APPENDIX C

Management Indicator Species

Management Indicator Species Report

Upper Truckee River
Sunset Stables Reach Restoration Project

Lake Tahoe Basin Management Unit

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1. Introduction

The purpose of this report is to evaluate and disclose the impacts of the Upper Truckee River Sunset Stables Reach Restoration Project (Proposed Project) on the habitat of the thirteen (13) Management Indicator Species (MIS) identified in the Forest (NF) Land and Resource Management Plan (LRMP) (USDA 1988) as amended by the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (USDA December 2007). This report documents the effects of the proposed action and alternatives on the habitat of selected project-level MIS. Detailed descriptions of the Proposed Project alternatives are found in the Project Draft Environmental Compliance Document, from which this document in tiered. Figure 1 shows the Proposed Project area, and Figure 2 shows components of the Proposed Project.

MIS are animal species identified in the SNF MIS Amendment Record of Decision (ROD) signed December 14, 2007, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). Guidance regarding MIS set forth in the Lake Tahoe Basin Management Unit LRMP as amended by the 2007 SNF MIS Amendment ROD directs Forest Service resource managers to (1) at project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and (2) at the bioregional scale, monitor populations and/or habitat trends of MIS, as identified in the Lake Tahoe Basin Management Unit LRMP as amended.

1.a. Direction Regarding the Analysis of Project-Level Effects on MIS Habitat

Project-level effects on MIS habitat are analyzed and disclosed as part of environmental analysis under the National Environmental Policy Act (NEPA). This involves examining the impacts of the proposed project alternatives on MIS habitat by discussing how direct, indirect, and cumulative effects will change the habitat in the analysis area.

These project-level impacts to habitat are then related to broader scale (bioregional) population and/or habitat trends. The appropriate approach for relating project-level impacts to broader scale trends depends on the type of monitoring identified for MIS in the LRMP as amended by the SNF MIS Amendment ROD. Hence, where the Lake Tahoe Basin Management Unit LRMP as amended by the SNF MIS Amendment ROD identifies distribution population monitoring for an MIS, the project-level habitat effects analysis for that MIS is informed by available distribution population monitoring data, which are gathered at the bioregional scale. The bioregional scale monitoring identified in the Lake Tahoe Basin Management LRMP, as amended, for MIS analyzed for the Proposed Project is summarized in Section 3 of this report.

Adequately analyzing project effects to MIS generally involves the following steps:

- Identifying which habitat and associated MIS that would be either directly or indirectly affected by the project alternatives; these MIS are potentially affected by the project.
- Summarizing the bioregional-level monitoring identified in the LRMP, as amended, for this subset of MIS.
- Analyzing project-level effects on MIS habitat for this subset of MIS.

- Discussing bioregional scale habitat and/or population trends for this subset of MIS.
- Relating project-level impacts on MIS habitat to habitat and/or population trends at the bioregional scale for this subset of MIS.

These steps are described in detail in the Pacific Southwest Region's draft document "MIS Analysis and Documentation in Project-Level NEPA, R5 Environmental Coordination" (USDA Forest Service 2006). This Management Indicator Species (MIS) Report documents application of the above steps to select and analyze MIS for the Proposed Project.

1.b. Direction Regarding Monitoring of MIS Population and Habitat Trends at the Bioregional Scale.

The bioregional scale monitoring strategy for the Lake Tahoe Basin Management Unit MIS is found in the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (ROD) of 2007. Bioregional scale habitat monitoring is identified for all twelve of the terrestrial MIS. In addition, bioregional scale population monitoring, in the form of distribution population monitoring, is identified for all of the terrestrial MIS except for the greater sage-grouse. For aquatic macroinvertebrates, the bioregional scale monitoring identified is Index of Biological Integrity and Habitat. The current bioregional status and trend of populations and/or habitat for each of the MIS is discussed in the Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA Forest Service 2008).

- **MIS Habitat Status and Trend.**

All habitat monitoring data are collected and/or compiled at the bioregional scale, consistent with the LRMP as amended by the 2007 SNF MIS Amendment ROD (USDA Forest Service 2007).

Habitats are the vegetation types (for example, early seral coniferous forest) or ecosystem components (for example, snags in green forest) required by an MIS for breeding, cover, and/or feeding. MIS for the Sierra Nevada National Forests represent 10 major habitats and 2 ecosystem components (USDA Forest Service 2007), as listed in Table 1. These habitats are defined using the California Wildlife Habitat Relationship (CWHR) System (CDFG 2005). The CWHR System provides the most widely used habitat relationship models for California's terrestrial vertebrate species. It is described in detail in the SNF Bioregional MIS Report (USDA Forest Service 2008).

Habitat status is the current amount of habitat on the Sierra Nevada Forests. Habitat trend is the direction of change in the amount or quality of habitat over time. The methodology for assessing habitat status and trend is described in detail in the SNF Bioregional MIS Report (USDA Forest Service 2008).

- **MIS Population Status and Trend.**

All population monitoring data are collected and/or compiled at the bioregional scale, consistent with the LRMP as amended by the 2007 SNF MIS Amendment ROD (USDA Forest Service 2007). The information is presented in detail in the 2008 SNF Bioregional MIS Report (USDA Forest Service 2008).

Population monitoring strategies for MIS of the Lake Tahoe Basin Management Unit are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment ROD (USDA Forest Service 2007). Population status is the current condition of the MIS related to the population monitoring data required in the 2007 SNF MIS Amendment ROD for that MIS. Population trend is the direction of change in that population measure over time.

There are a myriad of approaches for monitoring populations of MIS, from simply detecting presence to detailed tracking of population structure (USDA Forest Service 2001, Appendix E, page E-19). A distribution population monitoring approach is identified for all 12 of the terrestrial MIS in the 2007 SNF MIS Amendment, except for the greater sage-grouse (USDA Forest Service 2007). Distribution population monitoring consists of collecting presence data for the MIS across a number of sample locations over time. Presence data are collected using a number of direct and indirect methods, such as surveys (population surveys), bird point counts, tracking number of hunter kills, counts of species sign (such as deer pellets), and so forth. The specifics regarding how these presence data are analyzed to track changes in distribution over time vary by species and the type of presence data collected. These are addressed for each MIS in the SNF Bioregional MIS Report (USDA Forest Service 2008).

- **Aquatic Macroinvertebrate Status and Trend.**

For aquatic macroinvertebrates, condition and trend is determined by analyzing macroinvertebrate data using the predictive, multivariate River Invertebrate Prediction And Classification System (RIVPACS) to determine whether the macroinvertebrate community has been impaired relative to reference condition within perennial water bodies. This monitoring consists of collecting aquatic macroinvertebrates and measuring stream habitat features according to the Stream Condition Inventory (SCI) manual (Frazier et al. 2005). Evaluation of the condition of the biological community is based upon the "observed to expected" (O/E) ratio, which is a reflection of the number of species observed at a site versus the number expected to occur there in the absence of impairment. Sites with a low O/E scores have lost many species predicted to occur there, which is an indication that the site has a lower than expected richness of sensitive species and is therefore impaired.

2. Selection of Project level MIS

Management Indicator Species (MIS) for the Lake Tahoe Basin Management Unit are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007). The habitats and ecosystem components and associated MIS analyzed for the Proposed Project were selected from this list of MIS, as indicated in Table 1. In addition to identifying the habitat or ecosystem components (1st column), the CWHR type(s) defining each habitat/ecosystem component (2nd column), and the associated MIS (3rd column), the Table discloses whether or not the habitat of the MIS is potentially affected by the Proposed Project (4th column). The vegetation communities present in the Proposed Project area are quantified in Table 2.

Table 1. Selection of MIS for Project-Level Habitat Analysis for the Proposed Project.

Habitat or Ecosystem Component	CWHR Type(s) defining the habitat or ecosystem component[1]	Sierra Nevada Forests Management Indicator Species *Scientific Name*	Category for Project Analysis [2]
Riverine & Lacustrine	Riverine, and lacustrine or lake.	Aquatic macroinvertebrates[3]	3
Riparian	Montane Riparian, and valley foothill, open canopy deciduous woodland with shrubs.	Yellow warbler *Dendroica petechia*	1
Wet Meadow	Wet meadow, freshwater emergent wetland.	Pacific tree frog *Pseudacris regilla*	3
Early Seral Coniferous Forest	Ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine. Tree size 1,2,and 3, all canopy closures	Mountain quail *Oreortyx pictus*	1
Mid Seral Coniferous Forest	Ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine. Tree size 4, all canopy closures.	Mountain quail *Oreortyx pictus*	1
Late Seral Open Canopy Coniferous Forest	Ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine. Tree size 5. Sparse to open canopy.	Sooty (Blue) grouse *Dendragapus obscurus*	1
Late Seral Closed Canopy Coniferous Forest	Ponderosa pine, Sierran mixed conifer, white fir, and red fir. Tree size 5 and 6. Moderate to dense canopy closures.	California spotted owl *Strix occidentalis occidentalis*	1
		American marten *Martes americana*	
		Northern flying squirrel *Glaucomys sabrinus*	
Snags in Green Forest	Medium and large snags in green forest.	Hairy woodpecker *Picoides villosus*	1
Snags in Burned Forest	Medium and large snags in forest burned by a stand-replacing fire.	Black-backed woodpecker *Picoides arcticus*	1

[1] All California wildlife habitat relationship size classes and canopy closures are included (Mayer and Laudenslayer, 1988). dbh = diameter at breast height. Tree size classes and canopy closure classifications are:

1 = Seedling less than 1" dbh.
2 = Sapling from 1" to 5.9" dbh.
3 = Pole from 6" to 10.9" dbh.
4 = Small tree from 11" to 23.9" dbh.
5 = Medium to large tree over 24" dbh.
6 = Multi-layered tree in pine and Sierran mixed conifer.

S = Sparse cover, 10 to 24% canopy closure.
P = Open cover, 25 to 39% canopy closure.
M= Moderate cover, 40 to 59% canopy closure.
D = Dense cover, 60 to 100% canopy closure.

[2] Category of management indicator species habitat for Project analysis:

1 = Habitat is not in or adjacent to the Project area, and would not be affected by the Project.
2 = Habitat is in or adjacent to Project area, but would not be directly or indirectly affected by the Project.
3 = Habitat would be directly or indirectly affected by the Project.

[3] Aquatic macroinvertebrates include worms, clams, snails, shrimp, crayfish, caddisflies, stoneflies, diving beetles, and other invertebrates that are highly sensitive to changes in water quality and condition of aquatic habitat. The index of biotic integrity was last monitored at 17 sites in the Lake Tahoe basin from 2000-2001. The ratio of observed to expected macroinvertebrate species = 0.89, which is a very good score of aquatic sensitive species richness (Sierra Nevada Forests bioregional management indicator species report, January 2008).

Riparian, early seral coniferous forest, mid seral coniferous forest, late seral open canopy coniferous forest, late seral closed canopy coniferous forest, snags in green forest, and snags in burned forest will not be analyzed further in this document. These habitats, as defined in this document, do not occur in the project area.

Table 2. Vegetation Communities and Land Cover in the Project Area.

Cover Type	Acreage	Percent of Total (%)
Aspen Riparian Forest	0.8	0.27%
Big Sagebrush Scrub	8.2	2.79%
Developed	4.1	1.39%
Jeffrey Pine Forest	65.8	22.34%
Jeffrey Pine/Fir Forest	23.3	7.91%
Jeffrey Pine Forest associated with Urban Development	0.1	0.03%
Lodgepole Pine Forest	55.2	18.74%
Montane Riparian Scrub	18	6.11%
Open Ground	4.0	1.36%
Ruderal	6.1	2.06%
Water	10.7	3.64%
Wet Montane Meadow	98.3	33.36%
Total	**294.6**	**100%**

Source: El Dorado County 2003 and California Tahoe Conservancy

The MIS whose habitat would be either directly or indirectly affected by the Proposed Project, identified as Category 3 in Table 1, are carried forward in this analysis, which will evaluate the direct, indirect, and cumulative effects of the proposed action and alternatives on the habitat of these MIS. The MIS selected for project-level MIS analysis for the Proposed Project are: aquatic macroinvertebrates and Pacific tree frog (*Pseudacris regilla).*

3. Bioregional Monitoring Requirements for MIS Selected for Project-Level Analysis

3.a. MIS Monitoring Requirements.

The Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007) identifies bioregional scale habitat and/or population monitoring for the Management Indicator Species for ten National Forests, including the Lake Tahoe Basin Management Unit (USDA Forest Service 2007). The habitat and/or population monitoring requirements for Lake Tahoe Basin Management Unit MIS are described in the Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA Forest Service 2008) and are summarized below for the MIS being analyzed for the Proposed Project. The applicable habitat and/or population monitoring results are described in the SNF Bioregional MIS Report (USDA Forest Service 2008).

Habitat monitoring at the bioregional scale is identified for all the habitats and ecosystem components, including the following analyzed for the Proposed Project: Riverine/ lacustrine; riparian; wet meadow; late seral closed canopy coniferous forest; and snags in green forest.

Population monitoring at the Bioregional Scale for aquatic macroinvertebrates: Index of Biological Integrity (IBI) and habitat condition and trend are measured by tracking the condition and trend of a representative community of aquatic macroinvertebrates (aquatic insects, snails, shrimps, worms, etc.) and measurement of physical habitat attributes.

Population monitoring at the bioregional scale for Pacific tree frog: Distribution population monitoring consists of collecting presence data for the MIS across a number of sample locations over time (also see USDA Forest Service 2001, Appendix E).

3.b. How MIS Monitoring Requirements are Being Met.

Habitat and/or distribution population monitoring for all MIS is conducted at the Sierra Nevada scale. Refer to the SNF Bioregional MIS Report (USDA Forest Service 2008) for details by habitat and MIS.

4. Description of Proposed Project.

The Proposed Project would restore natural function to the Sunset Stables Reach of the UTR by constructing a new river channel that is geomorphically stable under the current hydrologic conditions, is hydrologically connected to the adjacent floodplain, and exhibits desirable aquatic habitat features (Figure 2). In addition, the former Sunset Stables site would be revegetated with native vegetation to reduce erosion and sedimentation into the UTR.

The proposed restoration activities would result in a channel width, depth, and sinuosity pattern more consistent with the current flow and sediment transport needs of the river. This would be accomplished primarily through new channel construction, and would also involve abandoning, filling, and revegetating the existing eroding and incised channel. The newly constructed channel would be smaller (narrower and shallower) than the existing channel and would be designed to be more resistant to erosion by improving streambank stability and incorporating more variable channel bed substrate.

The streambanks of the new channel would be stabilized with sod blocks, riparian vegetation planting, and/or large wood and rock placement. As a result, sediment production from streambank erosion would be reduced, thereby decreasing the sediment contributions to Lake Tahoe from this source. Additionally, the restored channel would sustain coarser substrate in riffles and provide a stream habitat more conducive to the production of native fish species. Some portions of the Sunset Stables Reach channel would stay in their existing location and act as transition zones and/or grade control structures between upstream and downstream reaches.

The reduced channel size (i.e. width and depth) would also result in more frequent overbank flooding (every year or two), depositing more sediment and nutrients onto the floodplain rather than transporting them downstream and to Lake Tahoe. The reduced channel depth would raise the bed elevation, and would in turn raise the groundwater table in the adjacent meadow. This would benefit the wet meadow vegetation and improve the riparian and meadow habitat quality. Several resources would benefit from the proposed channel and floodplain restoration, including; water quality, terrestrial and aquatic wildlife species, and terrestrial (riparian and meadow) and aquatic vegetation.

The Proposed Project would involve:

- Constructing approximately 12,000 feet of new channel within the Sunset Stables Reach of the Upper Truckee River (replacing nearly all of Reach 5 and much of Reach 6).
- Planting and temporarily irrigating native riparian vegetation along both sides of the new channel (approximately 24,000 feet).
- Creating floodplain features such as willow clumps that enhance suitable habitat for key wildlife and plant species (approximately 20 acres distributed across the Proposed Project area).
- Removing conifers in and adjacent to the newly constructed channel and along access road where necessary (approximately 20 acres of conifer removal throughout the Proposed Project area).
- Using a combination of excavated soil from the new channel alignment and possibly imported soil to partially fill the existing oversized channel, and revegetating the disturbed area with native riparian plant species (majority of the abandoned channel would be filled and revegetated in this way).
- Installing grade control structures at the upstream and downstream ends of the reach, redirecting flow into the new channel, and blocking off the existing channel to prevent recapture.

In order to minimize potential impacts on existing infrastructure, the alignment of the new channel was designed to avoid water and sewer pipelines. The South Tahoe Public Utilities District (STPUD) holds easements for location and access to its sanitary sewer collector lines (gravity-fed), water line (pressurized line), and back-up effluent export line (also called "force main export line") on the Proposed Project area. The main collector line and the back-up effluent export line run along the eastern side of the meadow and cross the river where the river channel runs east across the meadow (Figure 2). Several gravity sewer lines and the water line also cross the river channel.

The Proposed Project would be constructed in two phases to accommodate constraints in land ownership, funding and construction: Reach 5 (LTBMU and Conservancy lands) and Reach 6 (Conservancy land). At this time, Reach 5 is anticipated to be constructed first, followed after at least one year by Reach 6 construction. Each phase would last approximately three to four years in order to allow sufficient time for the new channel and floodplain to establish vegetation for the Upper Truckee River. Figure 2 shows the location of access roads and potential areas for staging and dewatering. The construction sequence is as follows:

Year One In Reach 5 only, lower the buried STPUD water and backup effluent export lines where the new channel will cross them so as not to compromise the integrity of the buried utilities. This will be completed prior to starting the construction of the new channel.

Year Two Excavate the new channel in the selected reach. Plant with native riparian vegetation and install irrigation.

Year Three Allow the new channel to "season" and continue irrigation to establish riparian vegetation (only if necessary in Reach 5).

Year Four Construct the crossings of the existing channel and new channel, and the tie-ins to the upstream and downstream ends of the Proposed Project reach. Connect the new channel to river flow in the fall. Monitor performance of banks. Backfill the old channel, recontour and revegetate.

This phasing of project implementation reduces potential cumulative impacts of having adjacent reaches exposed during the same year. Depending on the start date of Reach 6 construction, the Proposed Project could be completed in 4-7 years.

5. Effects of Proposed Project on the Habitat for the Selected Project-Level MIS.

The following section documents the analysis for the following 'Category 3' species: aquatic macroinvertebrates and Pacific tree frog. The analysis of the effects of the Proposed Project on the MIS habitat for the selected project-level MIS is conducted at the project scale. The analysis used habitat information obtained from the following reports (report findings are described in further detail in the BA/BE):

- *Final Existing Conditions Report*, July 2004 (CTC 2004)
- *Final Aquatic Resources Report*, October 2005 (CTC 2005a)
- *Amended Final Plant Communities and Special-Status Plant Species Report*, November 2005 (CTC 2005b)
- *Final Aquatic Vegetation Survey Report and Fish Distribution and Abundance Report*, October 2007 (CTC 2007b)
- *Final Western Pearlshell Mussel Survey Report*, October 2007 (CTC 2007c)
- *Final Amphibian and Reptile Survey Report*, October 2007 (CTC 2007d)

Detailed information on the MIS is documented in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference. Cumulative effects at the bioregional scale are tracked via the SNF MIS Bioregional monitoring, and detailed in the SNF Bioregional MIS Report.

Lacustrine/Riverine Habitat (Aquatic Macroinvertebrates)

Habitat/Species Relationship

Aquatic or Benthic Macroinvertebrates (BMI) were selected as the MIS for riverine and lacustrine habitat in the Sierra Nevada. They have been demonstrated to be very useful as indicators of water quality and aquatic habitat condition (Resh and Price 1984; Karr et al. 1986; Hughes and Larsen 1987; Resh and Rosenberg 1989). They are sensitive to changes in water chemistry, temperature, and physical habitat; aquatic factors of particular importance are: flow, sedimentation, and water surface shade.

Project-level Effects Analysis – Lacustrine/Riverine Habitat

Habitat Factor(s) for the Analysis: Flow; Sedimentation; and Water surface shade.

Current Condition of the Habitat Factor(s) in the Proposed Project Area: The Upper Truckee River is the principal hydrologic feature within the Proposed Project area. Streamflow varies greatly among years and across seasons in a pattern typical of unregulated snowmelt rivers in the Sierra Nevada. Peak runoff occurs between May and June (~200-500 cubic feet per second [cfs]), while seasonal low flow takes place between July and November (<25 cfs). Extremely high runoff can occur with rain-on-snow events, with flows ranging as high as 1,700 to 3,200 cfs.

Aquatic habitat in the Sunset Reach, as mapped in 2004, is predominantly flowing water composed of riffles, runs and pools (CTC 2005a). A few backwater areas and side channels may contain standing water seasonally. The substrate is dominated by sands and small gravel. The gravel is often a thin veneer over hardpan clay or embedded with sand and is poor habitat for benthic macroinvertebrates or substrate-spawning fish such as trout. Some sections of Reach 5 have eroded down to the clay hardpan with overlying silts. Additionally, water temperature fluctuations may be extreme during summer. Aquatic habitat conditions are fair to poor due to homogenous channel conditions (i.e. too few pools and riffles), lack of riparian vegetation, limited substrate quality, lack of cover (e.g., undercut banks), actively eroding banks, and limited depth during the summer low flow period. Many of these attributes are a result of an incised channel.

Direct and Indirect Effects to Habitat. The Proposed Project will have a direct beneficial effect on riverine and lacustrine habitat because it will reduce erosion, sedimentation, and nutrient loading in those habitats. The Proposed Project will enhance instream habitat by creating a new, more geomorphically suitable channel (approximately 12,000 linear feet), restoring riparian vegetation on banks, and installing habitat features.

The Proposed Project will have an adverse direct short-term effect on riverine habitat due to abandonment and fill of the former channel (approximately 11,150 feet) and construction impacts. The Proposed Project will not have any adverse direct effect on lacustrine habitat. The Proposed Project is not near Lake Tahoe and construction will not occur in or near the lake.

Construction could cause adverse indirect short-term effects on riverine or lacustrine habitat, but mitigation measures (found in the Draft Environmental Compliance Document prepared for the Proposed Project) will reduce or eliminate any such effects.

Cumulative Effects to Habitat in the Proposed Project Area. Given that all other projects in the Tahoe Basin are subject to environmental regulation and review, and are required to implement BMPs and mitigation measures, the overall cumulative effects on lacustrine and riverine habitat would be insignificant, or as in the case of EIP projects, beneficial.

Cumulative Effects Conclusion: Cumulative effects to riverine habitat in the Upper Truckee River would be beneficial. Cumulative effects to lacustrine habitat would be beneficial and could be significant, considering all other water-quality improvement efforts in the Lake Tahoe Basin.

Summary of Aquatic Macroinvertebrate Status and Trend at the Bioregional Scale
The Lake Tahoe Basin Management Unit LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale Index of Biological Integrity and Habitat monitoring for aquatic macroinvertebrates; hence, the lacustrine and riverine effects analysis for the Proposed Project must be informed by these monitoring data. The sections below summarize the Biological Integrity and Habitat status and trend data for aquatic macroinvertebrates. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat and Index of Biological Integrity Status and Trend. Aquatic habitat has been assessed using Stream Condition Inventory (SCI) data collected since 1994 (Frasier et al. 2005) and habitat status information from the Sierra Nevada Ecosystem Project (SNEP) (Moyle and Randall 1996). Index of Biological Integrity is assessed using the River Invertebrate Prediction and Classification System (RIVPACS) and macroinvertebrate data collected since 2000 (see USDA Forest Service 2008, Table BMI-1). These data indicate that the status and trend in the RIVPACS scores is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Aquatic Macroinvertebrates Habitat Trend. It is predicted that the change in flow, sedimentation, and shade caused by the Proposed Project will have a beneficial effect on the existing trend in the habitat and aquatic macroinvertebrates across the Sierra Nevada bioregion. The project will reduce erosion by increasing streambank stability and restoring riparian vegetation, thereby improving water quality and enhancing aquatic and riparian habitat. Additionally, the restored channel will sustain a gravel substrate in riffles and provide a stream habitat more conducive to the production of native fish species and macroinvertebrates.

Wet Meadow Habitat (Pacific tree frog)

Habitat/Species Relationship.
The Pacific tree frog was selected as an MIS for wet meadow habitat in the Sierra Nevada. This broadly distributed species requires standing water for breeding; tadpoles require standing water for periods long enough to compete aquatic development, which can be as long as 3 or more months at high elevations in the Sierra Nevada (CDFG 2005). During the day during the breeding season, adults take cover under clumps of vegetation and surface objects near water; during the remainder of the year, they leave their breeding sites and seek cover in moist niches in buildings, wells, rotting logs or burrows (ibid).

Project-level Effects Analysis – Wet Meadow Habitat

Habitat Factor(s) for the Analysis: (1) Acres of wet meadow habitat [CWHR wet meadow (WTM) and freshwater emergent wetland (FEW)]. (2) Acres with changes in CWHR herbaceous height classes [short herb (<12”), tall herb (>12”)]. (3) Acres with changes in CWHR herbaceous ground cover classes (Sparse=2-9%; Open=10-39%; Moderate=40-59%; Dense=60-100%). (4) Changes in meadow hydrology.

Current Condition of the Habitat Factor(s) in the Proposed Project Area: The predominant plant community in the Proposed Project area is wet montane meadow (98.3 acres). This plant community is in poor condition along the Upper Truckee River, with only minimal regeneration of meadow vegetation. This is attributed to river channelization, historic grazing, timber harvesting, and the airport. Much of the wet montane meadow in the Proposed Project area seems to be in transition toward dry montane meadow. Further, lodgepole pine are encroaching on the meadow, a trend seen in other Sierra meadows.

Direct and Indirect Effects to Habitat. Although part of the Proposed Project occurs within wet meadow habitat, it will not result in an adverse change in any of the key habitat factors.

The Proposed Project will have a direct beneficial effect on wet meadow habitat because it will reconnect overbank flows to the meadow and raise the groundwater elevation, thereby increasing soil moisture levels. Wetter conditions would benefit wet meadow plant species and discourage encroachment by lodgepole pine and other upland species.

Construction would cause adverse short-term effects on portions of the wet meadow habitat (access roads, new channel excavation). Meadow habitat disturbed during channel restoration would be actively revegetated using native stocks, thereby reducing or eliminating any such effects.

Cumulative Effects to Habitat in the Proposed Project Area. Given that all other projects in the Tahoe Basin are subject to environmental regulation and review, and are required to implement BMPs and mitigation measures, the overall cumulative effects on wet meadow habitat would be insignificant, or as in the case of EIP projects, beneficial.

Cumulative Effects Conclusion: Cumulative direct and indirect effects to wet meadow habitat in the Proposed Project area (and vicinity) would be beneficial but insignificant and would not alter the existing trend in the habitat.

Summary of Pacific Tree Frog Status and Trend at the Bioregional Scale
The NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the Pacific tree frog; hence, the wet meadow effects analysis for the Proposed Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the Pacific tree frog. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 66,000 acres of wet meadow habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend is stable.

Population Status and Trend. Since 2002, the Pacific tree frog has been monitored on the Sierra Nevada forests as part of the Sierra Nevada Forest Plan Amendment (SNFPA) monitoring plan (USDA Forest Service 2006, Brown 2008). These data indicate that Pacific tree frog continues to be present at these sample sites, and that the distribution of Pacific tree frog populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Pacific Tree Frog Trend. The change in herbaceous CWHR height class in wet meadow habitat in the Proposed Project area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of Pacific tree frogs across the Sierra Nevada bioregion.

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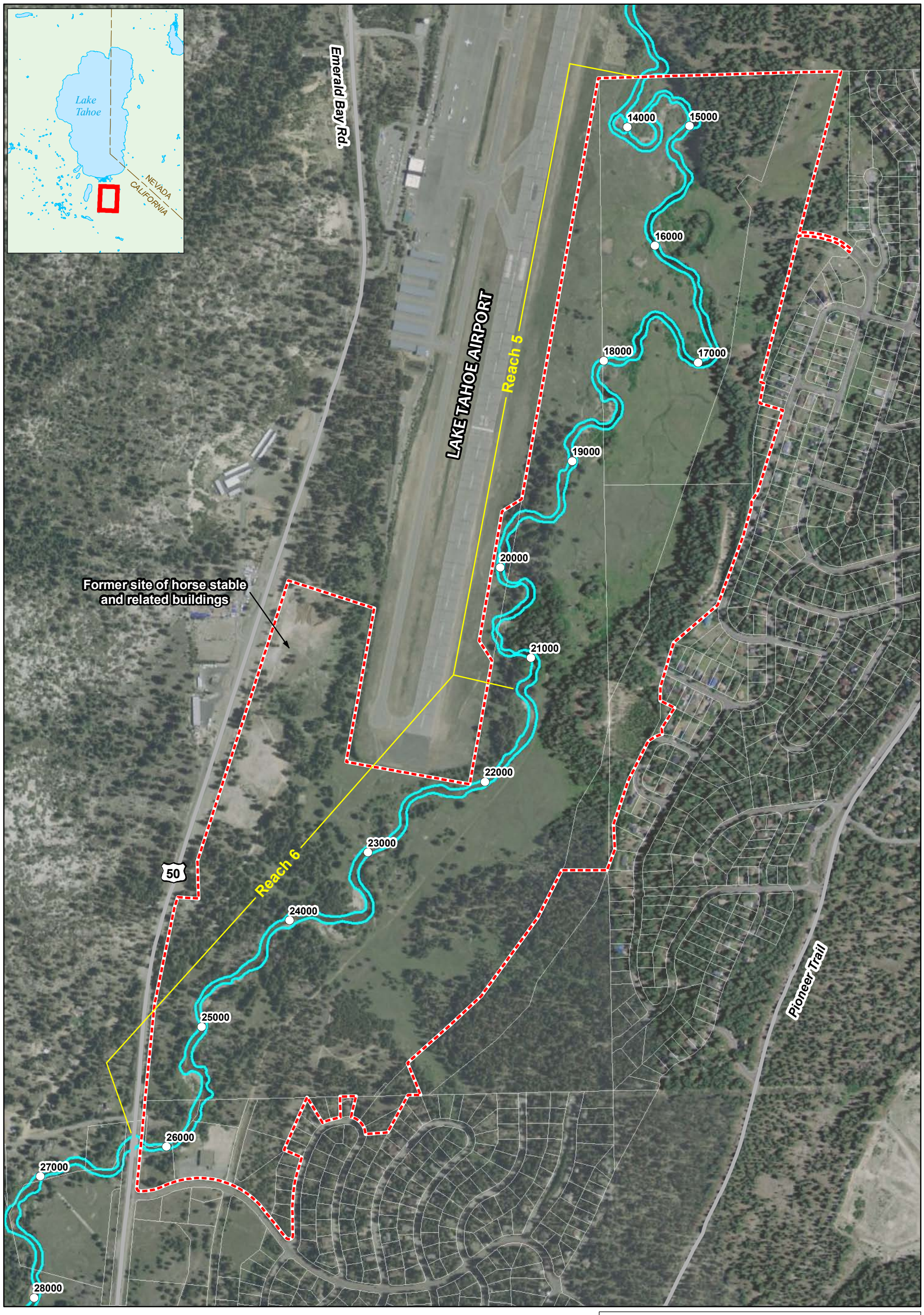

Project Boundary

Parcel Boundary

Upper Truckee River

1000-foot River Station

ENTRIX

Upper Truckee River Sunset Stables Reach Restoration Project

Figure 1

Project Area

500 250 0 500 Feet

Projection: California Stateplane, Zone 2
Datum: NAD 83

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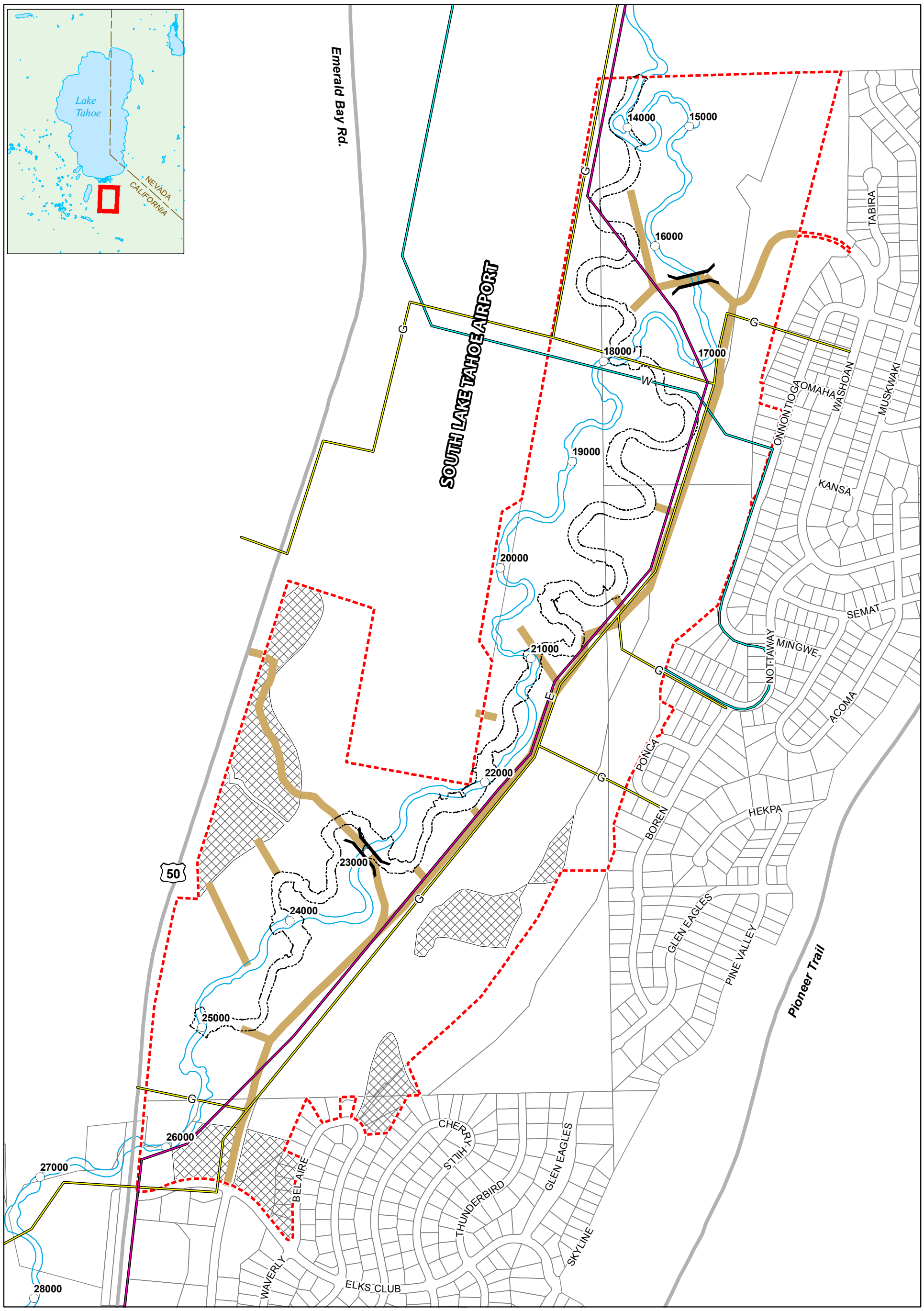

Project Boundary
Upper Truckee River
1000-foot River Station
Parcel Boundary
Alignment of Preferred Alternative
Potential Storage/Staging and/or Dewatering Area
Potential Haul Route
Temporary Railcar Bridge

Existing Sewer/Water Lines

E Backup Effluent Export
G Sewer Gravity
W Water

ENTRIX

Upper Truckee River Sunset Stables Reach Restoration Project

Figure 2

Proposed Project Components

500 250 0 500 Feet

Projection: California Stateplane, Zone 2
Datum: NAD 83

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