

RECLAMATION

Managing Water in the West

DRAFT Environmental Assessment

Independence Lake Spillway Fish Barrier



**Mid-Pacific Region
Lahontan Basin Area Office
Carson City, Nevada**



U.S. Department of the Interior
Bureau of Reclamation

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Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Section 1 Introduction

This document is a DRAFT Environmental Assessment (EA) for the Independence Lake Spillway Fish Barrier construction project and has been prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and Department of Interior regulations for the Implementation of the National Environmental Policy Act of 1969 (43 CFR Part 46).

The Bureau of Reclamation (Reclamation) has been directed by the Congress of the United States through Public Law 110-161, 208(a)(2) and PL 111-85, 208(a)(2) to provide funds to The Nature Conservancy (TNC) to partially fund the acquisition of land that surrounds Independence Lake and for protection of the native fishery and water quality of the lake.

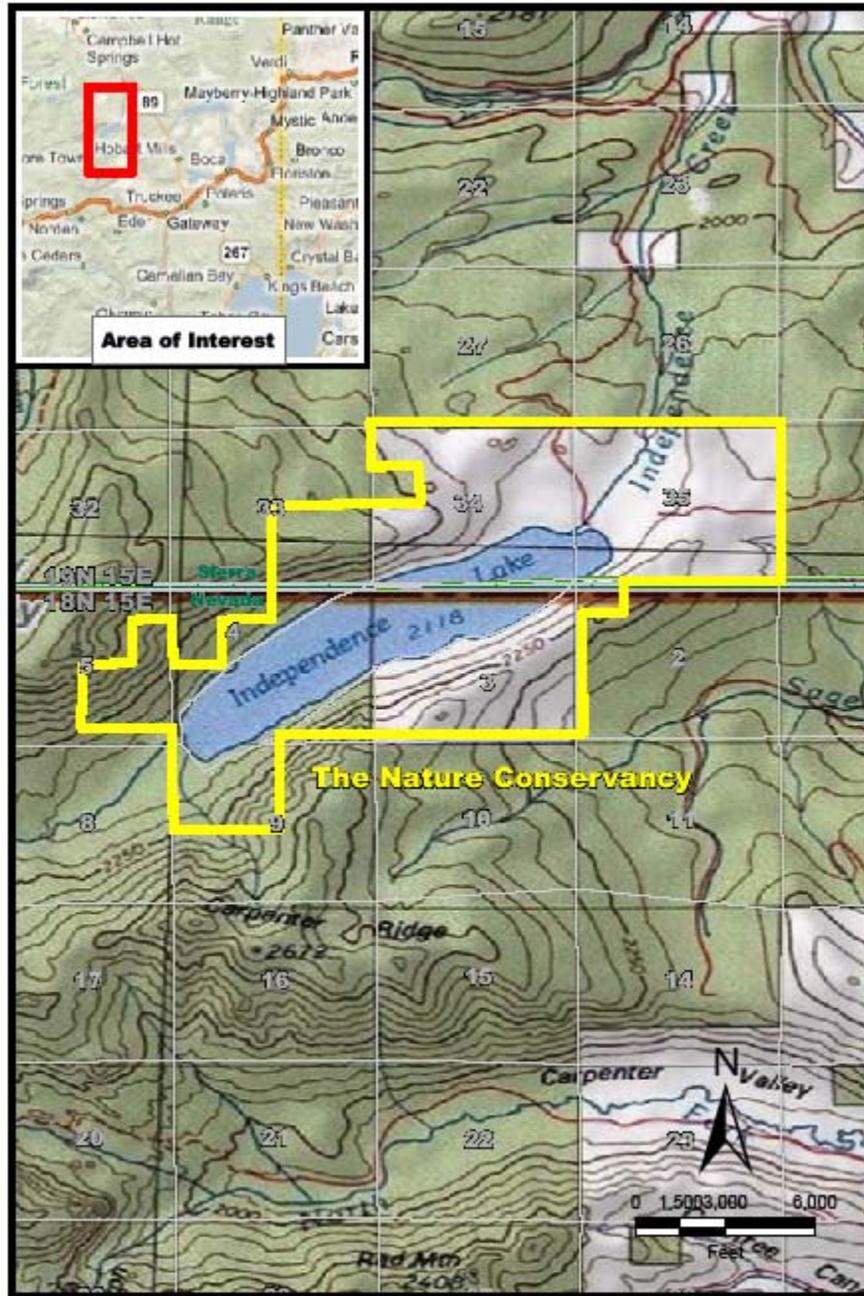
Reclamation has provided funding to TNC for \$11,000,000 under a grant agreement. The funding was originally anticipated primarily for the land acquisition and administrative costs. Reclamation is working with TNC on a grant modification to utilize a portion of the funding for other projects, including the fish barrier project being analyzed in this EA. The construction of a barrier to fish passage on Independence Lake's spillway is proposed to prevent the upstream migration of non-native fish that threaten the long-term viability of Lahontan cutthroat trout populations in the lake.

1.1 Purpose of and Need for Action

The purpose of the Proposed Action is to provide funding to TNC for activities that provide "protection of the native fishery and water quality of Independence Lake" as determined by TNC. A portion of the funding would be used for constructing a fish barrier at the spillway to the lake, which is essential to prevent colonization of the lake from non-native downstream fish. The fish barrier would protect the federally listed Lahontan cutthroat trout (*Oncorhynchus clarkia henshawi*) and other native fish located in the lake.

1.1.2 Location of Analysis Area

The location of the area analyzed in the EA is shown in Figures 1 and 2 below.



**INDEPENDENCE LAKE
SPILLWAY FISH BARRIER**

FIGURE 1

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Managing Water in the West

Lahontan Basin Area Office
705 N. Plaza Street, Carson City, NV 89701

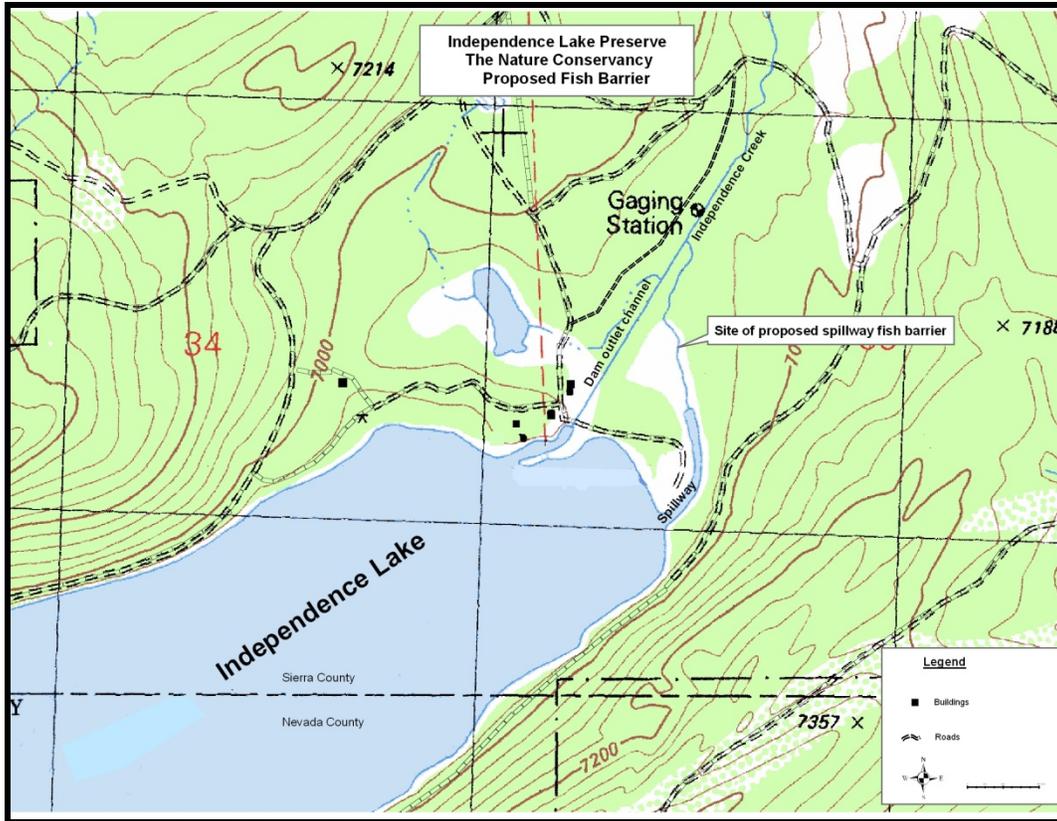


Figure 2 - Site of Spillway Fish Barrier Project

The proposed fish barrier structure would be located within the spillway channel of Independence Lake. The project site is located a short distance east of Independence Lake along the spillway channel, approximately 500 feet downstream of the existing flashboard weir outlet for the reservoir.

Independence Lake is located in Sierra County and Nevada County, California, approximately 9 air miles northwest of Truckee, California, and 5 miles west of State Route 89. The proposed project site is in Sierra County within the NWSW Section 35, T19 N, and R.15E. on the Independence Lake USGS 7.5' topographic map. The site elevation is approximately 6,945 feet above mean sea level (MSL). The approximate latitude and longitude of the site is 39° 27' 12.44" N and 120° 17' 16.40" W. The proposed project is accessed via SR89 to the Fiberboard Road (or Tahoe National Forest Route 7), and then to Sierra County Road 350.

Independence Lake is fed by the headwaters of Independence Creek, south of Mount Lola and east of the Sierra Nevada crest. Independence Creek flows into the Little Truckee River, which is a part of the Truckee River watershed, a 3,100 square mile basin originating in the Sierra Nevada and draining into Pyramid Lake. Independence Lake is part of the North Lahontan hydrologic basin.

1.1.3 Background

Since 1937, the land around Independence Lake was owned by Sierra Pacific Power Company (now NV Energy). The lake itself is a municipal water storage facility that remains in the ownership of the state of California. Water rights are held by the Truckee Meadows Water Authority (TMWA). TMWA operates and maintains the spillway in which the proposed fish barrier would be constructed. The lake has served as a water supply for Northern Nevada and as a rustic, remote recreation area.

TNC purchased the lands around Independence Lake to protect the lake's unique native fishery resources. Independence Lake is the only location in the entire Walker, Carson, and Truckee River drainages where wild and self-sustaining populations of all native fishes still co-occur. Lahontan cutthroat trout are the premier species of the native fish because Independence Lake and upper Independence Creek support the only self-sustaining indigenous lake population of LCT remaining in California, and is one of only two such lake populations in the world.

The Independence Lake LCT population is genetically unique and is vulnerable to hybridization or extinction. Displacement or hybridization with non-native trout and competition with and predation by non-native fishes are considered serious threats to LCT in Independence Lake. Although this species is supported by hatcheries, wild and self-sustaining populations of Lahontan cutthroat trout have declined by 99% relative to their historic range. A major factor in the decline of LCT is displacement (competition) and/or hybridization with non-native fish. A fish barrier at the spillway to Independence Lake is essential to prevent non-native fish from colonizing Independence Lake from downstream sources.

Independence Lake once supported spawning runs of over 2,000 fish annually into upper Independence Creek. In recent years, the number of spawning fish has varied from 40 to 237 fish annually. A population viability analysis conducted by the U.S. Geological Survey (USGS) indicates that with no management actions, LCT will be extirpated within 25 years at Independence Lake. Research by the USGS suggests that the primary causes of LCT decline are competition from Upper Independence Creek non-native species, especially brook trout (*Salvelinus fontinalis*) that prey upon LCT eggs and fry, and kokanee salmon (*Oncorhynchus nerka*) in the lake, which are predators and competitors of LCT (Swanson Hydrology + Geomorphology 2009). Additional threats to LCT and other native fish in Independence Lake are upstream migration of other non-native fish from Stampede Reservoir and introduction of diseases to LCT from the upstream migration of fish in lower Independence Creek. Because the population of LCT in Independence Lake has been so low in the past decade, any additional stress on the population could jeopardize its existence. Construction of the spillway fish barrier, along with other ongoing and planned conservation projects, is expected reduce the risk of LCT extinction from Independence Lake and increase the LCT population level.

The U.S. Geological Survey and California Department of Fish and Game fully support installation of a spillway barrier to stop the upstream movement of non-indigenous fish into Independence Lake.

1.2 Purpose and Need for Environmental Assessment

1.2.1 Purpose of an Environmental Assessment (EA)

The purpose of this EA is to describe the environmental consequences of providing federal funds to construct a spillway fish barrier at Independence Lake. Reclamation is providing TNC with funds appropriated by Congress (federal funds) to implement this project.

1.2.2 Authority

The Bureau of Reclamation (Reclamation) has been directed by the Congress of the United States through Public Law 110-161, 208(a)(2) and PL 111-85, 208(a)(2) to provide funds to partially fund the acquisition land that surrounds Independence Lake and for protection of the native fishery and water quality of the lake:

“the Secretary of the Interior---- acting through the Commissioner of Reclamation, shall —

*(2) allocate \$9,000,000 to a nonprofit conservation organization, acting in consultation with the Truckee Meadows Water Authority, for--
(A) the acquisition of land surrounding Independence Lake; and
(B) protection of the native fishery and water quality of Independence Lake as determined by the nonprofit conservation organization;”*

and:

*(2) allocate—
(A) acting through a nonprofit conservation organization that is acting in consultation with the Truckee Meadows Water Authority, \$2,000,000, to remain available until expended, for—
(i) the acquisition of land surrounding Independence Lake; and
(ii) protection of the native fishery and water quality of Independence Lake, as determined by the nonprofit conservation organization;*

Under a grant agreement between Reclamation and TNC, funds were allocated to partially fund the acquisition of the 2,325 acres of land surrounding Independence Lake. The property was acquired in April 2010, using a portion of the above-appropriated funds from Congress along with State and private funds. TNC is

currently providing stewardship of the property, continuing fish research, and conducting monitoring.

Consistent with the legislative authorization, remaining funds may be used by TNC for projects that provide “protection of the native fishery and water quality of Independence Lake” as determined by TNC. The spillway fish barrier is one of several agency and partnership projects at Independence Lake and within the Truckee River basin that are intended to eliminate or minimize threats affecting LCT and ensure the long-term persistence of the species in the Truckee River basin (U.S. Fish and Wildlife Service 2003a).

Section 2 Alternatives Considered

2.1.1 No Action

Under the No Action Alternative, Reclamation would not provide approximately \$200,000 in funding allocated by Congress for a spillway fish barrier at Independence Lake. The No Action Alternative reflects the existing condition at the site of the proposed spillway channel fish barrier and a continuation of the risk of introducing or augmenting non-native fish that threaten populations of LCT and other native fish in Independence Lake by way of upstream movement.

2.1.2 Proposed Action

Under the Proposed Action, Reclamation would allocate approximately \$200,000 in funding to TNC to construct a spillway fish barrier at Independence Lake.

Design of a spillway fish barrier is based on the following objectives:

1. To stop all fish species from passing the barrier in the upstream direction.
2. To avoid any hydraulic or hydrologic impact to the upstream spillway structure or operations.
3. To minimize changes to the hydraulic or fluvial geomorphic conditions below the barrier structure. To the extent some changes are unavoidable, appropriate measures are incorporated to ensure long-term stability to the channel downstream of the barrier.
4. To avoid the risk of a new channel forming around the new barrier during future high-flow events.
5. To complete the project for the lowest cost of implementation, consistent with other objectives.

TNC's goals associated with the fish barrier are consistent with the LCT recovery plan (U.S. Fish and Wildlife Service 1995) and include public education about the importance of the spillway to a restored population of LCT, and engaging volunteers following the barrier construction, as appropriate. Construction of the spillway fish barrier, along with other ongoing and planned conservation projects, is expected reduce the risk of LCT extinction from Independence Lake and increase the LCT population level.

Time Line of the Project

The process of designing the spillway fish barrier, obtaining permits for construction, and construction of the barrier is expected to be complete by late fall of 2011. Construction would require approximately 8 weeks and is scheduled to begin mid-August to early September 2011. Site stabilization work would be performed in 2011 following construction of the fish barrier. Revegetation work would occur in 2011 post-construction if weather conditions allow. Any remaining revegetation work would be completed during the 2012 growing season.

Planning and Implementation Steps:

- A design plan for the fish barrier was developed by a consulting firm, Waterways, Inc., with assistance from the California Department of Fish and Game.
- The design was reviewed by Truckee Meadows Water Authority (TMWA), California Division of Safety of Dams, Lahontan Water Quality Control Board, and the U.S. Fish and Wildlife Service for compliance with state and federal laws, and to ensure that the barrier does not interfere with TMWA's operation of the dam and spillway.
- Studies were commissioned for wetland delineation, botanical surveys, and hydrological modeling of the structure (at 60% design).
- Permit applications are being prepared and submitted concurrent with preparation of environmental compliance documentation.

Work at the spillway barrier site would involve construction of a concrete weir to prevent the upstream passage of fish into Independence Lake. In addition to the weir placement, the work would include minor grading of the streambed and banks, installation of grouted and un-grouted rock riprap, biodegradable erosion control fabric, and revegetation with native species to control erosion.

The project area, which includes the entire construction zone, is 0.78 acres.

The weir would be composed of approximately 60 cubic yards of poured-in-place reinforced concrete, with a thickness of 12 inches and a length of approximately 115 feet, running transverse to the spillway flow. The weir crest would be set to create a 9 foot near-vertical drop in the spillway bed, from just upstream of the weir (elev. 94.0) to the base of a downstream energy dissipation pool (elev. 85.0), as shown on the weir profile, Appendix C – Details, Typical Sections, and Reinforcing Details. The cross section of the weir would be “stepped” to allow access for maintenance and inspection. Design of the weir accommodates a future footpath (trail) crossing of the spillway.

Where possible, concrete would be placed directly in the excavation (not excavate an additional area to accommodate forms) which would reduce the amount of earthwork required for the project. Foundations would be embedded a minimum of 3 feet below the lowest adjacent finish grade for frost and scour protection and confinement.

Areas proposed for fill placement and/or grading would be cleared and grubbed of vegetation and other deleterious materials to an average depth of 6 inches. Existing vegetation, organic topsoil, and any debris would be stripped and hauled offsite or stockpiled outside the construction limits. All rocks greater than 8 inches in greatest dimension (oversized rock) would be removed from the top 12 inches of soil, if encountered. Oversized rock may be used in landscape areas, rock faced slopes, or removed from the site. Oversized rock would not be placed in fill without prior approval by the project geotechnical engineer.

An estimated 250 cubic yards of grouted rock riprap would be placed to a thickness of approximately three feet, starting immediately downstream of the weir and extending another 17 feet downstream to the base of the energy dissipation pool. From there, 280 cubic yards of ungrouted riprap would extend another 25 feet downstream to line the base and sides of the pool and conform to the existing geometry downstream. The existing boulders previously placed in the channel would be salvaged to construct a rock riprap apron upstream and downstream of the fish barrier.

Permits

The following permits would be obtained prior to construction:

- ✓ 401 Water Quality Certification, Lahontan Regional Water Quality Control Board (LWQCB)
- ✓ General Waste Discharge Requirements Permit for Small Construction Projects, Including ...Minor Streambed Alteration Projects, Lahontan Regional Water Quality Control Board (LWQCB)
- ✓ Nationwide Permit 27 (Aquatic Habitat Restoration, Establishment and Enhancement Activities) U.S. Army Corps of Engineers (USACE)

Environmental Commitments

1. An amphibian survey would be conducted prior to construction to determine the presence or absence of mountain yellow legged frogs (MYLFs). The construction site and adjacent areas would be surveyed by a qualified professional aquatic biologist. If MYLF were found, TNC would notify Reclamation and implement any necessary protection measures for MYLF.
2. The following permits would be obtained by TNC prior to construction:
 - 401 Water Quality Certification, LWQCB
 - General Waste Discharge Requirements Permit for Small Construction Projects, Including ...Minor Streambed Alteration Projects, LWQCB
 - Nationwide permit 27, USACE
3. Construction contracts would incorporate permit language and elements of the Weed Protection Plan (Appendix F) to protect against introduction or spread of noxious or invasive weeds.
4. Construction contracts would incorporate the Hazmat and Fire Prevention Plan (Appendix G) to protect against accidental spills of hazardous materials and construction-caused wildfire.
5. Prior to beginning construction, TNC would survey flowing or ponded water in the spillway channel at and near the construction site. If fish were present, the Fish Salvage Plan (Appendix E) would be implemented by U.S. Geological Survey personnel.
6. Access routes into the construction site would have advisory signage to warn the public about construction traffic.
7. Construction site dewatering would follow the Dewatering Plan (Appendix D), including contingencies for diverting larger amounts of water to different locations. Dewatering would remove groundwater to at least 2 feet below the lowest point of excavation to maintain stability of the excavation when placing and compacting the trench.
8. Erosion control measures would be implemented according to permit requirements and the erosion control plan and notes in the drawings (Appendix C).
9. Disturbed areas on the stream banks and staging areas would be stabilized and revegetated with a mixture of native shrubs, forbs and grasses, as shown in Appendix C Drawings, Revegetation Plan R1. Plant material would be obtained from TNC lands near the project site if possible.

10. A TNC representative would be on-site daily during construction to monitor activities. TNC would monitor stream conditions following construction and during the following year (2012).

See Appendix A and B for photographs of the proposed construction area.

See Appendix C for the following drawings:

- Existing conditions (2)
- Typical sections
- Reinforcing Details
- Access and Diversion/Dewatering Plan
- Grading Plan
- Details
- Revegetation Plan
- Notes

Appendices contain the following associated documents and plans:

Appendix D – Dewatering Plan

Appendix E – Fish Salvage Plan

Appendix F – Weed Prevention Plan

Appendix G – Hazmat and Fire Prevention Plans

Appendix H – Mitigation and Monitoring

Appendix I – Wetlands and Waters of the U.S. Report

Appendix J – California Environmental Quality Act Checklist

Section 3 Affected Environment and Environmental Consequences

This section presents the environmental consequences of the No Action and Proposed Action alternatives. The affected environment (or present condition or characteristics of the resource) is discussed first under each environmental factor. This is followed by a description of the estimated effects of the No Action and Proposed Action Alternative. Direct, indirect, and cumulative effects have been considered.

3.1 Vegetation Communities, Endangered, Threatened or Candidate Plant Species

3.1.1 Affected Environment

Independence Lake is surrounded by upland forests, upper montane mixed chaparral, aspen, and riparian vegetation complexes. The lowland riparian area

includes wet montane meadows, riparian aspen, willow, mountain alder and cottonwood trees as well as springs and seeps.

The proposed project area would disturb 0.78 acres within the spillway channel. The “footprint” of the fish barrier would occupy a cross section of the spillway channel, which currently has a series of eroded terraces from historic high flow events. At its lowest point, the site is occupied by wetland vegetation. The vegetation of the first terrace, which receives seasonal flooding is dominated by Baltic rush (*Juncus balticus*). Higher in the cross section, the vegetation becomes more sparse and other species co-dominate with Baltic rush, including Nebraska sedge (*Carex nebrascensis*), woolly pyrocoma (*Haplopappus hirta*) and Rydberg’s penstemon (*Penstemon rydbergii*). The highest point is outside the wetland area and on the edge of the proposed project area. The area is dominated in the overstory by lodgepole pine (*Pinus contorta*), and in the understory by Kentucky bluegrass (*Poa pratensis*) (Schnurrenberger 2011).

In addition to the fish barrier itself, the 0.78 acres includes the area in which equipment and materials would be stored. The location of this area was modified following a botanical survey to avoid species of plants, which have status with California Native Plant Society (CNPS) and are described below.

A 2009 botanical survey for a proposed forest thinning project covered 220 acres in and around the 0.78 acre proposed spillway fish barrier construction site (Schnurrenberger 2009a). The purpose of the botanical survey was to identify and protect any plant species of concern to the U.S. Fish and Wildlife Service and the California Department of Fish and Game that might occur on the thinning project area or on roads and trails used to access those areas. The species of concern included plants listed as threatened, endangered or sensitive by those agencies and plant species identified as rare or sensitive by the CNPS, referred here as threatened, endangered and species of concern (TESC) species.

Prior to conducting the survey the California Department of Fish and Game (CDFG) was contacted regarding any species of concern that may occur in or near the project area. Ten TESC species were listed by the CDFG as occurring within the Independence Lake 7.5 minute Quadrangle. Another three species occur on adjacent quadrangles. None of these species is listed with the federal or state government. They are listed as rare and/or sensitive with the CNPS, however. Eight species are confined to wetlands and/or meadow openings.

The botanical survey found Davy’s sedge (*C. davyi*) and possibly Constance’s sedge (*Carex constanceana*) near the area originally planned for construction equipment and material storage. According to the botanical report, there is some discussion that *Carex constanceana*, a rare sedge and not well documented in the literature, may actually be the same species as some plants identified as *C. davyi*. Due to this concern and to the fact that *Carex davyi* is also a rare sedge, listed as a

watchlist species by the CNPS, the proposed storage area was relocated away from the area where these plants were found.

The botanical survey also found healthy and robust populations of Plumas ivesia (*Ivesia sericoleuca*), which is listed as rare, threatened or endangered in California by the CNPS. The plants were found in clay pan soils in nearby meadow locations, but were not found in the proposed fish barrier project area.

Federally Listed and Candidate Species – Plants:

Webber's ivesia (*Ivesia webberi*) is listed as a Federal candidate species under the Endangered Species Act. Webber's ivesia is a low, spreading, perennial herb and is restricted to shallow, clayey soils derived from andesitic rock on mid-elevation flats, benches, or terraces above moderately large valleys (Witham 2000). The plant has been found on open summits and ridge-tops and in meadow areas on drier, raised hummocks (ibid). Its habitat is comprised of sparse to moderately dense vegetation usually dominated or co-dominated by Webber's ivesia and low sagebrush or squirrel-tail grass in association with a wide variety of dwarfed or cushion-like perennial herbs (ibid).

Webber's ivesia is known from 15 occurrences clustered in 7 general locations in Lassen, Plumas, and Sierra Counties, California, and in Douglas and Washoe Counties, Nevada. All known occurrences of Webber's ivesia are a considerable distance north and east of Independence Lake in different vegetation types than the proposed project site. The closest occurrence is 7 miles to the north in Sierra Valley on private land. Another occurrence is in Dog Valley, approximately 14.5 miles to the east of the proposed project site. A botanical survey of the proposed project site and 220 acres adjacent to the project site did not detect Webber's ivesia (Schnurrenberger 2009a).

Noxious and invasive weeds

A botanical survey in the eastern part of Independence Lake conducted in 2009 by Catherine Schnurrenberger of C.S. Ecological Surveys and Assessments detected 2 weeds listed as noxious with the State of California and 4 weeds listed as invasive with the State of California (Schnurrenberger 2009b). These weed species were found in areas of disturbed ground around, the campground, the edges of the dry meadow and along the banks of the outlet canal. Further results of the botanical survey follow below.

Bull thistle, *Cirsium vulgare*, is a common weed species found in uplands and edges of wetlands. It is often found in areas where livestock have grazed, or soil has been disturbed. Bull thistle was only found along the Independence Lake outlet canal. Only 4 plants were observed, though it is likely that more plants may be present. This species has not been assigned a rating by the California Department of Food and Agriculture and eradication of this species is at the discretion of the landowner. This species produces hundreds of seeds per plant,

which become airborne and spread widely. It is most effective to remove or treat bull thistle before it flowers, usually by mid June.

The other noxious weed species found on the TNC property near the proposed project area was quackgrass, *Elytrigia repens*. This species is often found along ditches and in meadows. It may have been planted at one point or have been introduced with hay or straw. This species was found along the entrance road to the campground just past the gate on the right hand side of the road, at the edge of the meadow. This species is assigned a “B” ranking with the California Department of Food and Agriculture. A “B” ranked noxious weed is “an organism of known economic importance subject to: eradication, containment, control or other holding action at the discretion of the individual county agricultural commissioner.” The quackgrass is not expected to spread; since it is out of its elevation range and would most likely die out on its own. It does not appear to be adversely affecting the local vegetation.

The 4 invasive weeds found are English plantain (*Plantago lanceolata*), orchard grass (*Dactylis glomerata*), dandelion (*Taraxacum officinale*), and false salsify (*Tragapogon dubius*). These weeds are ubiquitous in disturbed areas of the Sierra. These species are not considered very problematic and would most likely not have a large impact on the native flora. Eradication of these species is at the discretion of the landowner. English plantain was only found in the campground, along the edge of the road, in compacted soil. It is unlikely that this species would spread. Orchard grass was planted along the sides of the Independence Lake outlet canal and is one of the dominant grasses in this area. It would be impractical to eradicate this grass, without completely restoring the sides of the canal and re-planting with native grasses, which was not recommended at the time of the survey. Dandelion is found throughout the area, in meadows and open disturbed areas. It would not be practical to spray or pull all these plants. At present dandelions, do not seem to be excluding or adversely affecting native flora. False salsify is located in disturbed soils throughout the area. It is likely that this species would spread into areas of newly disturbed soil. This plant produces hundreds of seeds per plant that become airborne and easily spread to nearby areas of bare soil. If soil is exposed during the project, it may be prudent to pull false salsify plants that border disturbed soil.

Overall, there are few non-native plants were found during the botanical survey in 2009. Considering the history of use, which includes logging, camping, livestock grazing, and installation of roads, the vegetation of the project area has very few weed species and none of these species is very problematic.

3.1.2 Environmental Consequences

No Action Alternative

The No Action Alternative would not affect current vegetation conditions at the proposed project site. Any changes to vegetation would be from unrelated

processes such as spillway channel erosion or natural succession. No federal or state listed plants occur at the site.

Proposed Action Alternative

Based on the findings of the botanical survey, and the mitigation measure of relocating the equipment and material storage area, there should be no impacts to federally listed plant species, state listed plant species or any species identified as rare and/or sensitive by the CNPS. There should also be no impact to special plant associations, community types, or habitats. Webber's ivesia, a federally listed candidate species, does not occur in the project area. Its nearest known occurrence is 7 miles from the proposed project, so no adverse impacts to the plant are expected under this alternative.

The proposed project may temporarily create areas where weeds may germinate, but this would not have an adverse effect on the flora of the surrounding area if disturbed areas were monitored during the next few years. By taking weed prevention measures (see Appendix F, Weed Prevention Plan); the risk of introducing new weed species or spreading existing noxious or invasive weeds would be minimized during the spillway fish barrier construction project. Implementation of the revegetation plan would restore desired plant cover to reduce the risk of invasion by noxious weeds and reduce erosion.

3.2 Wetlands, Waters of the United States and Hydrology

3.2.1 Affected Environment

The proposed fish barrier project is within the lake's spillway. A spillway is the overflow structure of a reservoir. In the case of Independence Lake, the constructed spillway generally follows the path of the historic (natural) outlet of the lake, although erosion and down cutting have formed terraces which have caused sections of the spillway to become hydrologically disconnected from the adjacent meadow and riparian areas.

Prior to construction of the spillway and the TMWA outlet dam, outflow from Independence Lake most likely flowed from the lake through a braided and/or meandering channel at grade with the open meadow areas, thus providing a source of water for these areas. Currently the source of hydrology for these higher terraces is overflow during high flow events and snowmelt, which shows evidence of ponding on the clay soils associated with these mesic meadow areas (Swanson Hydrology + Geomorphology 2009). The infiltration capacity of these soils is important in determining the appropriate location for discharge of subsurface water during dewatering of the fish barrier foundation area.

In years with average snowpack, the spillway has flowing water or areas with moist soil from May until August. In above-average years, flows or moist areas can persist through August at the lowest areas of the spillway. 2011 is a year in which late flows in the spillway would be expected.

In 2010, C.S. Ecological Surveys and Assessments (CESA) performed an analysis of wetlands and waters of the United States (WOUS) for TNC's spillway fish barrier project (Schnurrenberger 2011). The following discussion summarizes that report. Additional detail, maps and survey methodology are in Appendix I.

The excavated overflow spillway channel is the only channel within the project. Evidence of flow and presence of a defined bed and bank for this channel were investigated. These characteristics are considered to be indicative of a potential WOUS. The width of the channel with these characteristics was measured at the ordinary high water mark (OHWM). The connection or "significant nexus" with a traditional navigable water was also investigated. The "significant nexus" with a traditional navigable water is ultimately the determining factor in deciding whether a non-navigable tributary or wetlands constitute a WOUS.

Representative locations in wetland vegetation types found within the survey area were examined for wetland characteristics in accordance with the criteria contained in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region, Version 2.0 (U.S. ACE 2010). The site was surveyed for wetlands in mid-summer. The spillway channel had flow from May through August and the ordinary high water mark was noted. Based on the location of the OHWM the average width of the spillway channel is 5 feet. To the east of the spillway channel the bank is deeply incised preventing overflow from the channel towards the east, thus the limits of the wetland/WOUS are defined by the steep incised bank on the eastern side of the channel. There are contiguous wetlands on the west bank of the spillway channel. See Appendix I for the wetland delineation map.

3.2.2 Environmental Consequences

No Action Alternative

The No Action Alternative would not affect current wetlands, Waters of the United States, or hydrology at or near the proposed project site. Any changes would be from unrelated processes such as spillway channel erosion from high flows or natural plant succession.

Proposed Action Alternative

There would be temporary disturbance to 0.39 acres of wetlands, of which only 0.07 acres of WOUS/wetland would be permanently impacted by the proposed project. The permanent disturbance areas include the concrete foundation of the fish barrier and the surrounding areas. All other disturbance would be temporary, natural topography, hydrology would be retained, and these areas would be

revegetated with local wetland species. The WOUS/wetlands to be affected include the current channel, the lower inset terraces, and the upper terrace to the west of the current channel. The wetland area extends beyond the project area such that only a small portion, (less than 10 percent) of the WOUS/wetland would be affected by the spillway fish barrier project.

3.3 Fish, Endangered, Threatened, or Candidate Fish Species

3.3.1 Affected Environment

This section describes the environmental setting related to fish resources, including special-status fish species, and fish habitat.

Native fish in Independence Lake and its tributaries include Lahontan cutthroat trout (LCT), Tahoe sucker, Paiute sculpin, speckled dace, Lahontan redbside shiner, Lahontan lake tui chub, and mountain whitefish. Independence Lake is the only location in the Truckee River watershed to support self-sustaining populations of all native fishes that historically occurred in lakes of the upper Truckee River drainage.

Non-native species have the capacity to drive native fishes to extinction and dramatically alter the lake ecosystem. Currently, Independence Lake does contain some non-native species. The goal for conservation of the area and protection of its resource values is to control or eliminate existing non-natives and minimize or prevent introduction of additional non-native species.

Federally Listed and Candidate Species - Fish

Lahontan cutthroat trout

Lahontan cutthroat trout (LCT) was federally listed as an endangered species in 1970 (35 FR 13520). In 1975, this designation was changed to threatened to facilitate management (40 FR 29864). In 1995, the U.S. Fish and Wildlife Service released its recovery plan for LCT, encompassing six river basins within the historic range of LCT, including the Truckee River basin. The Lahontan Cutthroat Trout Recovery Plan (U.S. Fish and Wildlife Service 1995) identified the need to develop ecosystem plans for the Truckee and Walker River Basins. The Short-term Action Plan for LCT in the Truckee River Basin was released in 2003. Critical habitat has not yet been designated for Lahontan cutthroat trout.

Lahontan cutthroat trout is an inland subspecies of cutthroat trout endemic to the Lahontan Basin of northern Nevada, eastern California, and southern Oregon. Lahontan cutthroat trout historically occurred in several lakes including Lake

Tahoe, Cascade, Fallen Leaf, Upper Twin, Lower Twin, Pyramid, Winnemucca, Summit, Donner, Walker, and Independence Lakes (Moyle 1976, Gerstung 1988). Self-sustaining populations of Lahontan cutthroat trout are now extirpated from these lakes with the exception of Independence and Summit lakes (Behnke 1992). Lahontan cutthroat trout has been extirpated from most of the western portion of its range in the Truckee, Carson, and Walker River basins, and from much of its historic range in the Humboldt basin (Gerstung 1988, Coffin 1988). Existing occupied stream habitat in the Truckee, Carson, and Walker River basins totals only 28 miles in headwater streams of northern California (Somer 1998). Due to the fragmented, isolated nature of lake and stream populations, Lahontan cutthroat trout may be at a high risk for extinction (U.S. Fish and Wildlife Service 1995, Somer 1998).

The severe decline of Lahontan cutthroat trout is attributed to a number of factors including hybridization and competition with introduced trout species; alteration of stream channels and morphology; loss of spawning habitat due to pollution and sediment from logging, mining, grazing and urbanization; migration blockage due to dams; reduction of lake levels and concentrated chemical components in natural lakes; loss of habitat due to channelization; de-watering due to irrigation and urban demands; and overfishing (Gerstung 1986, 1988, Coffin 1988, U.S. Fish and Wildlife Service 1995).

The Truckee River and its tributaries provided spawning and rearing habitat for Lahontan cutthroat trout that exhibited two distinct life history forms, lacustrine (lake) and fluvial (river and stream). These forms are functionally different as they use different habitats and express different growth rates, fecundity, and longevity (Bozek and Hubert 1992;

Harvey and Stewart 1991).

Generally, fluvial LCT inhabit small streams characterized by cool water, pools in close proximity to cover and velocity breaks, well vegetated and stable stream banks, and relatively silt-free, rocky substrate in riffle-run areas (U.S. Fish and Wildlife Service 1995). Fluvial populations of cutthroat trout including LCT appear to be intolerant of competition or predation by non-native salmonids, and rarely coexist with them (De Staso and Rahel 1994; Dunham et al. 2000; Schroeter 1998; U.S. Fish and Wildlife Service 1995). Lacustrine LCT have adapted to a wide variety of lake habitats that range from small alpine lakes to large desert waters. LCT are noted for their ability to live in streams where water temperatures during the summer may exceed 27 °C for short periods and fluctuate as much as 14-20 °C daily (U.S. Fish and Wildlife Service 1995, Dunham et al 1999).



Lahontan cutthroat trout.

Photo courtesy of the U.S. Fish and Wildlife Service

Specific habitat requirements of LCT vary seasonally and with life stage. Like most cutthroat trout species, LCT is an obligatory stream spawner, which means that LCT predominantly use tributary streams as spawning sites. Independence Lake LCT spawn in upper Independence Creek. Spawning typically occurs from April through July throughout the range of LCT, depending on stream elevation, stream discharge, and water temperature (U.S. Fish and Wildlife Service 1995). Stream dwelling Lahontan cutthroat trout generally have a life span of less than 5 years, while those living in lakes may live 5 to 9 years (Sumner 1940, Lea 1968, Rankel 1976, Coleman & Johnson 1988).

Lahontan cutthroat trout evolved in the absence of other trout species and do not compete well for food and habitat. In stream environments within the western portion of the Lahontan drainage, Lahontan cutthroat trout have seldom been able to co-exist with non-native trout for longer than a decade. Lahontan cutthroat trout, particularly those within the western portion of the Lahontan Basin, also hybridize with rainbow trout (Behnke 1979).

The only remaining indigenous lake population of LCT in California resides in Independence Lake and the main inlet tributary Independence (peacock et al 1999). Independence Lake has the only self-sustaining lake LCT population in the Truckee River basin. This population is genetically unique (Cowan 1988; Bartley and Gall 1993) and is vulnerable to extinction (U.S. Fish and Wildlife Service 1995). The lake supports a small catch-and-release fishery, and historically supported spawning runs of 2,000 to 3,000 fish (Welch 1929). By 1960, the population had declined to less than 100 spawners per year (Gerstung 1988), despite many attempts to supplement this population with hatchery-reared native Independence Lake LCT stock. The population decline is thought to be the result of competition with non-native kokanee salmon in the lake and brook trout in upper Independence Creek.

The objective of the LCT Recovery Plan (U.S. Fish and Wildlife Service 1995) is to remove LCT from the List of Threatened and Endangered Wildlife and Plants consistent with the ESA. The 1995 recovery plan specified conditions contributing to decline and affecting the potential for recovery of LCT in the Truckee River basin. One of those conditions is introductions of non-native fish species.

In a basin planning effort, the Truckee River Basin Recovery Implementation Team (TRIT) established recovery objectives for various reaches of the Truckee River and its tributaries. Important recovery areas that the TRIT has initially identified as having immediate potential include upper Independence Creek upstream of Independence Lake and Independence Creek downstream from Independence Lake to the Little Truckee River (U.S. Fish and Wildlife Service 2003a). The reduction of risk to the Independence Lake LCT population depends on implementing new conservation projects, continuing ongoing measures and research, and monitoring results of actions taken. LCT research at Independence

Lake has been ongoing for decades. The U.S. Geological Survey (USGS) summarized their research in a 2006 report (U.S. Geological Service 2006) and though periodic presentations at meetings with the LCT interagency group.

Removal of brook trout from upper Independence Creek is critical to the long-term survival of the Independence Lake LCT population. Because of brook trout electro-shock removal work since 2004, LCT spawners have increased from a low of 24 in 2003 to over 200 in 2010. The past two years (2009 and 2010) have had the highest number of total LCT spawners since the 1950s (P. Rissler, pers comm. 2011). Populations of other native fish in Independence Lake have also increased along this same trend.

U.S. Geological Survey research has demonstrated the need to prevent brook trout occupying upper Independence Creek. The strain of brook trout currently in Independence Lake appears to be obligate stream spawners. A concern is upstream migration of a different strain of brook trout, which could reproduce in Independence Lake and pose an even greater risk to the LCT population.

An equal concern is upstream migration of rainbow trout, which could hybridize with LCT and compromise the unique genetic characteristics of the Independence Lake LCT population. Brown trout, another non-native fish, occupies lower Independence Creek and could migrate into Independence Lake, threatening LCT and other native fish. Migrating fish from Stampede Reservoir and lower Independence Creek could also carry diseases that could be introduced into Independence Lake, potentially affecting LCT and the other native fish species. A spillway fish barrier would prevent fish migration and reduce the risk to the populations of LCT and other native fish.

The presence of fish at the spillway construction site would be dependent on flow conditions at the time. In most years, there is no flowing water in mid-August at the proposed construction site. 2011 is likely to be an exception because of an above-average snow pack. A fish salvage plan has been prepared (Appendix E) and would be implemented if fish were present or could be affected by construction activities.

3.3.2 Environmental Consequences

No Action Alternative

The No Action Alternative would not be consistent with legislative authority to provide federal funding to TNC for protection of the native fishery at Independence Lake. The risk of introduction of new non-native fish by upstream migration from lower Independence Creek via the Little Truckee River would continue. These fish would risk the viability of the Independence Lake population of LCT by colonization and subsequent competition with LCT (new strains of brook trout or new non-native fish species), hybridization (rainbow trout), or introduction of disease. Efforts to preserve the fragile LCT population,

as well as the other native fish populations in Independence Lake, would be jeopardized as long as this migration route continues to exist.

Proposed Action Alternative

The Proposed Action would allow federal funding for construction of the spillway fish barrier to move forward. Depending on approval of environmental compliance documents and permit approval, construction could be completed by November 2011. The effectiveness of the new fish barrier to eliminate upstream fish migration would be monitored during post-construction high flow events. Assuming full effectiveness, the risk of introductions of non-native fish through upstream migration in the spillway would be eliminated. An important risk factor that could affect the continued viability of Independence Lake LCT and other native fish populations would no longer exist.

There could be risk of short-term harm to fish in the spillway if fish are present due to late-season flows. A fish salvage plan (Appendix E) would be activated in this case, which would reduce the risk of harm to any fish, including LCT, at the construction site.

There could be a short-term risk of harm to fish in the spillway because of soil or water contamination at the 0.78 acre construction site. A hazardous material plan would be in place and activated if a spill were to occur (Appendix G). On-site monitoring by TNC and contract administrators would reduce the risk by anticipating problems and taking prompt action if a spill occurred.

There could be a short-term risk of harm to fish in the spillway because of site disturbance at the 0.78 acre construction site. Erosion control measures, a revegetation plan, and monitoring during and after construction would minimize a risk of sedimentation into the spillway channel from site disturbance (Appendix C Drawings).

3.4 Wildlife, Endangered, Threatened, or Candidate Wildlife Species

3.4.1 Affected Environment

The assemblage of species expected in the area surrounding Independence Lake is typical of Sierra Nevada mid- to upper montane habitats. The combination of alpine lake, upland conifer forest, upper montane chaparral, and a variety of riparian habitats in close proximity and in a relatively undisturbed condition makes the project area particularly rich in species diversity.

Aspen, alder, cottonwood and willow riparian habitat occurs in the area as a mosaic along stream courses, wet meadow edges, springs, and areas with high water tables. The riparian habitat groups are important for wildlife because of the

distribution and quantity of thermal and escape cover as well as providing a source of high quality forage.

Additional terrestrial species of interest that have or may have potential habitat in or near the project area include fisher, bald eagle, California spotted owl, American marten, Sierra red fox, great gray owl, northern goshawk, wolverine, pallid bat, Townsend's big eared bat, and western red bat. Other common wildlife species in this area of the Sierra Nevada include mule deer, black bear, Douglas squirrel, northern flying squirrels, chipmunks, and a variety of migratory songbirds.

Federally Listed and Candidate Species

Mountain yellow-legged frog (MYLF)

The mountain yellow-legged frog (*Rana muscosa*) is listed as a U.S. Fish and Wildlife Service Candidate species under the Endangered Species Act, being part of the Sierra Nevada Distinct Population Segment (DPS) as defined by the U.S. Fish and Wildlife Service.

Mountain yellow-legged frogs occur in the Sierra Nevada from around 4,500 feet to over 12,000 feet elevation, and inhabit ponds, lakes, and streams of sufficient depth for overwintering (Jennings and Hayes 1994). Based on habitat characteristics of occupied locations in the surrounding Tahoe National Forest, MYLF are thought to overwinter in spring and stream habitats, possibly less than 3 feet deep, that do not freeze solid in winter, such as deep pools in stream channels. Larvae require water bodies, which do not dry in summer (Knapp and Matthews 2000).

Frogs move overland in late summer to disperse to other nearby aquatic habitats. Some individuals moved overland for distances of at least 466 feet to other nearby aquatic habitats as summer progressed (Pope and Matthews 2001). Matthews and Pope (1999) found that frogs tended to be relatively stationary in August when feeding appeared important and were often found in the open, then moved to overwintering locations in September, and were stationary by the end of October under ledges and in rock crevices and rarely in the open.

During summer, frogs and larvae seek the warmest thermal regimes throughout the day and night (Bradford 1984). Adults are rarely far from water, usually less than 1 meter and usually on a wet substrate while basking, typically from sunrise into late morning (Bradford 1984).

The mountain yellow-legged frog has undergone a range-wide decline in the Sierra Nevada (U.S. Fish and Wildlife Service 2003b). Over 90% of historically occupied sites in the Sierra Nevada are now unoccupied (Vredenburg et al. 2007). The decline of mountain yellow-legged frogs in the Sierra Nevada has largely

been attributed to the introduction of salmonid fishes during the last century (U.S. Fish and Wildlife Service 2003b).

Mountain yellow-legged frogs are known to have been present within a number of locations in Tahoe National Forest, which surrounds the proposed project area, but now exist in only a few populations and generally in small numbers (U.S. Fish and Wildlife Service 2003b, Tahoe National Forest GIS database). Jennings and Hayes (1994) indicate that the species was extinct by 1992 in a number of locations based on re-surveys of historic locations.

Occurrence within the project area

Mountain yellow-legged frogs have been sighted in upper Independence Creek (Sean Shea, pers. comm. 2011), as well as lower Independence Creek about 3 miles from the proposed project area, and in nearby areas of the Tahoe National Forest (Deborah Urich, pers. comm. 2011). Although a pond area on the eastern part of the TNC property was surveyed during the past few years and MYLF were not sighted (Chris Fichtel, pers. comm. 2011) suitable habitat exists in the wet areas in and near the proposed spillway fish barrier construction site. MYLFs in the area are capable of dispersing to the construction site, so it is reasonable to assume presence for the purpose of this EA.

Fisher

Under the Endangered Species Act, the West Coast distinct population segment of the fisher was added to the U.S. Fish and Wildlife Service Candidate species list on April 8, 2004 (U.S. Fish and Wildlife Service 2004; 69 FR 18770).

Historically, fishers were distributed across forested regions of California in the Sierra Nevada, Klamath Mountains, and North Coast Ranges. Fishers now have a distributional gap from eastern Shasta County in the southern Cascades to Mariposa County in the central Sierra Nevada (Zielinski et al. 2005). This reported gap includes Tahoe National Forest, which surrounds the project area. There have been no confirmed sightings in the northern Sierra Nevada since the 1940s.

Vegetation used by fisher is structurally complex. They are typically found in late-successional coniferous forests (Freel 1991, Buskirk and Powell 1994) in stands of at least 80 acres (Freel 1991); with certain attributes including multi-layered canopies, large snags, down logs, and a component of decadent live trees.

Preferred fisher habitat is often in close proximity to dense riparian corridors and saddles between major drainages or other landscape linkage patterns used as adult and juvenile dispersal corridors. It includes an interspersed of small (<2 acre) openings with good ground cover used for foraging. Riparian areas are very important to fisher. Abundant evidence exists for selective movement patterns along drainages (Buck et al. 1983).

Important vegetation types for the fisher include montane hardwood conifer, mixed conifer, montane riparian, Jeffrey pine, ponderosa pine, lodgepole pine, subalpine conifer, aspen, eastside pine and red fir, all of which occur near the proposed project area. The historical and contemporary distributions of the fisher in California are clearly associated with areas of low snowfall across a wide range of forest types, and forest types known to be used by fishers in California appear to be used less when located in deep snow areas (Krohn et al. 1997).

There have been widely scattered anecdotal sightings of fisher across the Tahoe National Forest. No recent (past 20 years) sightings of fisher were reported near the proposed project area. Forest Service surveys in the area between the 1998 to 2004 field seasons did not detect any fisher. During this 6 year period, 136 baited camera stations (over 3,808 survey days) were operated by Sierraville Ranger District personnel. There were no detections of fisher (U.S. Forest Service 2007).

Ninety-one camera stations have been placed within adjacent National Forest land and no fisher were detected, although American marten, along with many other species were detected. Forty-eight camera stations were placed in transition zone where eastside pine mixes with white fir and 5 of the 47 marten detections occurred in these zones. Twenty-one camera stations were placed in pure eastside pine type habitats, and there were no fisher detections (U.S. Forest Service 2007).

Occurrence within the project area:

Despite numerous surveys by the U.S. Forest Service, no fishers have been detected near the project area or in the entire Tahoe National Forest. If fisher did occupy the proposed project area it is likely they would have been detected at one of the camera stations.

Wolverine

On December 14, 2010, the U.S. Fish and Wildlife Service announced a 12-month finding on a petition to list the North American wolverine (*Gulo gulo luscus*) as an endangered or threatened species under the Endangered Species Act (US Fish and Wildlife Service 2010; 75 FR 78030). The U.S. Fish and Wildlife Service found that wolverine occurring in the contiguous United States is a distinct population segment (DPS) and that listing of this DPS was warranted. The listing is currently precluded by higher priority species, but effective with the Federal Register publication, the contiguous U.S. DPS of the wolverine was added to the candidate species list. The range of the species includes California, along with several other western states. Contiguous U.S. populations are restricted to the highest elevation alpine areas in Montana, Idaho, Wyoming, Colorado, Washington, and California.

The essential condition for wolverines to successfully occupy and reproduce in an area is a cold climate with deep snow that persists into early summer (Copeland et al 2010). This requirement is critical to fulfill several reproduction and survival

needs. The southern-most occupied habitats in North American are patchy tree-line “sky islands,” separated by areas of unsuitable habitat.

Wolverine habitat relationships, particularly in the contiguous United States, are not well-studied (Ruggiero et al. 2007, Aubry et al. 2007, Copeland et al. 2007). In their analysis of broad-scale habitat relations, Aubry et al. (2007) found the only habitat characteristic that fully accounted for the historical distribution was persistent spring snow cover through the denning period (mid-April to mid-May), generally associated with alpine vegetation and alpine climatic conditions.

Knowledge of wolverine use in forested habitats is limited. White and Barrett (1979) believed that wolverines in California are highly dependent upon mature conifer forests for survival in winter, and generally move down slope in winter into heavier timber where food is available. In their preliminary search for study animals prior to capture for their demographic analysis, Squires et al. (2007) considered all forested areas (excluding ponderosa pine forest) and areas above tree line as potential wolverine habitat.

Research about the effects of human disturbance on wolverines is inconclusive. Copeland et al. (2007) state: “The wolverine has long been considered sensitive to human presence based largely on the species’ contemporary presence within remote, isolated areas. Several empirical studies have also come to the same conclusion, reporting spatial separation of wolverine and human-related infrastructure (Carroll et al. 2001, Rowland et al. 2003, May et al. 2006), but it is still unclear whether this is truly a cause-effect relationship or simply a description of the species’ tendency to reside in areas that are generally inhospitable to human development.” Copeland et al. (2007) found no apparent association between wolverine presence and trails, either reflecting a lack of sensitivity to human presence or a low frequency of human presence on the trails; they noted it was not uncommon to find study animals near trails and active campgrounds in summer and that in winter, unmaintained roads used by the researchers for snowmobile access were frequently used for travel by wolverines.

In its December 14, 2010, Federal Register notice, the U.S. Fish and Wildlife Service states that “little is known about the behavioral responses of individual wolverines to human presence, or about the species’ ability to tolerate and adapt to repeated disturbance. Some postulate that disturbance may reduce the wolverine’s ability to complete essential life-history activities, such as foraging, breeding, maternal care, routine travel, and dispersal. It may decrease habitat value, cause animals to avoid disturbed areas, or act as a barrier to movement (Packila et al. 2007).

Wolverines have large spatial requirements. Individuals may move great distances on a daily basis. Home ranges of wolverines are generally extremely large and vary greatly depending on gender, availability of food, age, and differences in habitat. Wolverines naturally occur in low densities of about 1

wolverine per 150 km² (58 mi²) with a reported range from 1 per 65 to 337 km² (25 to 130 mi²) (Hornocker and Hash 1981, Hash 1987, Copeland 1996, Copeland and Yates 2006, Inman et al. 2007, Squires et al. 2007).

Even in northern areas, the wolverine occurs at low densities and is secretive, difficult to observe even in core areas of its range, and one of the rarest and least known mammals in North America (Aubry et al. 2007). Zielinski et al. (2005), based on the lack of detections of wolverine in contemporary surveys, concluded that the California wolverines may be extirpated or in extremely low densities from the southern Cascades through the Sierra Nevada. Since the last historic specimen was collected in California in 1922 (Fry 1923, and Grinnell et al. 1937 as cited in Aubry et al. 2007), there have been periodic anecdotal sightings (lacking conclusive physical evidence) of the wolverine in California including many in and near the Tahoe National Forest, which surrounds the proposed project area. In its December 2010 Federal Register findings the U.S. Fish and Wildlife Service noted, “Only one Sierra Nevada record exists after 1930, indicating that this population was likely extirpated in the first half of the 1900s concurrent with widespread systematic predator control programs” (U.S. Fish and Wildlife Service 2010).

Fry (1923) noted that the wolverine was found in the high Sierra between 6,500 and 13,000 feet, that it was becoming very rare with individuals few and scattered where still found, and were most abundant near Mt. Whitney and Sequoia National Park. Grinnell et al. (1937) noted that “the wolverine in California is found chiefly in the Boreal life zone...at the time of heavy snowstorms in midwinter, wolverines have been found as low as 5,000 feet on the west slope of the Sierra Nevada...But ordinarily the wolverine is not known to come below 8,000 feet, even in the severest storms of winter.”

According to the U.S. Fish and Wildlife Service (2010), large areas of habitat with characteristics suitable for wolverines still occur in the Sierra Nevada, despite the extirpation of wolverines. The U.S. Fish and Wildlife Service supports this conclusion, in part, by noting that:

- Wolverine extirpation was coincident with systematic predator eradication efforts in the early 1900s, which have been discontinued for many years; and
- The Sierra Nevada has received at least one (male) migrant from populations in the northern Rocky Mountains (see discussion below) and the possibility that more, yet undetected, individuals inhabit the Sierra Nevada.

The U.S. Fish and Wildlife Service concluded that the Sierra Nevada mountains is an area where wolverines historically existed as reproducing and potentially self-sustaining populations prior to human-induced extirpation, and where reestablishment of those populations is possible given current habitat condition and management and are thereby included in the current range of wolverines

(U.S. Fish and Wildlife Service 2010).

The most recent anecdotal sighting in the Tahoe National Forest prior to 2008 was in the summer of 2003 in the Granite Chief Wilderness area, south of Interstate 80. Schempf and White (1977) reported three recorded sightings in the Webber Lake area of Sierra County. Other relatively recent incidental sightings that could potentially be wolverine include a 1991 sighting reported in the Euer Valley on the Truckee Ranger District, and a 1992 sighting in the Harding Point area northeast of the town of Sierraville, which was confirmed by track identification. Sightings on the Downieville Ranger District, which are potentially one individual, include single sightings in 1989, 1990, 1993, and in 1998. Additional sightings include the Robinson Flat area in 1980 and 1992 in the Granite Chief wilderness, both by wildlife biologists (U.S. Forest Service 2009).

Over the past 30 years, several agencies and university research units have participated in a number of local studies to detect the presence of wolverines, including use of baited camera systems. No wolverines were detected in any of these surveys.

In February 2008, as part of a research project in the Sagehen basin area (approximately 2.5 miles from the proposed fish barrier construction site), photographs and DNA were collected which verified the presence of a single male wolverine (Moriarty et al. 2009). Based on genetic analysis, this individual appears to have originated from the western edge of the Rocky Mountains region (Moriarty et al. 2009). How this individual wolverine arrived in the Sagehen area is unknown. The 2008 sighting is the first verified sighting since 1922 (U.S. Fish and Wildlife Service 2010).

Additional evidence (photographs or tracks) of this one male wolverine has been collected since that time on the Tahoe National Forest and on lands owned by Sierra Pacific Industries (SPI) in the “checkerboard” ownership area in the northern portion of the Tahoe National Forest. The wolverine was identified repeatedly in winter 2009/2010 (camera station) and in 2010/2011 tracks were discovered by a research biologist. DNA results are pending on the latest detections. Sightings of this wolverine have ranged from Yuba Pass to Donner Pass, a distance of more than 20 miles (Craig Wilson pers comm. 2011).

In the December 2010 Federal Register notice, the U.S Fish and Wildlife Service noted that the attempted dispersal events in California (and Colorado) may represent a continuation of the wolverine expansion in the contiguous United States and that other wolverines may have traveled to the Sierra Nevada (and elsewhere) and remain undetected. However, the U.S Fish and Wildlife Service found no evidence that California currently hosts a functional wolverine population or that female wolverines have made or are likely to make similar dispersal movements (U.S. Fish and Wildlife Service 2010).

Occurrence within the project area:

The February 2008 wolverine camera station sighting was approximately 2.5 miles east of the proposed project area. A 2010/2011 winter sighting was within 10 miles of the project area. The 2008 detection is well below the expected elevational range of breeding or denning wolverine habitat (above 8,000 feet in this area), but consistent with potential winter foraging habitat. The subsequent wolverine sightings have covered a large area between Highway 49 (Yuba Pass) to the north and Interstate 80 (Donner Pass) to the south, an indication of considerable movement by this individual through a variety of habitats and apparent tolerance of high levels of disturbance from winter and summer recreation over the past three years.

3.4.2 Environmental Consequences

No Action Alternative

The no action alternative would have no effect on terrestrial wildlife, including migratory birds and listed or candidate wildlife species. No construction activity would occur in the proposed project area and the site would be unchanged from its present condition.

Proposed Action Alternative

Construction of the spillway fish barrier would cause ground disturbance to the 0.78 acre site for approximately 2 months in late summer and early fall. Construction activities would also cause noise disturbance to the surrounding area during that time. Disturbance would be primarily from use of heavy equipment, construction worker activity, and vehicle traffic.

Most wildlife species would not be expected to be adversely affected by the fish barrier construction because of its timing, duration, construction area size, and nearby existing disturbance (scheduled logging and normal summer recreation activities). Disturbance could cause some animals to avoid the immediate area during construction.

The 0.78 acre spillway construction site may have surface water flow or subsurface moisture due to an unusually large snowpack from the 2010/2011 winter. These moist conditions could be augmented by mid-summer or early fall rain events, including locally heavy thunderstorms. There could be risk of harm to amphibians, including mountain yellow-legged frogs during construction if they are present at the construction site. Amphibians could also be present at nearby wet areas and move through or into the proposed construction site during construction. A scheduled pre-construction amphibian survey would provide information about the potential for amphibians to be in the proximity of the construction site (see Environmental Commitments in Section 2 and Mitigation and Monitoring Appendix H). In spite of the mitigation measures, the proposed

project could inadvertently affect both individual amphibians and amphibian habitat by destroying burrows, or crushing or digging up individuals.

There could be risk of harm to animals in the spillway because of soil or water contamination at the construction site. A hazardous material plan would be in place and activated if a spill were to occur (Appendix G). On-site monitoring by TNC and contract administrators would reduce the risk by anticipating problems and taking prompt action if a spill occurred.

There could be a short-term risk of harm to animals in the spillway because of soil disturbance at the construction site. Erosion control measures, a revegetation plan and monitoring during and after construction would minimize a risk of sedimentation into the spillway channel from site disturbance (see Appendix C Drawings).

Migratory birds are not expected to be affected by the construction project. Construction would take place in a limited, previously disturbed area (less than 1acre) that is maintained as an operational spillway facility. Construction timing is one season (2011), late summer to fall, when migratory birds at that elevation are expected to have completed breeding and are commencing migration.

3.5 Geology, Soils and Hydrology

3.5.1 Affected Environment

Information in this section is derived from the geotechnical report (Holdredge and Kull 2009) and the wetland delineation report (Schnurrenberger 2011).

The proposed project is located in the northern Sierra Nevada geologic province and near the western margin of the Basin and Range geologic province. The geology of the area is dominated by volcanic rocks of Miocene to Quaternary age consisting of andesite, dacite, and lahar (mud flow) deposits. Granitic rocks are present near the crest of the Sierra Nevada mountain range.

Independence Lake is located in an alpine glacial valley on the east slope of the Sierra Nevada. Repeated Pleistocene age glaciations occurred in the higher mountains west of the proposed project site. The glacial activity is responsible for transporting large volumes of sediment and boulders from sources west of the site, down the Independence Lake drainage and depositing this material throughout the valley as glacial till and outwash gravel. The till and outwash gravel consists of dense sand and gravel with cobbles and boulders. Boulders can range up to 10 feet in diameter or more. Several times terminal or recessional moraines apparently dammed the Independence Creek drainage, resulting in the deposition of lacustrine (lake) sediments behind the moraines. The proposed project site is underlain by these fine sand and silt sediments. The sediments are horizontally stratified, thin bedded (varved), with weakly to moderately cemented

layers. The lacustrine depositional environment resulted in a relatively level area around the proposed fish barrier site.

Soils in the project area were mapped by the Natural Resources Conservation Service. The soil map unit for the project area is TBE—Tallac-Cryumbrepts, wet complex. The Tallac component makes up 60 percent of the map unit. This component is found on moraines and mountains. The parent material consists of glaciofluvial deposits. Depth to a root restrictive layer, duripan, is 41 to 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded or ponded. A seasonal zone of water saturation is at 51 inches during March, April, and May. The Cryumbrepts wet component makes up 25 percent of the map unit. This component is also found on moraines and mountains. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Available water to a depth of 60 inches is very low. Shrink-swell potential is low.

None of the hydric soil characteristics found at the project site during the wetland delineation were noted in the mapped soil units. The soil mapping units are not detailed enough to include the riparian or wetland soils associated with the project area, which have most likely been formed by fluvial deposits overflowing the channel when the channel was still hydrologically connected to the outflow channel.

Due to the lower elevation of the dam outlet channel and the highly erodible lacustrine sediments in the project area, the spillway channel and adjacent small tributaries are down-cutting. Numerous small channels are incising into the relatively level lacustrine plain around the proposed fish barrier site. Large boulders have been placed at the site to reduce the headcutting on the spillway channel.

The current excavated spillway channel at Independence Lake receives overflow from the lake for 2 to 4 months during the growing season between May and August. This flow is mostly contained within the ordinary high water mark and only accesses the lower inset terraces. Higher flows may occur in the spring during snowmelt runoff; these flows may access some of the higher terraces to the west of the current excavated channel.

Prior to construction of the main spillway, and overflow spillway, outflow from Independence Lake most likely exited the lake through a braided and/or meandering channel at grade with the open meadow areas, thus providing a source of water for these areas. Currently the source of hydrology for these higher terraces is overflow during high flow events and snowmelt, which shows evidence of ponding on the clay soils associated with these mesic meadow areas as previously discussed.

3.5.2 Environmental Consequences

No Action Alternative

The no action alternative would have no effect on geology, soils, or hydrology. No construction activity would occur in the proposed project area and the site would be unchanged from its present condition.

Proposed Action Alternative

Objectives of the proposed spillway fish barrier project include:

- Avoiding any hydraulic or hydrologic impact to the upstream spillway structure or operations.
- Minimizing changes to the hydraulic or fluvial geomorphic conditions below the barrier structure. To the extent some changes are unavoidable, appropriate measures are incorporated to ensure long-term stability to the channel downstream of the barrier.
- Avoiding the risk of a new channel forming around the new barrier during future high-flow events.

The original design of the fish barrier structure and a subsequent design modification meets those objectives. The design modification is described in more detail in the “Water Resources” section of this EA. In a letter to TMWA, the spillway fish barrier design was reviewed and approved the California Department of Water Resources (DWR). DWR concurred that the fish barrier would not impact the hydraulic performance of the spillway, reduce the capacity of the spillway, or pose a risk to the safety of Independence Lake Dam (California Department of Water Resources 2010).

A potential concern is dewatering the construction site. Surface flows are possible and subsurface moisture is expected due to the unusually large snowpack from the 2010/2011 winter. If permeability of the soils in the preferred site (the mesic clay soils) were exceeded by the amount of dewatering necessary for construction, contingency measures in the dewatering plan (Appendix D) would be implemented.

On-site implementation monitoring during construction and longer-term effectiveness monitoring by TNC would ensure that construction plans are adhered to and the fish barrier meets the hydraulic objectives, as well as functions as an effective barrier to upstream fish migration. With these measures in place, there would be no adverse impacts to geology, soils, or the hydrology of the project site or areas that could be affected by the construction project.

3.6 Water Resources

3.6.1 Affected Environment

Independence Lake is situated in a glacially carved valley, naturally impounded by a terminal moraine at the east end of the lake. In 1879, a dam was constructed. The dam was enlarged in 1939, creating a usable storage capacity of about 17,500 acre-feet. This 31-foot-high earth-filled dam controls the upper 28 feet of the lake. Independence Lake serves as the upper most municipal water storage facility for the Truckee Meadows Water Authority in the Truckee River watershed. Reservoir operations and storage are linked to downstream flows in the Truckee River and management of other facilities in the Truckee basin through the Truckee River Operating Agreement (U.S. Bureau of Reclamation 2008).

Independence Lake is approximately 2.5 miles long and 0.5 miles wide, with a surface area of approximately 725 acres (California Department of Water Resources 2011). The shoreline of the lake is approximately 5.8 miles, and the maximum depth is about 145 feet. The boundary between Nevada and Sierra Counties runs through the lake.

The Independence Lake watershed covers approximately 7.5 square miles. Upper Independence Creek is the principle drainage that feeds Independence Lake, with a watershed area of approximately 4 square miles. The upper watershed drains steep granitic and volcanic terrain including the south face of Mount Lola (elevation 9,148 feet), which is the highest peak in the Upper Independence Creek. The majority of precipitation falls as snow from November to April, and the highest volume of runoff is generated by spring snowmelt from April through June (Swanson Hydrology + Geomorphology 2009).

Independence Lake stage is managed via a controlled outlet. When lake stage exceeds an elevation of 6,949 feet on the U.S. Geological Survey gage (USGS 10342900, Independence Lake) the spillway channel is activated. Flow through the spillway channel is uncontrolled and is dictated by the lake stage and the release rate through the controlled outlet. There is a flashboard weir in the spillway channel that further regulates the elevation at which the spillway becomes active (Waterways Consulting 2010).

Independence Lake discharge through the spillway channel is un-gaged and there are no records kept on the frequency at which it is activated or the discharge that is conveyed through the channel. Discharge on Independence Creek is monitored by the U.S. Geological Survey at a stream flow gage (USGS 10343000, Independence Creek) located approximately 250 feet downstream of the confluence of the dam outlet and spillway channels. This gage records the combined discharge of the release channel and the spillway channel (Waterways Consulting 2010).

Although reservoir operations would be unaffected by the fish barrier, the integrity and function of the spillway is an important consideration. Based on the 60% design drawings, Blue Line Consulting, in partnership with Waterways Consulting, modeled two hydrologic scenarios to evaluate the hydraulics of the proposed spillway fish barrier (Waterways Consulting 2010). The first scenario is a discharge of 325 cubic feet per second (cfs), which corresponds to the highest flow on record (January 3, 1997) for the U.S. Geological Survey gage below the dam. This is a conservative assumption of the discharge conveyed by the spillway for the flood of record, since the gage records the combined discharge of the outlet and spillway channels. The second scenario considered a discharge of 660 cfs, which is the design discharge for the spillway channel, based on records obtained from the California Department of Water Resources Division of Safety of Dams (DSOD). These two scenarios represent high end hydrologic conditions for the spillway channel and proposed fish passage barrier.

Detailed information about the hydraulic analysis of the spillway channel, including model, topographic mapping, and assumptions, is contained in the Waterways Consulting report (2010). The results of the hydraulic modeling are discussed in the Environmental Consequences section below.

In their 2009 geotechnical engineering report, Holdredge & Kull found that at the time of their fieldwork in mid-August, groundwater was generally coincident with the level of the water surface in the stream channel and the channel was flowing at the proposed fish barrier location. Fluctuations in soil moisture content and groundwater levels would vary depending on level of the channel and Independence Lake, precipitation, and runoff conditions. The report concluded that groundwater should be anticipated below the channel even without water at the surface of the channel.

3.6.2 Environmental Consequences

No Action Alternative

The no action alternative would have no effect on water resources. No construction activity would occur in the proposed project area and the site would be unchanged from its present condition.

Proposed Action Alternative

One of the key questions evaluated with the hydraulic model was the extent to which the spillway structure would raise the water surface elevation in the upstream direction. This is a critical concern because backwatering could affect the reservoir and spillway operation and potentially cause flooding. However, modeling showed that the backwater effect of the spillway barrier was found to dissipate well downstream of the flashboard weir, indicating that the barrier would not affect lake levels or the elevation at which the spillway becomes active.

Initial model runs showed the potential for the fish barrier's backwater effect to route flows into meadow on the left side of the channel (looking downstream). If water were to flow into the adjacent meadow, it would eventually re-enter the spillway channel downstream of the barrier. A significant elevation drop exists between the meadow surface and spillway channel so that water re-entering the spillway channel could result in stream bank erosion or destabilization of the spillway channel. Therefore, it was considered imperative to contain the water within the spillway channel at the fish barrier location for all flows up to the spillway design discharge. Waterways Consulting modified the fish barrier design by extending the structure upstream on the left bank to tie into higher ground, thereby directing design flows over the weir and containing flows within the spillway channel.

The hydraulic evaluation determined that the proposed fish barrier would not backwater the lake or impact lake levels under the DSOD design discharge. The design of the barrier was modified to contain flows within the spillway channel and prevent flooding into the adjacent meadow. The proposed spillway fish barrier is not expected to alter the performance or function of the spillway channel.

The geotechnical engineering report indicated a potential for surface flow, as well as subsurface (groundwater) moisture. The dewatering plan (Appendix D) would be implemented in the case of surface or groundwater at the construction site.

On-site implementation monitoring during construction and longer-term effectiveness monitoring by TNC would ensure that construction plans are adhered to and the fish barrier project meets the hydraulic objectives. With these measures in place, there would be no adverse impacts to water resources at the project site or in areas that could be affected by the construction project.

Measures to prevent contamination of water resources are integrated into the construction plans. Appendix G contains the Hazardous Materials Contingency Plan, which would be implemented if a spill were to occur.

3.7 Land Uses

3.7.1 Affected Environment

The proposed project area is in a spillway used for reservoir operations and maintained by the Truckee Meadow Water Authority (TMWA). In an October, 2010 letter to the California Department of Water Resources, TMWA transmitted the 60% design plans for the fish barrier and requested concurrence that the fish barrier structure would not reduce the spillway capacity or pose any dam safety concerns. The California Department of Water Resources responded in a December 2010 letter with that concurrence (California Department of Water Resources 2010).

The proposed fish barrier site is in an area of Independence Lake currently used by few or no visitors to Independence Lake. Late summer recreation use at Independence Lake is relatively light, especially during week days.

3.7.3 Environmental Consequences

No Action Alternative

The no action alternative would not have an effect on land uses. No construction activity would occur in the proposed project area and the site would be unchanged from its present condition. The site's land use as an operational spillway would be unchanged. Recreation use and visual quality would be unchanged.

Proposed Action Alternative

In a December, 2010 letter to TMWA, the California Department of Water Resources concurred that the fish barrier would not impact the hydraulic performance of the Independence Lake spillway. The fish barrier would not reduce the capacity of the spillway or pose a risk to the safety of Independence Lake Dam (California Department of Water Resources 2010).

The fish barrier structure would have minimal visual impacts from the construction activities and the completed concrete structure because current recreation use in the spillway area is nonexistent or very light. As site restoration work is completed, the disturbed area is revegetated, and the concrete "weathers" to a more natural color, visual impacts would be reduced. Depending on the outcome of a recreation plan, a future loop trail may be located on or near the fish barrier structure. The design of the fish barrier structure incorporates a footpath crossing for a future trail. If the trail were to be built, any visual concerns would be considered in the planning for that project.

Access routes to the lake would be posted with notices about construction activity and safety information advising visitors of construction traffic. Other than occasional noise from construction equipment, conflict with recreation users is not expected.

3.8 Air Quality and Noise

3.8.1 Affected Environment

Air Quality

The proposed project site is located in Sierra County, California, which is in the Northern Sierra Air Quality Management District (NSAQMD). Air quality at Independence Lake is generally excellent. The lake is in an isolated alpine

environment. A preserve manager home/office and a few other structures are the primary development at the lake. On average, about 6 to 8 visitor vehicles per weekday are expected, with an estimated 12 to 16 vehicles on weekends. Independence Lake is accessed by low standard dirt roads, which limit vehicle traffic and vehicle speeds, thereby limiting fugitive dust and exhaust emissions. The nearest urban development is the town of Truckee, approximately 10 miles from the lake.

Air quality at Independence Lake can be affected by drifting wood smoke from campfire, wildfires, or prescribed burns during the summer months. Ozone levels can become elevated by emissions from the Sacramento area to the west, although these occurrences are rare.

Noise

Due to its remote location and limited use, Independence Lake has few sources of human-caused noise. The main sources are from occasional vehicle traffic, campground users, and recreation activities during the summer. Boat use is mostly limited to paddled watercraft. The proposed fish barrier construction site does not have developed trail access, is 400 feet from the lakeshore and not near the primary recreation use areas. Ambient noise is generally dominated by natural sounds.

3.8.2 Environmental Consequences

No Action Alternative

Under the no action alternative there would be no change from current conditions. No construction activity would occur in the proposed project area, therefore noise or air pollution emissions would not be generated.

Proposed Action Alternative

Air Quality

There is a potential for temporary, localized impacts on air quality associated with fugitive dust and engine emissions during construction activities. Planned mitigation measures such as access road and construction site watering would minimize blowing dust. The entire construction site is less than 1 acre, which includes the actual fish barrier construction area, as well as equipment and materials storage areas.

Haul trucks and worker vehicles would contribute to existing motor vehicle emissions along access roads, but the emissions would be temporary and insubstantial. Anticipated construction traffic is about 25 trips for equipment move-in and move-out, plus about 40 vehicle trips for commuting workers. On-site construction traffic emissions would be temporary and would not result in a substantial increase in air pollutants. A dozer and small excavator would be brought in by trailer transport and would operate on-site during the construction period. Cement would be brought in from a local source, probably in Truckee. Traffic-related effects from other pollutants during the construction period would

be negligible and would not result in violations of national or state ambient air quality standards.

Noise Effects:

Because Independence Lake is a quiet place, the construction-generated noise would be noticeable near the construction site and possibly at walk-in campsites, about 0.5 miles from the construction site. Noise carries over open water and under certain wind conditions, boaters on the eastern part of Independence Lake would hear construction-generated noise. Topography and a wooded buffer of about 100 yards surrounding the construction area would help buffer construction noise.

The majority of the 8-week construction period would be during the recreation late-season (after Labor Day weekend) so recreation use would be light. Construction would be restricted to weekdays from about 7 a.m. to 5 p.m. Access roads to Independence Lake would be posted with notices about the fish barrier construction project and scheduled logging on TNC land at Independence Lake.

Under the Proposed Action, transport of construction materials and equipment would require the use of commercial trucks. These trucks and other motorized construction equipment, including use of a cement truck, a small excavator, and bulldozer, would increase the daytime ambient noise levels at the eastern shore of Independence Lake during their use.

Commercial trucks used to transport construction materials and equipment from off-site sources to the project area would generate approximately 25 truck trips (round trip) during the extent of the project. Workers commuting to the work site would generate about 40 trips.

3.9 Greenhouse Gases and Climate Change

3.9.1 Affected Environment

Climate change implies a significant change having important economic, environmental, and social effects in a climatic condition such as temperature or precipitation. Climate change is generally attributed directly or indirectly to human activity that alters the composition of the global atmosphere, additive to natural climate variability observed over comparable time periods.

Greenhouse gases in the atmosphere allow short wavelength solar radiation to pass through the atmosphere to reach the earth's surface, but absorb the longer wavelength heat that is radiated back into the atmosphere from the earth. The concentration of greenhouse gases in the atmosphere has an effect on the average temperature at the surface of the earth. If the atmospheric concentration of greenhouse gases decreases over time, then more heat will escape through the atmosphere, and the average temperature at the earth's surface will go down. If the greenhouse gas concentration in the atmosphere increases, however, less heat

will escape to outer space and the average temperature at the earth's surface will increase.

The greenhouse gas of interest in the proposed project is carbon dioxide (CO₂) because it is a combustion product of vehicle and equipment fuel burning.

The total amount of fuel expected to be used during the fish barrier construction project was estimated, then CO₂ emissions projected using an Environmental Defense Business Calculator program (<http://business.edf.org/projects/fleet-vehicles/fleet-greenhouse-gas-emissions-calculator>)

- Gasoline burned by vehicles during construction, including worker commute: estimated 300 gallons
- Diesel burned by equipment transport and material supply: estimated 200 gallons
- Diesel burned by on-site equipment during construction: estimated 100 gallons

Projected total CO₂ emissions over the length of the project (2 months) are estimated to be 5 to 6 metric tons.

3.9.2 Environmental Consequences

No Action Alternative

Under the no action alternative there would be no change construction activity, therefore construction-related greenhouse gas emissions would not be generated.

Proposed Action Alternative

Air Quality

Emissions from the construction project would be minimal relative to background levels, such as vehicle traffic on SR89 or construction projects in Truckee.

For NEPA compliance, there are no generally accepted significance thresholds for climate change-related impacts. In February 2010, the Council on Environmental Quality (CEQ) provided draft guidance on consideration of the effects of climate change and greenhouse gas emissions in NEPA documents and sought public comment on those draft guidelines. CEQ suggested a threshold of 25,000 metric tons for disclosure in NEPA documents. CEQ did not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs.

3.10 Cultural Resources

3.10.1 Affected Environment

A cultural resource is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. The National Historic Preservation Act (NHPA) of 1966 is the primary Federal legislation that outlines the Federal Government's responsibility to cultural resources. Section 106 of the NHPA requires the Federal Government to take into consideration the effects of an undertaking on cultural resources listed on or eligible for inclusion on the National Register of Historic Places (NRHP). Those resources that are on, or eligible for inclusion on, the NRHP are referred to as historic properties.

The Section 106 process is outlined in the Federal regulations at 36 Code of Federal Regulations (CFR) Part 800. These regulations describe the process that the Federal agency (Reclamation) takes to identify cultural resources and the level of effect that the proposed undertaking would have on historic properties. In summary, Reclamation must first determine if the action is the type of action that has the potential to affect historic properties. If the action is the type of action to affect historic properties, Reclamation must identify the area of potential effects (APE), determine if historic properties are present within that APE, determine the effect that the undertaking would have on historic properties, and consult with the State Historic Preservation Office (SHPO), to seek concurrence on Reclamation's findings. In addition, Reclamation is required through the Section 106 process to consult with Indian Tribes concerning the identification of sites of religious or cultural significance, and consult with individuals or groups who are entitled to be consulting parties or have requested to be consulting parties.

The USFWS assumed lead agency status for, and completed, Section 106 compliance for the fish barrier project pursuant to the terms of the 1997 *Programmatic Agreement Among the U.S. Fish and Wildlife Service Region 1, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer Regarding the Administration of Routine Undertakings in the State of California* (Programmatic Agreement). The activities for which Reclamation is providing partial funding are the same as those considered in the USFWS Section 106 compliance efforts.

In an effort to identify historic properties, the USFWS conducted a records search and reviewed the project activities pursuant to the terms of Appendix A of their Programmatic Agreement. No historic properties were identified within the APE.

Given that the USFWS has complete Section 106 compliance, Reclamation is notifying the State Historic Preservation Officer (SHPO) in May 2011 that Reclamation's responsibilities under Section 106 of the NHPA have been fulfilled.

3.10.2 Environmental Consequences

No Action Alternative

Under the No Action alternative, Reclamation would not provide funds. Conditions related to cultural resources would remain the same as existing conditions. There would be no impacts to cultural resources under the No Action alternative.

Proposed Action Alternative

The Proposed Action is the type of activity that has the potential to affect historic properties. The USFWS completed Section 106 compliance pursuant to their Programmatic Agreement. No historic properties were identified within the project area. Since no historic properties would be affected, no cultural resources would be impacted as a result of implementing the Proposed Action.

3.11 Indian Trust Assets

3.11.1 Affected Environment

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States government for federally recognized Indian tribes or individual Indians. ITAs can include, but are not limited to, land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, in stream flows associated with trust land, water quality, fisheries, native plants, wildlife resources, and cultural sites. These resources are important for both cultural and traditional practices.

Beneficiaries of the Indian trust relationship are federally recognized Indian tribes and tribal members with trust land; the United States government is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without the approval of the United States government. The characterization and application of the United States government trust relationship have been defined by case law that interprets congressional acts, executive orders, and historic treaty provisions.

There is one Tribe potentially affected by the proposed project, the Washoe Tribe of Nevada and California (Washoe Tribe).

The Washoe Tribe is a federally recognized Indian tribe organized pursuant to the Indian Reorganization Act of June 18, 1934, as amended. The Tribal office is located in Gardnerville, Nevada. The Washoe Tribe has four communities, three in Nevada (Stewart, Carson, and Dresslerville), and one in California (Woodfords). There is also a Washoe community located within the Reno-Sparks Indian Colony. The Washoe Tribe has jurisdiction over trust allotments in both

Nevada and California, with additional Tribal Trust parcels located in Alpine, Placer, Sierra, Douglas, Carson, and Washoe Counties. The Washoe Tribe has cultural interests at and near Lake Tahoe but does not exercise any water rights in the Lake Tahoe or Truckee River basins. Tribal history extends an estimated 9,000 years in the Lake Tahoe basin and adjacent east and west slopes and valleys of the Sierra Nevada. The present day Washoe Tribe has deep roots in the past, radiating from Lake Tahoe, a spiritual and cultural center, and encompassing an area that stretches from Honey Lake to Mono Lake. (Washoe Tribe 2011).

3.11.2 Environmental Consequences

No Action Alternative

Under the no action alternative there would be no change in land use or activities at or near the construction site. Indian Trust Assets would not change from current conditions.

Proposed Action Alternative

Implementation of the proposed project is not expected to have an effect on Indian Trust Assets. Land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, in stream flows associated with trust land, water quality, native plants, wildlife resources, and cultural sites would not be affected. The population of native LCT would be positively affected by eliminating the risk of non-native brown trout and rainbow trout entering Independence Lake by upstream migration.

3.12 Environmental Justice

3.12.1 Affected Environment

Executive Order 12898 (1994), Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, provides that each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. Environmental justice programs promote the protection of human health and the environment, empowerment via public participation, and the dissemination of relevant information to inform and educate affected communities.

Independence Lake has no residents other than a few seasonal TNC and TMWA caretakers and workers. The lake is lightly used by recreationists, mostly traveling from local areas such as Sierraville or Truckee.

3.12.2 Environmental Consequences

No Action Alternative

Under the no action alternative there would be no construction activity and no fish barrier built. There would be no change to existing environmental justice conditions or programs, and no effect to minority or low-income populations.

Proposed Action Alternative

Construction of the spillway fish barrier would take place in an uninhabited area that receives light seasonal recreation use. The fish barrier would not affect access, environmental quality, or human health. The project could have a slightly positive effect on local employment as the workers, equipment and construction materials are expected to be obtained locally. In summary, there would be no adverse human health or environmental effects to minority or low-income populations because of the proposed project.

3.13 Cumulative Effects

3.13.1 Introduction

The cumulative impacts analysis addresses the combined impacts of implementing the proposed project and No Action Alternative with those of other related past, present, and reasonably foreseeable projects that could result in impacts on the same environmental resources.

3.13.2 Legal Requirements

The CEQ regulations implementing NEPA (40 CFR 1508.7) define a cumulative impact for purposes of NEPA as follows:

Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Associated actions (past, present, or future) which, when viewed with the proposed actions, may have cumulative significant impacts. To determine the scope of the cumulative impacts analysis, related projects were identified. These include past, present, and reasonably foreseeable projects that may contribute to cumulative impacts, including, any projects outside of the control of the project proponent or agency.

CEQ regulations also state, “In general, actions can be excluded from analysis of cumulative impacts if the action will not affect resources that are the subject for the cumulative impacts analysis” (Council on Environmental Quality 1997).

3.13.3 Agreements, Plans, and/or Projects with Potential Related Cumulative Impacts

Table 1 lists the past, present, and reasonably foreseeable actions considered in the cumulative impacts analysis.

Table 1 – Activities Considered in Cumulative Effects Analysis

Project Name	Implementing Entities, Agencies and Cooperators
Upper Independence Creek weir removal and stream bank stabilization	TNC, U.S. Forest Service, U.S. Geological Survey, U.S. Fish and Wildlife Service, CA Dept. of Fish and Game, Truckee River Watershed Council
Brook trout removal in Upper Independence Creek	U.S. Forest Service, U.S. Geological Survey, U.S. Fish and Wildlife Service, CA Dept. of Fish and Game, TNC
Forest thinning	TNC, CALFIRE

Upper Independence Creek Weir Removal

Beginning in the fall 2011, TNC and partners will remove an old weir and restore an associated eroding stream bank currently threatening the key spawning stream for LCT. Scientific and management insights identified the need to remove an old non-functioning weir and rehabilitate an associated downstream stream bank at Upper Independence Creek (UIC) located at the northern end of Independence Lake. The stream bank is a site of high erosion on the outside of a meander bend. The eroding bank is causing harm to in-stream cutthroat trout habitat through sedimentation of spawning gravels and depletion of cover and resting habitat. The weir was destroyed by high storm water flows and the remains of the weir are causing disruptions to the natural geomorphic and hydrologic patterns in the creek.

The project has two main goals and objectives:

1. Remove the old, non-functioning fish weir to restore natural hydrology of UIC
2. Restore 80-feet of eroding stream bank to reduce sedimentation in Upper Independence Creek.

When the project is complete, TNC and partners would:

- Remove all traces of the non-functioning weir, including steel, lumber, concrete, rebar, cyclone fencing, and riprap.

- Restore the associated downstream stream bank by regrading the stream bank and constructing a log vestment to stop the erosive process.
- Improve spawning habitat for Lahontan cutthroat trout in the affected area of stream channel with the log revetment.
- Improve cover habitat for Lahontan cutthroat trout in the affected area of stream channel.
- Use natural materials so that as the project naturally degrades or the stream channel changes, only native materials would be visible.

Removal of brook trout in Upper Independence Creek

For six years, the U.S. Geological Survey has led an annual effort to remove brook trout from upper Independence Creek using electroshocking. Other cooperating agencies include the U.S. Forest Service, CA Department of Fish and Game and the U.S. Fish and Wildlife Service. This project supports the long-term conservation outcome at Independence Lake of increasing the number of spawning adult LCT from the current number of about 175 adults annually to 500 to 1,000 adults annually. The number of spawning LCT increased to 237 in 2010, the highest number in 50 years. Before the project began, the highest number of spawning LCT was 150 and there has been a steady increase each year since 2005, when the program began. LCT egg fry survival has increased three-fold during this same period.

Until brook trout are no longer a threat to the Independence Lake LCT population, it is expected this program would continue.

Forest Thinning

To maintain the watershed, the lake ecosystem, and water quality, and restore natural habitat diversity, TNC is planning to implement forest management practices that would 1) promote “old-growth” stand conditions of few, large, widely spaced trees with an open understory; 2) reduce the build-up of fuels; 3) reduce the risk of high severity wildfire; 4) enhance the natural regenerative capacity of aspen; and 5) restore degraded wet meadow and riparian habitats. Forest surveys by a CA Registered Professional Forester (RPF) in 2008 affirmed that the forests and montane chaparral at Independence Lake are at risk of high-severity wildfire.

During summer 2011, approximately 70 acres of forest stands are expected to be treated to meet these objectives. Logging and other vegetation management activities would be concurrent with the fish barrier construction.

3.13.4 Cumulative Impact Analysis

This section describes the cumulative impacts that could be associated with the fish barrier project alternative and No Action Alternative when combined with other related past, present and reasonably foreseeable actions in the Independence Lake basin. Cumulative impacts would not be considered adverse for one or both of these reasons:

- Cumulative impacts would be beneficial, or
- The impact of the proposed project alternative would not be added to the impact of other projects (i.e., no cumulative impact would occur) or would be too minor or localized to be considered cumulatively.

Biological Resources – Vegetation and Wetlands

The fish barrier project would have no long-term impact on vegetation. A 0.78 acre area within the existing spillway, including 0.39 acres of wetland, would be disturbed temporarily. The site would be stabilized and revegetated with native plant species except for 0.07 acres (the fish barrier structure itself). Any permanent loss of wetlands would be mitigated by the upper Independence Creek weir removal project, a restoration project that would restore hydrological function to an important section of LCT spawning habitat and stabilize 80 feet of an eroding stream bank. Upper Independence Creek spawning habitat is critical to the long-term survival of the Independence Lake population of LCT.

Forest thinning in adjacent upland areas would help protect the watershed from the effects of high severity wildfire, such as erosion and high sediment loads in the drainages. The thinning project is complimentary to the fish barrier project in that a healthy watershed is also necessary to the long-term survival of LCT.

No special status plants would be affected.

Biological Resources – Fish

The fish barrier project, when considered along with other past, present, and reasonably foreseeable future projects, would have a beneficial impact on LCT and other native fish species in Independence Lake. Implementation of these combined projects would improve native fish habitat, reduce the risk of non-native fish competition, and reduce the risk of damage to the watershed from high intensity wildfire.

Biological Resources – Wildlife

Implementation of the fish barrier project, in combination with other projects, is not expected to result in discernable or long-term impacts to wildlife. The projects are short-term in duration with expected minor impact on wildlife habitat. Most terrestrial species would be expected to avoid the affected areas while activity is underway. Minor short-term effects could occur to wildlife from cumulative impacts from disturbance (noise, human activity, dust), but habitat would improve over the long-term for most native wildlife species.

Cultural Resources

Implementation of the project would result in limited ground-disturbing activity. The cumulative impacts of past, present, and future actions on cultural resources relate primarily to the potential for damage to cultural resources and their context from ground-disturbing activities. Other federally funded projects occurring in the area would be required to comply with Section 106 of the NHPA if applicable.

Pursuant to the definition at 40 CFR Part 1508.27(b) (8), any potential adverse impacts on cultural resources from federal projects would be mitigated to less-than-significant levels using the Section 106 process.

The Proposed Action has the potential to affect cultural resources. Since the USFWS determined that no historic properties will be affected, no cultural resources would be impacted as a result of implementing the Proposed Action. Reclamation notified the State Historic Preservation Officer (SHPO) in May 2011 that Reclamation's responsibilities under Section 106 of the NHPA have been fulfilled. The project, along with other known activities occurring in the Independence Lake area, is not expected to result in adverse cumulative impacts on cultural resources.

Recreation

Access to certain parts of TNC's Independence Lake lands would be restricted for safety reasons during construction of the fish barrier and during the vegetation management work. Long-term access would not be affected by these projects, however.

Indian Trust Assets

The cumulative effects of the project, combined with the programs and projects listed in Table 3 would improve habitat of fish, wildlife, and improve the health vegetation and watershed ITAs. No adverse cumulative impacts on ITAs from the fish barrier along with other projects and programs in the area are anticipated.

Environmental Justice

The project would have no effect on minority and low-income groups. Other projects within the area including implementing potential federal and private conservation and stewardship activities, fisheries and habitat improvements, and restoration could result in beneficial impacts on environmental justice populations. The overall outcome would not be expected to result in a cumulative adverse impact on environmental justice populations.

Other Resources

The project, along with the other projects, would have no impact on land use, water resources, soils, hydrology, geology, or air quality.

Section 4 Coordination and Consultation

4.1 Consultation and Coordination

The final EA will be prepared in consultation with the Washoe Tribe of Nevada and California.

Pursuant to Section 7 of the Endangered Species Act of 1973, Reclamation is requesting formal consultation with the U.S. Fish & Wildlife Service for the Independence Lake Spillway Fish Barrier project.

4.2 Other Federal Laws, Regulations, and Executive Orders

In undertaking the proposal, Reclamation will comply with the following federal laws, executive orders, and legislative acts: Floodplain Management (Executive Order 11988); Protection of Wetlands (Executive Order 11990); Migratory Bird Treaty Act (16 U.S.C. 703 et seq.); Federal Noxious Weed Control Act, E.O. 13112, and 43 CFR 46.215 (1), Environmental Justice (Executive Order 12898), and the Fish and Wildlife Coordination Act (16 U.S.C. § 661).

4.3 Public Involvement

This Draft EA will be made available to the public for a 30-day review period. Reclamation will issue a news release on availability of the EA and send a notice to a list of potentially interested parties. The EA will be posted on Reclamation's Mid-Pacific website and mailed to individuals requesting a copy. Responses to public comments will be included in the final EA.

Section 5 References

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This EA was prepared for the Lahontan Basin Area Office, Mid-Pacific Region, Bureau of Reclamation.

APPENDIX

- Appendix A – Aerial Photograph
- Appendix B – Photographs of the proposed construction area
- Appendix C – Drawings
- Appendix D – Dewatering Plan
- Appendix E – Fish Salvage Plan
- Appendix F – Weed Prevention Plan
- Appendix G – Hazmat and Fire Prevention Plans
- Appendix H – Mitigation and Monitoring
- Appendix I – Wetlands and Waters of the U.S. Report
- Appendix J – California Environmental Quality Act (CEQA) Checklist