the Sierra Nevada indicates that occupied meadows range in size from 1 acre to 716 acres, averaging approximately 80 acres (USFS 2001).

Willow flycatchers were formerly known to nest by Trout Creek in the study area (Orr and Moffitt 1971). This species was not detected in the study area during surveys conducted by Borgmann and Morrison (2004). Protocol surveys for willow flycatcher conducted by AECOM biologists in 2011 located two male willow flycatchers within the study area, but no evidence of nesting (AECOM 2011). Much of the study area may not provide suitable habitat for nesting willow flycatchers (particularly in dry water years) because of its hydrologic conditions and the current willow structure and distribution there (e.g., lack of saturated soils or standing water within willow stands during the breeding season, limited dense willow cover in the floodplain). Some studies have shown that areas consisting of solid, contiguous masses of willows do not support willow flycatchers (Sanders and Flett 1989).

Yellow Warbler

The yellow warbler is designated by CDFG as a species of special concern; in addition, TRPA has proposed adding it as a special-interest species because of its potential to serve as an indicator of riparian health (TRPA 2007). In the Sierra Nevada, yellow warblers typically breed in wet areas with dense riparian vegetation. Primary breeding habitats are willow patches in montane meadows, and riparian scrub and woodland dominated by willow, cottonwood, aspen, or alder with dense understory cover. Localized breeding has been documented recently in more xeric sites, including chaparral, wild rose (*Rosa* spp.) thickets, and young conifer stands (Siegel and DeSante 1999, RHJV 2004).

Willow scrub habitat in the study area provides suitable summer breeding and foraging habitat for yellow warblers. Borgmann and Morrison documented yellow warblers breeding in the study area as recently as 2004; however, they also observed a high level (50 percent or more) of nest parasitism by brown-headed cowbirds (*Molothrus ater*).

Parasitism by brown-headed cowbirds has been identified as a major cause in reductions of yellow warbler populations in the Sierra Nevada. High levels of cowbird parasitism can be the result of increased human habitation and habitat alterations. Brown-headed cowbirds lay their eggs in the nests of other species, which in turn reduces their hosts' breeding productivity. This activity is known as brood parasitism. Brood parasitism reduces productivity in two ways: brown-headed cowbirds typically remove an egg of the host before laying their own egg in the nest, and cowbird nestlings often hatch before and develop more rapidly than the host young. As a consequence, the adult hosts tend to provision more to the larger, more aggressive cowbird nestlings at the expense of their own young. The severity of cowbird parasitism and its effect on populations of yellow warblers

within the study area could not be determined from the Borgmann and Morrison study because of their small sample size (Borgmann and Morrison 2004).

Waterfowl

Waterfowl are strongly associated with lagoon habitats. Because nesting habitat for waterfowl is limited in the Tahoe Basin, waterfowl are considered special-interest species by TRPA. Most of the study area is considered one of 18 TRPA-designated threshold sites for nesting waterfowl (as shown in Exhibit 3.4-4). Surveys conducted by USFS and TRPA indicate that the study area supports high species diversity, with a large number of species and high mean relative abundance (number of individuals) of each species (TRPA 2002a).

Waterfowl species that are likely to nest in the Tahoe Basin include the mallard, northern pintail, northern shoveler, cinnamon teal, American widgeon, gadwall, ring-necked duck, and common merganser. Most of these species nest along shallow-water margins of streams or lakes, in areas of emergent vegetation or other vegetation that provides concealment. Typically nests are in marshes or adjacent meadows and are scrapes on the ground lined with grass (Ehrlich, Dobkin, and Wheye 1988). Most of these ducks are dabblers and feed on vegetation in water approximately 6–10 inches deep. Ring-necked duck and common mergansers feed by diving under water and use aquatic areas approximately 3–10 feet deep.

Cinnamon teal were formerly one of the most common nesters in the study area (Orr and Moffitt 1971); now, however, they are only rarely seen there during the breeding season (TRPA 2002a). Mallards also bred at the marsh in great numbers historically (Orr and Moffitt 1971). They are one of the most common species of waterfowl still found at the marsh, but their numbers have been reduced from historical levels, probably because of reductions in suitable habitat within the Tahoe Basin (TRPA 2002b).

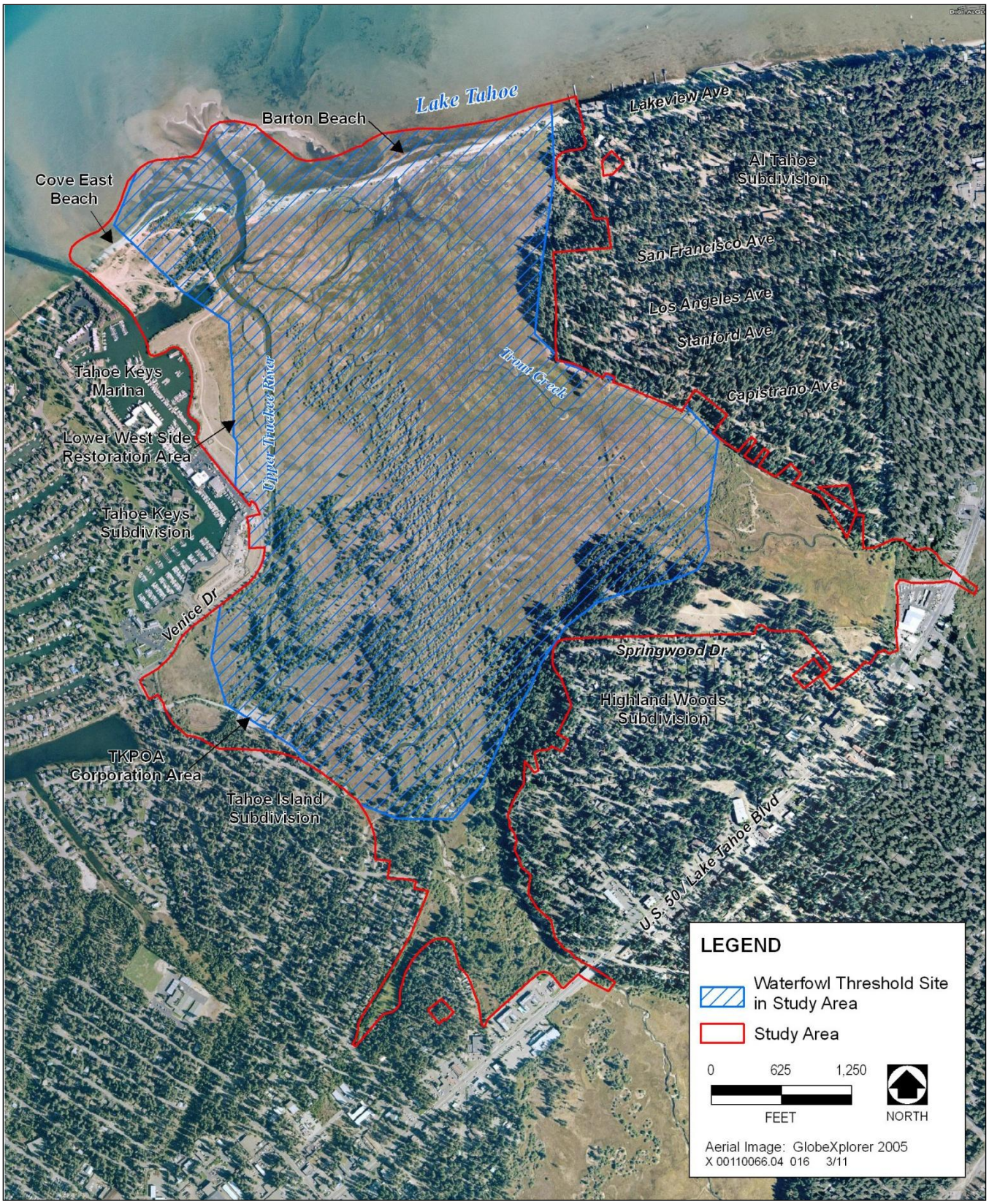
Recreational activities and human access in wetlands may disrupt normal waterfowl behavior (Knight and Cole 1995). Because of increased recreational encroachment into wetland areas, the quality of waterfowl habitats at TRPA-designated threshold sites has been degraded and the threshold standard is not in compliance with the nondegradation standard (TRPA 2002b).

The Canada goose (*Branta canadensis*) has undergone dramatic population growth within the lower 48 states (USFWS 2002). (The Pacific population of the Canada goose is *Branta canadensis moffitti*) Orr and Moffitt (1971) report that only small numbers of Canada geese formerly nested in the study area. However, transplant programs and habitat enhancement programs were undertaken in the past two decades to increase populations of the Canada goose in the West (USFWS 2002). As a result, these populations have risen substantially enough that Canada geese are increasingly coming into conflict with people and human activities. Conflicts between geese and people affect or damage property, human health and safety, agriculture, and natural resources (USFWS 2002). Consequently, Canada geese have become considered by some to be a nuisance species.

The Pacific population of the Canada goose is relatively nonmigratory, with most flocks wintering on or near their nesting areas. They can be found in freshwater marshes and meadows, and, in urban areas, in golf courses and lawns. Nests are usually near water and are made of dry grass, forbs, moss, sticks, and occasionally pine needles or bark. They feed on shoots, roots, seed of grass sedges, grain and berries, and also some insects and crustaceans (Ehrlich, Dobkin, and Wheye 1988).

Hoary Bat

The hoary bat is designated as a species of concern by CDFG. It is associated with a diverse array of forest habitats that also contain open areas, which can provide edge habitat. Hoary bats are solitary and tend to roost in the foliage of both coniferous and deciduous trees. Suitable roosting habitat exists in the study area along the montane meadow/upland edge, and high-quality foraging habitat is present throughout the study area. Hoary bats have been documented in various locations within the Tahoe Basin, including the study area, as recently as 2004 (Borgmann and Morrison 2004).



Source: TRPA 2006

Exhibit 3.4-4 **Waterfowl Threshold Site in Study Area**

Western Red Bat

The western red bat (*Lasiurus blossevilli*) has a broad distribution ranging from Canada (British Columbia) Canada, to Chile. In California, western red bat is designated as a species of concern by CDFG and considered sensitive by USFS Region 5.

Suitable habitat includes edge habitats adjacent to streams or open fields, in orchards, and sometimes urban areas. Roost sites are generally hidden from view in all directions; lack obstruction beneath, allowing the bat to drop downward for flight; lack lower perches that would allow visibility by predators; have dark ground cover to minimize solar reflection; have nearby vegetation to reduce wind and dust; and are generally located on the south or southwest side of a tree. Roost sites may be associated with intact riparian habitat, particularly willow, cottonwoods, and sycamores. Suitable habitat is present in the study area along the upland edge of montane meadow and willow scrub–wet meadow. The species may also forage across the other habitats located in the study area (e.g., wet meadow, lagoon, stream). Western red bats have been detected at Tallac Marsh, less than 4 miles west of the study area (Borgmann and Morrison 2004).

Sierra Nevada Snowshoe Hare

The Sierra Nevada snowshoe hare (*Lepus americanus tahoensis*) is listed as a species of concern by CDFG. In the Sierra Nevada, this species in found only in boreal zones. Suitable habitat includes riparian communities with thickets of willows and alders, and conifer forests with abundant cover composed of shrubs or small trees. In the Tahoe Basin, snowshoe hares can be found in dense brush near the edges of meadows or riparian communities. Montane meadow habitat and the willow scrub–wet meadow habitat in the study area provide suitable habitat for this species. However, the distance of the study area from other suitable habitat and the level of disturbance in the study area may limit the potential of occurrence for this species.

Sensitive Habitats

Sensitive habitats are those that are of special concern to resource agencies or that are afforded specific consideration through the TRPA Goals and Policies and TRPA Code of Ordinances, Section 404 of the CWA, and other applicable regulations. Sensitive natural habitats may be of special concern to these agencies and conservation organizations for a variety of reasons, including their locally or regionally declining status, or because they provide important habitat to common and special-status species. In the study area, the Upper Truckee River and Trout Creek and the associated montane meadow, willow scrub–wet meadow, lodgepole pine, and beach and dune communities are considered sensitive habitats. Some of the areas within these habitats are designated as SEZs. Formal wetland delineations pursuant to U.S. Army Corps of Engineers (USACE) guidelines have not been completed for the study area, but much of the study area is in the floodplain of the Upper Truckee River and Trout Creek. These areas would likely be considered jurisdictional by USACE and the Lahontan Regional Water Quality Control Board under Section 404 of the Federal CWA and the State's Porter-Cologne Act, respectively.

As described previously for the entire study area, sensitive habitats in the study area are affected by existing recreational activities, and unauthorized recreational activities have resulted in a number of trails and other disturbed areas in sensitive habitats. (These trails are described in Section 3.6, "Geology and Soils, Mineral Resources, and Land Capability and Coverage," and in Section 3.13, "Recreation.")

Other Ecologically Significant or Special-Interest Resources

In addition to special-status species and sensitive habitats, four other resources in the study area are considered ecologically significant or of special interest: the riparian bird community and neotropical migrant landbirds, the raptor community, wildlife movement corridors, and common migratory birds. These resources are discussed below.

Riparian Bird Communities and Neotropical Migrant Landbirds

The quality of riparian habitats and diversity of neotropical migrants in the southern portion of the Tahoe Basin indicate the importance of this area to regional avian conservation and management. Montane meadow and wet-meadow habitats and the forested habitats in the study area provide habitat for numerous neotropical migrant bird species during the breeding season, as well as during spring and fall migration.

Raptor Community

Raptors are considered ecologically significant as a group because they:

- function at a high trophic level, and their populations are typically sensitive to the distribution and local abundance of prey populations;
- represent a wide range of life histories with respect to nesting, foraging, and habitat-use requirements;
- include several species sensitive to habitat disturbance and loss; and
- are generally visible and an important component of a wildlife viewing experience.

The extent and mix of forest and riparian/wet meadow habitats found in the study area provide winter, breeding, and migration habitat for many raptor species known to occur over the larger region.

Wildlife Movement Corridors

Wildlife movement corridors are considered an important ecological resource by various agencies (e.g., USFWS, USFS, TRPA). In addition, wildlife movement and migration corridors are protected under the TRPA Code of Ordinances. Movement corridors may provide favorable locations for wildlife to travel between different habitat areas, such as foraging sites, breeding sites, cover areas, and preferred summer and winter range locations. They may also function as dispersal corridors that allow animals to move between various locations within their range.

As landscapes become increasingly fragmented, the habitat quality and area of organisms that occupy remaining patches of suitable habitat may be reduced, and these organisms may become at risk to processes that affect small or isolated populations (Hilty, Lidicker, and Merenlender 2006:30–48). These processes may include changes in microclimates, limits to daily or seasonal movements, inbreeding depression, and random demographic or environmental catastrophes (e.g., wildfire), and can result in increased mortality or local extinction of populations. Protecting and managing ecological corridors that link core areas of habitat, and that facilitate movement or dispersal of wildlife among habitat patches, has been widely proposed to reduce the adverse effects of habitat fragmentation. By maintaining or increasing connectivity among habitat patches or distinct regions, corridors may play an important role in maintaining population persistence and genetic diversity. Corridors can also facilitate the recolonization of sites where populations have been extirpated or allow for traditional seasonal movements within a population's overall range. Several studies have demonstrated their effectiveness in particular applications (e.g., Beier and Noss 1998). The effectiveness of corridors depends in part on the ecology of individual species and the attributes of the surrounding landscape (Rosenberg, Noon, and Meslow 1997; Hilty, Lidicker, and Merenlender 2006:198–201).

The study area could function as a movement corridor, or as a linkage within a larger movement route, at multiple spatial scales. At a regional scale, because of its large size, geographic position, and habitat quality, the Upper Truckee Marsh provides a "stepping stone" or seasonal habitat for waterfowl and shorebirds migrating along the Pacific Flyway. At a watershed (i.e., across habitats within the Upper Truckee watershed or the Tahoe Basin) or site (i.e., within the study area) scale, wetland and aquatic habitats in the study area likely facilitate movements of waterfowl and shorebirds between the Lake Tahoe shoreline and areas higher in the watershed, as well as local movements within the study area.

Although the study area is one of the most ecologically significant sites in the Tahoe Basin, the extent to which it functions as a movement corridor, particularly at a watershed or regional scale, for other wildlife species is unknown. The study area is surrounded on the west, south, and east by roads, residential development, and commercial activities, and on the north by Lake Tahoe. On its southern boundary, the site is also crossed by U.S. 50. At a watershed scale, these constraints may limit the study area's potential value in facilitating wildlife movements, particularly for medium to large animals (e.g., deer and other mammals). The site could function as a corridor or stepping stone for species whose movements are less sensitive to the presence of human disturbance and roads, such as landbirds. For example, for those species, the study area could provide a habitat linkage between the Lake Tahoe shorezone and areas upstream. Also, because of the study area's large size, riparian habitats there could facilitate local dispersal or movements by some riparian or aquatic species within the study area.

The importance of managing the study area as a potential wildlife corridor may increase in the future if upstream reaches of the Upper Truckee River are restored and habitat functions and values increase there.

Common Migratory Birds

A large number of common bird species are migratory and fall under the jurisdiction of the MBTA. A comprehensive list of MBTA species that could occur in the study area is too lengthy to provide here, but includes such familiar species as mountain chickadee, white-breasted nuthatch, yellow-rumped warbler, and several other warbler species. (Appendix H provides a list of bird species that could occur in the study area.) The nests of all migratory birds are protected under the MBTA, which makes it illegal to destroy any active migratory bird nest (see the discussion of the MBTA under the discussion of federal regulations above). Several migratory bird species have the potential to nest in the study area.

3.4.2 Environmental Consequences and Mitigation Measures

Significance Criteria

For this analysis, the following significance criteria were used to identify and analyze the significance of impacts.

CEQA Criteria

Under CEQA, an alternative was determined to result in a significant effect related to vegetation and wildlife resources if it would:

- have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or USFWS (CEQA 1);
- have a substantially adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFG and USFWS (CEQA 2);
- have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means (CEQA 3);
- interfere substantially with the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites (CEQA 4);
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (CEQA 5);

- conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved regional, State, or local habitat conservation plan (CEQA 6);
- conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production (CEQA 7);
- result in the loss of forest land or conversion of forest land to nonforest use (CEQA 8); or
- involve other changes in the existing environment which, due to their location or nature, could result in conversion of forest land to nonforest use (CEQA 9).

These criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines. For criteria CEQA 7 and 8, forest land is defined as in Public Resources Code Section 12220(g): land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.

NEPA Criteria

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the CEQA criteria used for this analysis. NEPA requires documentation and discussion of any beneficial effects of a project in addition to its negative impacts. Where appropriate, these beneficial effects are discussed and called out specifically for the purposes of NEPA in the following impact analysis.

TRPA Criteria

Based on TRPA's Initial Environmental Checklist, an alternative was determined to result in a significant impact related to vegetation and wildlife resources if it would:

- remove native vegetation in excess of the area utilized for the actual development permitted by TRPA's land capability program/Individual Parcel Evaluation System (IPES) (TRPA 1);
- remove riparian vegetation or other vegetation associated with critical wildlife habitat, through either direct removal or indirect lowering of the groundwater table (TRPA 2);
- introduce new vegetation that would require excessive fertilizer or water, or would provide a barrier to the normal replenishment of existing species (TRPA 3);
- cause a substantial change in the diversity or distribution of species, or the number of any species of plants (including trees, shrubs, grass, crops, microflora, and aquatic plants); (this criterion refers to "a substantial change" rather than just "a change" as in the TRPA Initial Environmental Checklist to clarify that this criterion defines a significant impact rather than just an impact) (TRPA 4);
- reduce the numbers of any unique, rare, or endangered species of plants (TRPA 5);
- remove streambank and/or backshore vegetation, including woody vegetation such as willows (TRPA 6);
- remove any native live, dead, or dying trees 30 inches or greater dbh within TRPA's Conservation or Recreation land use classifications (TRPA 7);

- change the natural functioning of an old-growth ecosystem (TRPA 8);
- cause a substantial change in the diversity or distribution of species, or the numbers of any species of animals (birds or land animals including reptiles, insects, mammals, amphibians, or microfauna); (this criterion refers to "a substantial change" rather than just "a change' as in the TRPA Initial Environmental Checklist to clarify that this criterion defines a significant impact rather than just an impact) (TRPA 9);
- reduce the number of any unique, rare, or endangered animal species (TRPA 10);
- introduce new species of animals into an area, or result in a barrier to the migration or movement of animals (TRPA 11); or
- cause the quantity or quality of existing wildlife habitat to deteriorate (TRPA 12).

Although not used as significance criteria, effects on TRPA thresholds were evaluated and these effects are reported in Section 4.6, "Consequences for Environmental Carrying Capacity Thresholds."

METHODS AND ASSUMPTIONS

The analysis of the alternatives' potential effects on vegetation and wildlife resources considers short-term disturbance; long-term conversion to other cover types; changes in river-floodplain connectivity, hydrology, and geomorphic processes; and changes in persistent, intermittent disturbance from recreational activities. Areas potentially affected by short-term disturbance or long-term conversion to other cover types were identified by overlaying GIS layers of proposed project components (including proposed haul routes and staging areas) on layers of vegetation (Exhibit 3.4-1), habitat occupied by special-status plants (Exhibit 3.4-2), and bald eagle perch sites (Exhibit 3.4-3). Acreages of short-term disturbance and long-term conversion of land cover types were generated through these GIS analyses, and are summarized in Tables 3.4-3 and 3.4-4, respectively. Hydraulic modeling results presented in the *Upper Truckee River and Wetland Restoration Project Final Concept Plan Report* (Conservancy and DGS 2006) were used to evaluate effects on river-floodplain connectivity; in particular, the area inundated by 2-year streamflow events was considered a general indicator of the area of active floodplain and river-floodplain connectivity. Evaluation of recreation effects on vegetation and wildlife was based in part on the location of user-created trails (Exhibit 3.6-2) and of existing and proposed facilities; on land steward observations (Rozance 2007); and on a presumed slight (Alternative 2) to small (Alternative 1) increase in recreational use, as described in Section 3.13, "Recreation." Other relevant existing information (which is summarized in Section 3.4.2, "Environmental Setting") and the environmental consequences presented in other sections of this chapter also were considered in determining effects on vegetation and wildlife resources.

In addition to the methods described above, the evaluation of effects on sensitive communities (SEZs, jurisdictional wetlands, and riparian vegetation) was based on several important assumptions. First, the boundaries of SEZs in the study area were considered to roughly correspond to the boundaries of Land Capability District 1b (Exhibit 3.6-2). This district includes almost the entire study area except for some upland forest, restored upland shrub, and developed and disturbed areas near the study area's boundaries. The plant community boundaries (Exhibit 3.4-1) and the SEZ/land capability district boundaries (Exhibit 3.6-2) were used as an interim basis for determining the location of potentially jurisdictional wetlands. A formal wetland delineation would be completed before construction to obtain a USACE permit. Areas mapped as the following vegetation types are presumed to potentially qualify as jurisdictional wetlands (and to include all riparian vegetation in the study area) and thus were considered sensitive communities: lodgepole pine forest, willow scrub-wet meadow, montane meadow, lagoon, and open water. In addition to these vegetation types, beach and dune was also considered a sensitive habitat. Some of the areas in these habitats are designated as SEZs. A formal wetland delineation according to USACE criteria will be conducted after selection of a preferred alternative and the footprint of its constructed elements, to provide impact acreages required for the permitting process.

Table 3.4-3
Acreage of Short-Term Disturbance of Land Cover Types by Alternative

Cover Type	Alternative			
	1	2	3	4
Developed	2.1	2.1	2.1	0.0
Disturbed	2.1	2.1	0.1	0.0
Restored upland shrub	6.8	6.8	6.8	4.7
Jeffrey pine forest	0.1	0.1	0.0	0.0
Lodgepole pine forest	***1.4***	***3.5***	***1.5***	***2.9***
Montane meadow	***3.4***	***7.3***	***2.0***	***3.6***
Willow scrub-wet meadow	***2.1***	***2.8***	***3.2***	***4.4***
Beach and dune	***0.2***	***0.2***	***0.0***	***0.0***
Open water	***6.3***	***8.3***	***9.2***	***4.3***
Lagoon	***2.4***	***2.4***	***2.4***	***0.0***
Total	26.9 (***15.8***)	35.6 (***24.5***)	27.4 (***18.3***)	19.9 (***15.2***)

Notes: Cover types in ***bold italic*** font are sensitive communities/habitats. The total acreage of these communities are in parenthesis.
No-Project/No-Action Alternative would not involve additional short-term disturbance of land cover and thus is not included in the table.
Acreages are derived from the conceptual design of the alternatives (Appendix C), and may not total exactly because of rounding to one decimal place.
Acreages do not include changes resulting from removal and restoration of the existing network of user-created trails or construction of grade controls, bank protection, or new pedestrian or bicycle trails (except the boardwalks and bridge that are included); acreages also do not include haul routes or staging areas that are outside of footprints of constructed components and not in existing disturbed areas.

Table 3.4-4
Estimated Acreage of Long-Term Conversion of Land Cover Types by Alternative

Cover Type	Alternative			
	1	2	3	4
Developed	-1.4	-2.0	-2.0	0.0
Disturbed	-2.1	-1.5	0.5	0.0
Restored upland shrub	-6.4	-6.4	-6.4	-4.7
Jeffrey pine forest	-0.1	-0.1	0.0	0.0
Lodgepole pine forest	***-1.1***	***-1.4***	***-0.8***	***-2.9***
Montane meadow	***0.2***	***-0.8***	***1.7***	***-3.6***
Willow scrub-wet meadow	***8.2***	***8.7***	***10.6***	***11.3***
Beach and dune	***2.7***	***2.8***	***0.0***	***0.0***
Open water	***-0.5***	***0.4***	***-3.5***	***0.0***
Lagoon	***0.4***	***0.4***	***0.0***	***0.0***

Notes: Cover types in ***bold italic*** font are sensitive communities/habitats.
No-Project/No-Action Alternative would not involve land cover conversion and thus is not included in the table.
Acreages are for conversions among the cover types and thus total to zero for each alternative.
Acreages are derived from the conceptual design of alternatives (Appendix C).
Acreages do not include changes resulting from removal and restoration of the existing network of user-created trails or construction of grade controls, bank protection, or new pedestrian or bicycle trails (except the boardwalks and bridge that are included); acreages also do not include haul routes or staging areas that are outside of footprints of constructed components and not in existing disturbed areas.
Assumptions: bulkhead area and stormwater treatment basin would remain disturbed; vegetation removed to construct East Barton Lagoon would be equally distributed among Jeffrey pine forest, montane meadow, and beach and dune; the TKPOA Corporation Yard would be restored to montane meadow (for applicable alternatives); land associated with the bulkhead and levee would result in restored upland shrub (90%) and disturbed (10%) cover; and the Alternative 3 river mouth modification would result in montane meadow.

IMPACTS NOT DISCUSSED FURTHER IN THIS EIR/EIS/EIS

Effects related to several CEQA and TRPA significance criteria would not occur, and thus these effects are not discussed further:

- **Forest Land/Timberland Zoning Conflicts (CEQA 7)**—No conflicts with existing zoning or rezoning of forest land, timberland, or timberland zoned Timberland Production would occur because the study area does not include any of these zoning designations.
- **New Vegetation (TRPA 3)**—No new vegetation would be introduced that required excessive water or fertilizer, or that provided a barrier to replenishment of existing species.
- **Large Tree Removal (TRPA 7)**—No trees greater than 30 inches in diameter would be removed (TRPA 7).
- **Old-Growth Forest (TRPA 8)**—No effects related to old-growth forests would occur because no old-growth forest exists in the study area.

Section 3.4.2, "Environmental Setting," discusses all special-status plant and wildlife species evaluated in this analysis, and Tables 3.4-3 and 3.4-4 summarize the potential for each of these species to occur in the study area. With regard to sensitive species (significance criteria CEQA 1 and TRPA 5), those plant and wildlife species not expected or with a low probability to occur (because of a lack of suitable habitat, recent focused surveys that did not detect the species, or lack of other occurrence records) are not addressed further in this analysis. Implementation of this project is not expected to affect those species.

Potential conflicts with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved regional, State, or local habitat conservation plan (CEQA 6) are evaluated in Section 3.10, "Land Use."

IMPACT ANALYSIS AND MITIGATION MEASURES

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

IMPACT 3.4-1 (Alt. 1) **Introduction and Spread of Invasive Plants by Construction Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 1, construction activities could introduce or spread nonnative, invasive plant species. Unwashed construction equipment could carry invasive plant seed or other propagules from infested sites outside of the study area; seed mixes or soil amendments containing invasive plant seed could be used during revegetation; soil containing invasive plant seed could be redistributed in the study area; and multiple sites would be disturbed, providing conditions favorable for invasive plant establishment. However, as described in Environmental Commitment 4, the Conservancy would implement invasive species management practices to avoid introducing invasive species during construction. Therefore, this impact would be* ***less than significant****.*

Nonnative, invasive plant species displace native plant species and can alter the structure, functions, and dynamics of aquatic and terrestrial plant communities. As described in Section 3.4.2, "Environmental Setting," several invasive plant species are already present in the study area that the Conservancy currently manages (e.g., Eurasian watermilfoil and cheatgrass), and other invasive species grow in the Tahoe Basin. (See Section 3.5, "Fisheries," for additional discussion of aquatic invasives.) Nonetheless, construction activities could facilitate the introduction and spread of invasive plants in terrestrial communities of the study area by several mechanisms:

- **Introducing invasive plant propagules (i.e., seeds or plant parts capable of establishing a plant) on unwashed construction equipment entering the study area from infested sites.** Under Alternative 1, multiple trucks and other construction machinery would repeatedly enter the study area for four years (Table 2-4). This equipment might enter the study area following use at sites infested with invasive plants and might be carrying invasive plant propagules (e.g., in mud attached to tread).

- **Introducing invasive plant materials by using seed mixes or soil amendments (e.g., compost) containing invasive plant propagules.** Although soil would not be brought into the study area to construct Alternative 1, seed mixes and soil amendments containing propagules of invasive plants could be used during revegetation.

- **Spreading terrestrial invasive plants already present in the study area by redistributing soil containing invasive plant propagules.** Under Alternative 1, soil would be stockpiled and reapplied or otherwise redistributed on acres of land. For example, as reported in Table 3.4-3, approximately 14 acres of terrestrial natural vegetation would be disturbed for the short term. This redistribution of soil could also spread propagules of invasive plants that are already present in the study area.

- **Facilitating the introduction and spread of invasive plants by creating disturbed sites.** Disturbed sites provide an opportunity for additional species of plants to establish on a site, particularly "weedy" species, which include a number of invasive species. Approximately 23 acres of disturbed sites would be created under Alternative 1, and these sites would provide an opportunity for invasive plants to establish and spread.

Through one or more of these mechanisms, it is possible that one or more invasive plant species could be introduced or spread by construction activities under Alternative 1. However, as described in Environmental Commitment (EC) 4, "Prepare and Implement an Invasive Species Management Plan" (Table 2-6), the Conservancy would implement invasive plant management practices during project construction. The following practices would be included:

- A qualified biologist with experience in the Tahoe Basin will conduct a preconstruction survey to determine whether any populations of invasive plants are present in the project area. If invasive species are documented, they will be removed or their spread otherwise prevented before the start of construction. Control measures may include herbicide application, hand removal, or other mechanical control.

- All equipment entering the study area from areas infested by invasive plants or areas of unknown infestation status will be cleaned of all attached soil or plant parts before being allowed into the study area.

- To reduce the need for importing seed or other materials potentially containing invasive plants, the project will use on-site sources of seed and materials to the extent practicable. Seed, soil amendment, and erosion control materials that need to be imported to the study area will be certified weed free or will be obtained from a site documented as uninfested by invasive plants.

- After project construction, the project site will be annually monitored for infestations of invasive plants for 4 years. If infestations of invasive plants are documented during monitoring, they will be treated and eradicated to prevent further spread.

By reducing or eliminating the primary vectors for introduction of invasive plant seed, and eliminating infestations that establish, implementation of EC 4, described above, would substantially reduce the likelihood of the inadvertent introduction and spread of invasive plants as a result of construction activities. Therefore, this impact would be **less than significant**.

IMPACT 3.4-2 (Alt. 1) **Introduction and Spread of Invasive Plants by Recreational Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 1, it is expected there would be an increase in the number of visitors to the study area, and these visitors could contribute to the introduction and spread of invasive plants by dispersing these plants and disturbing habitat. However, there would also be a reduction in habitat disturbance because existing user-created trails would be removed from the core habitat area and habitat protection measures (e.g., signs and railings) would be incorporated into recreation infrastructure to reduce habitat disturbance by visitors. However, Alternative 1 would increase access to other areas by the construction of boardwalks, bridges, and bike trails, which would increase visitor access at the north end of the study area. Because visitor access and associated recreational activities would be redistributed through implementation of Alternative 1, it is expected that the contribution of such activities to the spread of invasive weeds would remain similar to the existing contribution. This impact would be* ***less than significant.***

Recreational users can disperse invasive plants from infested sites into the study area and can disturb vegetation, which facilitates establishment of invasive plants. Currently, visitors and their pets use an extensive network of user-created trails in most habitats of the study area, including the core habitat area. Visitors also enter habitats from along the Upper Truckee River and the shoreline of Lake Tahoe. In all these areas, visitors disperse invasive plants and disturb vegetation (which facilitates the establishment of invasive plants). Implementing Alternative 1 would remove these user-created trails from the core habitat area, which would reduce the disturbance of vegetation and potential dispersal of invasive plants in those areas. However, Alternative 1 would increase recreational access to the mouth of the Upper Truckee River and the shoreline of Lake Tahoe within the study area because of the construction of boardwalks, bridges, and bike trails. These facilities would be designed to also provide some habitat protection (e.g., signage and designated facilities designed to discourage use of sensitive areas). Therefore, although implementing Alternative 1 would likely result in a small increase in visitors to a small portion of the study area (adjacent to boardwalks, bridges, and bike trails), there would be a decrease in access through a large portion of the study area (resulting from removal of user-created trails). Habitat protection features incorporated into the new recreation facilities would reduce disturbance in those areas, and the introduction and spread of invasive species would be reduced where trails and access are removed from the core habitat. Because visitor access and associated recreational activities would be redistributed through implementation of Alternative 1, it is expected that the contribution of such activities to the spread of invasive weeds would remain similar to the existing contribution. This impact would be **less than significant**.

IMPACT 3.4-3 (Alt. 1) **Damage to or Mortality of Special-Status Plants Resulting from Construction Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 1, construction activities would not occur in occupied American mannagrass habitat. However, construction of the bridge and boardwalk would occur in and close to Tahoe yellow cress habitat that could be occupied. Thus, construction of these facilities could damage or kill Tahoe yellow cress plants. This impact would be* ***potentially significant****.*

Two special-status plant species were documented in the study area by the protocol-level plant survey: American mannagrass and TYC. Alternative 1 would not involve construction activities in the area along Trout Creek occupied by American mannagrass. Thus, American mannagrass would not be affected by Alternative 1. However, a bridge and boardwalk would be constructed along the study area's Lake Tahoe shoreline under this alternative, and construction would also occur along the shoreline where the mouth of the Upper Truckee River would be modified. Footings for the bridge would be placed in beach and dune habitat where TYC is known to occur, and portions of the boardwalk would be located near beach and dune habitat where TYC is known to occur or could potentially be present. Similarly, river mouth modifications also would require construction activities and associated disturbance of beach and dune habitat. Therefore, construction of this bridge and boardwalk, and river mouth modification, could damage or kill TYC plants. This impact would be **potentially significant**.

Mitigation Measure 3.4-3 (Alt. 1): Conduct Protocol-Level Preconstruction Surveys and Avoid or Mitigate Impacts on Tahoe Yellow Cress Plants.

To avoid or mitigate potential adverse effects on Tahoe yellow cress (TYC) plants (stems) resulting from construction activities, the following actions will be implemented:

(A) A qualified botanical monitor familiar with the vegetation of the Tahoe Basin and identification of TYC will conduct a focused preconstruction survey for TYC in all beach habitat where construction-related ground disturbance could occur during that year. Surveys will be conducted between June 15 and September 30, when TYC is clearly identifiable, and will follow CDFG's *Protocols for Surveying and Evaluating Impacts to Special Status Plant Populations and Natural Communities* (CDFG 2009). Surveys will be completed for each year that construction activities could occur in beach habitat.

If no TYC stems are found during the survey, the results of the survey will be documented in a letter report to the Conservancy and TYC Adaptive Management Working Group (AMWG) that will become part of the project environmental record, and no further actions will be required.

(B) If TYC stems are documented during the survey in areas potentially disturbed by construction activities, they will be clearly identified in the field, and if feasible, protected from impacts associated with construction activities. Protective measures will include flagging and fencing of known stem locations and avoidance. If feasible, no construction-related activities will be allowed in areas fenced for avoidance, and construction personnel will be briefed about the presence of the stems and the need to avoid effects on the stems. If all TYC stems are avoided, no further actions will be required.

(C) If avoidance of all TYC plants is not feasible, the Conservancy, in coordination with the TYC AMWG, will delineate and fence a mitigation area within the study area, excavate and translocate potentially affected stems, plant additional nursery-grown TYC plants, and monitor and adaptively manage the mitigation area, as described below. The mitigation area will extend from the inland edge of suitable habitat to the location on the edge of Lake Tahoe under the lowest possible lake elevation. If deemed necessary during monitoring, the Conservancy will either relocate or enlarge the mitigation area to achieve mitigation goals.

All potentially affected stems will be excavated and translocated to the mitigation area. Translocation will follow, as closely as possible, protocols that have been shown to be effective and described by Stanton and Pavlik (2009), and all translocated stems will be marked and/or mapped to facilitate monitoring. Translocation will be limited to no more than 10 percent of the suitable habitat within the project area. If project activities would impact more than 10 percent of the suitable habitat, then design or construction techniques will be adjusted to ensure no more than 10 percent of the suitable habitat would be affected by translocation.

Additional outplanting of container-grown nursery TYC plants to the mitigation area will also occur. Outplanting will occur at a rate of two plants for every one transplanted stem, for a total mitigation rate of 3:1, for combined translocated stems and outplanted container-grown plants. Outplanting of container-grown plants will follow, as closely as possible, protocols that have been shown to be effective as described by Stanton and Pavlik (2009), and all outplanted plants will be marked and/or mapped to facilitate monitoring.

Tahoe yellow cress stem translocation and outplanting of container-grown plants will be followed by active monitoring and adaptive management for the remainder of the growing season in which translocation and outplanting occurs, and the following two growing seasons. Monitoring and adaptive management will include the following actions:

(1) For the remainder of the growing season in which stem translocation and outplanting or container-grown plants occurs, a qualified botanical monitor familiar with the identification of TYC shall inspect each translocated or outplanted stem at least once per month and record phenology (i.e., life cycle stage) and

condition. The Conservancy will consult with the AMWG concerning appropriate measures if significant mortality or vandalism is observed. Additional outplanting will depend on the timing of the observed mortality and the level of the lake.

(2) For the two growing seasons following the season in which stem translocation and container-grown plant outplanting occurred, success of mitigation efforts will be evaluated based on the ratio of TYC stems occurring within the mitigation area. Immediately following translocation and outplanting activities, a qualified botanical monitor shall conduct a complete inventory of TYC stems in the mitigation area.

During each of the two growing seasons following the season in which translocation and outplanting occurs, a qualified botanical monitor shall conduct a complete inventory of the number of TYC stems present in the mitigation area. Surveys will be conducted when TYC is clearly identifiable. If the ratio of stems in the mitigation area is less than the ratio recorded immediately following translocation and outplanting activities, then the Conservancy will conduct additional outplanting of container-grown TYC plants to achieve at least the same ratio of TYC stems in the mitigation area. If deemed necessary based on monitoring results, the Conservancy will either relocate or enlarge the mitigation area to achieve mitigation goals.

The TYC AMWG and CDFG are continuing to develop a standardized monitoring protocol for TYC. Therefore, in an effort to be consistent with the developed protocol, before project implementation, the Conservancy will coordinate with the TYC AMWG and CDFG to finalize the monitoring protocol for evaluating mitigation efforts.

Significance after Mitigation: With implementation of the measures described above, TYC plants that are present in areas of potential ground disturbance would be identified before construction, and impacts on those plants would be avoided if feasible. If avoidance is not feasible, affected TYC plants would be mitigated at a rate of 3:1, and active monitoring and adaptive management would ensure the success of mitigation actions. Therefore, with implementation of Mitigation Measure 3.4-3 (Alt. 1), Impact 3.4-3 (Alt. 1) would be **less than significant**.

IMPACT 3.4-4 (Alt. 1) **Altered Extent of Special-Status Plant Habitat. (CEQA 1, TRPA 5)** *Under Alternative 1, lagoon restoration could increase the extent of habitat that may be physically suitable for American mannagrass. Also, the increased extent and inundation of willow scrub-wet meadow under this alternative could increase the extent of habitat suitable for American mannagrass. However, both of these effects are uncertain and may not alter the extent of suitable habitat. Under Alternative 1, beach and dune restoration could increase the extent of habitat physically suitable for Tahoe yellow cress. The boardwalk would be located near the back beach-marsh transition, but as described in Chapter 2, in the final design it would be sited in the marsh outside of Tahoe yellow cress habitat. Potential changes in sediment supply would not be sufficient to substantially reduce areas physically suitable for Tahoe yellow cress. In summary, the effect on the extent of habitat for American mannagrass would be no effect to beneficial, and for Tahoe yellow cress, the effect would be less than significant. Therefore, this impact would be* ***less than significant****.*

There are two special-status plant species documented in the study area: American mannagrass and TYC. The effect of implementing Alternative 1 could be an increase in the extent of habitat that may be physically suitable for American mannagrass, but could be a reduction in the extent of habitat that may be physically suitable for TYC. It would provide additional habitat potentially suitable for American mannagrass by restoring the lagoon behind East Barton Beach (Table 3.4-4). Also, the extent of habitat suitable for American mannagrass could be increased by the additional acreage of willow scrub-wet meadow and more frequent overbanking of river flow into the marsh that would result from the river restoration included in Alternative 1. However, the specific microhabitat requirements of American mannagrass (e.g., mud benches along Trout Creek) are not known and thus river restoration may not increase the extent of this species.

Implementing Alternative 1 also would increase the acreage of beach and dune (Table 3.4-4) by restoring beach and dune at Cove East Beach, which could provide additional habitat suitable for TYC. However, most beach and dune that would be restored is up to several hundred feet from the immediate shoreline and may not include the moist microsites that provide habitat for TYC. In contrast, the boardwalk proposed under Alternative 1 would be located adjacent to the beach, and thus, could cause the loss of some occupied habitat. As described in Chapter 2, during final design, the alternative would avoid TYC habitat by locating the bridge and boardwalk in marsh not back beach habitat. The river restoration included in Alternative 1 would not alter the function of the beach but could affect the extent of beach habitat by altering the sediment supply from the Upper Truckee River to beaches in the study area. This potential effect would not be substantial and is evaluated in Section 3.9, "Geomorphology and Water Quality."

Although recreational use of potential habitat for TYC habitat would be increased because of boardwalk, bridge, and bike trail construction, disturbance associated with this recreational use would not alter conditions sufficiently to make habitat no longer physically suitable for TYC. However, increased recreational use would increase damage and death of TYC plants from trampling, which is addressed separately by Impact 3.4-5.

The effect of Alternative 1 on the function and extent of habitat for American mannagrass would be no effect to beneficial and on the function and extent of habitat for TYC would be less than significant. Thus, this impact would be **less than significant**.

IMPACT 3.4-5 (Alt. 1) **Damage to or Mortality of Special-Status Plants Resulting from Recreational Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 1, damage to or mortality of special-status plants resulting from recreational activities would increase. Under existing conditions, habitat occupied by American mannagrass is in a location that is not substantially disturbed by recreational activities, and implementing Alternative 1 would maintain this condition. Under Alternative 1, the existing Tahoe yellow cress management plan (including the Barton Beach exclosure and adaptive management) would continue to be implemented. However, Alternative 1 would construct a boardwalk in close proximity to habitat occupied by Tahoe yellow cress and increase recreational use of potential and occupied habitat, and thus, would likely increase trampling of Tahoe yellow cress plants. Therefore, this impact would be* ***significant****.*

Implementing Alternative 1 could change recreational activity in habitat suitable for the two special-status plant species documented in the study area: American mannagrass and TYC.

American mannagrass grows along Trout Creek in an area that is not disturbed by recreational activities under existing conditions and that is not likely to be disturbed in the future. Under Alternative 1, this area would be included in the core habitat in which recreational use would be reduced; therefore, there would be no substantial effect on American mannagrass.

Tahoe yellow cress grows in beach and dune habitat along the study area's Lake Tahoe shoreline at Cove East Beach and Barton Beach. Under existing conditions, this shoreline is used for recreation, and some TYC plants are damaged or killed by visitors. For the study area, the Conservancy has implemented a TYC management plan (Conservancy 2008) that incorporates applicable actions of the regional, multi-agency, conservation strategy for TYC (*Conservation Strategy for Tahoe yellow Cress [*Rorippa subumbellata*]* [Pavlik, Murphy, and TYCTAG 2002]). These actions include establishing and maintaining an exclosure to protect most occupied habitat at Barton Beach and monitoring and adaptive management.

Recreational use of Cove East Beach would not be substantially altered by implementation of Alternative 1. However, recreational use of Barton Beach would increase because Alternative 1 involves constructing a bridge over the Upper Truckee River and a boardwalk trail just inland from Barton Beach that would increase access. Railings, other design features of the boardwalk, and signage would discourage disturbance of beach and dune habitat. and an exclosure would continue to protect most TYC plants from damage or mortality. However, because the boardwalk would be constructed close to the existing populations and an increase in visitors is

expected. A subsequent increase in trampling of plants and other disturbance to TYC populations is also expected, despite signage, protective measures, and continued implementation of the TYC management plan.

This impact would be **significant**.

All feasible measures to avoid, minimize, or mitigate this impact have already been incorporated into the design of Alternative 1 and the existing TYC management plan. However, these measures would not be sufficient to fully mitigate the effects of increased trampling of TYC resulting from increased access to Barton Beach. For this reason, this impact would be **significant and unavoidable**.

IMPACT 3.4-6 (Alt. 1) **Short-Term Disturbance of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Construction Activities. (CEQA 2, 3; TRPA 1, 2, 4, 6)** *Implementing Alternative 1 would disturb sensitive communities. This disturbance would be short term. As described in Environmental Commitments 5 and 6, the Conservancy would minimize the risk to water quality and vegetation and comply with the terms and conditions of required permits to reduce this disturbance. Nonetheless, approximately 16 acres of sensitive communities would be disturbed. This impact would be* ***significant****.*

In the study area, as described above in "Methods and Assumptions," part or all of areas mapped as open water, lagoon, willow scrub-wet meadow, montane meadow, or lodgepole pine forest potentially qualify as jurisdictional wetlands or are considered riparian vegetation or an SEZ. Thus, these areas are all considered sensitive communities. Beach and dune is also a sensitive community.

Constructing the restoration, habitat protection, public access, and recreation components of Alternative 1 would disturb approximately 16 acres of these sensitive communities (Table 3.4-3). Short-term disturbance of sensitive communities can adversely affect ecosystem functions and the services that are products of these functions, including sediment retention and the provision of habitat for common and sensitive plant and wildlife species.

With implementation of EC 5, "Prepare and Implement Effective Construction Site Management Plans to Minimize Risks of Water Quality Degradation and Impacts to Vegetation," and EC 6, "Obtain and Comply with Federal, State, Regional, and Local Permits," described in Table 2-6 in Chapter 2, this impact would be reduced, but the short-term disturbance of sensitive communities would not be eliminated because such disturbance is integral to the river, floodplain, and other restoration elements of Alternative 1. This impact would be **significant**.

Beyond what is already proposed as environmental commitments as part of the project, no feasible mitigation is available to address this impact. Therefore, this impact would be **significant and unavoidable**.

IMPACT 3.4-7 (Alt. 1) **Enhancement and Creation of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZs) Resulting from River and Floodplain Restoration. (NEPA)** *Implementing Alternative 1 would convert some disturbed, developed, and restored upland shrub to sensitive communities. The combined increase in extent of sensitive communities would be approximately 10 acres. In addition, sensitive communities would be enhanced by increasing overbank flooding. Because the extent of sensitive communities would be increased and the existing sensitive communities would be enhanced, this effect would be* ***beneficial****.*

In the study area, sensitive communities include jurisdictional wetlands, riparian vegetation, and SEZ. These communities correspond to the open water, lagoon, willow scrub-wet meadow, montane meadow, lodgepole pine forest, and beach and dune cover types mapped for the study area (Exhibit 3.4-1). Alternative 1 would involve converting some disturbed, developed, and restored upland shrub to sensitive communities (Table 3.4-4). The combined increase in extent of sensitive communities would be approximately 10 acres, with willow scrub-wet meadow increasing in acreage more than other sensitive communities and lodgepole pine forest decreasing more than other sensitive communities. Because there is a broad overlap in the ecological functions and services provided by these sensitive communities, the effects of a decrease in the acreage of one community are largely

offset by increases in other sensitive communities. For example, many wildlife and plant species use more than one of these sensitive communities as habitat (Appendices G and H). SEZ preservation and restoration is an important component of the condition of Lake Tahoe, because SEZs remove some nutrients and sediment from runoff. SEZs also include sensitive communities that provide many other benefits, but they currently only compose only five percent of the land area within the Tahoe Basin (State Parks et al. 2011). Implementing Alternative 1 would increase and enhance SEZs within the study area. Additional long-term beneficial effects are discussed for Impacts 3.4-4 and 3.4-8, and in Section 3.9, "Geomorphology and Water Quality." Because river and floodplain restoration under Alternative 1 would increase the combined extent of sensitive communities and enhance the functions and services provided by them, this long-term effect would be **beneficial**.

IMPACT 3.4-8 (Alt. 1) **Disruption of Wildlife Habitat Use and Loss of Wildlife Resulting from Construction Activities. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 1, construction activities could cause short-term disruption of wildlife use of the study area, cause the loss of wildlife, or both. Wintering bald eagle use of the study area does not occur during the construction season and thus would not be disrupted. However, construction of the restoration elements and recreation infrastructure of Alternative 1 could result in the harm or loss of individuals or nests or result in substantial disruptions to nesting attempts or other activities by three special-status bird species (yellow warbler, willow flycatcher, and long-eared owl) and would substantially affect nesting or other activities by one special-status guild (waterfowl). It also could result in abandonment or removal of active roost sites for, or harm or loss of, hoary bat or western red bat. A number of common wildlife species also would likely have their use of the study area disrupted. This impact would be* ***significant****.*

Under Alternative 1, construction activities could cause short-term disruption of wildlife use of portions of the study area, cause the loss of wildlife, or both. Construction activities would affect both common and special-status wildlife species by the same mechanisms: (1) human disturbance (i.e., the sounds and motions of construction workers and machinery) that disrupts foraging, nesting attempts, or other wildlife use of the study area and concurrently causes physiological stress, energetic costs, and increased risk of predation and (2) damage and removal of vegetation by clearing and grubbing, stockpiling of materials and soil, off-road operation of vehicles and other machinery, and earthwork that destroys nests or roost sites or harms or kills wildlife.

Fifteen special-status wildlife taxa/guilds either have been documented in the study area or have a moderate to high likelihood of being present (Table 3.4-2). Some of these species are wide-ranging raptors that may forage or perch in the study area but that are unlikely to nest in the study area (including osprey, bald eagle, and northern goshawk); these species would not be substantially affected by construction activities, and construction activities might even benefit some foraging activities. Wintering bald eagles that perch in the study area would not be affected because their use of the study area would not be during the construction season. Construction activities could disturb the foraging activities of raptors, particularly where these activities would occur near the Upper Truckee River. However, because existing recreation use is already a source of disturbance, additional construction-related disturbance might not substantially affect foraging patterns. Furthermore, abundant foraging habitat is available in other areas nearby. Construction activities associated with Alternative 1 also would not cause injury or mortality to individuals. Therefore, construction activities would not be sufficient to affect the population size or viability of these species.

However, the nesting or roosting of six special-status taxa/guilds in the study area could be adversely affected by the human disturbance or by the damage and removal of vegetation associated with construction:

- **Yellow warbler and willow flycatcher.** The yellow warbler and willow flycatcher are special-status birds associated with riparian, wetland, and aquatic habitats. They potentially could nest in the study area during construction of Alternative 1. The yellow warbler has been documented nesting in willow scrub in the study area as recently as 2004 (Borgmann and Morrison 2004). The willow flycatcher also nests in riparian vegetation and historically nested in the study area (Orr and Moffitt 1971). Protocol surveys for willow flycatcher conducted by AECOM biologists in 2011 located two male willow flycatchers within the study

area, but no evidence of nesting; however, willow flycatchers still nest in the watershed of the Upper Truckee River several miles upstream.

- **Waterfowl.** As described in Section 3.4.2, "Environmental Setting," several species of waterfowl likely nest in the study area in dense herbaceous vegetation near the open water of lagoons or river channels.

- **Long-eared owl.** As described in Section 3.4.2, "Environmental Setting," there is uncertainty regarding the nesting requirements of long-eared owl. The species occurs in the Tahoe Basin and has been observed in the Upper Truckee watershed (Fields, pers. comm., 2007), but its breeding status in the area is unknown. Long-eared owl could nest in Jeffrey pine forest, lodgepole pine forest, or willow scrub-wet meadow in the study area.

- **Western red bat and hoary bat.** For both of these bat species, suitable roosting habitat exists in trees along forest edges bordering open habitats and in trees in riparian corridors of the study area, and high-quality foraging habitat is present throughout the study area. Western red bats have been detected at Tallac Marsh, less than four miles west of the study area (Borgmann and Morrison 2004). Hoary bats have been documented in the study area as recently as 2004 (Borgmann and Morrison 2004).

Construction of Alternative 1 would involve disturbance and removal of vegetation (including willow thickets and trees) from willow scrub-wet meadow, Jeffrey pine forest, and lodgepole pine forest that provides suitable nesting habitat for yellow warbler, potentially suitable nesting habitat for willow flycatcher and long-eared owl, and suitable roosting habitat for western red bat and hoary bat. Construction would also disturb and remove dense herbaceous vegetation near the open water of lagoons and the Upper Truckee River that provides nesting habitat for waterfowl. Furthermore, construction activities would generate human disturbance (e.g., noise) near these nesting and roosting habitats.

Removing or disturbing occupied nesting habitat would result in a substantial effect on the yellow warbler, willow flycatcher, long-eared owl, or waterfowl if individuals were killed, otherwise harmed, deterred from occupying breeding and nesting locations, or caused to abandoned a nest (potentially resulting in mortality of eggs and chicks). Similarly, roost removal or disturbance causing roost abandonment would have a substantial effect on either bat species, particularly if individuals were killed or otherwise harmed. In addition, use of the study area by a number of common wildlife species would likely be disrupted. Therefore, the effect of construction activities on wildlife use of the study area would be **significant**.

Mitigation Measure 3.4-8A (Alt. 1): Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers If Necessary.

For construction activities that would occur in suitable habitat during the nesting season (April 1 through August 31), a qualified wildlife biologist will conduct focused surveys for active nest sites of the yellow warbler, willow flycatcher, waterfowl, and long-eared owl. The biologist will be able to identify Sierra Nevada bird species audibly and visually. The conduct of these surveys will conform to the following guidelines:

- **Yellow warbler, waterfowl, and long-eared owl.** Focused surveys for yellow warbler, waterfowl, and long-eared owl nests will be conducted by a qualified wildlife biologist within 14 days before construction activities are initiated each construction season. The preconstruction survey for yellow warbler, waterfowl, and long-eared owl nests will be conducted using a nest-searching technique appropriate for the species. For yellow warbler, an appropriate technique will involve first conducting point counts in suitable riparian habitat to determine occupancy, followed by nest searching if the species is present. For long-eared owl, surveys will involve tape playbacks of recorded long-eared owl calls.

- **Willow Flycatcher.** For construction activities initiated in suitable breeding habitat for the willow flycatcher after May 31, a preconstruction survey for nesting willow flycatchers will be conducted each construction season. The survey will follow *A Willow Flycatcher Survey Protocol for California* (Bombay et al. 2003).

The protocol requires a minimum of two survey visits to determine presence or absence of the willow flycatcher: one visit during survey period 2 (June 15–25) and one during either survey period 1 (June 1–14) or period 3 (June 26–July 15).

If active yellow warbler, willow flycatcher, or long-eared owl nests are located during the preconstruction surveys, the biologist will notify TRPA and CDFG. If a yellow warbler or willow flycatcher nest is located, construction will be avoided within 500 feet of the nest (or at a distance directed by CDFG) to avoid disturbance until the nest is no longer active based on monitoring. If an active long-eared owl nest is located, construction within 0.25 mile of the nest site (or at a distance directed by CDFG) will be delayed until the nest is no longer active based on monitoring.

If active waterfowl nests are located during preconstruction surveys, the biologist will notify TRPA, and to the extent feasible, construction will be avoided within 500 feet of active nests.

Mitigation Measure 3.4-8B (Alt. 1): Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary.

Bat surveys will be conducted by a qualified wildlife biologist within 14 days before any tree removal or clearing each construction season. Locations of vegetation and tree removal or excavation will be examined for potential bat roosts. Potential roost sites identified will be monitored on two separate occasions for bat activity, using bat detectors to help identify species. Monitoring will begin 30 minutes before sunset and will last up to two hours at any potential roost identified. Removal of any significant roost locations discovered will be avoided to the extent feasible. If avoidance is not feasible, roost sites will not be disturbed by project activities until September 1 or later, when juveniles at maternity roosts are able to fly.

Significance after Mitigation: With the measures above, the loss of individuals, nests, or roost sites of special-status wildlife species during construction would be substantially reduced. However, because waterfowl likely nest near the river mouth, Sailing Lagoon, Trout Creek Lagoon, and elsewhere within the study area, implementing buffers or a limited operating period that would avoid substantial effects on waterfowl nesting would not be feasible. Therefore, with implementation of Mitigation Measures 3.4-8A (Alt. 1) and 3.4-8B (Alt. 1), Impact 3.4-8 (Alt. 1) would be **significant and unavoidable**.

IMPACT 3.4-9 (Alt. 1) **Altered Extent and Quality of Wildlife Habitats Resulting from River, Floodplain, and Other Restoration and Enhancement Elements. (NEPA)** *Implementing Alternative 1 would increase the extent of lagoon, willow scrub-wet meadow, and beach and dune habitats; and enhance the habitat quality of willow scrub-wet meadow, lagoon, and other floodplain habitats by increasing hydrologic connectivity of the river and its floodplain. This effect would be* ***beneficial****.*

Implementing Alternative 1 would alter the extent and quality of wildlife habitats through restoration that would create additional willow scrub-wet meadow, beach and dune, and lagoon habitat (Table 3.4-4). Most of this increase would result from the conversion of restored upland, disturbed, and developed areas, but smaller amounts of forest and channel would also be converted. The creation of additional habitat would benefit wildlife by providing more habitat and by increasing the size and connectivity of habitat patches.

Implementing Alternative 1 would also enhance the quality of floodplain habitats by restoring a sinuous channel and an active floodplain, which would increase overbank flooding, deposition of sediment on floodplains, and periodic disturbance of vegetation by floodwaters. For example, the two-year streamflow event would inundate approximately 18 percent more area under Alternative 1 than under existing conditions (Conservancy and DGS 2006:A1). These enhanced processes would increase heterogeneity of habitat features and conditions, provide more opportunities for vegetation establishment, and increase productivity of floodplain and riparian vegetation relative to existing and future no-project/no-action conditions.

In summary, Alternative 1 would increase the extent of lagoon, willow scrub-wet meadow, and beach and dune habitats; and enhance the habitat functions of willow scrub-wet meadow, lagoon, and other floodplain habitats by increasing hydrologic connectivity of the river and its floodplain. The long-term effect on wildlife habitats would be **beneficial**.

IMPACT 3.4-10 (Alt. 1) **Altered Quality of Wildlife Habitats Resulting from Altered Recreational Use. (CEQA 1; NEPA; TRPA 9, 10, 12)** *Implementing Alternative 1 would improve the quality of wildlife habitat in much of the study area by removing user-created trails from a core habitat area and by providing habitat protection features that would discourage recreational use of sensitive habitat areas. However, implementing Alternative 1 would increase disturbance of wildlife habitat in a small portion of the study area by increasing access in the vicinity of proposed boardwalks, bridges, and bike trail. This impact would be* ***less than significant****.*

Alternative 1 would involve removing and restoring to habitat the extensive network of user-created trails in a central, 308-acre portion of the study area (i.e., the designated core habitat) and in almost eight acres of forest adjacent to the Highland Woods subdivision. Outside of the core habitat, public access features would be constructed that would also discourage use of the core habitat, and signage would inform visitors of habitat values, and encourage a resource stewardship ethic. Recreational use and the associated disruption of wildlife use would not be reduced in all sensitive habitats, however. Some of the public access facilities (boardwalks, bridges, and bike trails) are expected to increase the number of visitors to the study area, thereby increasing the disruption of wildlife use outside of the designated core area (e.g., nesting by yellow warblers and waterfowl). In the Cove East Beach area, recreational use would remain similar to or slightly greater than the existing level of use. Wintering bald eagle perching in this area would not be disrupted because these perches already exist with recreational use of the area and because winter recreational use is unlikely to change considerably under Alternative 1. Because the bridge and boardwalk components of Alternative 1 would improve access, recreational use of Barton Beach is expected to increase. Despite signage and design features that would discourage visitors from entering habitat near the boardwalk, there would be an increased human presence. Consequently, some wildlife use, particularly waterfowl nesting, could be reduced or disrupted or both in the area adjacent to the boardwalk, which includes lagoon habitat. However, in a much larger portion of the study area, the presence of humans and disruption of wildlife use, including waterfowl nesting, would be reduced.

In summary, implementing Alternative 1 would increase the quality of wildlife habitat in much of the study area by removing user-created trails from a core habitat area and by providing public access and habitat protection features that would direct recreational use away from most sensitive habitat areas. However, in habitats in the vicinity of Barton Beach, human disturbance of wildlife could increase. Overall, this long-term impact would be **less than significant**.

IMPACT 3.4-11 (Alt. 1) **Conversion of Forest Land to Nonforest Use. (CEQA 8, 9; TRPA 4, 5)** *Implementing the restoration elements of Alternative 1 would convert approximately 0.1 acre of Jeffrey pine forest and 1.1 acres of lodgepole pine forest to natural vegetation types that are dominated by shrubs or herbaceous plants. This would be long-term, but not permanent conversion. This conversion would allow continued management for resource values including recreation, biodiversity, aesthetics, and water quality. In addition, river and floodplain restoration would enhance habitat values of the remaining forest land. Because the area of forest land conversion would be small, not permanent, allow for continued management of most resource values provided by the existing forest land, and enhance the resource values of remaining forest, this impact would be* ***less than significant.***

Implementing the restoration elements of Alternative 1 would convert approximately 0.1 acre of Jeffrey pine forest and 1.1 acres of lodgepole pine forest to natural vegetation types that are dominated by shrubs or herbaceous plants. This would be long-term but not permanent conversion: it would allow for the land to support greater than ten percent tree cover in the future through natural succession (e.g., through encroachment of meadow and willow scrub by lodgepole pine). This conversion would also allow continued management for

resources including recreation, biodiversity, aesthetics, and water quality. In addition, river and floodplain restoration would enhance biodiversity values of the remaining forest land, because many forest species also use the willow scrub-wet meadow and other habitats that would be restored or enhanced (Appendix H), and because the reduction in human disturbance of wildlife that would result from habitat protection and enhancement elements of Alternative 1. Because the area of forest land conversion would be small, allow for continued management of most resource values provided by the existing forest land, and enhance the resource values of remaining forest, this impact would be **less than significant**.

IMPACT 3.4-12 (Alt. 1) **Interference with Wildlife Use of Established Movement Corridors. (CEQA 4, TRPA 11)** *The study area may function as a corridor for wildlife movement between the Lake Tahoe shorezone and riparian areas upstream. Implementing Alternative 1 would result in short-term disturbance that could interfere with wildlife use of this corridor. However, construction-related disturbance would be restricted daily and seasonally, and disturbance to vegetation would affect only a small portion of the study area temporarily. Furthermore, as described in Environmental Commitments 5 and 6, the Conservancy would minimize vegetation disturbance and revegetate. Therefore, wildlife movement would not be blocked and the effect on wildlife movement would not be substantial. This impact would be* ***less than significant.***

Although no regionally significant wildlife movement corridors have been confirmed to occupy the study area, its large size and location make it potentially suitable for localized wildlife movement. Furthermore, the Upper Truckee River's riparian corridor likely functions as a potentially important wildlife movement corridor. Depending on their setting, quality, and physical connectivity to other habitats, stream corridors are often used by wildlife as movement corridors in many landscapes; the Upper Truckee River likely serves this function. The Upper Truckee River's riparian corridor is a well-defined linear landscape feature that provides unique biophysical conditions, traverses a variety of ecotones, and connects upstream and downstream areas within the watershed; however, it is degraded in its current condition within the study area because of historic channel straightening and ongoing incision and disconnection from its floodplain. As discussed previously, the increased area and improved ecosystem functions of SEZ, floodplain, and wetland communities along the Upper Truckee River under Alternative 1 would benefit wildlife communities locally; these benefits would improve the SEZ's corridor function by increasing habitat quality in the core habitat area and removing user-created trails, therefore, increasing the corridor width.

Recreation infrastructure proposed under Alternative 1 would be located primarily outside of the riparian corridor area and adjacent to areas of existing disturbance, with the exception of the bridge and boardwalk. Existing potential for habitat at this location to function as a wildlife movement corridor is compromised by its proximity to residential neighborhoods, well-traveled roads (U.S. 50 and East Venice Drive), and recreation disturbance on Lake Tahoe. The proposed bridge would be located outside of the 100-year floodplain; therefore, wildlife communities would continue to have access within the riparian corridor and to the Lake Tahoe shorezone, under the proposed bridge. The bridge and boardwalk are not expected to bifurcate any important habitat areas or prevent wildlife from continuing to access or travel between habitat areas in the vicinity.

The increased area and improved ecosystem functions of SEZ, floodplain, and riparian and wetland communities along the Upper Truckee River under Alternative 1 would benefit wildlife communities; these benefits would improve the SEZ's wildlife corridor function by increasing habitat quality, connectivity of native vegetation, and corridor width. This long-term effect would be beneficial.

Implementing Alternative 1 could interfere with wildlife movement in the short term because it would involve four years of intermittent disturbance from construction activities and short-term disturbance of 14 acres of vegetation. However, the Conservancy would implement ECs 5 and 6 to minimize these disturbances and revegetate areas disturbed by construction. Construction activities would be temporary, restricted daily from 8:00 a.m. to 6:30 p.m. Monday–Friday, and restricted seasonally to May 1–October 15 (or a more limited period if a limited operation period is necessary to avoid effects to sensitive wildlife). The 14 acres of vegetation that would

be disturbed and require several years to recover represents a very small portion of the study area, and thus, most habitat in the study area would remain intact.

Because construction impacts on wildlife movement would be short term and corridor access would continue to be provided under the proposed bridge in the long term wildlife movement would not be blocked and the effect on wildlife movement would not be substantial. This impact would be **less than significant**.

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

IMPACT 3.4-1 (Alt. 2) **Introduction and Spread of Invasive Plants by Construction Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 2, construction activities could introduce or spread nonnative, invasive plant species. Unwashed construction equipment could carry invasive plant seed or other propagules from infested sites outside of the study area; seed mixes or soil amendments containing invasive plant seed could be used during revegetation; soil containing invasive plant seed could be redistributed in the study area; and multiple sites would be disturbed, providing conditions favorable for invasive plant establishment. During construction, it is likely that one or more invasive plant species would be introduced or spread by one or more of these mechanisms. However, as described in Environmental Commitment 4, the Conservancy would implement invasive plant management practices to avoid invasive species being introduced during construction. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.4-1 (Alt. 1). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.4-2 (Alt. 2) **Introduction and Spread of Invasive Plants by Recreational Activities. (NEPA)** *Under Alternative 2, there would be a slight increase in the number of visitors to the study area, and these visitors could contribute to the introduction and spread of invasive plants by dispersing these plants and disturbing habitat. However, there would also be a substantial reduction in habitat disturbance because existing user-created trails would be removed from core habitat and habitat protection features would be installed to reduce habitat disturbance by visitors. The reduction in recreational use of core habitat and habitat disturbance would reduce the introduction and spread of invasive plants by recreational activities despite the small increase in number of visitors. This effect would be* ***beneficial****.*

Recreational users can disperse invasive plants from infested sites into the study area and can disturb vegetation, which facilitates establishment of invasive plants. Currently, visitors and their pets use an extensive network of user-created trails in most habitats of the study area. Visitors also enter habitats from along the Upper Truckee River and the shoreline of Lake Tahoe. In all these areas, visitors disperse invasive plants and disturb vegetation, facilitating the establishment of invasive plants. Implementing Alternative 2 would remove these user-created trails from the core habitat area, which would reduce the disturbance of vegetation and dispersal of invasive plants in those areas. In addition, habitat protection features (e.g., signage) would be incorporated into recreation infrastructure to reduce habitat disturbance. Therefore, despite a slight increase in the number of visitors to the study area under Alternative 2, this alternative would reduce habitat disturbance and the potential for the spread of invasive plant species. This effect would be **beneficial**.

IMPACT 3.4-3 (Alt. 2) **Damage to or Mortality of Special-Status Plants Resulting from Construction Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 2, construction activities related to recreation infrastructure would not occur in occupied American mannagrass habitat. However, construction activities associated with river restoration at the mouth of the Upper Truckee River would occur in or close to Tahoe yellow cress habitat that could be occupied. Thus, these construction activities could damage or kill Tahoe yellow cress plants. This impact would be* ***potentially significant****.*

This impact is similar to Impact 3.4-3 (Alt. 1), but the potential for construction activities to affect special-status plants is less under this alternative than under Alternative 1. Construction under Alternative 2 would be limited to construction associated with the river mouth of the Upper Truckee River that would occur in or close to TYC habitat; it would not include construction of a boardwalk, bridge, and bike trail in the areas where TYC may occur. Similar to Alternative 1, this impact would be **potentially significant**.

Mitigation Measure 3.4-3 (Alt. 2): Conduct Protocol-Level Preconstruction Surveys and Avoid or Mitigate Impacts on Tahoe Yellow Cress Plants.

This mitigation measure is identical to Mitigation Measure 3.4-3 (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measure 3.4-3 (Alt. 2), for the same reasons described for Alternative 1, Impact 3.4-3 (Alt. 2) would be **less than significant**.

IMPACT 3.4-4 (Alt. 2) **Altered Extent of Special-Status Plant Habitat. (NEPA)** *Under Alternative 2, lagoon restoration would increase the extent of potential habitat for American mannagrass. Also, the restoration and increased inundation of willow scrub-wet meadow under this alternative could increase the extent of habitat suitable for American mannagrass. However, both of these effects are uncertain and may not alter the extent of suitable habitat. Under Alternative 2, beach and dune restoration could and new river mouth construction likely would increase the extent of habitat suitable for Tahoe yellow cress, and potential changes in sediment supply would not be sufficient to substantially reduce Tahoe yellow cress habitat. In summary, the effect on the extent of habitat for American mannagrass would be no effect to beneficial and for Tahoe yellow cress would be beneficial. Therefore, this impact would be* ***beneficial****.*

With regard to American mannagrass, this impact is similar to Impact 3.4-4 (Alt. 1), except that under Alternative 2, the increase in the acreage of willow scrub-wet meadow would be slightly greater than under Alternative 1 (8.7 versus 8.2 acres) (Table 3.4-4), and increased inundation of willow scrub-wet meadow could also increase the extent of habitat. With regard to TYC, beach and dune restoration could and new river mouth construction likely would increase the extent of habitat suitable for TYC, and potential changes in sediment supply would not be sufficient to substantially reduce TYC habitat. This impact would be **beneficial**.

IMPACT 3.4-5 (Alt. 2) **Damage to or Mortality of Special-Status Plants Resulting from Recreational Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 2, damage to or mortality of special-status plants resulting from recreational activities would not be substantially altered. Under existing conditions, habitat occupied by American mannagrass plants is in a location that is not substantially disturbed by recreational activities, and implementing Alternative 2 would maintain this condition. Under Alternative 2, the existing Tahoe yellow cress management plan (including the Barton Beach exclosure and adaptive management) would continue to be implemented and protect habitat occupied by Tahoe yellow cress at Barton Beach. Also, implementing Alternative 2 would not substantially alter recreational use of Barton Beach or of habitat occupied by Tahoe yellow cress at Cove East Beach. Therefore, this impact would be* ***less than significant****.*

Alternative 2 would not include the bridge and boardwalk components of Alternative 1 or other components that would increase recreational use of habitat occupied by TYC. Alternative 2 proposes the minimum level of recreation infrastructure with proposed infrastructure being located outside of areas that support TYC and American mannagrass. Under existing conditions, habitat occupied by American mannagrass plants is not substantially disturbed by recreational activities, and implementing Alternative 2 would maintain this condition. Under Alternative 2, the existing TYC management plan (including the Barton Beach exclosure and adaptive management) would continue to be implemented and protect habitat occupied by TYC at Barton Beach. Therefore, this impact would be **less than significant**.

IMPACT 3.4-6 (Alt. 2) **Short-Term Disturbance of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Construction Activities. (CEQA 2, 3; TRPA 1, 2, 4, 6)** *Implementing Alternative 2 would disturb sensitive communities. This disturbance would be short term. As described in Environmental Commitments 5 and 6, the Conservancy would minimize the risk to water quality and vegetation and comply with the terms and conditions of required permits to reduce this disturbance. Nonetheless, approximately 24 acres of sensitive communities would be disturbed. This impact would be* ***significant****.*

This impact is similar to Impact 3.4-6 (Alt. 1) but greater because the acreage of sensitive communities disturbed would be approximately 50 percent greater than under Alternative 1. For the same reasons described for Alternative 1, this impact would be **significant**.

As described for Alternative 1, with implementation of ECs 5 and 6, this impact would be reduced, but the short-term disturbance of sensitive communities would not be eliminated because such disturbance is integral to the river, floodplain, and other restoration elements. For the same reasons described for Alternative 1, Impact 3.4-6 (Alt. 2) would be **significant and unavoidable**.

IMPACT 3.4-7 (Alt. 2) **Enhancement and Creation of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from River and Floodplain Restoration. (NEPA)** *Implementing Alternative 2 would convert some disturbed, developed, and restored upland shrub to sensitive communities. The combined increase in extent of sensitive communities would be approximately 10 acres. Because the combined extent of sensitive communities would be increased, this effect would be* ***beneficial.***

This impact is similar to Impact 3.4-7 (Alt. 1); Alternative 2 differs only slightly from Alternative 1 in the acreage changes for different sensitive communities and in the increase in the combined acreage of sensitive communities. Under Alternative 2, montane meadow would decrease by 0.8 acre as opposed to a small increase (0.2 acre) under Alternative 1, and more lodgepole pine forest would be lost (1.4 versus 1.1 acres); however, slightly more beach and dune habitat would be created (2.8 versus 2.7 acres under Alternative 2), as would more willow scrub-wet meadow (8.7 versus 8.2 acres). The acreage of sensitive communities would increase by 10.1 acres under Alternative 2 versus 9.9 acres under Alternative 1. Because river and floodplain restoration under Alternative 2 would increase the combined extent of sensitive communities and enhance the functions and services provided by them, this long-term effect would be **beneficial**.

IMPACT 3.4-8 (Alt. 2) **Disruption of Wildlife Habitat Use and Loss of Wildlife Resulting from Construction Activities. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 2, construction activities could cause short-term disruption of wildlife use of the study area, cause the loss of wildlife, or both. Wintering bald eagle use of the study area does not occur during the construction season and thus would not be disrupted. However, construction of the restoration, recreation, public access, and habitat protection elements of Alternative 2 could result in the harm or loss of individuals or nests or result in substantial disruptions to nesting attempts or other activities by three special-status bird species (yellow warbler, willow flycatcher, and long-eared owl) and would affect one special-status guild (waterfowl). It also could result in abandonment or removal of active roost sites for, or harm or loss of, hoary bat or western red bat. This impact would be* ***significant****.*

This impact is identical to Impact 3.4-8 (Alt. 1). For the same reasons provided for Alternative 1, this impact would be **significant**.

Mitigation Measure 3.4-8A (Alt. 2): Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers If Necessary.

This mitigation measure is identical to Mitigation Measure 3.4-8A (Alt. 1).

Mitigation Measure 3.4-8B (Alt. 2): Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary.

This mitigation measure is identical to Mitigation Measure 3.4-8B (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measures 3.4-8A (Alt. 2) and 3.4-8B (Alt. 2), for the same reasons described for Alternative 1 that is, because avoiding substantial effects on waterfowl nesting would not be feasible, Impact 3.4-8 (Alt. 2) would be **significant and unavoidable**.

IMPACT 3.4-9 (Alt. 2) **Altered Extent and Quality of Wildlife Habitats Resulting from River, Floodplain, and Other Restoration and Enhancement Elements. (NEPA)** *Implementing Alternative 2 would increase the extent of lagoon, willow scrub-wet meadow, and beach and dune habitats; and enhance the habitat quality of willow scrub-wet meadow, lagoon, and other floodplain habitats by increasing hydrologic connectivity of the river and its floodplain. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-9 (Alt. 1), but under Alternative 2, the extent of enhanced floodplain habitat would differ from that under Alternative 1. Both alternatives have the same lagoon, and beach and dune restoration components, and the extent of willow scrub-wet meadow would increase similarly under both alternatives (Table 3.4-4). However, implementing Alternative 2 would result in a greater increase in the floodplain area inundated by two-year streamflow events when compared with Alternative 1 (that is, an increase of 97 percent versus 18 percent) (Conservancy and DGS 2006:A1). Thus, the quality of wildlife habitats would be enhanced more under Alternative 2 than under Alternative 1. For the same reasons described for Alternative 1, this effect would be **beneficial**.

IMPACT 3.4-10 (Alt. 2) **Altered Quality of Wildlife Habitats Resulting from Altered Recreational Use. (NEPA)** *Implementing Alternative 2 would improve the quality of wildlife habitat in much of the study area by removing user-created trails from a core habitat area and by providing public access and habitat protection features that would discourage recreational use of sensitive habitat areas, and engender a resource stewardship ethic in users. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-10 (Alt. 1), but under Alternative 2, recreational use and the associated human disturbance of wildlife would be much less than under Alternative 1. Alternative 2 would not include the bridge and boardwalk that is expected to increase human presence and reduce wildlife use in the vicinity of Barton Beach. Also, Alternative 2 would designate a larger area of core habitat than Alternative 1 (344 versus 308 acres). Overall, the reduction of human disturbance of wildlife by Alternative 2 would be greater than the reduction under Alternative 1. This effect would be **beneficial**.

IMPACT 3.4-11 (Alt. 2) **Conversion of Forest Land to Nonforest Use. (CEQA 8, 9; TRPA 4, 5)** *Implementing the restoration elements of Alternative 2 would convert approximately 0.1 acre of Jeffrey pine forest and 1.4 acres of lodgepole pine forest to natural vegetation types that are dominated by shrubs or herbaceous plants. This would be long-term, but not permanent conversion. This conversion would allow continued management for resource values including recreation, biodiversity, aesthetics, and water quality. In addition, river and floodplain restoration would enhance habitat values of the remaining forest land. Because the area of forest land conversion would be small, not permanent, allow for continued management of most resource values provided by the existing forest land, and enhance the resource values of remaining forest, this impact would be* ***less than significant.***

This impact is similar to Impact 3.4-11 (Alt. 1), but Alternative 2 would convert slightly more lodgepole pine forest than Alternative 1 (1.4 versus 1.1 acres, respectively). However, for the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.4-12 (Alt. 2) **Interference with Wildlife Use of Established Movement Corridors. (CEQA 4, TRPA 11)** *The study area may function as a corridor for wildlife movement between the Lake Tahoe shorezone and areas upstream. Implementing Alternative 2 would result in short-term disturbance that could interfere with wildlife use of this corridor. However, temporary construction-related disturbance would be restricted daily and seasonally, and disturbance to vegetation would affect only a small portion of the study area. Furthermore, as described in Environmental Commitments 5 and 6, the Conservancy would minimize vegetation disturbance and revegetate. Therefore, wildlife movement would not be blocked and the effect on wildlife movement would not be substantial. This impact would be* ***less than significant.***

This impact is similar to Impact 3.4-12 (Alt. 1), but Alternative 2 would not include a bridge over the Upper Truckee River. Alternative 2 would result in greater short-term disturbance of vegetation than Alternative 1 (20.7 versus 14 acres, respectively). Nonetheless, for the same reasons as described for Alternative 1, this impact would be **less than significant**.

Alternative 3: Middle Marsh Corridor (Moderate Recreation Infrastructure)

IMPACT 3.4-1 (Alt. 3) **Introduction and Spread of Invasive Plants by Construction Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 3, construction activities could introduce or spread nonnative, invasive plant species. Unwashed construction equipment could carry invasive plant seed or other propagules from infested sites outside of the study area; seed mixes or soil amendments containing invasive plant seed could be used during revegetation; soil containing invasive plant seed could be redistributed in the study area; and multiple sites would be disturbed, providing conditions favorable for invasive plant establishment. During construction, it is likely that one or more invasive plant species would be introduced or spread by one or more of these mechanisms. However, as described in Environmental Commitment 4, the Conservancy would implement invasive plant management practices to avoid invasive species being introduced during construction. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.4-1 (Alt. 1); however, Alternative 3 would construct less recreation infrastructure than Alternative 1 and more than Alternative 2. As described in EC 4 (Table 2-6), the Conservancy would implement invasive plant management practices to avoid invasive species being introduced during construction. For the same reasons as described in Impact 3.4-1 (Alt. 1), this impact would be **less than significant**.

IMPACT 3.4-2 (Alt. 3) **Introduction and Spread of Invasive Plants by Recreational Activities. (NEPA)** *Under Alternative 3, there would be a small increase in the number of visitors to the study area, and these visitors could contribute to the introduction and spread of invasive plants by dispersing these plants and disturbing habitat. However, there would also be a substantial reduction in habitat disturbance within the core habitat area because existing user-created trails would be removed and habitat protection features would be incorporated into recreation infrastructure to reduce habitat disturbance by visitors. The reduction in habitat disturbance would reduce the introduction and spread of invasive plants by recreational activities despite the small increase in number of visitors. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-2 under Alternative 2, and unlike Alternative 1, would result in a reduction in dispersal of invasive plants and habitat disturbance. Implementing Alternative 3 would cause a reduction in the introduction and spread of invasive plants less than Alternative 2 because the core habitat area would be smaller than under Alternative 2. For the same reasons as described above, this effect would be **beneficial**.

IMPACT 3.4-3 (Alt. 3) **Damage to or Mortality of Special-Status Plants Resulting from Construction Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 3, construction activities related to recreation infrastructure would not occur in occupied American mannagrass habitat. However, construction activities associated with river restoration at the mouth of the Upper Truckee River would occur in or close to Tahoe yellow cress habitat that could be occupied. Thus, these construction activities could damage or kill Tahoe yellow cress plants. This impact would be* ***potentially significant****.*

Two special-status plant species were documented in the study area by the protocol-level plant survey: American mannagrass and TYC. This impact is similar to Impact 3.4-3 (Alt. 1), but the potential for construction activities to affect special-status plants is less under this alternative than under Alternative 1 and similar to Alternative 2. Construction under Alternative 3 would be limited to construction associated with the river mouth of the Upper Truckee River that would occur in or close to TYC habitat; it would not include construction of a boardwalk, bridge, and bike trail in the areas where TYC may occur. Similar to Alternative 1, this impact would be **potentially significant**.

Mitigation Measure 3.4-3 (Alt. 3): Conduct Protocol-Level Preconstruction Surveys and Avoid or Mitigate Impacts on Tahoe Yellow Cress Plants.

This mitigation measure is identical to Mitigation Measure 3.4-3 (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measure 3.4-3 (Alt. 3), for the same reasons described for Alternative 1, Impact 3.4-3 (Alt. 3) would be **less than significant**.

IMPACT 3.4-4 (Alt. 3) **Altered Extent of Special-Status Plant Habitat. (CEQA 1, 5; TRPA 5)** *Under Alternative 3, the extent of habitat for special-status plants would remain largely unaltered. Lagoon and beach and dune restoration would not be components of Alternative 3. The restoration and increased inundation of willow scrub-wet meadow could increase the extent of habitat suitable for American mannagrass. However, both of these effects are uncertain and may not alter the extent of suitable habitat. Potential changes in sediment supply would not be sufficient to substantially reduce Tahoe yellow cress habitat. In summary, the effect on the extent of habitat for American mannagrass would be no effect to beneficial and for Tahoe yellow cress would be less than significant. Therefore, this impact would be* ***less than significant****.*

Under Alternative 3, the extent of habitat for special-status plants (i.e., American mannagrass and TYC) would remain largely unaltered. Restoration of lagoon habitat potentially suitable for American mannagrass would not be a component of Alternative 3. The restoration and increased inundation of willow scrub-wet meadow could increase the extent of habitat suitable for American mannagrass; however, because the microhabitat requirements of American mannagrass (e.g., mud benches along Trout Creek) are uncertain, habitat suitable for American mannagrass may not increase. Restoration of beach and dune habitat potentially suitable for TYC would not be a component of Alternative 3. Also, potential changes in sediment supply would not be sufficient to substantially alter TYC habitat. Therefore, the impact on the extent of habitat for American mannagrass and TYC would be **less than significant**.

IMPACT 3.4-5 (Alt. 3) **Damage to or Mortality of Special-Status Plants Resulting from Recreational Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 3, damage to or mortality of special-status plants resulting from recreational activities would not be substantially altered. Under existing conditions, habitat occupied by American mannagrass plants is in a location that is not substantially disturbed by recreational activities, and implementing Alternative 3 would maintain this condition. Under Alternative 3, the existing Tahoe yellow cress management plan (including the Barton Beach exclosure and adaptive management) would continue to be implemented and protect Tahoe yellow cress. Also, implementing Alternative 3 would not substantially alter recreational use of Barton Beach or habitat occupied by Tahoe yellow cress at Cove East Beach. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.4-5 (Alt. 2). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.4-6 (Alt. 3) **Short-Term Disturbance of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Construction Activities. (CEQA 2, 3; TRPA 1, 2, 4, 6)** *Implementing Alternative 3 would disturb sensitive communities. This disturbance would be short term. As described in Environmental Commitments 5 and 6, the Conservancy would minimize the risk to water quality and vegetation and comply with the terms and conditions of required permits to reduce this disturbance. Nonetheless, approximately 18 acres of sensitive communities would be disturbed. This impact would be* ***significant****.*

This impact would be similar to Impact 3.4-6 under Alternatives 1 and 2. It would be comparable to Alternative 1 and less than under Alternative 2 because the amount of acreage of sensitive communities disturbed would be comparable to that under Alternative 1 and less than that under Alternative 2. For the same reasons described for Alternative 1, this impact would be **significant**.

As described for Alternative 1, with implementation of ECs 5 and 6, this impact would be reduced, but the short-term disturbance of sensitive communities would not be eliminated because such disturbance is integral to the river, floodplain, and other restoration elements. For the same reasons described for Alternative 1, Impact 3.4-6 (Alt. 3) would be **significant and unavoidable**.

IMPACT 3.4-7 (Alt. 3) **Enhancement and Creation of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from River and Floodplain Restoration. (NEPA)** *Implementing Alternative 3 would convert some disturbed, developed, and restored upland shrub to sensitive communities. The combined increase in the extent of sensitive communities would be approximately eight acres. Because the combined extent of sensitive communities would be increased, this effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-7 under Alternatives 1 and 2; Alternative 3 differs from Alternatives 1 and 2 in that no net change in lagoon, beach and dune, or Jeffrey pine forest would occur; montane meadow would increase by 1.7 acres rather than increase by 0.2 acre (Alternative 1) or decrease (as under Alternative 2); and the acreage changes for different sensitive communities are less certain because natural processes would dictate the exact location of a portion of the restored river channel. Also, the increase in the combined acreage of sensitive communities would be smaller under Alternative 3 than under Alternative 1 or 2 (eight acres versus approximately ten acres) (Table 3.4-4). Because river and floodplain restoration under Alternative 3 would increase the combined extent of sensitive communities and enhance the functions and services provided by them, this long-term effect would be **beneficial**.

IMPACT 3.4-8 (Alt. 3) **Disruption of Wildlife Habitat Use and Loss of Wildlife Resulting from Construction Activities. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 3, construction activities could cause short-term disruption of wildlife use of the study area, cause the loss of wildlife, or both. Wintering bald eagle use of the study area does not occur during the construction season and thus would not be disrupted. However, construction of the restoration, recreation, public access, and habitat protection elements of Alternative 3 could result in the harm or loss of individuals or nests or result in substantial disruptions to nesting attempts or other activities by three special-status bird species (yellow warbler, willow flycatcher, and long-eared owl) and would affect one special-status guild (waterfowl). It also could result in abandonment or removal of active roost sites for, or harm or loss of, hoary bat or western red bat. This impact would be* ***significant****.*

This impact is identical to Impact 3.4-8 (Alt. 1). For the same reasons as described for Alternative 1, this impact would be **significant**.

Mitigation Measure 3.4-8A (Alt. 3): Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers If Necessary.

This mitigation measure is identical to Mitigation Measure 3.4-8A (Alt. 1).

Mitigation Measure 3.4-8B (Alt. 3): Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary.

This mitigation measure is identical to Mitigation Measure 3.4-8B (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measures 3.4-8A (Alt. 3) and 3.4-8B (Alt. 3), for the same reasons described for Alternative 1 that is, because avoiding substantial effects on waterfowl nesting would not be feasible, Impact 3.4-8 (Alt. 3) would be **significant and unavoidable**.

IMPACT 3.4-9 (Alt. 3) **Altered Extent and Quality of Wildlife Habitats Resulting from River, Floodplain, and Other Restoration and Enhancement Elements. (NEPA)** *Implementing Alternative 3 would increase the extent of willow scrub-wet meadow habitat; and enhance the habitat quality of willow scrub-wet meadow, lagoon, and other floodplain habitats by increasing hydrologic connectivity of the river and its floodplain. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-9 under Alternatives 1 and 2; however, under Alternative 3, the extent and location of restored and enhanced habitats would differ from those under Alternative 1 (Table 3.4-4), and there is greater uncertainty regarding the effects of Alternative 3 on wildlife habitats. Unlike Alternatives 1 and 2, Alternative 3 would not increase the acreage of lagoon or beach and dune habitats. As with Alternatives 1 and 2, Alternative 3 would increase the acreage of willow scrub-wet meadow (Table 3.4-4), and enhance floodplain habitats by increasing river-floodplain connectivity. However, natural processes would be allowed to dictate the exact location and form of a portion of the restored river channel, so there is less certainty regarding the resulting vegetation and floodplain properties than for Alternatives 1 and 2. It is anticipated that implementing Alternative 3 would result in greater river-floodplain connectivity than would occur under Alternatives 1 and 2. For example, the area inundated by a two-year streamflow event would increase by approximately 142 percent, compared to 18 and 97 percent under Alternatives 1 and 2, respectively (Conservancy and DGS 2006:A1). For the same reasons provided for Alternative 1, the effect of river, floodplain, and other restoration and enhancement elements on wildlife habitat would be **beneficial**.

IMPACT 3.4-10 (Alt. 3) **Altered Quality of Wildlife Habitats Resulting from Altered Recreational Use. (NEPA)** *Implementing Alternative 3 would improve the quality of wildlife habitat in much of the study area by removing user-created trails from a core habitat area and by providing public access with habitat protection features that would discourage recreational use of sensitive habitat areas, and engender a resource stewardship ethic in users. At Cove East Beach, the extent of recreational use would be similar to or slightly greater than existing conditions, and would not adversely affect wintering bald eagles. This effect would be* ***beneficial.***

This impact is similar to Impact 3.4-10 (Alts. 1 and 2), but implementing Alternative 3 would alter the human disturbance of habitat in different locations than would implementing Alternative 1 or 2. Unlike Alternative 2, Alternative 3 includes recreation infrastructure in the eastern portion of the study area, similar to but less than Alternative 1. Unlike Alternative 1, Alternative 3 would not include the bridge and boardwalk that could increase human disturbance of wildlife in the vicinity of Barton Beach. However, because Alternative 3 involves relocating the Upper Truckee River to the center of the study area, it would result in a much smaller area of core habitat than Alternatives 1 and 2 (251 acres versus 308 and 344 acres, respectively), and habitat west of the river could experience greater human disturbance than under existing conditions. Overall, under Alternative 3, the enhancement of wildlife habitat from reducing human disturbance would be comparable to that under Alternative 2. For the same reasons described for Alternative 2, this effect would be **beneficial**.

IMPACT 3.4-11 (Alt. 3) **Conversion of Forest Land to Nonforest Use. (CEQA 8, 9; TRPA 4, 5)** *Implementing the restoration elements of Alternative 3 would convert approximately 0.8 acre of lodgepole pine forest to natural vegetation types that are dominated by shrubs or herbaceous plants. This would be long-term, but not permanent conversion. This conversion would allow continued management for resource values including recreation, biodiversity, aesthetics, and water quality. In addition, river and floodplain restoration would enhance habitat values of the remaining forest land. Because the area of forest land conversion would be small, not permanent, allow for continued management of most resource values provided by the existing forest land, and enhance the resource values of remaining forest, this impact would be* ***less than significant.***

This impact is similar to Impact 3.4-11 (Alts. 1 and 2), but Alternative 3 would not convert Jeffrey pine forest, and would convert slightly less lodgepole pine forest than Alternatives 1 and 2 (0.8 acre versus 1.1 and 1.4 acres, respectively). However, for the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.4-12 (Alt. 3) **Interference with Wildlife Use of Established Movement Corridors. (CEQA 4, TRPA 11)** *The study area may function as a corridor for wildlife movement between the Lake Tahoe shorezone and areas upstream. Implementing Alternative 3 would result in short-term disturbance that could interfere with wildlife use of this corridor. However, short-term construction-related disturbance would be restricted daily and seasonally, and short-term disturbance to vegetation would affect only a small portion of the study area. Furthermore, as described in Environmental Commitments 5 and 6, the Conservancy would minimize vegetation disturbance and revegetate. Therefore, wildlife movement would not be blocked and the effect on wildlife movement would not be substantial. This impact would be* ***less than significant.***

This impact is similar to Impact 3.4-12 (Alts. 1 and 2), but implementing Alternative 3 would result in slightly less short-term disturbance of vegetation than Alternative 1 and less than Alternative 2 (13.6 acres versus 14 and 20.7 acres, respectively). Alternative 3 does not include a bridge over the Upper Truckee River. For similar reasons as described for Alternative 1, this impact would be **less than significant**.

Alternative 4: Inset Floodplain (Moderate Recreation Infrastructure)

IMPACT 3.4-1 (Alt. 4) **Introduction and Spread of Invasive Plants by Construction Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 4, construction activities could introduce or spread nonnative, invasive plant species. Unwashed construction equipment could carry invasive plant seed or other propagules from infested sites outside of the study area; seed mixes or soil amendments containing invasive plant seed could be used during revegetation; soil containing invasive plant seed could be redistributed in the study area; and multiple sites would be disturbed, providing conditions favorable for invasive plant establishment. During construction, it is likely that one or more invasive plant species would be introduced or spread by one or more of these mechanisms. However, as described in Environmental Commitment 4, the Conservancy would implement invasive plant management practices to avoid invasive species being introduced during construction. Therefore, this impact would be* ***less than significant****.*

This impact is similar to Impact 3.4-1 (Alt. 1), except that recreation infrastructure construction would be less than under Alternative 1 and similar to construction under Alternative 3. For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.4-2 (Alt. 4) **Introduction and Spread of Invasive Plants by Recreational Activities. (NEPA)** *Under Alternative 4, there would be a small increase in the number of visitors to the study area, and these visitors could contribute to the introduction and spread of invasive plants by dispersing these plants and disturbing habitat. However, there would also be a substantial reduction in habitat disturbance because existing user-created trails would be removed from core habitat and habitat protection features (e.g., signage) would be incorporated into recreation infrastructure to reduce habitat disturbance by visitors. The reduction in habitat disturbance would reduce the introduction and spread of invasive plants by recreational activities despite the small increase in number of visitors. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-2 under Alternatives 2 and 3, and unlike Alternative 1, would result in a reduction in dispersal of invasive plants and habitat disturbance. Under Alternatives 1–3, the reduction of the introduction and spread of invasive plants would be related to the extent of the alternative's core habitat area. Therefore, implementing Alternative 4 would provide a comparable reduction to Alternative 2, and more of a reduction than Alternative 3. For the same reasons as described above, this effect would be **beneficial**.

IMPACT 3.4-3 (Alt. 4) **Damage to or Mortality of Special-Status Plants Resulting from Construction Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 4, construction activities would not occur in or near the habitat occupied by American mannagrass or in or near habitat occupied by or potentially suitable for Tahoe yellow cress. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.4-3 (Alt. 3). For the same reasons as described above for Alternative 3, this impact would be **potentially significant.**

Mitigation Measure 3.4-3 (Alt. 4): Conduct Protocol-Level Preconstruction Surveys and Avoid or Mitigate Impacts on Tahoe Yellow Cress Plants.

This mitigation measure is identical to Mitigation Measure 3.4-3 (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measure 3.4-3 (Alt. 4), for the same reasons described for Alternative 1, Impact 3.4-3 (Alt. 4) would be **less than significant**.

IMPACT 3.4-4 (Alt. 4) **Altered Extent of Special-Status Plant Habitat. (CEQA 1, 5; TRPA 5)** *Under Alternative 4, the extent of habitat for special-status plants would remain largely unaltered. Lagoon and beach and dune restoration would not be components of Alternative 4. The restoration and increased inundation of willow scrub-wet meadow under this alternative could increase the extent of habitat suitable for American mannagrass. However, both of these effects are uncertain and may not alter the extent of suitable habitat. Potential changes in sediment supply would not be sufficient to substantially reduce Tahoe yellow cress habitat. In summary, the effect on the extent of habitat for American mannagrass would be no effect to beneficial and for Tahoe yellow cress would be less than significant. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.4-4 (Alt. 3). For the same reasons as described for Alternative 3 above, this effect would be **less than significant**.

IMPACT 3.4-5 (Alt. 4) **Damage to or Mortality of Special-Status Plants Resulting from Recreational Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 4, damage to or mortality of special-status plants resulting from recreational activities would not be substantially altered. Under existing conditions, habitat occupied by American mannagrass is in a location that is not substantially disturbed by recreational activities, and implementing Alternative 4 would maintain this condition. Under Alternative 4, the existing Tahoe yellow cress management plan (including the Barton Beach exclosure and adaptive management) would continue to be implemented. Also, implementing Alternative 4 would not substantially alter recreational use of Barton Beach or of habitat occupied by Tahoe yellow cress at Cove East Beach. Therefore, this impact would be* ***less than significant****.*

This impact is identical to Impact 3.4-5 (Alt. 2). For the same reasons as described above, this impact would be **less than significant**.

IMPACT 3.4-6 (Alt. 4) **Short-Term Disturbance of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Construction Activities. (CEQA 2, 3; TRPA 1, 2, 4, 6)** *Implementing Alternative 4 would disturb sensitive communities. This disturbance would be short term. As described in Environmental Commitments 5 and 6, the Conservancy would minimize the risk to water quality and vegetation and comply with the terms and conditions of required permits to reduce this disturbance. Nonetheless, approximately 15 acres of sensitive communities would be disturbed. This impact would be* ***significant****.*

This impact would be similar to Impact 3.4-6 under Alternatives 1–3. It would be comparable to the impact under Alternatives 1 and 3 and less than under Alternative 2 because the amount of acreage of sensitive communities disturbed would be comparable to that under Alternatives 1 and 2 and less than that under Alternative 3. Alternative 4 would not include a bridge over the Upper Truckee River. For similar reasons described for Alternative 1, this impact would be **significant**.

As described for Alternative 1, with implementation of ECs 5 and 6, this impact would be reduced, but the short-term disturbance of sensitive communities would not be eliminated because such disturbance is integral to the river, floodplain, and other restoration elements. For the same reasons described for Alternative 1, Impact 3.4-6 (Alt. 4) would be **significant and unavoidable**.

IMPACT 3.4-7 (Alt. 4) **Enhancement and Creation of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from River and Floodplain Restoration. (NEPA)** *Implementing Alternative 4 would convert some disturbed, developed, and restored upland shrub to sensitive communities. The combined increase in the extent of sensitive communities would be approximately 5 acres. Because the combined extent of sensitive communities would be increased, this effect would be* ***beneficial.***

This impact is similar to Impact 3.4-7 under Alternatives 1–3. It differs from Alternatives 1 and 2 in that developed land would not be converted to sensitive communities; no net change in lagoon or beach and dune would occur; willow scrub-wet meadow would be the only sensitive community to increase in extent; the extent of montane meadow would be reduced, unlike Alternatives 1 and 3, and by more than Alternative 2 (3.6 acres versus 0.8); and the extent of lodgepole pine forest would be reduced by 2.9 acres versus 1.1 acres, 1.4 acres, and 0.8 acre under Alternatives 1–3, respectively. The increase in the combined acreage of sensitive communities would be smaller under Alternative 4 than under Alternatives 1–3 (approximately 5 acres versus 8–10 acres) (Table 3.4-4). Because river and floodplain restoration under Alternative 4 would increase the combined extent of sensitive communities and enhance the functions and services provided by them, this long-term effect would be **beneficial**.

IMPACT 3.4-8 (Alt. 4) **Disruption of Wildlife Habitat Use and Loss of Wildlife Resulting from Construction Activities. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 4, construction activities could cause short-term disruption of wildlife use of the study area, cause the loss of wildlife, or both. Wintering bald eagle use of the study area does not occur during the construction season and thus would not be disrupted. However, construction of the restoration, recreation, public access, and habitat protection elements of Alternative 4 could result in the harm or loss of individuals or nests or result in substantial disruptions to nesting attempts or other activities by three special-status bird species (yellow warbler, willow flycatcher, and long-eared owl) and would affect one special-status guild (waterfowl). It also could result in abandonment or removal of active roost sites for, or harm or loss of, hoary bat or western red bat. This impact would be* ***significant****.*

This impact is identical to Impact 3.4-8 (Alt. 1). For the same reasons described for Alternative 1, this impact would be **significant**.

Mitigation Measure 3.4-8A (Alt. 4): Conduct Preconstruction Surveys for Nesting Special-Status Birds (Yellow Warbler, Willow Flycatcher, Waterfowl, and Long-Eared Owl), and Implement Buffers If Necessary.

This mitigation measure is identical to Mitigation Measure 3.4-8A (Alt. 1).

Mitigation Measure 3.4-8B (Alt. 4): Conduct Preconstruction Surveys for Special-Status Bats, Avoid Removal of Important Roosts, and Implement a Limited Operating Period If Necessary.

This mitigation measure is identical to Mitigation Measure 3.4-8B (Alt. 1).

Significance after Mitigation: With implementation of Mitigation Measures 3.4-8A (Alt. 4) and 3.4-8B (Alt. 4), for the same reasons described for Alternative 1 that is, because avoiding substantial effects on waterfowl nesting would not be feasible, Impact 3.4-8 (Alt. 4) would be **significant and unavoidable**.

IMPACT 3.4-9 (Alt. 4) **Altered Extent and Quality of Wildlife Habitats Resulting from River, Floodplain, and Other Restoration and Enhancement Elements. (CEQA 1; TRPA 9, 10, 12)** *Implementing Alternative 4 would increase the extent of willow scrub-wet meadow vegetation; and enhance the habitat functions of willow scrub-wet meadow, lagoon, and other floodplain habitats by increasing hydrologic connectivity of the river and its floodplain. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-9 (Alts. 1–3), but the acreage and location of restored and enhanced habitats would differ among alternatives. Unlike implementing Alternatives 1 and 2, implementing Alternative 4 would not increase the acreage of lagoon or beach and dune habitat. Implementing Alternative 4 also would result in a greater acreage of willow scrub-wet meadow than would result under Alternatives 1–3 (15.6 acres versus 8.2 to 10.6 acres) (Table 3.4-4). However, the enhancement of habitats resulting from increased river-floodplain connectivity would be limited under Alternative 4 because it provides this enhancement for the inset floodplain area only, leaving the remainder of the study area in its existing, relatively disconnected condition. Thus, the

acreage of floodplain inundated by two-year streamflow events would be increased by only approximately 25 percent, which would be similar to the increase under Alternative 1 but much smaller than under Alternatives 2 and 3 (Conservancy and DGS 2006:A1). Additional discussions related to floodplain connectivity are addressed in Section 3.8, "Hydrology and Flooding." Overall, river, floodplain, and other restoration and enhancement elements would increase the function and extent of wildlife habitats less than under Alternatives 1–3. However, for the same reasons provided for Alternative 1, this effect would be **beneficial**.

IMPACT 3.4-10 (Alt. 4) **Altered Quality of Wildlife Habitats Resulting from Altered Recreational Use. (NEPA)** *Implementing Alternative 4 would improve the quality of wildlife habitat in much of the study area by removing user-created trails from a core habitat area and by providing public access and habitat protection features that would discourage recreational use of sensitive habitat areas, and engender a resource stewardship ethic in users. At Cove East Beach, the extent of recreational use would be similar to or slightly greater than existing conditions, and would not adversely affect wintering bald eagles. This effect would be* ***beneficial****.*

This impact is similar to Impact 3.4-10 (Alts. 1–3) but more beneficial. Implementing Alternative 4 would reduce human disturbance of habitat more than would implementing Alternatives 1 and 2. Alternative 4 includes most of the habitat protection components of Alternative 1 (unlike Alternative 2) but does not include the bridge and boardwalk that could increase human disturbance of wildlife in the vicinity of Barton Beach (unlike Alternative 1). Also, a larger area of core habitat would be designated under Alternative 4 than under Alternatives 1–3 (350 acres versus 251–344 acres). For the same reasons described for Alternative 1, this effect would be **beneficial**.

IMPACT 3.4-11 (Alt. 4) **Conversion of Forest Land to Nonforest Use. (CEQA 8, 9; TRPA 4, 5)** *Implementing the restoration elements of Alternative 4 would convert approximately 2.9 acres of lodgepole pine forest to natural vegetation types that are dominated by shrubs or herbaceous plants. This would be long-term, but not permanent conversion. This conversion would allow continued management for resource values including recreation, biodiversity, aesthetics, and water quality. In addition, river and floodplain restoration would enhance habitat values of the remaining forest land. Because the area of forest land conversion would be small, not permanent, allow for continued management of most resource values provided by the existing forest land, and enhance the resource values of remaining forest, this impact would be* ***less than significant.***

This impact is similar to Impact 3.4-11 (Alts. 1–3), but Alternative 4 would convert more lodgepole pine forest than Alternatives 1, 2, and 3 (2.9 acres versus 1.1 acres, 1.4 acres, and 0.8 acre, respectively). Like Alternative 3 and unlike Alternatives 1 and 2, Alternative 4 would not convert Jeffrey pine forest. For the same reasons as described for Alternative 1, this impact would be **less than significant**.

IMPACT 3.4-12 (Alt. 4) **Interference with Wildlife Use of Established Movement Corridors. (CEQA 4, TRPA 11)** *The study area may function as a corridor for wildlife movement between the Lake Tahoe shorezone and areas upstream. Implementing Alternative 4 would result in short-term disturbance that could interfere with wildlife use of this corridor. However, construction-related disturbance would be restricted daily and seasonally, and short-term disturbance to vegetation would affect only a small portion of the study area. Furthermore, as described in Environmental Commitments 5 and 6, the Conservancy would minimize vegetation disturbance and revegetate. Therefore, wildlife movement would not be blocked and the effect on wildlife movement would not be substantial. This impact would be* ***less than significant.***

This impact is similar to Impact 3.4-12 (Alts. 1–3), but implementing Alternative 4 would disturb 15.6 acres of vegetation for the short term versus 13.6, 14, and 20.7 acres for Alternatives 1, 2, and 3, respectively. Alternative 4 would not include a bridge over the Upper Truckee River. For similar reasons as described for Alternative 1, this impact would be **less than significant**.

Alternative 5: No-Project/No-Action

IMPACT 3.4-1 (Alt. 5) **Introduction and Spread of Invasive Plants by Construction Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.*

Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.

IMPACT 3.4-2 (Alt. 5) **Introduction and Spread of Invasive Plants by Recreational Activities. (CEQA 2, 3; TRPA 12)** *Under Alternative 5, recreational activities would remain comparable to existing conditions. Under existing conditions, visitors introduce and spread invasive plants throughout the study area. This existing adverse condition would continue. This impact would be **less than significant.***

Under Alternative 5, recreational activities would remain comparable to existing conditions. Under existing conditions, visitors introduce and spread invasive plants throughout the study area. This existing adverse condition would continue. This impact would be **less than significant.**

IMPACT 3.4-3 (Alt. 5) **Damage to or Mortality of Special-Status Plants Resulting from Construction Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.*

Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.

IMPACT 3.4-4 (Alt. 5) **Altered Extent of Special-Status Plant Habitat. (CEQA 1, 5; TRPA 5)** *Under Alternative 5, no additional special-status plant habitat would be created. Thus, **no impact** would occur.*

Under Alternative 5, no additional special-status plant habitat would be created. Thus, **no impact** would occur.

IMPACT 3.4-5 (Alt. 5) **Damage to or Mortality of Special-Status Plants Resulting from Recreational Activities. (CEQA 1, 5; TRPA 5)** *Under Alternative 5, recreational activities would remain comparable to existing conditions. Under existing conditions, habitat occupied by American mannagrass is in a location that is not substantially disturbed by recreational activities, However, visitors cause damage to and mortality of some Tahoe yellow cress. This existing adverse condition would continue. Thus, **no impact** would occur.*

Under Alternative 5, recreational activities would remain comparable to existing conditions. Under existing conditions, habitat occupied by American mannagrass is in a location that is not substantially disturbed by recreational activities, However, visitors cause damage to and mortality of some TYC. This existing adverse condition would continue. Thus, **no impact** would occur.

IMPACT 3.4-6 (Alt. 5) **Short-Term Disturbance of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from Construction Activities. (CEQA 2, 3; TRPA 1, 2, 4, 6)** *Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.*

Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.

IMPACT 3.4-7 (Alt. 5) **Increased Extent of Sensitive Communities (Jurisdictional Wetlands, Riparian Vegetation, and SEZ) Resulting from River and Floodplain Restoration. (CEQA 2, 3; TRPA 1, 2, 4, 6)** *Under Alternative 5, no river or floodplain restoration would occur, and the extent of sensitive communities would remain comparable to their extent under existing conditions. Thus,* ***no impact*** *would occur.*

Under Alternative 5, no river or floodplain restoration would occur, and the extent of sensitive communities would remain comparable to their extent under existing conditions. Thus, **no impact** would occur.

IMPACT 3.4-8 (Alt. 5) **Disruption of Wildlife Habitat Use and Loss of Wildlife Resulting from Construction Activities. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus,* ***no impact*** *would occur.*

Under Alternative 5, no construction of additional restoration, recreation, public access, or habitat protection features would occur. Thus, **no impact** would occur.

IMPACT 3.4-9 (Alt. 5) **Altered Extent and Quality of Wildlife Habitats Resulting from River, Floodplain, and Other Restoration and Enhancement Elements. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 5, no river, floodplain, or other restoration would occur; thus, the extent and quality of wildlife habitats would remain similar to existing conditions. Where existing conditions are degraded (as along the straightened reach of the Upper Truckee River), the existing adverse conditions would continue.* ***No impact*** *would occur.*

Under Alternative 5, no river, floodplain, or other restoration would occur; thus, the extent and quality of wildlife habitats would remain similar to existing conditions. Where existing conditions are degraded (as along the straightened reach of the Upper Truckee River), the existing adverse conditions would continue. **No impact** would occur.

IMPACT 3.4-10 (Alt. 5) **Altered Quality of Wildlife Habitats Resulting from Altered Recreational Use. (CEQA 1; TRPA 9, 10, 12)** *Under Alternative 5, recreational activities would remain comparable to existing conditions. Under existing conditions, visitors disrupt wildlife use of the study area and damage all the habitats in the study area. This existing adverse condition would continue.* ***No impact*** *would occur.*

Under Alternative 5, recreational activities would remain comparable to existing conditions. Under existing conditions, visitors disrupt wildlife use of the study area and damage all the habitats in the study area. This existing adverse condition would continue. **No impact** would occur.

IMPACT 3.4-11 (Alt. 5) **Conversion of Forest Land to Nonforest Use. (CEQA 8, 9; TRPA 4, 5)** *Under Alternative 5, no conversion of forest land to nonforest uses would occur.* ***No impact*** *would occur.*

Under Alternative 5, no conversion of forest land to nonforest uses would occur. **No impact** would occur.

IMPACT 3.4-12 (Alt. 5) **Interference with Wildlife Use of Established Movement Corridors. (CEQA 4, TRPA 11)** *Under Alternative 5, no short-term disturbance would occur that could interfere with wildlife use of the study area as a movement corridor.* ***No impact*** *would occur.*

Under Alternative 5, no short-term disturbance would occur that could interfere with wildlife use of the study area as a movement corridor. **No impact** would occur.

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