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Environmental Assessment

Blackwood Creek Phase III, Stream and Floodplain Restoration Project

Lake Tahoe Basin Management Unit
Placer County, California

SE1/4 of the NE1/4 of Section 34 T15N R16E

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ENVIRONMENTAL ASSESSMENT
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Lake Tahoe Basin Management Unit, USDA Forest Service
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CHAPTER 1 - PROPOSED ACTION

1.1 INTRODUCTION

The Blackwood Creek Watershed delivers the largest volume of fine sediment, per square mile, of any of Lake Tahoe's tributary watersheds. These conditions are the result of historic land use activities such as canalization, in-channel gravel mining, road building, and logging. The cumulative effects from these activities, combined with a series of floods in the 1960's, initiated channel and floodplain instability along the lower 3.5 miles of Blackwood Creek's main stem. Upland streams and hill slopes are recovering and are continuing on that trajectory; however, the main channel of Blackwood Creek continues to be unstable with excessive bank erosion. The result has been chronic stream bank erosion, a lower floodplain water table, sparsely vegetated unstable floodplains, and a shift from a cottonwood-willow to a conifer dominated floodplain.

We have completed two of three phases recommended in the Blackwood Creek Restoration Plan (Swanson, 2003). Activities in two earlier phases involved restoration of manmade impediments. We replaced a dilapidated fish ladder located above the Barker Pass road crossing with a naturalized step pool channel in 2003 (Phase I), and replaced the low water crossing and undersized culvert at the Barker Pass Road Crossing with a bridge and naturalized step pool channel in 2006 (Phase II).

This final phase (Phase III) would address excessive bank erosion and channel incision as well as diminished nutrient uptake capacity along Blackwood Creek's main-stem (Figure 1).

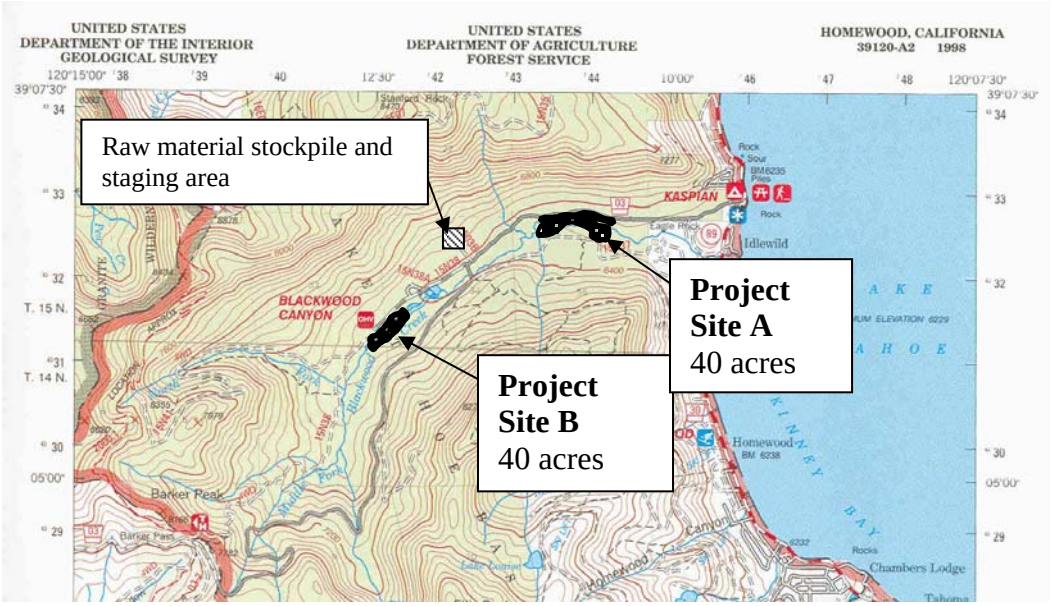

FIGURE 1 - Vicinity map, Phase III

The approach involves installation of physical structures made of boulders and logs, re-contouring of existing floodplain surfaces and channel, plug and fill of existing gully channel, and new channel construction. Riparian vegetation transplant and planting of containerized riparian stock would occur where needed.

The objective of these improvements is to develop a more stable channel that is resistant to excessive bank erosion. Additionally, these improvements are designed to create a channel that is better connected to the adjacent floodplain, resulting in increased flow spreading, and filtering of fine sediments and nutrients, and the development of a more desirable riparian ecosystem.

Project Site A

Much of the recent lateral channel instability (e.g. excessive bank erosion) occurs along a 1-mile section (Site A - Project Reach 6) of channel located approximately .5 mile downstream of the Barker Pass Road Crossing. From 1965 thru 1996, the channel had incised but erosion rates were relatively slow. Incipient incision and channel instability were a result of historic gravel mining and logging.

Channel and floodplain condition changed abruptly when the flood of record in January 1997 occurred and triggered massive bank failures and bank retreat of approximately 100 to 300 feet in Site A. Catastrophic erosion converted an ecologically diverse meadow and floodplain ecosystem, to one with large, sparsely vegetated gravel bars having limited ecological value. The channel at Site A is straighter, wider, and shallower than what occurs naturally in this setting and aquatic habitat quality is now very low. The Blackwood Creek Restoration Plan states that this site is still unstable and without intervention, excessive bank erosion would continue unchecked for decades. They predict that most of the erosion would occur during larger mid winter floods. Under these conditions, flood flows rise to level where they attack the base of 6-10 ft high vertical cut banks.

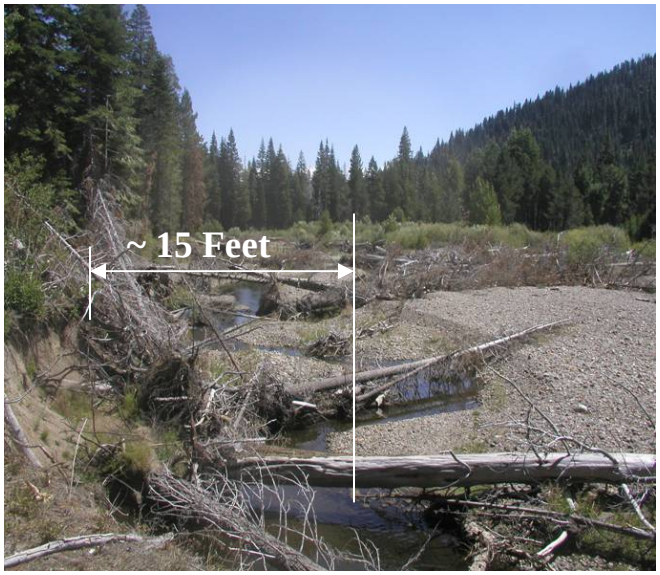

FIGURE 2 - Bank erosion and tree throw after the 31 December 2005 flood at Site A

Scour at the base of these banks produce cut bank failure, quickly mobilizing and transporting fine sediment and organic material (nutrients) to Lake Tahoe. This hypothesis was strongly supported when a recent flood (December 2005), triggered 10-15 feet of bank retreat along a portions of Site A; 1500 tones of alluvial sediment in one 500-foot section alone (Swanson, 2007).

The triggering mechanism for cut bank failure are large scale, sparsely vegetated, cobble-gravel bars on the valley floor adjacent to these cut banks. These bars are immobile in all but the highest of flows. So during most flood events, flow is forced to move laterally around the bar and into the cut bank, and the result is excessive bank erosion as shown. Furthermore, these bar forms delay channel and floodplain recovery resulting in chronically degraded aquatic and riparian habitats.

Project Site B

While erosion characteristics and channel conditions at Site A are the most dramatic in terms of poor stream condition, another area of concern is a 0.5-mile section of stream (Site B) located just upstream of the 2003 Blackwood Phase I fish ladder restoration site.

Historically, the stream channel maintained a gallery cottonwood forest atop a coarse grain glacial-fluvial fan deposit. Throughout most of a typical year, the stream appears to have flowed in a single channel along the northern edge of the floodplain; however, during the larger spring and mid winter floods, flows would exceed main channel capacity and spread out over the floodplain and into a series of disconnected swales and smaller channels.

Channel and floodplain function at Site B changed abruptly when gravel-mining operators in the 1960's channelized this section of creek diverting most of the flow out of the historic channel. They placed the water in a ditch along the southern edge of the fan. Over time the ditch incised.

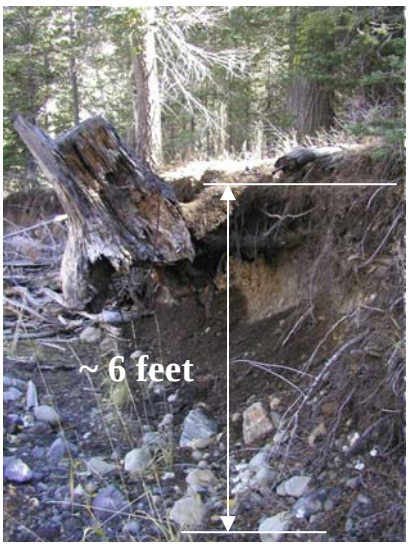

FIGURE 3 - Unstable, vertical cut-bank located just downstream of the head cut knick point near the upstream end of Site B

Restoration actions (installation of a fish ladder and a series of boulder structures) in the 1980s improved conditions somewhat, however head cutting, incision, and impacts to the floodplain ecosystem in this area continue (see Figure 3).

Furthermore, the October 2007 topographic surveys revealed actively migrating, 3-foot high head cuts on the southern ditch and the historic channel. If left untreated, these head cuts would likely continue migrating upstream, probably to point where the north fork channel enters the main stem. The result would be continued channel incision, excess bank erosion, and floodplain degradation along a 0.5-mile section of stream and cottonwood floodplain above Site B.

1.2 PURPOSE AND NEED

Recent scientific studies have identified Blackwood Creek as having the highest fine-sediment (X < 0.063mm) delivery rate per square mile (yearly average of 844 Tons/year), for a Lake Tahoe tributary watershed (Simon, 2006). Simon estimated that eroding stream banks generate approximately 200 Tons/year of this load. Putting this loading level in Basin–wide context, Blackwood Creek generates approximately 30-percent of all stream bank erosion in the Lake Tahoe Basin, with the other largest offender being the Upper Truckee watershed at 40 to 50-percent. The sites where Simon performed his analysis are the sites we have identified for restoration. From a watershed perspective, Blackwood also has the highest suspended sediment delivery rate per square mile (yearly average of 1930 Tons/year) among Lake Tahoe tributary watersheds.

The purpose of this project is to restore channel stability, and improve flood plain connectivity in two keys areas (Sites A & B) along Blackwood Creek's main stem. We would do this by taking actions to restore the stream's former morphological character as well as restore stream bank-floodplain vegetative structure, typical of what is characteristically present in this geologic and hydrologic setting. We need to take action at this time under the goals of the Blackwood Creek TMDL, the Lake Tahoe TMDL, and the LTBMU Forest Plan. We would meet these goals by achieving the following objectives for this project:

1) Restore aquatic habitat through reconstruction of critical channel features. (Blackwood TMDL, 2007).

2) Reduce fine sediment and nutrient delivery rate to Lake Tahoe through stabilization of stream channels and reconnecting channels to floodplains in support of the Lake Tahoe TMDL (under development).

3) Restore the degraded riparian plant community through the stabilization of stream channels and reconnecting channels to floodplains (1988 LTMBU Forest Plan, as amended). See APPENDIX A for a summary of project area management direction.

1.3 ALTERNATIVES

The LTBMU analyzed two alternatives. The alternatives are:

1. Proposed Action: Implement a combination of channel and floodplain rock and log structures, direct channel reconstruction, activation of historic channels, floodplain grading, and riparian planting.

2. No action: take no action at this time

1.3.1 PROPOSED ACTION

The proposed action is located in the SE1/4 of the NE1/4 of Section 34 T15N R.16E (Figure 1)

The proposed actions at Sites A & B (FIGURES 4 & 5) are:

Site A Channel (.75 mile):

A1. Skimming and reshaping in-channel bars to deflect flow away from vulnerable channel banks and terraces, greatly reducing the threat of wide scale bank erosion during floods, while promoting sediment storage and retention on lowered floodplain surfaces.

A2. Strengthening the heads of the flow deflection points with a combination of imported river boulders and logs, such that they are able to withstand the forces generated by a 25 to 50-year flood.

A3. Plant and irrigate native cottonwood, willow, and alder stock in an encapsulated soil layer on the lee side of the deflector points, as a means of reestablishing riparian vegetation to restore floodplain roughness, stability, and sediment storage – sorting characteristics.

A4. Reshape portions of the existing channel to increase sinuosity, add roughness / stability elements, which promote in-channel sediment storage along with pool and riffle formation and frequency.

A5. Construction of floodplain features (examples: seasonally wet depressions or large wood roughness structures) that enhance suitable habitat for key wildlife and plant species such as cottonwood, willow, alder, and herbaceous vegetation. Features would also be effective at trapping fine sediments on the floodplain.

Site A Terrace (15 acres):

A6. Harvest of conifers in adjacent aspen stands for aspen enhancement; use the logs to provide additional flood and channel roughness to improve stream and floodplain function at Site A. We estimate that approximately 300 logs, 10-20” in diameter, could be harvested in and around these aspen stands. A qualified vegetation specialist and wildlife biologist would direct the harvest so that we can maintain desirable forest structure and increase aspen stand health and vigor, adjacent to Site A.

Site B Channel (.5 miles):

B1. Use a combination of coarse river substrate generated at Site A, imported river boulders, and logs, to plug off the existing dozer-built, gully channel

B2. Use a combination of local river substrate from site A and the fill source area, boulders, and logs to fill the incised portion of the historic channel and re-grade the adjacent floodplain surfaces. Plant these surfaces with native cottonwood and willow stock. Irrigate as needed.

B3. Reshape the historic main stem channel on the northern side of the fan; sculpt this channel as needed so and restore it as the main flow path during annual spring snowmelt floods as well as summer base flow

B4. Construct approximately 650 feet of new channel to connect the historic channel to the boulder step pool channel (e.g. old fish ladder site)

B5. Enhance existing floodplain depressions to increase floodplain roughness, stability, and promote sediment storage and sorting on the floodplain.

Site B Terrace (15 acres):

B7. Harvest of conifers in adjacent aspen stands for aspen enhancement; use the logs to provide additional flood and channel roughness to improve stream and floodplain function at Site A. We estimate that 500 logs, 10-20” in diameter, could be harvested in and around these aspen stands. A qualified vegetation specialist and wildlife biologist would direct the harvest so that we can maintain desirable forest structure and increase aspen stand health and vigor, adjacent to Site A.

FIGURE 4 – Site-A Project Area

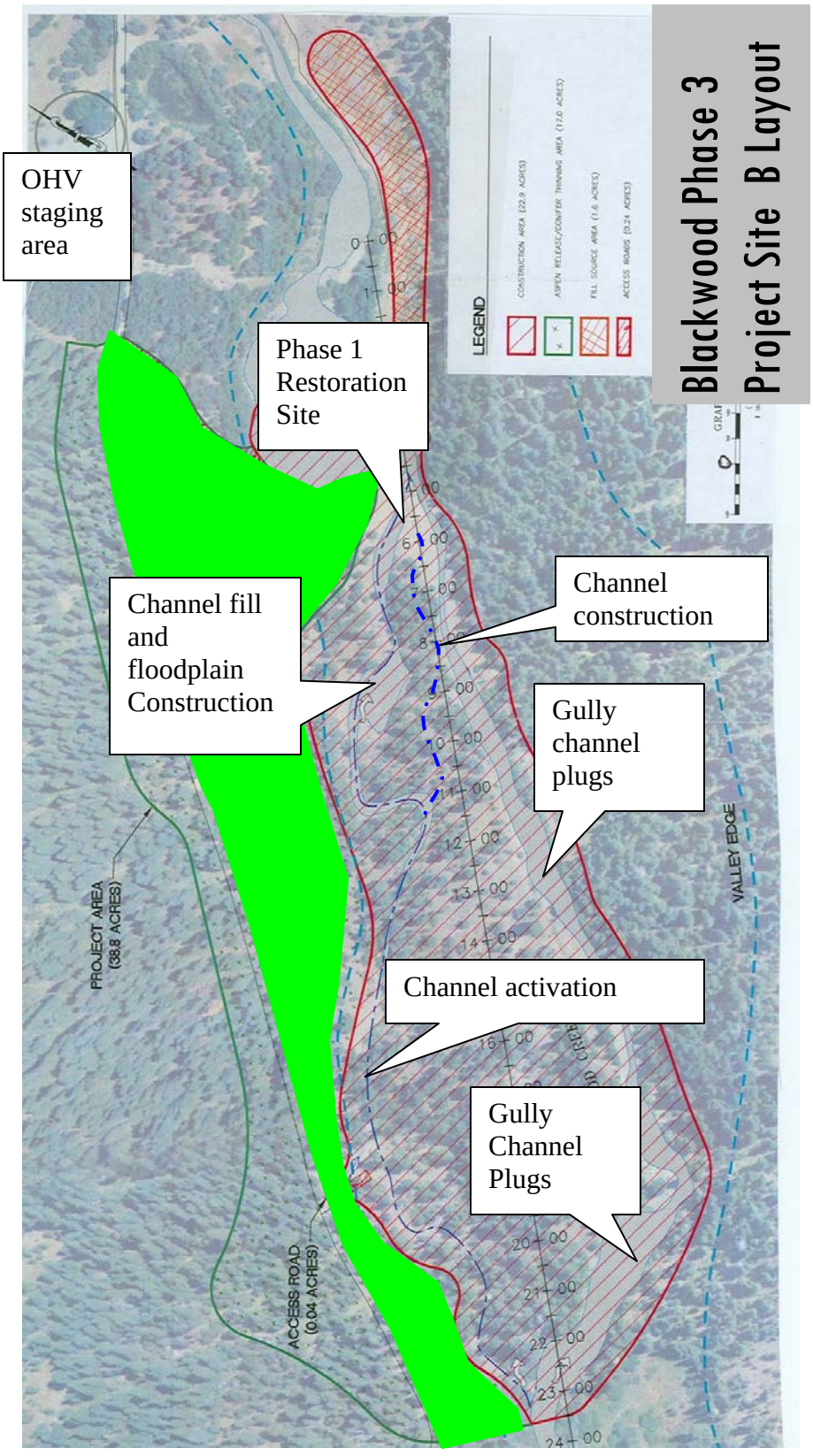

FIGURE 5 – Site-B Project area

1.3.2 PUBLIC INVOLVEMENT

Agency consultations for this proposed action began in 2003 with a meeting, led by Mitchell Swanson, Principle - Swanson Hydrology and Geomorphology, to discuss the findings of the Ecosystem Assessment Report (Swanson et. al. 2003). Members of the Lahontan Water Quality Control Board (Water Board), the Tahoe Regional Planning Agency (TRPA), the United States Environmental Protection Agency (EPA), and the League to Save Lake Tahoe attended the meeting. The agencies were in agreement with the restoration approach.

In 2006, the LTBMU developed a new design due to the increased cost of raw materials. This new design approach, developed by Mitchell Swanson, president of Swanson Hydrology and Geomorphology, was one of several case studies in a U.C. Berkeley short course "Geomorphic and Ecological Fundamentals for River and Stream Restoration" held in August 2007. Matt Kondolff, Professor of Earth Science at U.C. Berkeley taught the course. Several of the co-instructors are also distinguished members of the scientific research community studying river processes. There were no issues brought to the attention of the LTBMU following the 'show-casing' of this design approach.

In September 2007, the design was peer-reviewed by consultants Matt Keisse of River Run and Toby Hanes of Hydroscience, private firms specializing in river and floodplain restoration. These consultants raised no issues for the design at Site A; however, they did recommend the need for additional surface roughness and increased strength of floodplain fill surfaces for Site B. The contractor addressed this design issues for Site B before completing the Site B design to 60 percent.

In October 2007, the LTBMU conducted an interagency field trip to review the approach and solicit comments on the approach. Members of the LTBMU Interdisciplinary Team (IDT), as well as members from the Water Board, the TRPA, the EPA, and the League to Save Lake Tahoe attended the trip. Forest IDT or attendees from the regulatory agencies raised no significant issues.

The proposed action for this project was developed and circulated for a 30- day period beginning on January 24, 2008. Seven environmental and regulatory permitting agencies, as well as twenty-four individuals / affected publics received the document via mail. The LTBMU released a Press Notice that same day. One local newspaper (Sierra Sun) interviewed the Forest Public Information Officer and the Project Leader, resulting in article describing the project. Three newspapers and two newspaper- affiliated internet web sites picked up the article. All electronic news notices invited the public to comment. The project leader monitored these sites. No postings occurred at any these internet sites. Four comments were received (two via phone and email) and none of these comments raised significant issues (Appendix B).

1.3.3 DECISION TO BE MADE

The LTBMU Forest Supervisor will decide whether to proceed with the proposed action or choose the no action alternative.

1.3.4 IMPLEMENTATION

The LTBMU anticipates Site A prep-work to commence on or around August 1, 2008, with implementation beginning on or around August 15, 2008. Site-B work would commence in mid summer 2009. Equipment and materials for both projects would be stored at a material staging area that was used in past projects (Blackwood Phase I and II).

CHAPTER 2 - ALTERNATIVES

2.1 ALTERNATIVE 1 – PROPOSED ACTION

The table below is a list of the tasks needed to implement this alternative. The list shows the sequence of operations anticipated at this time. Field conditions would dictate the precise order of operations. The LTBMU would generally accomplish all ground-disturbing activities during the Aug 15 thru Oct 15-construction window, stream conditions permitting.

TABLE 1 – PROJECT SPECIFIC IMPLEMENTATION SCHEDULE

Task	Description	Site $A_{(quantity)}$	Site $B_{(quantity)}$	Unit of measure	Total Quantity
1	Setup, operation, maintenance and demobilization of the stockpile and staging area North of Barker Pass Rd	X*	X*	Acre	10
2	Installation and maintenance and removal of temporary surface water diversions and dewatering facilities	$X_{(1500)}$	$X_{(1500)}$	Linear Feet	3000
3	Installation and maintenance of temporary BMPs (fencing)	$X_{(15000)}$	$X_{(500)}$	Linear Feet	20000
4	Location and construction of heavy equipment access paths leading to and in the SEZ	$X_{(1500)}$	$X_{(1500)}$	Linear Feet	3000
5	Setup, operation, maintenance and demobilization of material / equipment staging areas in the SEZ	$X_{(2)}$	$X_{(1)}$	Acre	3
6	Delivery of boulders to the project area (as needed) by truck from off-site sources	X	X	Trips (truck trips per day)	20
7A	Log Harvest and Aspen Release Plan	X		Acres / Quantity	15/400
7B	Log Harvest and Aspen Release Plan		X	Acres / Quantity	13/500
8A	Installation of rock / log flow deflection structures		X	Number installed	25
8B	Installation of rock / log floodplain roughness structures	$X_{(12)}$	$X_{(8)}$	Number installed	20
9	Channel Construction	$X_{(2000)}$	$X_{(700)}$	Linear Feet	2700
10	Channel Plugging / Gully Fill		X	Acres	7
11	Channel activation (introduce flow into a historic channel)		X	Linear Feet	2000
12	Riparian Transplants and Planting	$X_{(15)}$	$X_{(5)}$	Acres	20
13	Irrigation as needed	X	X	Volume – cfs	0.5 from stream

X = task occurring or associated with a site, $_{(\#\#\#)}$ = quantity of task at a site, $*$ - same area to be used for stockpile

A detailed description of each task is as follows:

1. The stockpile and staging area

The LTBMU would use the same fenced staging area used in earlier phases, located outside the SEZ on the north side of Barker Pass Road (See Figure 1). The staging area would hold heavy equipment, maintenance equipment, and fuels/lubricants, and non-native construction materials (cable, hardware and tools, etc.). The LTBMU would BMP the staging area beginning in July 2008. The LTBMU anticipates that the staging area would be active over the two-year construction period (2008 thru 2009).

2. Temporary surface water diversions, crossings, and dewatering facilities

Some of the rock and log structure placements, floodplain roughness structures, and areas of direct channel construction, occur within areas of live stream or in areas where construction activities are likely to encounter shallow groundwater. These sites would require temporary diversion, dewatering and/or de-silting facilities that allow for construction while protecting water quality.

3. Temporary construction fencing

The Forest Service would install construction and erosion control fencing along existing roads and trails during construction activities.

4. Construction of access roads to and in the SEZ

The Forest anticipates that metal-landing mats would serve as the road surface from the paved road to the SEZ. Landing mats would be used to minimize surface erosion and compaction. There would be some minor clearing and grubbing along corridor to allow for truck traffic in and out of the site. Temporary access roads for heavy equipment access to and from the construction sites in the SEZ would be located, developed, and Best Management Practices (BMP) would be employed, to minimize impact to sensitive vegetation and habitat to the greatest extent possible. Forest Service staff would direct grading operations.

5. Setup, operation, maintenance and demobilization of material / equipment staging areas in the SEZ

Staging areas for materials to construct rock and log structures, floodplain roughness structures, channel construction, and channel plug and gully fill, would be located at the end of the SEZ access roads.

6. Delivery of boulders to the site area by truck from off-site sources

Boulders would be delivered by truck to the Site A project area would be stockpiled per the construction staging area plan. The boulders source is the Tragedy Springs rock quarry on the El Dorado National Forest. There would be an average of 20 truck trips per day for forty days to Site's A and B. The boulders would be staged onsite where the road enters the SEZ. From there, they would be transported by heavy equipment to rock and log structure construction sites as well as areas designated for channel construction. Boulders leftover from Site-A construction, would be stockpiled at the staging area north of Barker Pass Road and used for Site B construction in 2009.

7. Delivery of logs by heavy equipment from sources on-site

Logs would be harvested on site; inventories verify a sufficient number of logs are present to support the log need for construction. An Aspen release specialist (Biologist), in a manner that favors the release of Aspen present onsite, would mark the trees. Estimates are that all trees with DBH less than 24" would be removed around each Aspen clone. The trees would be pushed over physically using heavy equipment and from there transported by machinery to the central access road; then on to rock/log and floodplain roughness construction sites, portions of existing channel, and areas designated for channel construction. The Biologist, assisted by a Landscape Architect, would direct the harvest operations ensuring the preservation of the scenic resources potentially affected by log harvest.

8. Installation of rock / log structures and flood plain roughness structures

Heavy equipment would be used to install the rock and log structures. The installation process involves hauling logs and boulders from the stockpile areas to the installation sites (using loaders), excavation of stream bed, bars and/or cut banks (terraces) using excavators at some sites in order to "key-in" and install structures. Logs and boulders would be placed by heavy equipment. Hardware (cabling, deadmen, etc.) would be installed by hand crews. All excavated material (terrace alluvium and river substrate) would be incorporated as a growing media into the structures interior; no off-haul of excess materials would be required. Salvaged woody riparian shrubs and trees (willow and cottonwood), and containerized plantings (mainly willow stakes and cottonwood poles) would be incorporated in the installation. Once construction is completed, irrigation of riparian vegetation would commence and continue through the end of construction at this site; site-specific irrigation may continue the following season as needed.

9. New channel construction

Heavy equipment would be used to construct 2700 feet of new channel. Construction would require grading and excavation to establish proper cross section form and streambed elevation, and excavation into the sub-grade to install in-stream structures (logs and boulders) in strategic locations to function as grade control and aquatic habitat. Salvaged root balls from woody riparian shrubs and trees (willow and cottonwood), and containerized plantings (mainly willow stakes and cottonwood poles) would be incorporated into the stream banks.

10. Installation of plugs and grading to block off flow in the existing gully channels

A series of plugs would be installed using heavy equipment, at geomorphically strategic locations to block off flow to the gully channel that exists currently. The plugs would be constructed with native substrate and faced with logs harvested from the aspen release area. Salvaged woody riparian shrubs and trees (willow and cottonwood), and containerized plantings (mainly willow stakes and cottonwood poles) would be incorporated onto the surface of each plug. Heavy equipment would be used to install grade control needed to fill and reshape portions of the historic and gully channel in order to restore the floodplain back to natural grade. Boulders grade control that extends off the wings of the existing fish ladder weir structures would be installed using heavy equipment; logs from Aspen release would be incorporated in design to add additional sub-grade stability and enhance surface sediment trapping potential. Native substrate

(sand and gravel) would be used as backfill to bring the floodplain up to finish grade. Hand crews would plant this surface with native and containerized plant stock at strategic locations and irrigated as needed.

11. Channel Activation
Heavy equipment would be used to reshape 100 feet of existing channel in order to create a flow path back into the upstream end of the historic channel; this section of channel would have dimensions and structure similar to the historic channel that exists upstream of the project area currently. Construction would require grading and excavation to establish cross section form and streambed elevation, and excavation to install in-stream structures (logs and boulders) in strategic locations along the historic stream channel

12. Riparian transplants and plantings
Riparian vegetation (willow and cottonwood poles and seedlings), displaced during construction operations, would be stockpiled, kept alive through irrigation, and replanted as needed. Containerized riparian plant stock would be delivered to the site, irrigated, and planted as needed.

13. Irrigation
Native and containerized vegetation require irrigation to increase root growth and probability of plant survival. Pumping would occur from the live channel upstream of construction operations. Irrigation would be conducted using portable pumps and hose lays from the stream to the construction area; the water truck may also be utilized when pumping is not feasible.

The Forest Service would utilize a restoration crew, construction crew, and heavy equipment, to accomplish this work. Equipment and crews including but limited to the following:

Heavy Equipment -
A bulldozer, excavator (2), backhoe, dump truck (2), loader (2), and a water truck. Excavators would be tracked vehicles while loaders and support equipment would be rubber tired.

Personnel-
During each workday, there would be an average of six people on site with generally no more than 20 people during times of peak construction activity.

2.1.1. DESIGN FEATURES

Activities associated with implementation of this alternative would have localized, short-term impacts. This alternative has design features built in to correct short-term impacts and avoid long-term impacts to soils, water, vegetation, wildlife, fisheries, heritage resources, recreational resources, and air quality. Site conditions may vary seasonally. The BMP approach may require adjustments depending on how site conditions vary over time. A brief description of the anticipated disturbance to each of the effected resources, and the design features developed to prevent impacts to that resource is as follows:

Soils & Water

Disturbance to soils would occur during any activity that requires excavation, placement of temporary fill, tree harvesting, or where heavy machinery is driven. Disturbance to surface and subsurface water flow may occur during any activity that requires excavation, fill, or use of heavy machinery in or near wet areas. Some short term, localized disturbance to soil and water quality would occur during these activities: construction of rock-log and floodplain roughness elements, direct channel construction or channel initiation, channel plugging and floodplain grading, installation and removal of diversions, and clearing and grading for temporary access roads. A variety of best management practices (BMPs) will be employed to prevent adverse impacts to soil and water resources. Detailed specification for these BMPs, are documented in the design plans for the project (Blackwood Project Design Plans, 2008). These design plans are available at the LTBMU offices and will also be attached to the Storm Water Pollution Prevention Plan (SWPPP), required by the Lahanton Regional Water Quality Control Board to obtain the necessary permits prior to project implementation. A summary of these BMPs are presented below as design features to protect soil and water quality:

SW1. Generally plan surface disturbance activities to begin after August 15 and no later than Oct. 15, depending on stream flow and weather conditions.
SW2. Place stockpile locations along access roads in the SEZ within areas of coarse (cobble-gravel) alluvial sediments.
SW3. Scarify/till and mulch forest soils near and around aspen release sites as well as the temporary access road to and from the SEZ.
SW4. Construct rolling dips or swales and energy dissipaters along existing dirt access road between the staging area and Barker Pass Road.
SW5. Place drain rock within swales on SEZ access roads.
SW6. Install drain rock at entrances of all LTBMU roads to prevent spreading of soils onto adjacent areas.
SW7. Install soil erosion controls such us as metal landing mats, silt fencing, straw wattles or other suitable means to contain material on site. BMPs of this nature would be used along areas such as temporary access roads, the stockpile area on terminal end of the SEZ access road, the staging area, and along the haul road between staging area and the existing LTBMU roads.
SW8. Plant native willow and cotton in areas were flood sediment is deposited (post construction–if necessary).
SW9. Operate equipment in such a way as to prevent accidental spills, and ensure proper disposal of wastes and petroleum products. Specify remediation actions in the event of an accidental spill, including a hazardous spill plan, and

designate refueling and maintenance activities outside of SEZs. These requirements would be explicitly identified in equipment contracts utilized for the project

SW10. In channel construction activities and installation of water diversions would occur after stream flow falls to 4 cfs; and would cease when storms or fall base flow increases, cause flows to exceed 8 cfs.

SW11. Utilize, cofferdam and gravity pipeline or similar measures to re-route surface flow.

SW12. Contain storm flow and excess fugitive ground water with a geo-textile lined sediment basin at the downstream end of the project sites.

SW13. Pump disturbed groundwater from excavations for irrigation of stream banks and floodplains with transplanted and containerized riparian plant stock.

SW14. Jet dislodged fine sediment (using a pump) into the interstitial space between river gravel prior to release of surface flow. Jetting would take place on constructed and historic channels, and will occur on rock-log structures and re-contoured floodplain surfaces.

SW15. Flood irrigate newly constructed channel segments and reactivated historic watercourses, utilizing temporary dams (constructed of sand bags [Site A], and local gravel [Site B]) to back up flow. These dams would cause water to pond temporarily, causing fine sediment to fall out into the freshly constructed streambed surfaces. Site A dams would be removed once flood irrigation was complete. Site B dams would utilize flood flows the following spring. to obliterate the temporary dams and the sand/gravel/cobbles would be incorporated into streambed naturally the following spring. This BMP would reduce turbidity to near background conditions.

SW16. Initiate surface flow into a newly constructed channels or historic watercourses after attempting to reduce turbidity to background conditions.

SW17. Siphon water from the stream, downstream of project areas, to use as water supply for construction activities for dust abatement and construction needs; place screen over the siphon to avoid impacts to fish. Siphoning would be ceased if stream flow level falls below one cubic foot per second, or falls below a level, that would affect fisheries resources, as determined by an LTBMU fisheries biologist.

Vegetation

Disturbance to vegetation would occur because of the construction of the temporary access roads, construction of rock and deflection and floodplain roughness elements, direct channel construction or channel initiation, and channel plugging and floodplain grading. Design features include:

V1. Cropping of riparian vegetation at the ground on access paths to protect root structures and soil integrity. Cropping would be done (if possible) when plants are dormant and clipped with clean pruning equipment to insure no introduction of disease or pests into the stems. Shoots, if viable, may be used as bioengineering materials for replanting.

V2. Stockpiling and irrigation of displaced willow and cottonwood plants.

V3. Replanting displaced vegetation/or cuttings and/or containerized stock in and around rock-log flow deflector structures, floodplain roughness structures, reconstructed and re-graded floodplain areas, and stream banks.
V4. Protecting riparian vegetation with temporary construction fencing; vegetation would cropped as described above were disturbance cannot be avoided
V5. (ASPEN RELEASE) Creating a clearing using heavy equipment, with a radius of approximately 100 feet, around each clone to allow sunlight to penetrate the area and enhance clone recovery. Voids created by removal of conifer root balls, would be filled with native alluvial spoils from stream bank reconstruction nearby.

Vegetation (Sensitive Species)

The LTBMU conducted surveys in the summer of 2004 and 2006. No sensitive species were found in the project area although habitat is present for *upswept moonwort, scalloped moonwort, slender moonwort, common moonwort, Mingan moonwort, western goblin, Bolander's candle moss, subalpine fireweed, short-leaved hulsea, and veined water lichen*. Design features include:

V6. Conduct one more year of surveys prior to construction, by qualified LTBMU Botanist, to determine if any sensitive plant species have colonized channel and floodplain surfaces within the project area.
V7. If species are present, provide appropriate protection such as avoidance, fencing and/or transplant, if feasible.

Vegetation (Noxious and Invasive weeds)

The LTBMU established three priorities with respect to noxious weeds and they are to prevent the introduction of new invaders, conduct early treatment of new infestations, and contain and control established infestations. Surveys for noxious weeds were conducted in the project area during the summer of 2002 and 2006 by LTBMU botany staff. The Noxious Weed Risk Assessment indicates that three species of noxious weeds, *Cirsium vulgare, Hypericum perforatum*, and *Leucanthemum vulgare*, are present along the channel at Sites A&B. One species of invasive weed, Klamathweed – *Hypericum perforatum,* was treated at Site B in 2002 by hand removal of seedheads, and LTBMU field crews would continue to monitor and hand clip and collect seed material at this site in order to control and if possible eliminate this population. Design features include:

V8. Wash trucks and heavy equipment being brought in from outside of the Basin to work on the project, at the Tragedy Spring rock quarry, and inspect prior to leaving the site to prevent transport of weed seed.
V9. Haul routes and material pits must be identified as being weed free.
V10. Any new detections during implementation would be reported to the Forest Botanist and appropriate measures to control and, where possible, measures to eradicate the populations would be taken.
V11. Conduct a weed survey at the boulder supply area on the El Dorado National Forest. If weeds are detected, the botanist would consult with the ENF resource officer to determine the appropriate weed control measures for this site.

V12. Prior to construction, remove all roots and above ground material for any current invasive or noxious weeds encountered in the construction area. All weed plant material would be double-bagged and properly disposed.
V13. Any weed-contaminated soil would be stockpiled away from the construction zone, riparian areas, and staging areas and monitored for two years to determine if new weed seedlings germinate. If any germination of weeds is detected, these populations would be controlled.

Wildlife

Wildlife surveys for all Region 5 designated sensitive species with suitable habitat within the Lake Tahoe Basin have been conducted in Blackwood Canyon since 1989. Refer to the Biological Evaluation/Biological Assessment for complete management requirements during project implementation (APPENDIX C).Design features include:

WL1. All construction related traffic are to travel no faster than 15 miles per hour along Blackwood Canyon Road to decrease the probability of individual mortality of animals crossing the road, and reduce impacts of additional noise disturbance associated with project related traffic.
WL2. To avoid project-related disturbances to breeding activity and the habitat of the species analyzed in the BE/BA, limited operating periods (LOPs) would be implemented around nests, dens, roost sites, and other areas of concentrated use of these species. Prior to project implementation, surveys for willow flycatchers, northern goshawks, and spotted owls would be conducted to attempt to determine the locations of active nest sites. If pre-project surveys determine that a nest or protected activity center (PAC) is not active, the LOP(s) may be lifted at the LTBMU wildlife biologist's discretion.
WL3. All non-degradation standards associated with TRPA habitat disturbance buffers would be observed.
WL4. All trash created during construction would be properly contained in wildlife-proof containers and removed at the end of each day. No trash would be left overnight on site due to the potential of attracting wildlife.
WL5. Riparian vegetation, expected to be displaced during construction operations, would be stockpiled and transplanted either after the bird breeding season, or after any active bird nests within plants have fledged young.
WL6. Any detection made by LTBMU staff of threatened, endangered, management indicator species, sensitive or special interest species, or location of nest or dens of these species would be reported to the Forest Wildlife Biologist or Forest Botanist. These nests, dens, or plant locations would be protected in accordance with the Forest Plan.

Fisheries

The work would cause temporary disturbance to surface and subsurface flows. In addition to the design features previously identified in the soil and water section, additional design features to protect fisheries resources include:

F1. Conduct salvage/recovery of fish with anticipated construction dewatering or diversion zones operations by electro-shocking or other suitable means as developed through consultation and with the California Department of Fish and Game and LTBMU fisheries staff.

F2. Scheduling of construction activities to avoid upstream migration periods (Spring)
F3. Screening of pump intakes to avoid impacts to fish

Heritage Resources

There is a high probability that buried archaeological resources may be present within the proposed undertaking's Area of Potential Effect (APE); particularly pertaining to the Aspen release areas. Therefore, Standard Resource Protection Measures (SRPMs) are needed to protect the archaeological values of any site(s), which may be located within the project's APE, and which may be affected by this undertaking. The proposed project may be implemented as currently planned, provided that the recommended SPRMs would be implemented. These protective measures shall consist of monitoring ground disturbing activities within the proposed project's APE by Heritage Resources specialists. In the event cultural resources are encountered during such monitoring, the procedures as outlined in the Heritage Resource Evaluation (Appendix D) shall be initiated.

Recreation

Truck and construction equipment traffic congestion generated during this project would have short-term impacts to recreational activities and traffic in Blackwood Canyon, and could potentially affect public safety and health. The project areas would be closed to the public during construction activity, from approximately August 1 through the end of the grading season (including any exemptions to the October 15th end of grading season). Design features to protect public health and safety, and minimize impacts to recreational users include:

R1. Postings and public notices would be issued in advance of construction and posted at the bottom of and along Barker Pass Road and the entrance to the old mill site.
R2. Placement of construction fencing around the construction and staging area perimeters.
R3. Personnel with warning flags may be used when Barker Pass road is blocked with equipment entering and exiting the project area.
R4. A temporary forest closure will be issued during implementation within the construction zone.
R5. The rock-hauling contractor's truck drivers, heavy equipment delivery personnel, and Forest Service personnel transporting heavy equipment to and from staging area along the Barker Pass road, will be required to maintain a 15 mph speed limit when traveling on the Barker Pass Road. All other Forest Service personnel will follow the posted speed limit for Barker Pass Road and may reduce speed as conditions (weather or visitor use) dictate.
R6. Construction will only occur from 7:30 am to 5:00 pm on weekdays; no construction will occur on Saturdays or Sundays.
R7. Warnings signs will be posted on Barker Pass road, above and below the project area, to warn users that they are approaching an active construction site.

Air Quality

Transport, stockpiling, staging of construction materials, and construction activities may have short-term impacts on air quality. Air quality impacts would occur from release of fugitive dust. Design features include:

AQ1. Water exposed soil with adequate frequency to keep the soil moist on access roads, areas under construction, and the staging area; avoid over watering so as not to create surface flow down construction and SEZ access roads.

AQ2. Water all stockpiled materials at an adequate frequency during project implementation.

Fire

Construction activities could inadvertently result in an accidental start of a wildfire. The contractor will be required to sign and follow a fire plan developed by the district fire management staff.

FR1. Fire extinguishers and tools shall be required to be kept onsite and in proper working order during project activities.

FR2. Daily monitoring of fire weather and Fire Activity Level will occur during construction. If Fire Activity Levels thresholds are reached, construction will be shut down.

Monitoring Program

The LTBMU considers monitoring to be a key design feature in determining whether the project was implemented as planned, and effective at meeting project goals. The objectives of monitoring for this project are:

- Determine whether project design features and mitigations are implemented as planned, are effective in preventing short term adverse impacts to soil and water, and avoid adverse impacts to heritage resources.
- Determine whether the project is meeting the interim 5-year target of an improving trend in vegetation, sinuosity, and bank stability, established in the Blackwood Creek TMDL (Lahontan, 2007).
- Determine whether long term 20-year targets for vegetation, sinuosity, and bank stability are being achieved, as described in the Blackwood Creek TMDL, and the objectives presented in the Purpose and Need section of this document.

A general description of the monitoring strategy for the Proposed Action is included in APPENDIX E**.** A detailed monitoring plan would be completed prior to project implementation that would provide more description of scheduling and protocols.

ALTERNATIVE 2 – NO ACTION

Under the No Action alternative, the LTBMU would take no action**.**

CHAPTER 3 – AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

This section addresses consequences of each alternative by describing the existing conditions and analyzing the direct, indirect and cumulative effects on resources under each alternative.

As noted earlier, the 2003 watershed analysis (Swanson et. al., 2003) determined that deteriorating conditions in the river corridor has an adverse impact to ecosystem health in Blackwood. Adverse effects arise from excessive stream bank erosion, excessive release of fine sediment into Lake Tahoe, and decreased sediment trapping and nutrient uptake capability due to sparse stream bank and floodplain vegetation cover. Direct and /or indirect effects result from the implementation of either alternative. For cumulative effects, the alternatives were analyzed in terms of how the proposed action, when combined with the effects of past, recent, and future projects, would affect physical and biological resources at the watershed scale. The projects considered in this analysis are:

TABLE 2 – CUMULATIVE EFFECTS PROJECT LIST

Project category	**Project type**	**Project Purpose**	**Year**
Past Projects			
Road Restoration and Upgrades	Infrastructure Upgrades	Decommission North Fork road, upgrade Barker Pass and Middle Fork road with appropriate Best Management Practices (BMPs)	2000-2001
Blackwood Gully Restoration	Channel/Upland Stabilization	Revegetation and stabilization of gullies in the headwaters of Blackwood creek to decrease sediment transport into Blackwood creek	2001-2003
Blackwood canyon Uplands Restoration Project	Channel/Upland Stabilization	Small-scale rehabilitation and revegetation of 7.5 acres of landslide area that occurred along the jeep trail between the north and middle fork of Blackwood creek. Rehabilitation occurred with a hand crew and involved mulching exposed soil areas with native materials, placing logs occasionally over mulched areas to discourage off trail travel and revegetating with native plant mixes.	2002

Blackwood Fish Ladder Removal (Phase I)	Channel/Ecosystem Restoration	Removal of fish ladder that was placed in Blackwood creek above existing bridge near the old gravel mining operation and replacement with a naturalized boulder step pool. Purpose was to replace a fish passage structure that didn't allow for complete hydrologic function with another channel design that improved fish sediment storage and passage function	2003
Quail Vegetation and Fuel Treatment Project	Fuels Reduction	Conifer removal	2005-2008
Blackwood Bridge replacement (Phase II)	Infrastructure Upgrades	Replaced existing culvert on Barker Pass road where it crosses Blackwood creek with a 100-year flood capacity bridge	2006
Present Projects			
Quail Vegetation and Fuel Treatment Project	Fuels Reduction	Prescribed pile burning	2008-2012
USFS Urban Lots fuels reduction	Fuels Reduction	Prescribed pile burning and chipping in previously thinned urban lots	2008
CTC Urban Lots fuels reduction project	Fuels Reduction/aspen regeneration	Reduce fuels on CTC urban lots in the Tahoe Pines neighborhood	2008
Future Projects			
Placer County Erosion control project (Tahoe Pines)	Infrastructure Upgrades	Implement erosion control measures within Tahoe Pines residential unit.	2009
CTC Lower Blackwood Creek Restoration Project	Channel/Ecosystem Restoration	Improve wildlife habitat and channel stability of Lower Blackwood creek, while reducing sediment loads to the Lake by 1) increasing stream shading, 2) creating benches on the floodplain to enhance area for riparian habitat and increase area for overbank flooding, 3) removing encroaching conifer, and 4) stabilizing eroding banks. Minor trail upgrades in the vicinity to reduce sediment sources.	2010

3.1 SOILS & WATER

Existing condition

The soils in the project area which may be subject to disturbance consist of a range textures from fine sandy loam soils in forested areas on the adjacent terraces, and fine (silt) to coarse (cobble-gravel) alluvial loams and coarse well-drained alluvial wash sediments on the floodplains. Currently upland forest soils at Site A have retained adequate soil cover, and soil function following hand thinning operations during the

Quails fuel reduction project (LTBMU, 2004). Forest soils at Site B are undisturbed and have an organic surface layer that grades into weakly developed 'A' horizon.

However, past land uses have affected floodplain soils adversely. Land use impacts converted the soils in the active floodplain at Sites A&B to coarse, cobble-gravel alluvial wash after existing floodplain top soils were eroded away. These modern-day deposits are young and not enough time has passed for soil to develop in these areas.
These past land uses also have affected water quality and water storage capacity adversely. Vertical cut-banks (terraces) and large scale, coarse grain in-channel bars confine flow and keep water depth and velocity higher than what occurred under pre-disturbance condition. Higher flow depth and velocity, particularly during floods, increases erosive force and sediment transport capacity, decreases the quality of water flowing off these sites. Channel down cutting and widening created conditions causes the valley aquifer to drain earlier in the season, reducing storage capability and water supply for late summer stream flow.

Alternative 1- Proposed Action

Direct effects
This alternative would have short-term localized impacts on forest soils and floodplain deposits. Forest loams within access paths, the stockpile area, and Aspen release areas, may be compacted by heavy machinery. Heavy equipment used in structure installation, channel construction, gully channel plugging, and floodplain construction and shaping (re-grading), would displace floodplain deposits. Some stream bank and floodplain surface erosion is expected in the short term, however employing design features described in Section 2 of this document would minimize these impacts to acceptable levels. In summary these design features would prevent short-term effects to forest soils during project implementation, as relates to wind and water erosion, reverse the short-term effects to soils where impacts are unavoidable through rehabilitation of soils, protect floodplain alluvium during project implementation to prevent the release of sediment into a live channel, and minimize transport of fine-grain sediment during high flows as the stream and floodplain equilibrate in the short-term

There could be short-term, localized impacts to water quality onsite, during excavation and installation and removal of diversions. Short-term impacts to water quality downstream could also occur during re-watering operations, or if storm flows were to overwhelm water control design features during implementation.

Employing the design features described in Section 2 would reduce these impacts to water quality to acceptable levels during project implementation.

Indirect effects
Restoration actions would have a beneficial effect on water quality indirectly by creating new hydraulic conditions which would decrease erosion, increase sediment deposition potential, increase vegetative growth, and filtering and uptake of soluble nutrients in the water column. Restoration actions would also raise the water table and increase water retention potential, which increases the availability of water for vegetation and stream flow for aquatic organisms later in the season, and results in increased chemical

weathering, microbial activity, and soil formation. Restoration actions will also result in longer and shallower flow path in the Blackwood stream channel, which results in decreased channel and vertical cut-bank erosion, and increased sediment deposition on stream banks, floodplains, and preservation of existing alluvial soils.

Cumulative effects

As noted earlier in this document, historic activities associated with resource extraction had significant impacts in terms of cumulative watershed effects. The Swanson 2003 watershed analysis documented how the sum of the effects of resource extraction activities, when combined with natural dynamics of this watershed, resulted in significant adverse impacts to soil and water resources. This analysis indicates that uplands and headwater streams are recovering, but that some portions of the valley (river and floodplain) have not begun to recover in terms of soil and water function. Swanson determined that without direct channel and floodplain process-based restoration, poor soil and water conditions in impacted sections of the river corridor would persist for decades or longer.

Uplands

This alternative when combined with past and future upland restoration projects (road obliteration, gully repair, recreation site rehabilitation, and residential BMP upgrades) help to restore proper soil and water function in the watershed. At the project scale, these actions decrease surface water velocity, increase water percolation, and promote conditions where soils can heal and evolve. These conditions promote natural water storage characteristics and water-soil chemical interactions, natural soil and water delivery rates at these sites. These effects may translate down to the river corridor in terms of delivering less fine sediment and nutrients where the sites are connected to surface water, or potentially increase the amount water available for summer low flows in some tributaries that feed Blackwood Creek.

Although past fuels treatment projects have resulted in some loss of soil infiltration capacity in the watershed (calculated in terms of equivalent roaded area or ERA), the cumulative watershed effects (CWE) analysis presented in the Quail Vegetation and Fuel Treatment EA (LTBMU, 2005) indicate that this watershed is still below the threshold of concern as it relates to impervious cover thresholds.

River Corridor

Past projects (including Blackwood Phases I and II), this project, and future projects (CTC-Lower Blackwood creek), promote hydraulic and vegetative conditions in the river corridor that support the proper soil and water resource function.

Blackwood Phases I and II restored a natural pattern of sediment and water flow locally, and were designed in such as way (step pool / boulder grade control) as to prevent channel bed erosion and excessive sedimentation, protecting water quality downstream. These sites will retain sediment on their channel banks and floodplains as the riparian vegetation platform establishes itself. Once vegetation is established, these sites will trap sediment and treat runoff through nutrient uptake.

In this alternative, the installation rock-log and floodplain roughness structures, channel construction, activation of the historic channel, and riparian plantings; would promote a hydraulic, hydro-geologic, and vegetative platform that restores a natural flow patterns of sediment sequestration, improving soil function and runoff treatment capacity.

The CTC – Lower Blackwood Creek project would also promote a stable channel, floodplain, and vegetative platform, resulting in improved hydrologic function.

In summary, the net effect of this alternative combined with other past and future river restoration projects, is the restoration of hydrologic function along sections of the stream channel and floodplain where impacts from past land use were most severe. Combining these effects of these improvements with the current trend in recovery and / or preservation of soil and water quality along the functional sections of Blackwood Creek, translates into restoration of soil and water function along most of the main stem Blackwood Creek. Therefore, cumulative impacts from this alternative would result in net positive effect on the hydrologic function of the stream channel and floodplain of Blackwood Creek.

Alternative 2 - No Action.

Direct Effects
No Effect

Indirect and Cumulative Effects
This alternative would permit conditions for hydrologic function to be poor for decades or longer. The lack of soil development indirectly affects vegetation communities by limiting the nutrients available for plant uptake. Negative impacts to water quality would continue, due to hydraulic conditions promoting high flow energy, erosion, delayed colonization of riparian vegetation, and continued excessive volume of sediment delivered to Lake Tahoe. The valley aquifer would continue to drain at the current rate. . Forest structure, composition, and inter-specific competition at Aspen release sites may limit Aspen release potential.

3.2 VEGETATION

Existing condition
Currently, the project area includes suitable habitat for the species listed in the following table.

TABLE 3 – SENSITIVE PLANT LIST

Species	**Status[1]**	**Suitable habitat**
Vascular Plants		
Galena Creek rockcress *(Arabis rigidissima var demota)*	S	
Tahoe yellow cress (*Rorippa subumbellata*)	C, S, SI	
Tahoe Draba *(Draba asterophora var. asterophora)*	S	
Cup Lake Draba (*Draba asterophora var. macrocarpa)*	S	

Subalpine fireweed (*Epilobium howellii*)	S	X
Donner Pass buckwheat (*Eriogonum umbellatum* v. *torreyanum*)	S	
Starved daisy (*Erigeron miser*)	S	
Long petaled lewisia (*Lewisia longipetala)*	S	
Upswept moonwort (*Botrychium ascendens*)	S	X
Scalloped moonwort (*Botrychium crenulatum*)	S	X
Western goblin (*Botrychium montanum*)	S	X
Nonvascular Plants		
Veined water lichen *(*Hydrothyria venosa)	S	X
Bolander's candle moss *(Bruchia bolanderi*)	S	X
Three-ranked hump-moss (*Meesia triquetra*)	S	
Broad-nerved hump-moss (*Meesia uliginosa*)	S	

X = project area could support this species

[1] Status explanations

T	=	USFWS Threatened Species
C	=	Candidate for listing as threatened or endangered under the ESA
MIS	=	LTBMU Management Indicator Species
S	=	LTBMU Sensitive Species, Regional Forester's Sensitive Species List, Fall 2001
SI	=	TRPA Special Interest Species, Regional Plan for the Lake Tahoe Basin: Code of Ordinances, 1987 (Updated 2002)
E	=	USFWS Endangered Species
P	=	USFWS Petitioned for listing

Vegetation communities at each site differ. Vegetation at Site A consists of annual and perennial grasses and forbs on the barren alluvial wash and scattered pockets of woody shrub and trees (remnant Cottonwood Forest intermixed with conifer) on the terraces above the main channel. The overall vegetative condition at Site A is poor.

Vegetation at Site B consists of willow-cottonwood mix with conifers encroaching on the stream banks and central terrace, and an under-story of rhizomatous perennial grasses and forbs. Conifers and shrubs with depressed stands of Aspen occur on the terraces where the Aspen release actions would occur. The overall vegetative condition at Site B is fair, but at risk because of conifer encroachment as result of a depressed water table.

Alternative 1- Proposed Action.

Direct effects

This project would have short-term impacts on approximately 50 acres of vegetation communities, (little or no vegetation exists on the remaining 30 acres of barren, well drained, cobble-gravel river bar). Restoration activities will result in the short term displacement of riparian vegetation, and loss of some herbaceous species for this 50 acre area. There is also the potential for adverse impacts from introduction of noxious weeds from heavy equipment and imported construction materials, as well as adverse impacts to sensitive plants that may be present, but were not identified in previous project surveys.

Employing the design features presented in Section 2 would minimize the potential for adverse impacts to vegetation through recycling vegetation cropped or displaced during

construction activities, minimizing the potential for noxious weed introduction and prevent the spread of weeds if they are introduced inadvertently, and protecting sensitive plants if they were present

Indirect effects
This alternative promotes soil and water conditions that lead to increased colonization and establishment of desired species. These new condition may promote the colonization desirable sensitive species, and discourage the colonization of noxious weeds. In addition restoration actions would reverse the effect of conifer encroachment and enhance Aspen stand density and vigor, resulting in an overall improvement to desired conditions for vegetation in this area.

Cumulative effects
As with soil and water, there were significant adverse impacts to vegetation resources from past upland grazing, timber harvest, and gravel extraction. Upland and headwater stream vegetation is recovering, but some portions of the valley (river and floodplain) have not begun to recover in terms of vegetative function. Swanson determined the loss of vegetative structure on the valley bottom was one of the key factors in the degraded condition along the river corridor. Poor hydraulic and soil conditions translate into poor vegetation conditions in impacted sections of the river corridor that would persist for decades or longer, without direct intervention.

Uplands
This alternative when combined with these past and future upland projects (road obliteration, gully repair, recreation site rehabilitation, and residential BMP upgrades) promotes desired vegetative structure at these sites. At the project scale, these actions restored surface slope and soil conditions so that vegetation can flourish locally. These conditions promote root strength, which holds soil in place. Roots also fluff the soil and create sub surface voids, which promote desired water percolation characteristic at these sites. These effects may translate down to the river corridor in terms of delivering less fine sediment and nutrients where the sites are connected to surface water, or potentially increase the amount water available for summer low flows in some tributaries that feed Blackwood Creek.

In summary, the general trend in the recovery of vegetation in the uplands and headwater streams (Swanson, 2003) and the combined effects of this alternative with past, recent and future actions indicate that upland vegetative condition would continue to improve and no adverse effects would be translated down to the river corridor.

River Corridor
Past projects (Blackwood Phases I and II), this project, and future projects (CTC-Lower Blackwood creek), promote water and soil conditions in the river corridor that support proper vegetative function.

Blackwood Phases I and II restored a natural pattern of sediment and water flow locally, which promotes the establishment of riparian vegetation community. Once vegetation is established, the sites would trap sediment, and treat runoff through nutrient uptake.

In this alternative, the installation rock-log and floodplain roughness structures, channel construction, activation of the historic channel, and riparian plantings; promote conditions that improve vegetative cover, resulting in increased sediment sequestration, and treatment of runoff through nutrient uptake.

The CTC – Lower Blackwood Creek project would also include actions that would produce similar results as described above.

In summary, the net effect of this alternative combined with other past and future river restoration projects, is the restoration of vegetative function along sections of Blackwood Creek where impacts from past land use were most severe. Combined with the current trend in recovery and / or preservation vegetation along the functional sections of Blackwood Creek, this translates into restoration of vegetation form and function along the most of main stem Blackwood Creek. Therefore, the cumulative impacts from projects on river vegetation resources result in a net positive effect on desired conditions for vegetation in this watershed.

Alternative 2 - No Action.

Direct effects
No effect

Indirect and Cumulative effects
Taking no action would continue to promote water flow and soil conditions that would inhibit the proper function of vegetation communities in the river corridor for decades. Continued high flow energy would perpetuate large areas of coarse grained porous alluvium, with impacts greatest downstream of the project area.

3.3 WILDLIFE

Existing Condition
See above section on existing vegetation conditions for a description of habitat conditions for wildlife within the proposed project area at Sites A & B. In general, riparian vegetative cover is limited within the Site A floodplain providing little functional habitat for wildlife in this portion of the project area, with the exception of foragers that prefer edge habitats. Conditions along the channel and floodplain at Site B offer greater riparian cover for wildlife communities due to the willow-cottonwood riparian forest mixed with conifers, although under-story structure and diversity are still less than desired due to the currently lowered ground water table and reduced riparian productivity. Conditions described in the Aspen release areas adjacent to Sites A & B generally indicate a near type conversion of habitat from aspen to conifer dominated forest, hence the current abundance and diversity of wildlife within these Aspen stands are suppressed just as the aspen trees are; current conditions do not reflect the potential of fully functioning Aspen stands.

Several wildlife species of management concern have been detected, have suitable habitat within or adjacent to the project area, and were analyzed for species-specific effects of

the proposed action and alternatives. The two tables below list the determinations for Forest Sensitive species and Management Indicator Species:

TABLE 3 – FOREST SENSITIVE SPECIES EFFECTS DETERMINATION

Species	Special Status	Known to Occur in the Project Area	Suitable Habitat in the Project Area	*Determination
Birds				
Bald Eagle (*Haliaeetus leucocephalus*)	Forest Sensitive Species	Y	Y	MANL
American Peregrine Falcon (*Falco peregrinus anatum*)	Forest Sensitive Species	N	Y	MANL
California Spotted Owl (*Strix occidentalis occidentalis*)	Forest Sensitive Species	Y	Y	MANL
Northern Goshawk (*Accipiter gentiles*)- **also trpa sis**	Forest Sensitive Species	Y	Y	MANL
Willow Flycatcher (*Empidonax traillii adastus*)	Forest Sensitive Species	N	N	MANL
Great Gray Owl (*Strix nebulosa*)	Forest Sensitive Species	N	N	NE
Mammals				
Sierra Nevada red fox (*Vulpes vulpes necator*)	Forest Sensitive Species	N	Y	MANL
American marten (*Martes americana*)	Forest Sensitive Species	Y	Y	MANL
California wolverine (*Gulo gulo luteus*)	Forest Sensitive Species	N	N	NE
Townsend's big-eared bat (*Corynorhinus townsendii*)	Forest Sensitive Species	Y	Y	MANL

*Federally Listed Species

NA - Would not affect the species or its designated critical habitat.
NLAA - May Affect Not Likely to Adversely Affect the species or its designated critical habitat.
LAA - May affect and is likely to adversely affect the [name of species] or its designated critical habitat

Sensitive Species

NE – Would not affect the species.
MANL – May affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability. Also includes beneficial effects to species.
MALT - May affect individuals, and is likely to result in a trend toward Federal listing or loss of viability.

TABLE 4 – MANAGEMENT INDICATOR SPECIES EFFECTS DETERMINATION

Habitat or Ecosystem Component	CWHR Type(s) defining the habitat or ecosystem component[1]	Sierra Nevada Forests Management Indicator Species *Scientific Name*	Category for Project Analysis [2]	Effects Determination[3]
Riverine & Lacustrine	lacustrine (LAC) and riverine (RIV)	aquatic macroinvertebrates	Category 3	MAHF/NE
Riparian	montane riparian (MRI), valley foothill riparian (VRI)	yellow warbler *Dendroica petechia*	Category 3	MAHF/NE
Wet Meadow	Wet meadow (WTM), freshwater emergent wetland (FEW)	Pacific tree frog *Pseudacris regilla*	Category 3	MAHF/NE
Early Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer	Mountain quail *Oreortyx pictus*	Category 1	NE

	(SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree sizes 1, 2, and 3, all canopy closures			
Mid Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 4, all canopy closures	Mountain quail *Oreortyx pictus*	Category 3	MAHF/NE
Late Seral Open Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P	Sooty (blue) grouse *Dendragapus obscurus*	Category 1	NE
Late Seral Closed Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6.	California spotted owl *Strix occidentalis occidentalis*	Category 2	NE
		American marten *Martes americana*		NE
		northern flying squirrel *Glaucomys sabrinus*		NE
Snags in Green Forest	Medium and large snags in green forest	hairy woodpecker *Picoides villosus*	Category 3	MAHF/NE
Snags in Burned Forest	Medium and large snags in burned forest (stand-replacing fire)	black-backed woodpecker *Picoides arcticus*	Category 1	NE

[1] All CWHR size classes and canopy closures are included unless otherwise specified; **dbh** = diameter at breast height; **Canopy Closure classifications:** S=Sparse Cover (10-24% canopy closure); P= Open cover (25-39% canopy closure); M= Moderate cover (40-59% canopy closure); D= Dense cover (60-100% canopy closure); **Tree size classes:** 1 (Seedling)(<1" dbh); 2 (Sapling)(1"-5.9" dbh); 3 (Pole)(6"-10.9" dbh); 4 (Small tree)(11"-23.9" dbh); 5 (Medium/Large tree)(≥24" dbh); 6 (Multi-layered Tree) [In PPN and SMC] (Mayer and Laudenslayer 1988).

[2] **Category 1:** MIS whose habitat is not in or adjacent to the project area and would not be affected by the project.

Category 2: MIS whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project.

Category 3: MIS whose habitat would be either directly or indirectly affected by the project.

[3] **NE:** MIS in Category 1 or 2 for Project analysis, for which there would be no direct or indirect effects of the proposed project on habitat for the respective MIS.

MAHF/NE: MIS in Category 3 for project analysis, for which proposed actions may affect individual habitat factors at the project scale for MIS, but would not alter the existing trend in the habitat for the MIS, nor would it lead to a change in the distribution of the MIS at the bioregional scale.

Additionally, there are species that are TRPA Special Interest Species (SIS). The LTBMU evaluated SIS species in terms of impacts to TRPA Thresholds. The following table is a list SIS species and the determination for each:

TABLE 5 – TRPA SPECIAL INTEREST SPECIES EFFECTS DETERMINATION

Species	Population Sites[1]	Disturbance Zone (mi.)	Potential to Impact Threshold Standard? Y/N	Determination
Northern goshawk (*Accipiter gentiles*)	12	0.50	Y	No Substantial effect
Osprey (*Pandion haliaetus*)	4	0.25	N	No Substantial effect
Bald eagle (winter) (*Haliaeetus leucocephalus*)	2	Mapped	N	No Substantial effect
Bald eagle (nesting)	1	0.50	N	No Substantial effect
Golden eagle (*Aquila chrysaetos*)	4	0.25	N	No Substantial effect
Peregrine falcon (*Falco peregrinus anatum*)	2	0.25	N	No Substantial effect
Waterfowl	18	Mapped	Y	No Substantial effect
Mule deer (*Odocoileus hemionus*)	Critical fawning habitat	Meadows-Critical fawning habitat is mapped	Y	No Substantial effect

For a complete analysis of Threatened, Endangered, Sensitive (TES), TRPA Special Interest Species, and Management Indicator Species (MIS) habitats analyzed for impacts of the proposed action (alternative 1) and alternatives (alternative 2; no action), refer to the following reports: Blackwood Creek Phase 3 – Stream and Floodplain Restoration Project Biological Assessment-Biological Evaluation, and MIS report (Appendix C).

The following summarizes impacts to only those species that have the highest potential for impact from the proposed project.

Alternative 1 - Proposed Action

<u>California Spotted Owl</u>

This alternative may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability of the Spotted Owl. Design features in this alternative would minimize adverse direct, indirect, and cumulative impacts to the Spotted Owl in the following ways:

1. *Direct and indirect effects* of proposed actions to individuals would be largely avoided, due to implementation of design features [e.g., LOP (March 15 to August 1)and vehicle traffic restrictions] aimed at avoiding impacts to breeding individuals, due to the overall lack of temporal overlap of spotted owl foraging (nighttime) and project related activities (daytime), and due to the lack of suitable roosting habitat in the project area; only occasional displacement of roosting individuals due to noise disturbance may occur.
2. *Direct and indirect effects* of proposed actions to spotted owl habitat include a short-term reduction in foraging habitat quantity by ~20-30 acres in treated aspen stands.
3. *Long-term direct and indirect effects* of proposed actions to spotted owl habitat include a net zero effect to a possible increase in habitat quality and quantity due to the anticipated long-term development of ~10-30 acres of mature riparian forest, and eventual development of ~20-30 acres of treated aspen stands to suitable foraging habitat and maybe nesting/roosting habitat.
4. *Cumulative effects* of past, present, and future projects overall can be considered beneficial relative to the previous baseline condition after the 1990's, in terms of enhancing and protecting spotted owl habitat. Overall cumulative projects effects are expected to result in reduced tree densities, lower risk of wildfire, and enhancement of riparian habitats for wildlife foraging and breeding.

Northern Goshawk

This alternative may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability of the Northern goshawk. Design features in this alternative would minimize adverse direct, indirect, and cumulative impacts to the Northern Goshawk in the following ways:

1. *Direct and indirect effects* of proposed actions to individuals would be minimal, due to design features [e.g., LOP (February 15 to September 15) and vehicle traffic restrictions] aimed at avoiding impacts to breeding activities, and due to the availability of suitable habitat outside of the project area as refuge for individuals potentially displaced while foraging during project implementation.
2. *Direct and indirect effects* of proposed actions to goshawk nest stands would largely be avoided because no construction activities are within 500 feet of nest sites. Short term effects to foraging and additional suitable nesting habitat in the project area may include a short term reduction in habitat quality due to vegetation treatments that would reduce vegetation structure and total canopy closure in aspen stands.
3. *Long term direct and indirect effects* of proposed actions to goshawk habitat include an increase in habitat quality (release of conifer encroachment within 20-30 acres of aspen habitat) and quantity (development of 10-30 acres of mature riparian forest on floodplain).
4. *Cumulative effects* of past, present, and future projects overall can be considered beneficial relative to the previous baseline condition after the 1990's, in terms of enhancing and protecting goshawk habitat. Overall cumulative projects effects are expected to result in reduced tree densities, lower risk of wildfire, and enhancement of riparian habitats for wildlife foraging and breeding

Alternative 2 - No action

Direct effect
No effect

Indirect and Cumulative Effects
This alternative would have impacts on Goshawk and Spotted Owl for several reasons. If the current state of functionality is left static within the project area, due to no action, the habitat for the above species, including riparian habitat, may continue to degrade. Healthy riparian areas promote nesting and foraging by passerine birds and rodents, which in turn provide prey for several species of management concern including marten, northern goshawk, spotted owl, and Sierra Nevada red fox. It also provides nesting/fawning and foraging habitat for waterfowl, mallard, bald eagle, willow flycatcher, Townsend's big-eared bat and mule deer.

3.4 FISHERIES

Existing condition
Blackwood Creek currently supports mixed population of lake run and resident salmonid and native non-game species including Lahontan redside (*Richardsonius egregious*), Paiute sculpin (*Cottus beldingii*), brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss*), and brown trout (*Salmo trutta Linnaeus*). General habitat conditions in the project areas are poor at this time.

TABLE 6 – SPECIAL STATUS AQUATIC SPECIES EFFECTS DETERMINATION

Species	Status[1]	Suitable habitat
Fish Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi)*	T, SI	No
Lahonton Lake tui chub (*Gila bicolor pectinifer)*	S	No

[1] Status explanations

T	=	USFWS Threatened Species
C	=	Candidate for listing as threatened or endangered under the ESA
MIS	=	LTBMU Management Indicator Species
S	=	LTBMU Sensitive Species, Regional Forester's Sensitive Species List, Fall 2001
SI	=	TRPA Special Interest Species, Regional Plan for the Lake Tahoe Basin: Code of Ordinances, 1987 (Updated 2002)
E	=	USFWS Endangered Species
P	=	USFWS Petitioned for listing

No special status fish species occur within the project area, nor does suitable habitat exist at this time. It is unlikely that Lahonton Lake tui chub (*Gila bicolor pectinifer)* would migrate to the portion of stream designated in the project. Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi)* are negatively affected in streams that have been degraded by grazing, logging, road building, mining, dams, diversions, and other human endeavors as well as interaction with nonnative trout (especially if the introduced species

are fall or winter spawners, unlike Lahontan cutthroat, which spawn in spring). A variety of these disturbances have occurred in the Blackwood Creek watershed.

Alternative 1 - Proposed Action

Direct effects
The project should provide improved instream habitat by providing new instream cover, better pool development, and improved sediment sorting and gravel substrate. Over the long term, lengthening the channel by the anticipated reduction in slope would increase stream length and provide more aquatic habitat. Prior to construction at Sites A & B, those species found would be captured and released in suitable habitat outside the construction area. The alternative would have some temporary minor effects on existing macroinvertebrate communities due to construction activities, but over the long term better substrate and greater areas of streambed should increase production.

Indirect effects
No adverse indirect effects are likely. Reduction of current erosion and improvements in geomorphic function would enhance aquatic habitat within and downstream of the project area. The enhancement of natural fluvial habitat, sediment transport, and deposition would improve water quality and aid in the regeneration of riparian vegetation. These improvements would enhance spawning habitat in the project areas as well as up and downstream. The improvements water quality and riparian vegetation would enhance the macroinvertebrate population thus increasing the food supply to other aquatic species.

Cumulative effects

The cumulative effects of this alternative, when combined with other projects in Blackwood Canyon would have positive long-term effects on fisheries. Those effects are: more higher-quality instream cover and substrate conditions with greatly improved fish passage provided by other project phases (i.e., Barker Pass Road crossing replacement and Fish ladder replacement), and improved conditions for all species with greatly improved conditions for macroinvertebrate communities due to increased water tables and recolonization of riparian vegetation. No adverse cumulative effects are likely.

Alternative 2 - No action

Direct effect
No effect

Indirect Effect and Cumulative Effects
This alternative would continue to have negative effects on fisheries by not changing the current unfavorable conditions in suitable habitat. Impacts to fisheries would be due to unfavorable hydraulics, inadequate habitat, and fewer available food sources.

3.5 HERITAGE RESOURCES

No direct, indirect, or cumulative effects would occur regardless of which alternative is chosen.

3.6 RECREATION

Existing condition

The Barker Pass Road corridor and the Blackwood Creek corridor in the project reach, both of which would be affected and used for construction in the canyon, are major sources of recreation in the Lake Tahoe Basin. The Barker Pass Road runs the length of the Blackwood Creek/Canyon corridor, and provides access to public lands in the canyon and to the adjoining Tahoe National Forest. The canyon is a popular area for dispersed recreation. Recreational activities occurring near the project area includes dispersed camping, biking and mountain biking, roller blading, hiking, scenic driving, and recreational shooting.

Direct effects

This alternative would have short-term periodic impacts on traffic flow and recreational activities in the project area. Specific effects to recreation activities with measures to minimize impacts are:

1. There would be minor disruptions, to vehicle, bicycle, and roller blade traffic on Barker Pass Road as equipment and materials are transported from the staging area to the project stockpiles. These disruptions may last up to 30 minutes per working day. Equipment would be moved during off peak travel hours minimize impacts to traffic. Design features R1 and R3 would be implemented to protect recreational users on the Barker Pass Road.
2. The immediate project areas would be off limits to hiking, fishing, and other streamside recreational activities during construction activities. These activities would still be available to the public at many other locations along the stream corridor. Design feature R2 would delineate recreational use boundaries in the construction area.
3. The Blackwood dispersed camping area is approximately ½ mile from the closest project area. Judging from previous years' construction activities in the stream corridor, there should be only a minor affect from the construction activities or noise. Design feature R4 minimizes impacts to dispersed camping in Blackwood.
4. The mountain bike route traversing the slope on the southern side of the stream corridor would remain open but would be lined with construction fence (Design feature R3) to prohibit access to project sites.

Indirect effects

No effect

Cumulative effects

The cumulative effects of this alternative, when combined with other projects in Blackwood Valley would have positive long-term effects on recreation. Restoration results in improved aesthetics, increased opportunities for wildlife viewing, higher quality streamside hiking, and increased opportunities for fishing.

Alternative 2 - No action

No direct, indirect, or cumulative effects to recreation

3.7 AIR QUALITY

Existing condition
The Blackwood Creek watershed has good air quality that rarely violates ambient standards. Because the proposed action is in an area that is in attainment for all state and federal ambient air quality standards, an air quality conformity analysis (pursuant to CFR Parts 51 and 93) is not required for this action.

Alternative 1 - Proposed Action

Direct, Indirect effects, and Cumulative effects
This alternative involves short-term construction activities associated with transporting and staging of materials and SEZ restoration. Short-term construction activities associated with these activities would generate minor amounts of construction vehicle exhaust and fugitive dust. The design features presented in Section 2 would protect temporary construction roads and stockpile areas from the transport of fugitive dust airborne transport. Long-term benefits would occur because restoration action that restores vegetative structure on temporary access paths, aspen release sites, stream banks, and floodplains, which also stabilize the soils and reduce the potential for airborne transport of fugitive dust.

Alternative 2 - No action

Direct Effect
No effect

Indirect and Cumulative effects
Continued potential for fugutive dust release from barren alluvial wash communities.

3.8 EFFECTS SUMMARY

A checklist summary of project impacts to resources is presented in Appendix F. This checklist format was obtained from the Lahontan Regional Water Quality Control Board, to use as a tool for this purpose. The results presented in this Appendix and the discussion above, indicate that there are no potentially significant adverse direct, indirect, or cumulative impacts related to the proposed project. The project would be expected to result in a net positive impact to soil and water, vegetation, wildlife, and recreation (aesthetic) resources over the long term. There would be the potential for less then significant short term adverse impacts (with mitigation incorporated) related to the following resources: recreation (aesthetics and noise), soil and water (including hazardous materials), vegetation, wildlife, hazards (fire), cultural resources, and air quality, as described above. There are no impacts anticipated to the following resources:

agricultural, land use and planning, mineral resources, population and housing, public services, transportation and traffic, and utilities and service systems.

REFERENCES

Lahontan. 2007. Total Maximum Daily Load for Bedded Sediment, Blackwood Creek, Placer County, Final Staff Report, California Regional Water Quality Control Board, Lahontan Region

LTBMU. 2005. Quail Vegetation Treatment and Fuel Reduction Project Environmental Assessment, USDA Forest Service, Lake Tahoe Basin Management Unit.

LTBMU. 1988. Land and Resource Management Plan. USDA Forest Service, Lake Tahoe Basin Management Unit.

Simon. A. 2006. Lake Tahoe Basin Framework Implementation, Sediment Loadings and Channel Erosion Study.

Swanson. M., Keisse. M. Hanes, W., 2003, Blackwood Creek Watershed Analysis and Restoration Plan, Final Report, USDA Forest Service, Lake Tahoe Basin Management Unit

Swanson. 2008. Reach 6 Rock Debris Jam, Channel and Floodplain Enhancement Structures (95%) and Reach 1 Channel and Floodplain Enhancement Plan (60%). USDA Forest Service, Lake Tahoe Basin Management Unit.

Swanson 2007. Phase III Design Report. USDA Forest Service, Lake Tahoe Basin Management Unit.

APPENDIX A - Management Direction Summary

LAND AND RESOURCE MANAGEMENT PLAN

The USDA Forest Service authority to manage and regulate National Forest system lands is derived form the Organic Administration Act of 1897 (16 USC 551). The Multiple-Use Sustained-Yield Act of 1960 (16 USC 528, 528-531) confirmed USDA Forest Service regulatory authority over recreational use and watershed improvement. This law sets a Congressional policy that National Forests be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes. It directs that forest resources be utilized in the combination that would best meet the needs of the American people. It allows for some of the land to be used for less than all of the resources. The National Forest Management Act (NFMA) of 1976 (16 USC 472 et seq.) establishes the planning requirements for National Forest System lands.

LTBMU FOREST PLAN

The LTBMU, an administrative unit of the National Forest system, has approved a Land and Resource Management Plan (Forest Plan) that establishes a programmatic framework specifically for managing National Forest lands within Lake Tahoe's watershed (USDA Forest Service 1988).

Management goals describe the desired future condition expected to result from Forest Plan implementation. Successful achievement of these goals is dependent on accomplishing the activity and production levels described as objectives, employing the standards and guidelines, and receiving appropriate funding. Additionally, monitoring and evaluation might necessitate adjustment of those same objectives, standards, and guidelines to achieve management goals.

The following section describes highlights of goals and predicted conditions, excerpted from the Forest Plan, which bear directly upon the project's desired outcomes. Other goals can be referenced in the Forest Plan.

- WATER QUALITY GOAL: Reverse the downward trend in the quality of water entering Lake Tahoe and tributary streams. Restore water quality in the lake toward the clarity occurring when measurements first began (Forest Plan, page IV-10).
  Predicted Condition: Restoration of disturbed land would have occurred by the year 2005.

- RIPARIAN AREA GOAL: Riparian areas are able to perform their natural function in the environment, such as habitat for dependent species and for watershed protection (Forest Plan, page IV-8).

Predicted Condition: Damaged riparian areas would be restored through the watershed restoration program, adjustments in management practices, and natural rehabilitation over time.

Management Objectives, described as average annual outputs (Forest Plan pages IV-12-13), were designed to measure the attainment of the Forest Plan, and to provide forest-wide management direction.

Management Practices, along with the Forest-wide Standards and Guidelines that implement them, provide management direction to the various resource areas. The Water Quality Maintenance and Improvement Practice (Practice 30, Forest Plan pages IV-33-34) provides overall management direction specific to restoration projects, with a purpose of restoring damaged sites. It directs the LTBMU to restore damaged watersheds and sites contributing to water quality degradation, with SEZs designated the first priority for restoration. It sets a goal of attaining an overall 5% increase in acreage of naturally functioning SEZ lands in the Basin through restoration activities. It allows replacement of existing land coverage in SEZs where the proposed action would reduce impacts and not impede restoration efforts.

In addition, the General Management Practices (Forest Plan page IV-18) notes that "in resolving conflicts, the following list of resources or used are in order of priority and would normally apply: Highest priority would be given to the protection of water quality and the enhancement of the clarity of water in lake Tahoe…" and "program and project development would be guided by both this forest plan and by the Tahoe Regional Planning Agency (TRPA) Regional plan for the Tahoe Basin."

SIERRA NEVADA FOREST PLAN AMENDMENT

The recently adopted Sierra Nevada Forest Plan Amendment (SNFPA) amends the Forest Plans on National Forest Lands in the Sierra Nevada. All activities associated with this project as well as any future stream restoration projects the Tahoe Basin must abide by the management direction provided by this plan. The Record of Decision (ROD) for the SNFPA Final Environmental Impact Statement (FEIS) was signed in January 2004.

One of the five primary purposes of the SNFPA was to develop regional directives that would protect and restore aquatic, riparian, and meadow ecosystems and provide for the viability of native plant and animal species associated with these ecosystems. This regional direction is represented by an array of features that, in their entirety, constitute an aquatic management strategy (AMS) for the Sierra Nevada. The fundamental principle of the AMS is to retain, restore, and protect the processes and landforms that provide habitat for aquatic and riparian-dependent organisms, and produce and deliver high-quality waters for which the national forests were established. There are six specific elements that are core principles of the AMS:

1. Aquatic management strategy (AMS) goals.
2. Watershed restoration.

3. Riparian area designation and management (including stream buffer areas and aquatic refuges).
4. Standards and guidelines that maintain natural watershed processes and mitigate management impacts.
5. A long-term strategy for anadromous fish-producing watersheds in the Lassen National Forest.
6. An adaptive management program that includes an array of monitoring and research activities.

The following are brief descriptions of the core principles that apply to this project. Later in the document, the alternatives for restoring Blackwood Creek were analyzed with respect to the core principles of the AMS. Please refer to the ROD or SNFPA-FEIS if more information is needed than is found in this planning document.

AQUATIC MANAGEMENT STRATEGY (AMS) GOALS

AMS goals describe ideal or desirable conditions for aquatic, riparian, and meadow ecosystems. Moving ecosystem conditions toward attaining these goals would restore and maintain the physical, chemical, and biological integrity of the regions waters as mandated by the Clean Water Act, National Forest Management Act, Organic Act, Safe Drinking Water Act, the Endangered Species Act, and the LTBMU Land and Resource Management Plan. The goal of this project is to promote the recovery of ecological processes leading to desired conditions with respect to aquatic, riparian, and meadow ecosystems.

WATERSHED RESTORATION

Watershed restoration is an integral part of the AMS. The two basic means by which restoration is accomplished are changing management activities or through physical alteration of the environment such as rebuilding stream channels in meadows. In many cases it may not be possible to restore the environment to its historic condition, but actions can be taken to rehabilitate or improve the functioning of disrupted processes. This project would improve processes disrupted by the current conditions.

RIPARIAN AREA DESIGNATION AND MANAGEMENT

Riparian conservation areas (RCAs) are areas designated along streams and around water bodies. Management in RCAs is directed at:

1. Preserving, enhancing, and restoring habitat for riparian and aquatic dependent species.
2. Ensuring water quality is maintained or restored.
3. Enhancing habitat conservation for species associated with the transition zone between upslope and riparian areas.
4. Provide greater connectivity with watersheds.

This proposed project is located entirely within an RCA and implementation would meet each of these directives.

STANDARDS AND GUIDELINES

Site-specific project analyses are conducted to determine the activities that could be conducted by in RCAs. The analyses assure consistency with Resource Conservation Objectives (RCOs) and associated standards and guidelines. The RCOs and their associated standards and guidelines serve as a checklist for evaluating management prescriptions to determine if a proposed activity is consistent with the desired conditions described by the AMS goals. This proposed action is consistent with RCOs. Every effort would be made local and federal standards and guides for environmental protection.

DESIRED FUTURE CONDITIONS

The SNFPA states that the desired condition for aquatic and riparian ecosystems across the Sierra Nevada forests is that the AMS goals are supported in most landscapes. The desired condition for this project is a reach of channel that is hydrologically and ecologically functional. This implies a dynamically stable channel with sediment storage and transport characteristics, establishment of a vigorous vegetation community, reduced erosion and improved water quality by dissipating stream energy generated by high flows. The proposed action would promote system wide recovery in order to meet the Desired Future Conditions direction for riparian systems across the Sierra Nevada.

MONITORING

Monitoring is the feedback mechanism necessary for adjusting management in response to new information, knowledge, or technologies, and is an important component of the SNPFA and a requirement for Water Board approval. There are unknowns and uncertainty exists in the course of achieving any natural resource management goal. Ecosystem restoration is a relatively new science with enormous complexity. Variability in physical and biotic conditions across both time and space does not allow for blanket prescriptions or cut and paste techniques. A certain amount of uncertainty is therefore inherent in stream and watershed restoration. Monitoring and evaluation is expected to provide important feedback information that would continuously link planning to plan implementation. A brief summary of the monitoring strategy for this project is included in Appendix E. Its development and implementation would be based on final design plans for the bridge and channel pending approval to go forward with the preferred alternative presented in this environmental assessment.

TAHOE BASIN REVIEWING AGENCIES

Tahoe Regional Planning Agency

The process for TRPA review of National Forest activities at Lake Tahoe was defined in a 1989 Memorandum of understanding (MOU) between TRPA and the LTBMU. The

Erosion Control and Watershed Restoration section of the MOU provides the following permit exemptions whether or not there is land coverage or disturbance in land capability districts 1, 2, 3, or SEZs:

- Installation and maintenance of soil erosion control and surface water runoff control measures on 50 acres or less.
- Restoration of disturbed areas of 50 acres or less, including the maintenance of revegetation until established.

The project involves direct restoration of approximately 80 acres of SEZ. Overall this project would provide long-term SEZ benefit by improving the performance of this site.

SEZ restoration is permitted activity in Plan Area Statement 162, the applicable TRPA Plan Area for the Blackwood project area. Consequently, proposed SEZ restoration activities are exempt from TRPA permitting.

California Regional Water Quality Control Board, Lahontan Region

The process for Water Board review of National Forest activities at Lake Tahoe was last updated in a 2004 MOU between Water Board and the LTBMU. The MOU is an extension of the Management Agency Agreement signed between the LTBMU and the State Water Resources Control Board in 1981. "The MOU is intended to guide the LTBMU and RWQCB in the review and regulation of LTBMU projects and activities on the California side of the Lake Tahoe Basin".

The Water Board prepared a Basin Plan that "is the basis for the Regional Board's regulatory program. It sets forth water quality standards for the surface and ground waters of the Region, which include both designated beneficial used of water and the narrative and numerical objectives, which must be maintained or attained to protect those used. It identifies general types of water quality problems, which can threaten beneficial uses in the Region. It then identifies required or recommended control measures for these problems. In some cases, it prohibits certain types of discharges in particular areas. The Basin Plan summarizes applicable provisions of separate State Board and Regional Board planning and policy documents (e.g., the Regional Board waiver policy), and of water quality management plans adopted by other federal, state, and regional agencies. The Basin Plan also summarizes past and present water quality monitoring activities which should be carried out to provide the basis for future Basin Plan updates and for waste discharge requirements or conditional waivers"..

The Basin Plan includes waste discharge prohibitions applicable within the Lake Tahoe Basin (Basin Plan Section 5.2). 'Waste' includes, but is not limited to waste earthen materials (such as soil, silt, sand, clay, rock, or any other organic or mineral material) and any other waste as defined in the California Water Code Section 13050(d). The Water Board can grant exemptions to the prohibitions against discharges or threatened

discharges attributable to new development or permanent disturbance in SEZs for erosion control projects, habitat restoration projects, wetland rehabilitation projects, SEZ restoration projects, and similar projects, programs, and facilities, if all of the following findings can be made:

(a) The project, program, or facility is necessary for environmental protection;

(b) There is no reasonable alternative, including relocation, which avoids or reduces the extent of encroachment in the SEZ; and

(c) Impacts are fully mitigated**.**

APPENDIX B – PROPOSED ACTION SCOPING SUMMARY

The LTBMU mailed copies of the proposed action and a scoping letter to 31 interested agencies and individuals requesting comments and issues for consideration in the project EA. Copies of these notices are on file.

A copy of the Proposed Action was mailed on 24 February 2008 to these agencies:

US EPA Region 9, Jack Landy
California Dept of Fish and Game, Jeff Drongesen
TRPA, Mike Elam
Army Corps of Engineers, Kevin Roukey
League to Save Lake Tahoe, Carl Young
Lahontan RWQCB, George Cella & Andrea Stanley
California Tahoe Conservancy, Adam Lewandowski and Scott Carroll

The comment period for agencies to respond to the proposed action ended 24 January 2008.

A copy of the scoping letter was mailed on 24 January 2008 to the following individuals:

Elizabeth and Leslie Simmonds	1082 Rahara Way	Lafayette, CA 94549
Samuel and Susan Mendes	2740 Jones Rd	Walnut Creek, CA 94596
Marshall Kraus	420 Riding Club Lane	Sacramento, CA
Jocelyn Yaskovic	5936 Blackstone Drive	Rockline Ca.95765
Derek and Kim Vanacore	100 Iron Point Cir #100	Folsom, CA 95630
Peter Ostwald	912 Indian Rock Ave.	Berkeley, CA 94707
Merriam Lewis	555 20th St.	Hermosa Beach, CA 9
Robert and Bonnie Symon	368 Castello Rd.	Lafayette, CA 94549
Timothy and Kristine Martin	1801 Sierra Sage Lane	Reno, NV 89509
James and Susan Clopton	2326 Pacific Ave.	San Francisco, CA
Patrick Porter	5316 Hilltop Rd	Garden Valley, CA
Virginia Balsdon	540 12th St.	Colusa, CA 95932
David Gottesman	243 Avila St.	San Francisco, CA
James Porter	2403 Jeremiah Dr.	Auburn, CA 95603
John and Cathy Stannard	2945 Oakmead Village Ct	,Santa Clara, CA
Daniel and Suzanne Wilkins	P.O. Box 8162	Tahoe City, CA
Albert and Dora Bynum	P.O. Box 270835	Houston, TX 77277
Albert and Ursula	P.O. Box 362	Homewood, CA
Michael Hammond	1841 Hamilton Ave.	Palo Alto, CA 94303
Daniel Lawrence	9234 Tavernor Rd	Wilton, CA 95693
Mike and Sandy Clauss	P.O. Box 6205	Tahoe City, CA

The comment period for individuals and organizations to respond ended

24 February 2008. The LTBMU received four comments: one letter, one electronic message (e-mail), and two phone messages.

Letter - George Cella, Engineering Geologist, Lahontan Water Quality Control Board
Letter stating support of the Water Board staff for this project and to continue working with the project team through design, permitting, and implementation phases of this project
FS response: Comment Noted

Electronic Message - Ron Mooiweer (romkem@aol.com)
Letter expressing concern for snow mobile parking causing soil erosion at the mouth of Blackwood Canyon.

FS response: email sent to Mr. Mooiweer acknowledging his concern; forwarded email to FS Law Enforcement (Ron Thompson)

Phone Message 1 – Ernie Claudio, local resident
Expressed support for the project. The project leader discussed the scope and scale of the project with Mr. Claudio. Mr. Claudio stated he would contact several individuals who live near the project area (Tahoma) and would solicit their comments.

FS response: Expression of support noted. No comments were received because of this conversation.

Phone Message 2 – Jan Brisco, local resident
Expressed support for FS project; mistook Sierra Sun Newspaper article believing that the information presented related a project under development by the California Tahoe Conservancy (CTC) near the mouth of Blackwood Canyon.

FS response: Expression of support noted. Forwarded information on to Adam Lewandowski with CTC

A legal notice seeking comments for the proposed action was issued by LTBMU on 24 January 2008. Andrew Cristancho, a reporter for the Sierra Sun (local newspaper) contacted Rex Norman and Craig Oehrli to gather background information for an article on the project. The article was printed on 28 January 2008 and posted on the Sierra Sun website. The article posted on three additional websites: Tahoe Daily Tribune, North Tahoe Bonanza, and the Reno Gazzette. Two web blogs, Yuba.net (Sacramento Bee) and Lake Tahoe Blog (San Francisico Chronicle) posted notices paraphrasing the Sun article and soliciting comments.

No comments were noted or received as result of these postings

Comments received are commonly organized into 2 categories: Questions/Comments and Issues. It is not uncommon for public scoping responses to include many comments and questions that do not fit the NEPA definition of an issue. These are therefore considered "non-issues" in NEPA sense.

The issues are analyzed and classified as "significant issues" and non-significant issues". Issues may be non-significant for any one of four reasons:

1. The issue is outside the scope of the proposed action.
2. The issue is already decided by law, regulation, Forest Plan, or other higher level decision.
3. The issue is irrelevant to the decision being made.
4. The issue is conjectural and not supported by scientific or factual evidence.

NEPA does not require non-significant issues to be addressed in the EA, but they do need to be identified and addressed n the public scoping documentation. Any issue that is not non-significant is classified as a significant issue. Significant issues must be addressed in the EA and should inherently point out the controversy embodied in the issue. Alternatives need to be developed that reasonably address each significant issue while still meeting the project purpose and need. The development and analysis of "reasonable alternatives" is the primary reason that clear issue analysis is so important in NEPA. NEPA regulations direct the analysis team to limit analysis to those effects directly related to significant issues and required findings.

APPENDIX C - Wildlife and Vegetation BE-BA, TRPA Report, and Management Indicator Species (MIS) Report

Copies of the Wildlife and Vegetation BE-BA, TRPA and MIS Reports can be obtained at the LTBMU office located at 35 College Drive, South Lake Tahoe California.

APPENDIX D - Heritage Resource Evaluation

United States Department of Agriculture | **Forest Service** | **Lake Tahoe Basin Management Unit** | **35 College Drive, South Lake Tahoe, CA 96150, (530) 543-2600, (530) 543-0956 TTY**

File Code: 2360-3 **Date:** April 04, 2008
Route To: Craig Oehrli, Project Manager

Subject: Proposed Blackwood Creek Phase 3 Stream and Floodplain Restoration Project, Blackwood Canyon Vicinity, LTBMU, Placer County, CA; TB-2008-016; R2008051900019.

From: Michael Weichman, Assistant Heritage Resources Program Manager

I have reviewed the proposed Blackwood Creek Phase 3 Stream and Floodplain Restoration Project. The proposed project's entire Area of Potential Effect (APE) has been previously surveyed for Historic Properties, with the results discussed in Heritage Resources Reports CRR 05-19-003, CRR 05-19-119, CRR 05-19-164, and TB-2004-008.

The proposed undertaking falls within Stipulations III (B)(5), III (D)(3), and IV (D) of the Programmatic Agreement (PA) for Compliance with Section 106 of the National Historic Preservation Act for Undertakings in the Pacific Southwest Region PA. The proposed project may be implemented without any further Section 106 consultation or review in accordance with the provisions of the Regional PA as currently planned provided that the recommended Standard Resource Protection Measures (SRPMs) are implemented.

There are recorded archaeological resources, i.e. Forest Service Site Nos. 05-19-1067, 05-19-1068, 05-19-127 and 05-19-214, located within close proximity to the proposed undertaking. Therefore, SRPMs (Stip. I (E)) are needed to protect the archaeological values of the historic properties located within the proposed undertaking's APE. This protective measure shall consist of a Heritage Resources specialist monitoring ground disturbing activities associated with the proposed project.

In addition, if the scope or design of the proposed project is altered or changed, additional review by the Heritage Resources Program will be required. Furthermore, if any previously unrecorded cultural resources are discovered during this project, all project related activities must cease immediately and the consultation process as outlined in Section 800.13 of the Advisory Council on Historic Preservation's regulations 36 CFR 800 must be initiated.

Please keep a copy of this letter in the project's planning implementation files. If you have any questions, please contact me at (530) 573-2678.

Concur: John Maher, Heritage Resources Program Manager.

APPENDIX E - Monitoring Strategy

Required Monitoring – The following monitoring elements are considered to be required for project implementation. These include:

1) Design implementation inspection and reporting. To be documented in a daily diary, and presented in a final construction report shortly after project completion. This report would document any problems encountered during project implementation, and changes that occurred between final design and on the ground implementation, including a discussion on impacts to meeting project objectives, if any.

2) Heritage resource monitoring. Due to the close proximity of recorded heritage resources, a heritage resource specialist would monitor ground disturbing activities associated with this project

3) Vegetation monitoring. Prior to project implementation, one final year of pre-project surveys would be conducted to determine if any sensitive plant species have colonized channel and floodplain surfaces within the project area, since the last survey. Also, a weed survey would be conducted prior to obtaining materials from the El Dorado Forest Boulder Supply Area.

4) Wildlife monitoring. Prior to project implementation one final year of pre-project, surveys for willow flycatchers, northern goshawks, and spotted owls would be conducted to attempt to determine the locations of any active nest sites.

4) Soil and Water best management practices monitoring. As part of the Stormwater Protection Plan (SWPPP) as required by the Lahontan Regional Water Quality Control Board, SWPPP monitoring would include Regional Best Management Practices Evaluation Program (BMPEP) monitoring as described in the Regional BMPEP Monitoring Protocols. Temporary BMP Monitoring as described in the LTBMU TBMP Monitoring Plan, and short term stream flow turbidity monitoring.

5) Interim TMDL Target Monitoring. Pre and post project ground based and aerial photography to evaluate whether the interim targets, as established in the Blackwood Creek TMDL, for positive (increasing) trends in vegetative cover, channel sinuosity, and stream bank stability are being achieved.

Desired Monitoring

The following monitoring elements are not considered to be required to implement this project, but implementation of this project presents an opportunity to monitor long term effects as it relates to the objectives presented in the Purpose and Need section of this document, as well as long term 20-year targets for vegetation, sinuosity, and bank stability, as established in the Blackwood Creek TMDL. These elements are designed for long term monitoring, and the frequency, scale and scope at which this elements would

be monitored would be dependent on available budgets and resources. Generally, a base line would be established through either pre-project monitoring or immediately post project, as appropriate for the specific parameter. Additional data collection would then generally be conducted at 3 to 5 year intervals.

- Vegetation Condition. Immediately post project, establish on the ground transects/plots to measure plant species composition and diversity across the floodplain.

- Channel and floodplain sediment storage. The design contractor (Swanson Hydrology) is currently developing a sediment storage model for Blackwood. The model utilizes ground topography and hydraulic roughness estimates to predict channel and floodplain sediment deposition volume and pattern.
  The approach to utilizing this model to estimate project effectiveness in terms of sediment deposition and retention include; resurvey ground topography utilizing geo-rectified aerial surveys of ground topography, overlay on to existing digital topographic survey net, and calculate channel and floodplain scour and fill. Select field sites to evaluate the grain size distribution of sediment deposits.

- Effects on Wildlife Species**.** A wildlife monitoring contractor (Morrison, et. al) has gathered three years of pre-project wildlife trend data at this site, which were used to assist in developing design features for the project and in the effects analysis presented in the BA/BE for this project. The LTBMU is currently assessing how to proceed in terms of selecting a suite of species most suitable for detecting positive trends in wildlife response at this site, for long term effectiveness monitoring.

- Stream Channel Condition. Immediately post project, establish a representative reach for evaluating stream channel condition (SCI) per USFS Region 5 protocols. These protocols provide a suite of measures to evaluate channel condition as it relates to aquatic habitat and channel stability. The LTBMU has already collected two years of pre-project macroinvertebrate data, which is one component of the SCI protocol.

- Water Quality Monitoring. Continued implementation of the USGS water quality monitoring site in Blackwood Creek. The site is part of the USGS/TRPA LTIMP stream monitoring network. The funding for this site is outside of the control of the USFS, but the LTBMU would continue to endorse continued monitoring of this site as part of the LTIMP program, and depending on available funding may continue to provide financial contributions to the LTIMP program, as it has done in recent years.

APPENDIX F – Lahontan Environmental Effects Checklist

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
I.	**AESTHETICS.** Would the project:				
a.	Have a substantial adverse effect on a scenic vista?	❑	❑	❑	■
b.	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway?	❑	❑	❑	■
c.	Substantially degrade the existing visual character or quality of the site and its surroundings?	❑	■	❑	❑
d.	Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
II.	**AGRICULTURAL RESOURCES.** In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation. Would the project:				
a.	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	❑	❑	❑	■
b.	Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?	❑	❑	❑	■
c.	Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
III.	**AIR QUALITY.** When available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a.	Conflict with or obstruct implementation of the applicable air quality plan?	❑	■	❑	❑
b.	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	❑	❑	❑	■
c.	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	❑	❑	❑	■
d.	Expose sensitive receptors to substantial pollutant concentrations?	❑	■	❑	❑
e.	Create objectionable odors affecting a substantial number of people?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
IV.	**BIOLOGICAL RESOURCES.** Would the project:				
a.	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	❑	■	❑	❑
b.	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	❑	■	❑	❑
c.	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?	❑	■	❑	❑
d.	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	❑	❑	❑	■
e.	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	❑	❑	❑	■
f.	Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
V.	**CULTURAL RESOURCES.** Would the project:				
a.	Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	❑	❑	❑	■
b.	Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	❑	❑	❑	■
c.	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	❑	❑	❑	■
d.	Disturb any human remains, including those interred outside of formal cemeteries?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
VI.	**GEOLOGY AND SOILS.** Would the project:				
a.	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
	1. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	❑	❑	❑	■
	2. Strong seismic groundshaking?	❑	❑	❑	■
	3. Seismic-related ground failure, including liquefaction?	❑	❑	❑	■
	4. Landslides?	❑	❑	❑	■
b.	Result in substantial soil erosion or the loss of topsoil?	❑	■	❑	❑
c.	Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?	❑	❑	❑	■
d.	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	❑	❑	❑	■
e.	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
VII.	**HAZARDS AND HAZARDOUS MATERIALS.** Would the project:				
a.	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	❑	❑	❑	■
b.	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	❑	■	❑	❑
c.	Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	❑	❑	❑	■
d.	Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	❑	❑	❑	■
e.	Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?	❑	❑	❑	■
f.	Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?	❑	❑	❑	■
g.	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	❑	❑	❑	■
h.	Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	❑	■	❑	❑

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
VIII.	**HYDROLOGY AND WATER QUALITY.** Would the project:				
a.	Violate any water quality standards or waste discharge requirements?	❑	■	❑	❑
b.	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?	❑	❑	❑	■
c.	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite?	❑	■	❑	❑
d.	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?	❑	■	❑	❑
e.	Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	❑	❑	❑	■
f.	Otherwise substantially degrade water quality?	❑	■	❑	
g.	Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	❑	❑	❑	■
h.	Place within a 100-year flood hazard area structures that would impede or redirect floodflows?	❑	■	❑	❑

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
i.	Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	❑	❑	❑	■
j.	Contribute to inundation by seiche, tsunami, or mudflow?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
IX.	**LAND USE AND PLANNING.** Would the project:	❑	❑	❑	■
a.	Physically divide an established community?	❑	❑	❑	■
b.	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	❑	❑	❑	■
c.	Conflict with any applicable habitat conservation plan or natural community conservation plan?				

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
X.	**MINERAL RESOURCES.** Would the project:				
a.	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	❑	❑	❑	■
b.	Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XI.	**NOISE.** Would the project:				
a.	Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?	❑	❑	■	❑
b.	Expose persons to or generate excessive groundborne vibration or groundborne noise levels?	❑	❑	■	❑
c.	Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	❑	❑	❑	■
d.	Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	❑	❑	■	❑
e.	Be located within an airport land use plan area, or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?	❑	❑	❑	■
f.	Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XII.	**POPULATION AND HOUSING.** Would the project:				
a.	Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	❑	❑	❑	■
b.	Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere?	❑	❑	❑	■
c.	Displace a substantial number of people, necessitating the construction of replacement housing elsewhere?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XIII.	**PUBLIC SERVICES.** Would the project:				
a.	Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
	Fire protection?	❑	❑	❑	■
	Police protection?	❑	❑	❑	■
	Schools?	❑	❑	❑	■
	Parks?	❑	❑	❑	■
	Other public facilities?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XIV.	**RECREATION.** Would the project:				
a.	Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	❑	❑	❑	■
b.	Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XV.	**TRANSPORTATION/TRAFFIC.** Would the project:				
a.	Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?	❑	❑	❑	■
b.	Cause, either individually or cumulatively, exceedance of a level-of-service standard established by the county congestion management agency for designated roads or highways?	❑	❑	❑	■
c.	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	❑	❑	❑	■
d.	Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	❑	❑	❑	■
e.	Result in inadequate emergency access?	❑	❑	❑	■
f.	Result in inadequate parking capacity?	❑	❑	❑	■
g.	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XVI.	**UTILITIES AND SERVICE SYSTEMS.** Would the project:				
a.	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	❑	❑	❑	■
b.	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	❑	❑	❑	■
c.	Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	❑	❑	❑	■
d.	Have sufficient water supplies available to serve the project from existing entitlements and resources, or would new or expanded entitlements be needed?	❑	❑	❑	■
e.	Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	❑	❑	❑	■
f.	Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	❑	❑	❑	■
g.	Comply with federal, state, and local statutes and regulations related to solid waste?	❑	❑	❑	■

		Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
XVII.	**MANDATORY FINDINGS OF SIGNIFICANCE**				
a.	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	❑	■	❑	❑
b.	Does the project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	❑	❑	❑	■
c.	Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	❑	❑	❑	■