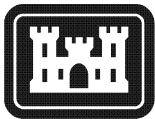


**Final
Environmental Assessment**

**Blackwood Creek Restoration Project
Placer County, California**

January 2010



**US Army Corps
of Engineers** ®
Sacramento District



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

Reply To
Attention Of

JAN 19 2010

Environmental Resources Branch

FINDING OF NO SIGNIFICANT IMPACT
Blackwood Creek Restoration Project
Placer County, California

I have reviewed and evaluated the information presented in this Environmental Assessment (EA) for the Blackwood Creek Restoration Project, Placer County, California. This project would restore approximately 1 acre of riparian habitat and 1,100 feet of creek channel, restore the adjacent stream environment zone, including riparian habitat and natural floodplain, and create aquatic and terrestrial wildlife habitat within the lower Blackwood Creek watershed. These efforts would benefit the creek itself, preserve Lake Tahoe water quality, increase the quantity and quality of fish and wildlife habitat, and enhance recreational opportunities.

Instream and bank construction work to restore aquatic and riparian habitats would have short-term adverse effects on water quality. The project has been designed to minimize those effects during construction, as well as reduce higher than usual rates of localized bank erosion that has continuously degraded water quality supporting fish and wildlife. Prior to this construction work, the sponsor is required to obtain a Department of Army permit under Section 404 of the Clean Water Act and seek water quality certification under Section 401 of this Act from the State of California.

During this review, the possible consequences of the work described in the EA have been studied with consideration given to environmental, economic, social, and engineering feasibility. In evaluating the effects of the proposed project, specific attention has been given to significant environmental conditions that could potentially be affected. I have also considered the views of other interested agencies, organizations, and individuals concerning the study. The effects and measures have been coordinated with, and agreed to by, the U.S. Fish and Wildlife Service and the California State Historic Preservation Office. In addition, the Blackwood Creek Restoration Project is being coordinated with other relevant government agencies, including the California Tahoe Conservancy, California Department of General Services, Lahontan Regional Water Quality Control Board, Tahoe Regional Planning Agency, and Placer County.

Based on my review of the EA and my knowledge of the project area, I am convinced that the proposed Blackwood Creek Restoration Project is a logical and desirable alternative. Furthermore, I have determined that the work would have no significant, long-term effects on the environment. All construction will be implemented in strict compliance with applicable Federal, State, and local laws and regulations. Based on the results of the environmental evaluation and completion of interagency coordination, I have determined that the EA and Finding of No Significant Impact provide adequate documentation and that no further environmental document is required.

18
Date

[Signature]
10

[Signature]

Thomas C. Chapman, P.E.
Colonel, U.S. Army
District Engineer

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1.0 PURPOSE

1.1 Proposed Action

The US Army Corps of Engineers (Corps), California Tahoe Conservancy (CTC), and the California Department of General Services (DGS) proposes to implement the Lower Blackwood Creek Restoration Project (Blackwood Project) to restore approximately 1 acre of riparian habitat and 1,100 feet of creek channel, restore the adjacent stream environment zone (SEZ) including riparian habitat and natural floodplain, and create aquatic and terrestrial wildlife habitat within the lower Blackwood Creek watershed. The Blackwood Project is designed to restore functions to Blackwood Creek which have been degraded by historic watershed alterations and floodplain encroachment. The project will reduce sediment sources through bank stabilization and source control measures; improve wildlife habitat through riparian vegetation enhancement; improve floodplain connectivity within the project area; and improve in-stream aquatic habitat through construction of riffle and pool complexes.

1.2 Location of the Project Area

The Blackwood Project area is located in Placer County, California, approximately five miles south of Tahoe City, in the northwest portion of the Lake Tahoe Basin (Plate 1). Blackwood Creek originates in the Tahoe National Forest in Placer County, California. The watershed encompasses approximately 11.2 square miles. The project area is located within the lower portion of the watershed, and begins at the western perimeter 3,000 feet upstream of Highway 89, and extends to Lake Tahoe, north of the Tahoe Pines residential area (Plate 2).

Property ownership within the project area includes a mix of public and private ownership. Upstream of Highway 89, land to the north of Blackwood Creek is owned by CTC and properties to the south of the creek are owned by a combination of private landowners and the US Forest Service (USFS). The reach downstream of Highway 89 is owned by private landowners with a single CTC parcel located in the channel near the highway. A US Geological Survey (USGS) gauging station is located 400 feet upstream of Highway 89 on the south side of the creek adjacent to privately owned land. The Blackwood Creek culvert at Highway 89 is owned, operated, and maintained by Caltrans.

The project site is commonly accessed by hikers via a locked gate north of the Blackwood Creek Bridge along SR-89. From the locked gate, trails provide visitor access to the project site and to Eagle Rock as well as Blackwood Creek. During construction, the main trail from Highway 89 would be used as a temporary construction access road for equipment and vehicles (Plate 3).

1.3 Need For Proposed Action

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 logging, grazing, in-channel gravel mining, and residential development. Timber leases were the prevalent land use in the 1950s and 1960s, and in-stream

gravel mining occurred between 1960 and 1968. The volcanic geology of the watershed and steeply glaciated topography results in relatively high natural erosion rates and sediment yield, and consequently high sensitivity to disturbance. Upland and stream corridor disturbances have resulted in elevated runoff sediment loads and high rates of bank erosion. The cumulative effects of historic land use 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; however, the main channel of Blackwood Creek continues to be unstable with excessive bank erosion. The result has been chronic stream bank erosion, sparsely vegetated unstable floodplains, and a shift from riparian vegetation such as cottonwood, willow and aspen to a conifer dominated floodplain.

The changes in and along the channel have affected the various trout species that migrate from Lake Tahoe into the creek to spawn in the spring or fall. The increased erosion has caused loss of spawning gravels and pools and riffles necessary for successful spawning. The loss of in-stream cover and riparian vegetation has led to increased water temperatures and decreased food sources, further contributing to the degradation of fish habitat in the creek. Once a major spawning stream, the lower reach of Blackwood Creek is no longer considered optimal spawning habitat (Swanson, et al 2003).

The Blackwood Project objectives reflect the water quality enhancement goals of the Lahontan Regional Water Quality Control Board (LRWQCB) and the Environmental Improvement Program (EIP) goals of the Tahoe Regional Planning Agency (TRPA), which lists Blackwood Creek as a resident and migratory fish-bearing stream needing habitat improvement (TRPA 2001). The project's restoration objectives are to:

- Improve water quality through streambank stabilization measures and sediment source control;
- Improve floodplain connectivity by increasing floodplain bench area;
- Not increase the risk of flooding to private property;
- Increase channel roughness and diversity to provide areas of slower velocity and sediment deposition and improve aquatic habitat diversity;
- Improve wildlife habitat through riparian habitat enhancement to benefit both aquatic and terrestrial species; and
- Improve in-stream aquatic habitat and complexity through the addition of riffle and pool complexes.

1.4 Project Authorization

This project is authorized by Section 108 of the Energy and Water Development Appropriations Act of 2005 (Public Law 108-447). This Act authorizes the Corps to provide environmental assistance and share in the costs of a broad range of water-related environmental infrastructure and resource protection projects within the Lake Tahoe Basin. Recreational enhancements are not included within this authority and are therefore excluded from this analysis. The Corps is acting as the lead Federal agency with respect to National Environmental Policy Act (NEPA) and the CTC is the local sponsor for the project.

1.5 Purpose of the Environmental Assessment (EA)

The purpose of this EA is to describe the construction methods for this project; discuss the environmental resources in the project area; evaluate the effects the alternatives may have on the natural and human environment; and to propose mitigation measures to avoid, minimize, or mitigate any adverse effects of the project to less-than-significant levels. The purpose of an EA is to provide sufficient information on potential environmental effects of the proposed action and, if appropriate, its alternatives, for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) (40 CFR 1508.9).

This Final EA is in compliance with the National Environmental Policy Act (NEPA). Because this project involves the discharge of dredged or fill material into waters of the United States, the sponsor is required to obtain a Department of the Army permit under section 404 of the Clean Water Act. The Section 404 permit application is expected to be submitted by September 2010. Additionally, the local sponsor will seek water quality certification under Section 401 of the Clean Water Act from the State of California, Lahontan Regional Water Quality Control Board by September 2010. Any additional requirements included as part of the water quality certification will be incorporated into the project. If there are significant changes in, or additions to, the existing conditions or basic design of the Blackwood Project during future designs or construction, the required subsequent environmental documentation will be prepared and submitted to the appropriate agencies to ensure compliance with Federal, State, TRPA, and local laws and regulations. The Draft EA was available for public review for a period of 30 days from October 9, 2009 to November 9, 2009. Public review comments and responses are presented in Appendix E.

2.0 ALTERNATIVES

2.1 Project Reach Descriptions

For the purpose of identifying and evaluating restoration opportunities within the site, Blackwood Creek is divided into six (6) study reaches as designated on Plate 2. Stream reaches are numbered one through six starting at the upstream project boundary.

Reach 1. Reach 1 was identified as one of the two most stable portions of Blackwood Creek within the study area (Reach 2 was the other) (Corps 1999). No significant water resource issues impacting fish and wildlife resources were identified in Reach 1. No action is proposed for Reach 1.

Reach 2. Problems identified in field reconnaissance were limited to erosion of the channel's north bank approximately 200 feet upstream of an existing logjam. A logjam spans the channel and although it is not a permanent structure, it has caused deposition of gravels for several hundred feet upstream of the jam. Backwater effects from the logjam are contributing to some overtopping of the north bank upstream of the existing logjam which during storm events may lead to excessive sheering of bank material. Due to the quality of habitat in this area and the stability of the channel under existing conditions, no project restoration measures are proposed for Reach 2.

Reach 3. Significant deposition of coarse sediment occurs within Reach 3. The deposition in Reach 3 has caused the formation of a large gravel bar (Appendix C). The formation of the bar is concentrating the flow to the outside of the north bank, causing accelerated bank erosion and therefore a widened channel. The channel bend in this reach is actively eroding with the steepest bank profile occurring in the uppermost bend where the bank is nearly vertical and 6-8 feet high (CTC and DGS 2007).

Reach 4. Reach 4 is incised below an abandoned floodplain surface on the south bank and a higher terrace on the north bank. The lower portion of this reach is a straight section of channel with very steep and poorly vegetated banks that are 6 to 10 feet above the stream thalweg (CTC and DGS 2007). In general, flows only reach the overbank areas during the 5 to 10 year or larger return event. Along some sections of Reach 4, riparian and wetland vegetation is lacking as a result of bank erosion and channel incision that has disconnected the channel from the floodplain. This disconnection increases bank erosion and channel instability. Additional erosion and resulting nonpoint source fine sediment loading is caused by pedestrian traffic along this reach. Channel incision has resulted in higher velocity flows that have the effect of reducing pool/riffle sequences, decreasing aquatic habitat diversity. Vegetation on the north-bank plateau consists primarily of conifer forest with little to no ground cover (Corps 1999).

Reach 5. Reach 5 is relatively narrow and incised with some widening where bank erosion has removed the soil and riparian vegetation. The channel incision has removed important pool and riffle habitat sequences, substrate suitable for spawning, and rearing habitats. The channel in Reach 5 appears to have been excavated at some point, creating very low sinuosity and forcing the channel to make an unnatural bend on the upstream side of the Highway 89 culvert. At this bend the bank has eroded further increasing the sharpness of the bend and reducing bank stability. The Highway 89 culvert configuration causes significant backwater, increasing upstream water surface elevations at discharges equal to and greater than the 5 year return period storm of 1,100 cfs (CTC and DGS 2008). When the flows in the channel are less than the 5 year return period, the stream's power is relatively high and capable of transporting most of the sediment that enters Reach 5. Some of this sediment is deposited downstream of the culvert.

Reach 6. Reach 6 extends from just downstream of the Highway 89 culvert to the mouth of Blackwood Creek at Lake Tahoe. The reach is a natural fan/delta of the watershed and thereby a deposition zone that is subject to frequent change from the natural stream flow processes and annual changes in lake level elevations. Downstream of the Highway 89 crossing and before the creek enters the lake's beach zone, utilities and private landowners have implemented isolated bank stabilization measures including gabion placement and concrete lining. These structural bank protection measures have resulted in no riparian vegetation along the banks of the protected sections, resulting in degraded habitats for fish and wildlife. Within reach 6, maintenance and/or replacement would be required to prevent further erosion of the existing concrete structure and potential failure in the future. During initial project planning consideration was given to including improvements to the concrete structure within the proposed project. Because this section of the channel is located on private property outside of the CTC project area, it was determined that no action would be pursued as a part of this project.

2.2 Alternative Evaluation and Design

Restoration alternatives developed for the Blackwood Project area were evaluated by the Technical Advisory Committee (TAC). The alternatives were developed based on field observations, published technical reports, and additional analysis of the system (CTC and DGS 2007). Three potential design approaches were considered for the Blackwood Project: (1) creek enhancement without changes to the Blackwood Creek culvert at Highway 89, (2) creek enhancements coupled with hydraulic and structural improvements to the culvert, and (3) creek enhancements coupled with replacement of the culvert with a full-span structure (CTC and DGS 2007).

The Blackwood Creek culvert at Highway 89 imposes a hydraulic constriction on the creek resulting in a backwater effect and exacerbating flooding to adjacent properties upstream of the culvert. Previous Blackwood Creek restoration proposals included the removal of this constriction. Approaches two and three, which included modifications to the culvert and replacement of the culvert at Highway 89, respectively, were found to be too costly and not feasible for consideration as a part of the project without direct participation and financial assistance from Caltrans. The estimated cost of approach one, river restoration without culvert modification or replacement is \$1.9 million, as compared to \$3.8 million and \$5.0 million for approaches two and three, respectively (NHC, 2007). Any action to replace this culvert would require an encroachment permit and agreement between the project sponsor and Caltrans. Because a recent study conducted by Caltrans of the culvert/bridge at Blackwood Creek has found the bridge to be structurally sound, Caltrans has no plans to replace this bridge within the next ten years. Further, due to concerns about the potential for increased flooding to downstream homeowners associated with hydraulic modification at this location, this culvert would likely be replaced with a similar sized culvert rather than the proposed modifications included within approaches two and three. Therefore, the concept of modifying or replacing the culvert was eliminated from further consideration and analysis.

Two restoration alternatives were developed which would work with the existing culvert alignment while meeting the project objectives. Alternative 1 proposed restoration on privately owned land within Reach 6 (Plate 2) including replacement of a concrete structure just upstream of Lake Tahoe. Alternative 1 would also result in less floodplain-bench square footage than Alternative 2. Alternative 2 proposed minimal restoration in Reach 6 while maximizing restoration within CTC owned land and increasing floodplain-bench area through channel realignment in Reaches 4 and 5 where the existing channel is severely undercut and disconnected from the floodplain. Vegetation enhancement elements proposed as part of the project were common to each alternative evaluated. The Preferred Alternative evaluated in this EA includes components of Alternative 2 as well as some additional enhancement measures that were refined by the TAC.

The restoration design focuses on enhancement in Reaches 3 through 6 only. Reaches 1 and 2 were observed to be in relatively good condition and are not, therefore, included in the design plans. The active project limits extend from about 1000 feet upstream of Highway 89 to about 300 feet downstream. The project has been designed to stabilize streambanks within the

project area, improve aquatic and terrestrial wildlife habitat, and provide recreation opportunities within the project area while not increasing the frequency of flooding to adjacent lands.

2.2.1 Design Considerations

A primary design consideration for the Blackwood Project is to avoid an increase in the risk of flooding to private property associated with the project. Since the bridge and culvert is not proposed to be replaced or modified as part of the Blackwood Project, the current backwater conditions will not change. However, design features that could act to reduce the potential for flooding have been included where those features also meet other enhancement objectives. For example, the placement of large wood structures in Reach 5 may serve to capture floating debris, thereby reducing the potential for debris to block the culvert during floods (NHC/EDAW, 2008). The proposed project would be designed to not increase the risk of flood hazards to persons or property. As part of project design, NHC, the project engineer, modeled future flooding conditions and concluded that the project would not cause increased flooding risks (Conservancy and DGS 2007).

Another important design consideration is the sustainability of recommended habitat improvements. This consideration led the design process to focus on aquatic and riparian habitat restoration in areas that are geomorphically stable, and improvement of channel stability through bank stabilization measures. During the project design process, opportunities for stabilization and sediment source control were considered both to improve water quality and to provide a sustainable project design.

2.3 No Action

Under the No Action Alternative, there would be no construction within the project area and the existing degraded habitat and water quality would not be restored. While future projects within other reaches of Blackwood Creek could affect the conditions within the lower reach, the No Action Alternative would result in the further loss of riparian, aspen, and coniferous forest habitats, the continued degradation of water quality, and the inability to create more suitable conditions which are needed by all of the fish and wildlife found along Blackwood Creek. There would be a continued loss of habitat and water quality degradation for fish because less riparian vegetation would be available to help stabilize the stream channel banks and provide cover. Considering the project area is in close proximity to where the creek flows into the mouth at Lake Tahoe, there would also be continued effects to the water quality of Lake Tahoe. In the absence of the Blackwood Project there would be no benefit to environmental, water, and wildlife resources that could result with the implementation of this project. The No Action Alternative establishes the baseline conditions that determine the action alternative's effects on environmental conditions.

2.4 Preferred Alternative

The following section describes construction activities associated with the Preferred Alternative. The Preferred Alternative consists of bank stabilization activities and channel realignment for water quality improvement, vegetation thinning and enhancement to create

additional areas of riparian habitat, and trail construction to provide additional recreational opportunities.

2.4.1 Preconstruction Activities

Prior to initiation of construction, CTC would be required to obtain all permits necessary to perform the work including, local, state and federal permits. For further information on permits required by the project, see Sections 5.1 and 5.2. The CTC would also be required to verify the depths and locations of all existing utilities in the work area, as well as notify and coordinate with the TCPUD directly concerning the timing and degree of the work. All studies and plans including BMPs for mitigating effects such as dust and traffic have to be approved by the appropriate resource agencies prior to construction.

Dewatering: The Stormwater Pollution Prevention Plan (SWPPP) shall contain a dewatering plan to detail proper handling, treatment, and disposal of groundwater and surface water, should it be encountered during construction activities. A preliminary dewatering plan is indicated in Appendix B on Sheet 2 and on Plate 5. The preliminary dewatering plan includes a diversion structure located between Reaches 2 and 3. The diversion structure will divert stream flows approaching from upstream. At the downstream end of the project, a second diversion structure will be constructed to prevent minor flows remaining in the channel from leaving the dewatered portion of the creek. A section of sheet piles will also be inserted into the channel bed downstream of the dewatered channel to prevent subsurface flows from passing out of the project channel. Stream flow will be diverted around the construction site using two 30-inch pipes that will divert the water 1600 feet downstream. Control valves will be installed at the upstream end of the pipelines to regulate flow. Based on preliminary hydraulic analyses, it is expected that the two pipelines will have a maximum capacity of about 70 cfs, which correlates to about a 10-year peak annual flow capacity during the months of the construction season (CTC and DGS 2008).

It is assumed that, during excavation, subsurface water will be encountered. The preliminary dewatering plan includes actions for isolating, removing, and treating construction water that collects in excavation areas. The system entails pumping water out of excavation areas to a collection pipe near the main access road. From there, the water will be discharged into a series of temporary basins built to the north of the project area. Water will be sent to an irrigation system and used to irrigate upland areas at the base of Eagle Rock or sent to an infiltration basin where it will be infiltrated. The maximum irrigation and infiltration rate would be 0.5 cfs.

If more water is encountered during construction than can be handled by irrigation and infiltration alone, a water treatment system would be used to provide increased dewatering capacity capable of treating an additional 0.5 to 1 cfs. The proposed treatment system includes two sand filters and a polishing filter. Monitoring stations upstream and downstream of the treatment station would be included to measure water quality of the influent and effluent. If the water quality of the flow out of the basins meets water quality standards without treatment, a bypass system would allow the water to bypass the treatment filters. Final effluent from the basin/treatment system would be piped downstream of the construction area where it would be

discharged to the Blackwood Creek channel.

Fish Capture and Translocation: Before construction activities commence within lower Blackwood Creek (i.e., before creek diversion and dewatering), a qualified biologist would conduct fish capture and translocation activities within the construction impact area, and areas approximately 100 feet upstream and downstream of that area. Block nets with 1/8-inch mesh would be placed at the upstream and downstream extent of the fish removal area to prevent fish from moving into the area during fish removal and subsequent construction activities. All captured fish species would be immediately released to suitable habitat upstream of the construction work area.

2.4.2 Construction Details

As part of the Preferred Alternative, approximately 1 acre of riparian habitat and 1,100 feet of aquatic habitat within the Blackwood Creek channel would be restored. This restoration includes bank stabilization and grade control within the existing channel through the use of bioengineering techniques and excavation and grading of a realigned channel within Reaches 3, 4, and 5. In addition, wildlife habitat would be enhanced through revegetation and temporary irrigation of riparian areas, and the construction of in-channel habitat diversification. Additional streambank, erosion control, and habitat protection and enhancement measures would be employed to protect Blackwood Creek from impacts associated with recreational uses of the area. The CTC and their Construction Manager will monitor construction activities during implementation and construction. Plate 4 depicts the stream restoration activities proposed for the Blackwood Creek channel. Engineered design plans for the Blackwood Project are included in Appendix B.

Streambank Stabilization. Streambank stabilization treatments including rock and log toe revetment, woody debris jams, boulder clusters, and riprap would be focused in areas where erosion and undercutting are currently observed. Streambank stabilization including revegetation would be used to stabilize the toe, bank, and overbank zones within reaches 3, 4, 5, and 6 of Lower Blackwood Creek. Some streambank stabilization treatments are proposed on privately owned land. Easements would be required prior to installing these treatments. CTC is responsible for obtaining all construction related easements. If an easement cannot be obtained, the project would progress without the project component requiring the easement.

Rock and log toe revetment structures would be used to stabilize channel banks on the outside of bends where stream velocities are high including reaches 3, 4, and 5 (Appendix B and Plate 4). They are designed to provide physical protection of the channel toe and lower bank as well as push high velocity flows back toward the channel center. The structures provide increased aquatic habitat complexity and cover along the channel banks. Rock and log toe revetment structures will create a continuous bench about 3 feet above the channel bed, at the approximate elevation of the 2- to 5-year flood event. River gravel excavated from the construction site and rocks will be used to fill in the voids between logs. Many of the structures will be partially backfilled with soil to provide additional planting areas for riparian vegetation. In addition, as floods overtop the structures, it is expected that fine sediment will be captured inside as well as on the surface of the benches. This will provide opportunities for natural

colonization by riparian vegetation, thereby increasing floodplain habitat along the banks. Details of the rock and log revetment structures are presented on Appendix B, Sheet C6.

Large woody debris jams would be used to enhance in-stream and floodplain habitat for aquatic species, provide refugia to fish during high flows, move the location of scour away from the toe, and reduce near bank velocities. These structures have been incorporated in the project to provide protection in both the toe zone and in the overbank zone. For the toe zone, structures would be located in the channel bed. The structures would add in-stream habitat complexity while redirecting flows away from the bank to reduce erosion. Log jams that would be installed in the floodplain area would be used to reduce velocities in the overbank zone, deflect flows away from the bank, and provide aquatic habitat during flooding events at the approximate elevation of the 2- to 5-year flood event. Details of the debris jams are presented on Appendix B, Sheet C6.

Riprap would be used to protect channel banks and adjacent structures that are vulnerable to erosion damage due to high velocities and turbulence in the river. Riprap sometimes reduces habitat values by reducing vegetation on banks and decreasing bank and channel complexity and its use has therefore been minimized within the Blackwood Project. The only uses of riprap within the project area are proposed around the Highway 89 culvert in Reach 5 and at an existing force main sewer line in Reach 6. These areas currently have some riprap protection, but would benefit from increased protection.

Channel Realignment. The preliminary design for Blackwood Creek includes channel realignments in Reaches 3, 4 and 5 (Plate 4a). The new alignments were chosen to reduce flow impingement on eroding banks, increase channel stability, and increase floodplain connectivity. Within Reach 3, the channel toe would be moved inward toward the channel center line to allow for the placement of log jams and rock and log revetment on the outside of the bend (north bank) while reducing the streambank slope which is currently undercut. The new alignment would pass through the toe of a gravel bar on the inside of the bend, decreasing the sharpness of the bend to reduce potential scour. The second realignment occurs in the middle of Reach 4 and redirects the channel through the CTC parcel to the north. The new channel would provide sufficient room to construct a floodplain bench on the inside of the bend increasing floodplain connectivity and habitat. The new alignment would also increase sinuosity. As the channel approaches the culvert in Reach 5, the new alignment lengthens the radius of the bend upstream of the highway and reduces the angle of the bend at the entrance to the culvert where significant erosion is currently present. The proposed channel alignments would increase stability of the creek by streamlining transitions and removing abrupt bends. They would also provide the space necessary to grade channel banks for placement of toe protection and the planting of vegetation.

Aspen Treatments. There are three stands of mature aspen trees intermixed with dense conifers within the project area (Plate 6). Currently aspen trees in these areas are competing with larger conifer trees which are inhibiting regeneration of the mature aspen. In order to encourage the regeneration of aspen within these areas, conifers would be selectively removed using hand crews. The total area where selective vegetation removal would occur to encourage aspen regeneration is 3.5 acres. Within these areas, conifers less than 30 inches diameter at breast height (dbh) would be removed and some conifers larger than 30 inches dbh would be

selected for removal by a CTC forester and Cal Fire staff. It is anticipated that moderate to extensive levels of aspen root disturbance will occur during conifer removal and subsequent channel restoration activities. This root disturbance is expected to trigger increased aspen regeneration similar to that resulting from aspen cutting. In addition, aspen seedlings are being propagated from local sources and will be planted throughout the project area. The removed conifers would be stockpiled on site in the staging area nearest to the area of removal. Materials removed during the aspen treatments, such as logs and large branches, would be incorporated into bank revetments, debris structures, and trail features where possible. Vegetative debris/materials that cannot be incorporated into the stream bank treatments would be chipped on site and stockpiled. The chipped vegetation would be used onsite for soil stabilization and mulch in revegetation areas and on trail surfaces. Excess material, if any, would be trucked off site for use on other CTC properties.

Habitat Enhancement/Revegetation. Revegetation with suitable riparian species, in-stream boulder clusters and in-stream riffles would be used in the Blackwood Project to improve in-stream habitat as well as streambank and floodplain habitats for both aquatic and terrestrial species.

Boulder clusters would be placed in the channel at locations where hydraulic diversity is needed and to enhance aquatic habitat. The clusters will consist of a 4-foot front boulder buried 1 to 2 feet below grade with a smaller 2-foot support rock immediately downstream. Details of the boulder clusters are presented on Appendix B, Sheet C7.

Rock riffles would be used to stabilize channel grades, reduce erosion, and provide hydraulic complexity for aquatic species. Riffle structures would be used in reaches 3, 4, and 5 as designated on Plates 3, 4, and 5. In addition to maintaining channel grade, the rock riffles will help to reduce the number of glide/run reaches and encourage the formation of pools in downstream bends. Riffle structures are proposed immediately upstream of significant channel bends to simulate the natural locations of grade drops in the stream. Large boulders on the surface would be placed to maximize hydraulic diversity along the structure. In addition, small woody debris would be located within the riffle to add habitat complexity and hydraulic diversity. Stable riffles observed in Reaches 1 and 2 upstream will be used as example sites when placing boulders during construction. The upstream and downstream ends of the riffles include a 6-foot scour toe to prevent damage during high flows. Riffle widths vary between 10 and 15 feet and include side slope protection that extends at least 3 feet up onto adjacent banks to protect against erosion. Details of the riffles are presented on Appendix B, Sheet C7.

Revegetation will be conducted in areas disturbed by grading and other construction-related activities to establish a diversity of plant species, enhance shaded riverine aquatic habitat, assist in stabilizing the creek banks, and provide erosion control (Plate 7). Temporary irrigation will be provided for up to 2 years following plant installation. Watering applications will be conducted to establish healthy and vigorous plants that are not irrigation dependent at the end of the maintenance period. Weekly site investigations will be conducted to evaluate the plants for signs of inappropriate watering, including water stress (from overwatering), stunted growth, wilting, premature leaf loss (for deciduous species), and premature yellowing of leaves (for deciduous species). After plants are established, the temporary irrigation system will be

removed and recycled off-site. Native plant revegetation in the creek floodplain will involve procuring and installing native riparian plantings (herbaceous, shrub, and tree species) and collecting, storing, and installing native riparian cuttings. Plant material will be grown from genetic stock collected from within the Tahoe Basin. Plants will be installed in appropriate hydrologic zones as defined on the creek banks by flood recurrence elevations. These zones include the lower slope, middle slope, lower terrace, and upper slope areas. Plant lists will be tailored to each planting zone and be adapted to specific site conditions. Additionally, specific planting prescriptions have been identified for specific creek stabilization treatments, including the log jam areas, rock and log revetments, rock boulder clusters, and trench planting. Planting operations will involve preparing planting holes; planting pole cuttings in the log jam areas, rock and log revetment areas, and rock boulder clusters; and planting the 36-inch-length cuttings on the downward slope of the trench planting areas. The trenches will vary by angle and elevation with respect to the creek.

Seeding operations will be conducted with 3 types of seed mixes based on elevations related to flood recurrence intervals and location relative to available sun and shade on site. Following plant installation, a 2-year maintenance period will be conducted to facilitate the establishment of healthy plants. During the maintenance period, the foliage of each plant will be observed for symptoms of disease, size, color, wilting, defoliation, new growth, browsing by wildlife, insect damage, and vandalism. The wood and root crown of each plant will be checked for symptoms of disease, browsing by wildlife, insect damage, girdling, structural deformities, dieback, and sunburn. Any deficiencies will be corrected, and adaptive management will be exercised as appropriate. To document the revegetation efforts, annual reports summarizing plant survivorship, forms recording daily maintenance activities and as-built drawings to record actual planted conditions on-site will be prepared.

2.4.3 Staging, Borrow, Stockpiling, Disposal and Temporary Access

Entry to the project site will be via a 650-foot main roadway 12 feet in width that follows an existing dirt path upstream of the highway (Plate 3). Four river access routes will be constructed to allow heavy equipment to enter the creek in areas where excavation or rock treatment is required. When possible, excavation of the channel and placement of restoration structures will be performed from the top of bank. However, it is expected that some sections of the project will require that heavy equipment enter and maneuver within the creek channel itself.

Four storage/staging areas will be located at various points around the site: three to the north and one to the south of Blackwood Creek. These areas will be used to stockpile construction materials for building structures. Most will be located on CTC property. A main storage/staging area is located just to the south of the main access route and will be about 0.15 acres in size. A 0.1 acre site is located just north of the main access route near Highway 89. In addition to storage, this site will be used for parking heavy equipment and tire washing as needed for trucks leaving the project area. The southern access route into the channel will follow the right of way of a Placer County road that approaches the creek. A small storage area is included adjacent to this access point for stockpiling materials. During construction, sensitive areas away from construction access points will be fenced off to prevent trampling. Silt fences will be used around sections of the channel where overbanks subject to disturbance slope down

toward the channel. After completion of the project, all access routes and storage areas will be regraded as necessary and treated with appropriate BMPs. Staging and storage locations are indicated on Plate 3 and Appendix B, Sheet G2.

Materials that would need to be imported to the site for the creek restoration elements include approximately 76 cubic yards of logs, 876 cubic yards of rock, and 45 cubic yards of boulders. Assuming the average haul truck would have the capacity to carry approximately 14 cubic yards of material, the proposed project would generate approximately 72 truck trips related to materials import over the duration of project construction. Approximately 5,300 cubic yards of soil would be excavated to construct the new channel alignment and approximately 1,800 cubic yards would be reused on site to fill the old channel. Approximately 3,500 cubic yards of soil would be removed from the site and transported to an appropriate location in accordance with local, state and federal regulations. Approximately 250 truck trips would be needed over the duration of the project to remove the excess material.

2.4.4 Construction Schedule

Construction would begin in late summer of 2010 with construction staging and Aspen treatments. Streambank stabilization and in-stream habitat enhancement work would begin in June of 2011. The work would be completed by October 15, 2011. Vegetation monitoring would be conducted in 2012 and 2013. During the vegetation monitoring period, vegetation would be replaced as needed and invasive weeds removed. Should criteria for vegetation success not be met at the end of the two-year monitoring period, additional monitoring would be conducted until the vegetation reestablishment has been deemed successful.

2.4.5 Monitoring and Maintenance

Monitoring activities would include regular and ongoing inspection and maintenance along lower Blackwood Creek by CTC staff to monitor the degree to which the creek restoration is achieving its intended purpose, including no increased risk of flooding of private properties. A detailed monitoring and maintenance plan is under development. At a minimum, the plan would include monthly visual inspections of log/debris jams, rock and log toe revetments, and areas near the mouth of the SR 89 culvert. In addition, CTC would conduct annual adult spawning and juvenile surveys for three to five years to determine whether fish passage objectives are met and to determine use of the newly created fish habitat. As necessary, CTC staff members would remove from the creek materials caught in these structures. In addition, aspen regeneration will be monitored annually after project implementation and if regeneration is not occurring at an adequate level, additional treatments, including aspen cutting may be implemented.

3.0 AFFECTED RESOURCES AND ENVIRONMENTAL CONSEQUENCES

This section describes the resources in the Blackwood Project area, as well as any effects of the alternatives on those resources. When necessary, mitigation measures have been incorporated into the project to reduce potential effects to a less-than-significant level. Appendix D contains a tabulated summary of potential effects of construction and proposed

mitigation measures. Appendix D also contains a mitigation measures monitoring checklist. All avoidance, reduction, and minimization measures would conform to the requirements in TRPA's Handbook of Best Management Practices (TRPA, 1988), LRWQCB, Basin Plan, Chapter 5.3 Best Management Practices and other more recent best available technologies.

3.1 Resources Not Considered in Detail

Initial evaluation of the effects associated with the Blackwood Project indicate that there would likely be little to no significant effect(s) on the quality of the human environment and no unresolved conflicts concerning alternative uses of several resources. These resources are discussed below to add to the overall understanding of the project area.

3.1.1 Climate

The climate in the Lake Tahoe Basin is characterized by cool, dry summers with maximum daily temperatures around 75 degrees Fahrenheit and cold winters with daily average temperatures around 30 degrees Fahrenheit (Corps, 1999). Annual precipitation occurs mostly in the form of winter snow and/or spring rain. The average annual precipitation in the Blackwood Creek watershed is estimated at 60 inches, with over 80 inches on the high elevation ridges at the western edge of the watershed (Tetra Tech, 1998). Elevations of the project area ranges from approximately 6250 to 6230 feet.

3.1.2 Geology and Seismicity

The Lake Tahoe Basin spans the border between the Sierra Nevada Batholith to the west and the Basin and Range province to the east and shares the character of each province (USACOE, 2001). Much of the Sierra Nevada has been affected by glaciation during the past 1.5 million years. The rocks of the Sierra Nevada can be divided into granitic, metamorphic, and volcanic (Hyne, et al., 1972). Cretaceous granodiorite of the Sierra Nevada Batholith is the predominant basement bedrock of the Tahoe Basin. The current geomorphology found in and around the Blackwood Project area were mainly formed over the last two million years by various geological and glacial processes. Tectonic uplift and periodic volcanic eruptions have resulted in steep mountainous terrain with areas of thick layers of ash and fine erodible soils (TRCD, 2003).

The Lake Tahoe Basin is located in an area of moderate seismicity (USGS, 2003-UTR). Active faults within the Lake Tahoe Basin include the North Tahoe fault, which runs southwest to northeast beneath the northern portion of Lake Tahoe, and the East Tahoe fault that borders the eastern shore of Lake Tahoe, also beneath the Lake's water. (USGS Earthquake Hazards Program – Northern California, Map of Recent Earthquake Activity in California-Nevada, <http://quake.usgs.gov/recenteqs/FaultMaps/120-39.htm> June 17, 2008)

3.1.3 Soils and Topography

The United States Department of Agriculture, National Resources Conservation Service (NRCS) 2007 'Soil Survey Tahoe Basin Area, California and Nevada identifies five soil types in the project area which are defined and characterized as follows:

Tahoe Complex. The Tahoe Complex soils consist of very deep, very poorly drained soils that formed in alluvium derived from granitic and volcanic rock. These soils are found in floodplains and valley flats with slopes of 0 to 2 percent and are more than 80 inches in depth. A typical soil profile demonstrates a range of soil textures from the ground level down of decomposed plant materials to mucky silt loam to gravelly coarse sand to mucky silt loam to loam. Depth to the water table is 0 to 12 inches and the soils are subject to occasional flooding and ponding.

Kneeridge Gravelly Sandy Loam. The Kneeridge Gravelly Sandy Loam soils consist of very stony, very deep, moderately well drained soils. These soils are found in moraines with slopes of 2 to 5 percent or 5 to 15 percent. Kneeridge Gravelly Sandy Loam soils display the same characteristics within both slope classifications. A typical soil profile displays soil textures within the top two inches of earth consisting of decomposed plant matter with layers of gravelly sandy loam beneath. Depth to the water table and depth to restrictive features is more than 80 inches and the soils are not subject to flooding or ponding.

Paige Medial Sandy Loam. These soils consist of very deep, well drained soils that formed in colluvium over till derived from volcanic rock. Paige Medial Sandy Loam soils are found within two slope classifications within the project area: 5 to 15 percent and 15 to 30 percent. These soils are found in moraines and vary in depth from approximately 59 to 79 inches below the ground surface. A typical soil profile demonstrates a range of soil textures from the ground level down of decomposed plant matter to sandy loam to cobbly sandy loam to cobbly loam to extremely stony coarse sandy loam. Depth to the water table is more than 80 inches and the soils are not subject to flooding and/or ponding.

Waca Very Gravelly Medial Coarse Sandy Loam. These soils consist of moderately deep, well drained soils that formed in colluvium over residuum from andesitic tuff. These soils are found in hills and mountains with slopes of 9 to 30 percent and are approximately 20 to 39 inches in depth. A typical soil profile displays very gravelly coarse sandy loam soil layers laid atop of bedrock. Depth to the water table is more than 80 inches and the soils are not subject to flooding and/or ponding.

Volcanic Rock Outcrop. A large volcanic rock outcrop lies within the eastern portion of the project area and is referred to by locals as 'Eagle Rock'.

3.1.4 Land Use

Land use within and surrounding the project area is regulated by the Placer County General Plan and the TRPA's Code of Ordinances and Regional Plan. Both agencies use the TRPA Plan Area Statements (PASs) as guidelines for determining appropriate land use and

zoning within the Tahoe Basin. The TRPA has divided the basin into approximately 175 Plan Areas and each of the Plan Areas includes a PAS that describes general policies, permissible land uses, remedial action programs, and developmental limits.

The project area is located within Plan Areas 161-Tahoe Pines and 162-Blackwood. The 161-Tahoe Pines Plan Area is located approximately one mile north of Homewood on Lake Tahoe's west shore. This area includes the outlet of Blackwood Creek, the shorezone area on the east side of SR 89 extending from the north of Cheny Street and ending at St. Michaels Court, and the residential area located west of SR 89 and north of Cheny Street and extending to the southern edge of Blackwood Creek. The existing use is residential and consists of numerous single family homes and one large condominium complex. The majority of the project area lies within the 162-Blackwood Plan Area, which follows the Basin boundary from Twin Peaks to Ellis Peak, and then eastward to 161-Tahoe Pines. This area is classified by the TRPA as conservation land and the PAS recommends that 'this area should be managed, as appropriate, to improve the quality of the watershed, including management of Blackwood Creek as a resident and migratory fishery.' The existing uses include recreation, such as hiking, fishing, and camping, and timber management. Timber practices are limited to non-sensitive areas.

The project area includes both land designated by TRPA as "non-sensitive" areas and "sensitive" SEZ areas based on land qualities such as steepness, type and amount of soil and vegetation, and erosion potential. Blackwood Creek is classified by the TRPA as a sensitive SEZ. Activities in this zone are generally limited to restoration, erosion control, and revegetation projects (TRPA, 1991). The project's goal is to improve riparian habitat and water quality and is therefore in accordance with the environmental restoration goals of the TRPA for SEZ.

3.1.5 Aesthetics

The Lake Tahoe area is well-known for its scenic beauty and aesthetics. The project area is visible from SR 89 and surrounding residential areas. Any effects to visual resources and aesthetics would be temporary, as no permanent structures would be constructed. Over the long-term, the Blackwood Project could create a more sinuous channel which may result in larger riparian and floodplain areas, thus improving the visual character of the area.

3.1.6 Noise

Noise can be defined as unwanted sound and noise levels. Effects are interpreted in relationship to noise level standards. The Blackwood Project falls under TRPA's noise standards for the Lake Tahoe region. TRPA has adopted environmental carrying capacities for noise for various land use categories. The project area falls within the Residential (Plan Area 161-Tahoe Pines) and Conservation (Plan Area 162-Blackwood) land use categories. The numerical average noise level standard for Residential areas is 55 decibels and for Conservation areas is 50 decibels. However, the TRPA noise standards do not apply to noise from TRPA-approved construction and maintenance projects, provided that construction activities are limited to 8:00 a.m. to 6:30 p.m.

The primary sources of noise in the project area include motor vehicle traffic on SR 89, residential sounds such as music, and natural sounds such as wind and wildlife. Construction activities would temporarily increase noise levels within the Blackwood Project area. Potential sources of noise from the proposed construction include both on-site construction noise sources from the use of heavy equipment (bulldozers, payloaders, trucks, etc.) and transportation-related noise sources from construction workers, visitors, and deliveries. The anticipated construction noises produced by implementation of the Blackwood Project would have insignificant, short-term construction noise impacts, and no long-term noise impacts. BMPs to reduce noise may include, but are not limited to equipping construction equipment with operating mufflers and limiting construction hours to 8:00 a.m. to 6:30 p.m.

3.1.7 Socioeconomics/Environmental Justice

In 2007, approximately 324,495 people lived in Placer County, California (Placer County, 2008). The largest population center in close proximity to the project area is Tahoe City with a 2000 population of 1,761. The largest industrial categories in Placer County are: trade, transportation, and utilities; natural resources, mining, and construction; and professional and business services.

Within the Tahoe Basin, tourism and recreation provide the largest share of both revenue and employment for the Lake Tahoe economy. Placer County offers a number of recreational activities such as gaming, boating, fishing, hunting, hiking, biking, camping, skiing, and snowboarding.

Executive Order 12898 directs all Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. Minority population is defined as including all non-white racial groups and Hispanics of any racial group; low-income population is defined based on Federal poverty thresholds. Temporary construction-related effects as a result of the proposed project to adjacent residential properties including traffic, noise, or visual effects would not have a disproportionate effect to low income and/or minority populations. There are not large populations of low-income or minority groups within or adjacent to the project area.

3.1.8 Hazardous, Toxic, and Radiological Waste

In May of 2002, the Corps conducted a Phase I Environmental Site Assessment (ESA) of the Blackwood Project area and all land within a one-mile radius of the project area. The ESA was preceded by a database search, records research, and phone interviews during which the California Department of Toxic Substances Control, the California Environmental Protection Agency, and the California State Water Resources Control Board were contacted. The database search identified two potential hazardous, toxic, or radiological waste (HTRW) sites in the vicinity of the project area; however, both of these sites were investigated and are considered closed cases. No evidence of HTRW has been observed during field visits to the project area.

Construction would involve the use of substances that could be considered hazardous, such as fuels, adhesives, and solvents. CTC is responsible for preparing an Accidental Spill Prevention and Response Plan prior to project implementation. Sites of particularly elevated spill risk such as staging locations within the project area shall be isolated and treated with appropriate BMPs such as: turbidity curtains, gravel bags, filter fabrics, silt fences, absorbent materials, etc. intended to prevent contamination to surface waters. Staging areas for fueling and maintenance of heavy construction equipment shall be located away from stream channels and Lake Tahoe in order to limit potential spills to designated areas where observation and clean-up can be readily accomplished. Should an oil or fuel spill occur during construction or maintenance activities, all work would stop immediately, LRWQCB would be notified, and clean up procedures would commence immediately in accordance with the guidelines of the NPDES permit and the TRPA Basin Plan.

3.2 Resources Considered in Detail

Initial evaluation of the effects associated with the Blackwood Project indicate that there is the potential for significant effect(s) resulting from the Preferred Alternative if unmitigated for several resources. These resources, the potential effects, and the mitigation measures required to reduce the potential effect to less than significant are discussed below and presented in Appendix D.

3.2.1 Water Resources and Quality

3.2.1.1 Existing Conditions

Lake Tahoe lies within a very deep basin. Radiating around it are 63 tributaries that drain the surrounding watershed and flow into the lake. That water carries with it a wide variety of materials, including clay, silt, sand, gravels, lawn chemicals, sewage, and organic matter. With the increasing development in the Tahoe Basin during the last 50 years, sedimentation to the Lake has increased. The increased erosion and downstream sedimentation are major concerns to the numerous Federal, State, and local agencies who are actively trying to restore and preserve the exceptional water clarity of Lake Tahoe. Actions are needed to reduce the amount of sediment and nutrients entering the lake. For creeks such as Blackwood Creek, there is a need to decrease streambank erosion and increase overbank flows into the flood plain, thereby slowing water velocities and allowing sediments to settle before creek flows enter the lake.

The Blackwood Creek watershed encompasses 11.2 square miles of steep mountainous terrain. The gradient of Upper Blackwood Creek is approximately ten percent, and the stream gradient decreases abruptly to approximately one percent as it approaches the Middle Fork and mainstem of Blackwood Creek. Blackwood Creek contributes an average of 2.5 tons of fine sediment per day to Lake Tahoe, which is the largest volume of fine sediment, per square mile, of any of Lake Tahoe's tributary watersheds (USGS 1997). This load is due to a variety of factors, including the erosive nature of the volcanic soils in the basin and past lumbering and gravel mining operations (USFS 1999). Sediment loads are greatest during periods of high runoff.

Hydraulic and sediment transport analyses and field observations indicate that the evolution of the Blackwood Creek channel over the past several decades has involved incision and subsequent widening and straightening (CTC and DGS 2007). These changes have resulted in streambank erosion, less frequent and less extensive floodplain inundation, and consequently lower levels of sediment deposition on the floodplain.

3.2.1.2 Effects

Basis of Significance. An alternative would be considered to have a significant effect on water quality if it would substantially degrade water quality, contaminate a public water supply, substantially degrade or deplete ground-water resources or interfere with ground-water recharge, or expose sensitive species or humans to substantial pollutant concentrations.

No Action. The conditions under the no action alternative are those expected to occur in the study area without implementation of any of the restoration plans identified in this study. The no action alternative conditions provide the basis of comparison to the preferred alternative to assess the plan's effectiveness at addressing identified problems. The no action alternative would not improve water quality in Blackwood Creek and erosion and sediment transport to Lake Tahoe would continue. The existing backwater effects from the Highway 89 Bridge culvert and continued bank erosion would continue to directly affect the creek's water quality, supporting fisheries, and other aquatic organisms and indirectly affect water quality at the terminus where it empties into Lake Tahoe. These conditions are based on technical predictive analyses conducted during previous studies and incorporate consideration of existing relevant plans of other agencies and groups (Corps 1999; Corps 2003; CTC and DGS 2007). Previous studies identified the following trends related to future water resource problems in the Blackwood Project area:

- Continued and accelerated rates of bank erosion that would result in further loss of riparian vegetation and instream cover;
- Continued limitation of the creek's ability to regenerate riparian habitat for fish and wildlife;
- Continued and accelerated rates of fine sediment and associated nutrient inflow into Blackwood Creek and Lake Tahoe;
- Continued separation of connectivity between channel and floodplain resulting in the system's decreased ability to sustain a functional floodplain for the natural establishment and regeneration of riparian vegetation; and
- Continued scouring of channel would result in reduced pool/riffle ratio where there is important foraging, spawning, and rearing habitat for trout and other aquatic species.

Preferred Alternative. The Blackwood Project has been designed to improve existing watershed functions and restore historic functions that were lost as a result of anthropogenic actions. Project activities would have substantial long-term benefits to water quality. While there is the potential for temporary and indirect effects to downstream water quality in the case of a discharge of sediment during construction and during initial project implementation, appropriate BMPs and mitigation measures would be utilized as discussed below.

The Blackwood Project would realign segments of Blackwood Creek to restore sinuosity to the channel and to reduce scour in portions of the creek where the current alignment currently feature abrupt bends. Approximately 5,300 cubic yards of soil would be excavated to construct the new channel alignment and approximately 1,800 cubic yards would be reused on site to fill the old channel. Construction activities associated with channel realignment would have the potential to result in temporary affects on water quality. Excavation and channel construction would disturb a significant amount of soil which could conceivably be transported downstream to Lake Tahoe if not planned for or mitigated appropriately. However, construction work would only occur after dewatering of Blackwood Creek and when there are no flows in the channel to minimize the potential of discharging sediment to Blackwood Creek.

The project also includes elements associated with in-stream habitat restoration and streambank stabilization. In-stream riffles and streambank stabilization structures would be applied to stabilize the toe, bank and overbank zones of the streambank as well as improve fish habitat within the creek. Installation of in-stream riffles and fish habitat structures as well as streambank stabilization structures would require heavy equipment to be working within the creek channel. The use of heavy equipment in the creek channel if unmitigated would have the potential to discharge pollutants to Blackwood Creek. However, prior to installation of in-stream habitat structures or streambank stabilization structures, Blackwood Creek would be properly dewatered.

The Blackwood Project would provide for increased floodplain connectivity by creating floodplain overbank areas along the creek that would flood at the 2- to 5-year return interval. The floodplain overbank area would be revegetated with riparian species upon construction of the floodplain bench. There could be a potential affect to water quality in the scenario that an event that causes overbank flooding occurs prior to vegetation establishment. To protect against this potential discharge of sediment, additional BMPs are included in the project design including rock and woody debris to protect this area. Furthermore, the floodplain area would only be inundated under the 2- to 5-year event and it is unlikely that this area would be flooded prior to vegetation establishment.

Off-site water quality could be indirectly affected in the scenario that there is a discharge of sediment flowing into the downstream areas outside the footprint of the construction activities. Through proper implementation of BMPs, soil erosion would be minimized to avoid adverse affects to water quality. Through the proper implementation of the mitigation measures in Section 3.2.1.3, there would be no significant direct or indirect affect to water resources as a result of the project.

3.2.1.3 Mitigation

Permitting. Section 404 of the Federal CWA requires authorization from the Secretary of the Army for the discharge of dredged or fill material into waters of the United States (WOUS). Regional General Permit (GP) 16 has been authorized for activities with minimal individual or cumulative impacts to WOUS in the Lake Tahoe Basin, including restoration of stream channels, which is the purpose of the Blackwood Project. CTC is responsible for submitting an application for GP 16 to the Corps and would be responsible for compliance with the conditions of GP 16,

including but not limited to, providing compliance documentation to the Corps upon completion of the project.

Work that involves the discharge of dredged or fill material would also require 401 Water Quality Certification and exemptions from LRWQCB to the 100-year floodplain and SEZ prohibitions. CTC will seek water quality certification under Section 401 of the Clean Water Act from the State of California, Lahontan Regional Water Quality Control Board by September 2010. Work within Blackwood Creek would also require a State of California, Department of Fish and Game (CDFG) Streambed Alteration Agreement. The LRWQCB and State Water Quality Control Board also regulate waste discharge associated with construction activities under a National Pollutant Discharge Elimination System (NPDES) General Permit. Prior to construction, a Notice of Intent (NOI) shall be submitted to the State of California Water Resources Control Board (SWRCB), with a copy to the LRWQCB, and a SWPPP including a BMP Plan prepared in accordance with NPDES guidelines.

Temporary Sediment and Erosion Control BMPs. BMPs such as silt fencing on vulnerable slopes, water filled isolation dams and diversion structures, construction fencing, straw wattles or coir logs, and filter fabric would be implemented to minimize soil erosion in the case of storm events during construction. BMPs would be consistent with TRPA standards as well as Federal and state permit conditions including Corps, LRWQCB, and CDFG permits. Daily BMP inspections during construction would be conducted and remedial actions would be taken should deficiencies be noted.

Construction vehicles and equipment will be limited to restricted areas and will be serviced in specific upland areas or stabilized areas to prevent accidental spills of fluids, oils and lubricants into surface water. This area will consist of a clean gravel pad with an impervious liner underneath. Construction equipment shall be cleaned to remove any loose dirt or sediment prior to exiting the site. Washing will take place in an area stabilized with crushed stone and drain to an approved sediment trap or basin.

The project site will be winterized according to TRPA and LRWQCB requirements at the end of each construction season. The following winterization measures would be adhered to: maintain all temporary erosion control including filter fencing and coir logs; stabilize all disturbed areas with heavy mulch and tackifier; clean up and remove all construction site waste including trash, debris and spoil piles; and, cover all soil stockpiles/berms with a natural fiber blanket and secure stockpiles/berms with filter fencing.

Permanent Sediment and Erosion Control BMPs. The project incorporates permanent sediment and erosion control BMPs into the design. Streambank stabilization structures such as rock and log toe revetment, woody debris jams, boulder clusters, and riprap would be used to stabilize Blackwood Creek streambanks from erosion. Grade control would be achieved using in-stream riffles. These structures would control potential sediment sources after the project has been constructed.

To prevent areas of disturbed soil from contributing sediment to Blackwood Creek, disturbed areas would be revegetated. Native vegetation and mulch would be applied. Where

appropriate, native plants, rock, wood and soils salvaged from project excavation would be used in revegetation and restoration. Revegetation would be conducted as soon as practicable to stabilize the ground after construction is completed in an area. Irrigation systems would be installed and maintained to ensure success of the revegetation.

Dewatering. A Dewatering Plan will be developed as a part of the SWPPP to detail the procedures that will be followed for construction dewatering for both in-channel dewatering activities as well as dewatering associated with groundwater that is encountered during construction. The preliminary dewatering plan includes a diversion structure located between Reaches 2 and 3. The diversion structure will impound stream flows approaching from upstream. At the downstream end of the project, a second diversion structure will be constructed to prevent minor flows remaining in the channel from leaving the control reach. A section of sheet piles will also be inserted into the channel bed downstream of the control reach to prevent subsurface flows from passing out of the project channel. Stream flow will be diverted around the construction site using two 30-inch pipes that will divert the water 1600 feet downstream. Control valves will be installed at the upstream end of the pipelines to regulate flow. Based on preliminary hydraulic analyses, it is expected that the two pipelines will have a maximum capacity of about 70 cfs, which correlates to about a 10-year peak annual flow capacity during the months of the construction season (CTC and DGS 2008).

Three basins will be used to treat the construction water. The first basin is a sand settling basin to remove large suspended particles. Water would be pumped from the sand settling basin to irrigate an upland area at the base of Eagle Rock. The second basin chamber will be used to settle out fines in the construction water and will be connected to the sand settling basin by a weir structure. A flocculent additive may be injected into the flow to promote settling of fine material. The third basin chamber will be used for groundwater infiltration. If more discharge is added to the basin than can be handled by irrigation and infiltration alone, a water treatment system would be used. The system will include two sand medium filters and a final polishing filter. Monitoring stations upstream and downstream of the treatment station would be included to measure water quality of the influent and effluent. If the water quality of the flow out of the basins meets project standards without treatment, a bypass system would pass the flow around the treatment filters. Final effluent from the basin/treatment system will be piped downstream of the construction reach and allowed to discharge by gravity back into the Blackwood Creek channel.

3.2.2 Vegetation and Wildlife

3.2.2.1 Existing Conditions

The project area is comprised primarily of montane coniferous forest dominated by white fir (*Abies concolor*) and Jeffrey pine (*Pinus jeffreyi*) with a dense shrubby understory. Cottonwood-willow riparian forest lines Blackwood Creek in a band running west to east and is characterized by an upper canopy of black cottonwood (*Populus tremuloides*) and a lower canopy of willows (*Salix spp.*). An aspen riparian forest vegetation community, a montane riparian scrub vegetation community, and a wet meadow are located within the northwestern portion of the project area, abutting Blackwood Creek to the north. The approximately two-acre

aspen riparian forest located on the western side of the wet meadow, is dominated by quaking aspen (*Populus tremuloides*), and shows evidence that the stand is being encroached-upon by conifers. Patches of montane riparian scrub are located to the north and south sides of the wet meadow. The plant community is largely dominated by willows (*Salix spp.*), service berry (*Amelanchier alnifolia*), and red osier dogwood (*Cornus sericea*). A variety of herbaceous species grow throughout the wet meadow and the small stream channels which meander through it. Dominant vegetative species within the wet meadow include rushes (*Juncus spp.*), sedges (*Carex spp.*), corn lily (*Veratrum californicum*), shooting-star (*Dodecatheon sp.*), domestic timothy (*Phleum pretense*), ranger's buttons (*Sphenosciadium capitellatum*), and monkeyflower (*Mimulus sp.*) (EDAW, 2003).

In addition to the northwestern stand of aspen riparian forest, three stands of mature aspen intermixed with dense white fir line Blackwood Creek within the southern portion of the project area. Minimal aspen regeneration is occurring within these stands, likely due to shading and competition from encroaching white fir. The vegetative species observed within the Blackwood Project area are listed below in Table 1.

Table 1: Vegetative Species Observed within Blackwood Project Area

Scientific Name	Common Name
<i>Abies concolor</i>	White fir
<i>Abies magnifica</i>	Red fir
<i>Achillia millefolium</i>	Yarrow
<i>Alnus incana</i>	Mountain alder
<i>Alnus rhombifolia</i>	White alder
<i>Amelanchier alnifolia</i>	Service berry
<i>Anaphalis margaritacea</i>	Pearly everlasting
<i>Acocynum cannabinum</i>	Dogbane
<i>Aquilegia Formosa</i>	Columbine
<i>Arctostaphylos Manzanita</i>	Common Manzanita
<i>Arctostaphylos patula</i>	Green leaf Manzanita
<i>Artemisia douglasiana</i>	Mugwort
<i>Aster sp.</i>	Aster
<i>Calocedrus decurrens</i>	Incense cedar
<i>Carex spp.</i>	Sedge species
<i>Castilleja sp.</i>	Paintbrush
<i>Ceanothus leucodermis</i>	Chaparral whitethorn
<i>Ceanothus prostrates</i>	Mahala mat
<i>Ceanothus velutinus</i>	Tobacco brush
<i>Cirsium vulgare</i>	Bull thistle
<i>Cornus sericea</i>	Redosier dogwood
<i>Cryptantha sp.</i>	Cryptantha
<i>Dodecatheon sp.</i>	Shooting-star
<i>Elymus elymoides</i>	Squirrel-tail grass
<i>Epilobium angustifolium</i>	Fireweed
<i>Epilobium sp.</i>	Willow herb

Scientific Name	Common Name
<i>Equisetum arvense</i>	Common horsetail
<i>Eriogonum nudum</i>	Naked buckwheat
<i>Elymus trachycaulis</i>	Slender wheatgrass
<i>Fragaria virginiana</i>	Mountain strawberry
<i>Fritillaria atropurpurea</i>	Fritillary
<i>Galium aparine</i>	Common bedstraw
<i>Galium sp.</i>	Bedstraw
<i>Goodyera oblongifolia</i>	Rattlesnake plantain
<i>Heracleum lanatum</i>	Cow parsnip
<i>Juncus spp.</i>	Rush species
<i>Lepidium sp.</i>	Peppergrass
<i>Lupinus sp.</i>	Lupine
<i>Lupinus succulentus</i>	Arroyo lupine
<i>Mimulus sp.</i>	Monkeyflower
<i>Monardella odoratissima</i>	Mountain monardella
<i>Phacelia sp.</i>	Phacelia
<i>Phleum pretense</i>	Domestic timothy
<i>Pinus contorta ssp. Murrayana</i>	Lodgepole pine
<i>Pinus jeffreyi</i>	Jeffrey pine
<i>Pinus ponderosa</i>	Ponderosa pine
<i>Poa pratensis</i>	Kentucky bluegrass
<i>Populus tremuloides</i>	Quaking aspen
<i>Populus trichocarpa</i>	Black cottonwood
<i>Potentilla glandulosa</i>	Cinquefoil
<i>Potentilla gracilis</i>	Cinquefoil
<i>Pteridium aquilinum</i>	Bracken fern
<i>Pterospora andromedea</i>	Pinedrops
<i>Quercus berberidifolia</i>	Scrub oak
<i>Ribes spp.</i>	Gooseberry species
<i>Rubus discolor</i>	Himalayan blackberry
<i>Rubus parviflorus</i>	Thimbleberry
<i>Rumex acetocella</i>	Sheep sorrel
<i>Salix scouleriana</i>	Scouler's willow
<i>Salix sp.</i>	Willow
<i>Sarcodes sanguinea</i>	Snow plant
<i>Scrophularia californica</i>	California figwort
<i>Sidalcea sp.</i>	Checkerbroom
<i>Solidago sp.</i>	Goldenrod
<i>Sphenosciadium capitellatum</i>	Ranger's buttons
<i>Stachys albens</i>	White hedge nettle
<i>Stellaria arvensis</i>	Chickweed
<i>Symphoricarpos mollis</i>	Creeping snowberry
<i>Thalictrum fendleri</i>	Fendler's meadow-rue

Scientific Name	Common Name
<i>Veratrum californicum</i>	Corn lily
<i>Verbascum Thapsus</i>	Woolly mullein
<i>Veronica Americana</i>	Brooklime
<i>Wyethia mollis</i>	Mule's ears

The array of vegetative communities within the project area provide habitat for a variety of animal species. Jeffrey pines provide seeds and protection from the elements. Several large (greater than 24 inches dbh) aspen snags are located in the meadow and are used by cavity-nesting birds.

Wildlife species observed within the Project area are indicated in Table 2 below. Typical mammals in these habitats would include yellow-bellied marmot (*Marmota flaviventris*), western gray squirrel (*Sciurus griseus*), Douglas squirrel (*Tamiasciurus douglasii*), pine marten (*Martes americana*) as well as widespread species such as raccoon (*Procyon lotor*), mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), and beaver (*Castor canadensis*).

Table 2: Wildlife Species Observed within the Blackwood Project Area

Family	Scientific Name	Common Name
Reptiles	<i>Sceloporus occidentalis</i>	Western fence lizard
	<i>Thamnophis elegans</i>	Western terrestrial garter snake
Birds	<i>Bubo virginianus</i>	Great-horned owl
	<i>Carduelis pinus</i>	Pine siskin
	<i>Certhia Americana</i>	Brown creeper
	<i>Ceryle alcyon</i>	Belted kingfisher
	<i>Cinclus mexicanus</i>	American dipper
	<i>Coccothraustes vespertinus</i>	Evening grosbeak
	<i>Colaptes auratus</i>	Northern flicker
	<i>Contopus sordidulus</i>	Western wood-pewee
	<i>Corvus corax</i>	Common raven
	<i>Cyanocitta stelleri</i>	Stellar's jay
	<i>Dendroica coronata</i>	Yellow-rumped warbler
	<i>Dryocopus pileatus</i>	Pileated woodpecker
	<i>Empidonax oberholseri</i>	Dusky flycatcher
	<i>Hirundo rustica</i>	Barn swallow
	<i>Junco hyemalis</i>	Oregon junco
	<i>Melospiza melodia</i>	Song sparrow
	<i>Molothrus ater</i>	Brown-headed cowbird
	<i>Passerella iliaca</i>	Fox sparrow
	<i>Pheucticus malanocephalus</i>	Black-headed grosbeak
	<i>Picoides villosus</i>	Hairy woodpecker
<i>Piranga ludoviciana</i>	Western tanager	
<i>Poecile gambeli</i>	Mountain chickadee	
<i>Regulus satrapa</i>	Golden-crowned kinglet	
<i>Sialia Mexicana</i>	Western bluebird	

Family	Scientific Name	Common Name
	<i>Sitta Canadensis</i>	Red-breasted nuthatch
	<i>Sitta pygmaea</i>	Pygmy nuthatch
	<i>Tachycineta bicolor</i>	Tree swallow
	<i>Turdus migratorius</i>	American robin
	<i>Vireo gilvus</i>	Warbling vireo
	<i>Wilsonia pusilla</i>	Wilson's warbler
	<i>Zonotrichia leucophrys</i>	White-crowned sparrow
Mammals	<i>Castor canadensis</i>	Beaver

Source: EDAW, October 29, 2001

3.2.2.2 Effects

Basis of Significance. An alternative would be considered to have a significant effect on vegetation and wildlife if it would result in the loss or degradation of native vegetation, or loss of resident or migratory wildlife species and/or their habitat.

No Action. This alternative would result in adverse effects on the existing vegetation and wildlife found in the project area, as the banks would continue to erode and result in the further loss of habitat as riparian vegetation and creek-side conifers growing on top of bank would fall into the creek. Plant communities and associated wildlife use would continue to decrease and lose their value over time. Wildlife habitat quality and quantity in the area, especially along the river banks, are expected to continually degrade and be lost. No action would also contribute to expediting the loss of some of the larger cottonwoods and conifers that currently have exposed roots growing along the eroding banks. These trees would be subject to falling into the creek sooner than expected if the restoration effort was not implemented. Without the restoration effort, there would be no action to help stabilize the banks from higher than usual rates of erosion.

Preferred Alternative. Construction related to the project's erosion control and habitat restoration goals would have the potential for minimal temporary effects on the wildlife and vegetation within the project area. Much of the project work would be conducted along a stretch of Blackwood Creek where the streamside habitat is degraded. Given that project outcomes would include stabilizing and revegetating these areas and restoring their associated habitats, the long term outcome of the project would have a benefit to the wildlife and vegetation within the Blackwood Project area. Approximately 1 acre of riparian habitat and 1,100 linear feet of aquatic habitat would be restored, creating wildlife habitat in areas which had been previously disturbed by development activities. Every effort would be made to not remove native riparian trees or shrubs such as willows in the aspen riparian forest, montane riparian scrub, and wet meadow communities. A total of approximately 47.2 acres within the overall project area could be disturbed by the proposed restoration activities.

Aspen treatments would be applied to the aspen stands located within the southern portion of the project area. The presence of mature aspens indicates that a vigorous root system exists within the stand, which is likely to result in aspen regeneration if competing conifers are removed. This assumption is supported by localized aspen regeneration on the site where blow-

downs have reduced the shading from conifers. Black cottonwood is also included in these stands and is also likely to benefit from the removal of encroaching conifers.

Any resident or migrating wildlife could be temporarily disturbed and/or displaced due to noise and activity during construction. Displaced species would be expected to return to the enhanced creek area once construction is complete. There would be no potential indirect effects to vegetation or wildlife as project effects would be contained within the project area. However, the goal of the project is to restore wildlife and riparian habitat, and the project will benefit wildlife because increased wetland and riparian areas are expected upon project completion. Through excavation, the creek channel and thinning of conifer species within aspen stands, approximately 1 acre of riparian forest areas would be created within the project site. Approximately 1,100 linear feet of restored channel would provide food and cover benefits to wildlife and a variety of aquatic species.

3.2.2.3 Mitigation

During construction, removal of mature trees would be avoided when possible, and other trees in the work area would be protected with fencing. Only mature trees selected by qualified foresters would be removed. Wherever feasible, native riparian vegetation would be preserved or salvaged for replanting within the new Blackwood Creek corridor. Large woody material from unsalvageable riparian vegetation would be used as aquatic habitat features or cuttings for stake plantings. Willow clumps would be salvaged for stake planting and for live fascines for bank stabilization. In addition, BMPs would be implemented to minimize any effects of traffic or equipment on soil or vegetation. Upon the completion of construction, all disturbed and excavated areas, including temporary access roads, shall be revegetated or stabilized where needed. Salvaged willows and other riparian vegetation will be propagated and used where possible. Additional seed or vegetation will be added where needed for stabilization measures and for wildlife habitat enhancement. Seed used in revegetation shall be certified weed free.

Where feasible, management activities that require the removal of trees and shrubs should be conducted outside the avian nesting season (April 1 through August 15). If vegetation removal during the avian nesting season is required, surveys would be conducted by a qualified biologist prior to vegetation removal. The project proponent shall retain a qualified biologist to conduct a focused survey for active nest sites of migratory birds in accordance with the Migratory Bird Treaty Act (MBTA) within a 1/8 mile radius of the project area prior to (i.e. within fifteen days) the onset of construction activities initiated during the nesting season. If active nests are located during the preconstruction surveys, the biologist shall consult with CDFG and USFWS as required to determine the appropriate buffer around the nest. In addition, all trash created during construction would be properly contained in wildlife-proof containers and removed at the end of each day.

3.2.3 Special Status Species

3.2.3.1 Existing Conditions

In order to assure proper protection of species which are designated with a heightened level of concern, efforts have been made to discover and evaluate the presence of special status species within the Blackwood Project area. Special status species are herein defined as: those listed as threatened, endangered, or as candidates for listing by the U.S. Fish and Wildlife Service (USFWS). The USFWS, the USFS Lake Tahoe Basin Management Unit (LTBMU), the CDFG California Natural Diversity Database, and the TRPA were consulted regarding special status species that could potentially occur in and/or near the project area. The habitat requirements for the special status animal and plant species identified by the USFWS, the LTBMU, and TRPA were reviewed prior to conducting field surveys (EDAW 2007).

In July 2008, the USFWS (Sacramento District) Endangered Species Listing resources were consulted to obtain a current listing of threatened, endangered, and candidate species within or near the UTR project area. The USFWS provided a list of Federally listed and candidate species, and species of concern that may occur in the vicinity of the proposed project (Appendix A). Special status species that have the potential to occur in the project area include threatened species Delta smelt (*Hypomesus transpacificus*), and candidate species mountain yellow-legged frog (*Rana muscosa*), fisher (*Martes pennanti*), and Tahoe yellow-crested salamander (*Rorippa subumbellata*). No critical habitat for special status species is designated in or near the Blackwood Project area.

3.2.3.2 Effects

Basis of Significance. An alternative would be considered to have a significant effect on special status species if it would result in the take of a federally listed threatened or endangered species, adversely affect designated critical habitat, or substantially affect any other special status species, including degradation of its habitat to the degree of jeopardizing the continued existence of the species or critical habitat.

No Action. This alternative would have no effect on federally listed special status species or their existing habitat in the project area. However, there would also be no improvement to habitat for potential special status species.

Preferred Alternative. Construction activities associated with proposed project water quality improvement and habitat restoration activities are deemed to have no effect to special status species, therefore the impacts are less than significant. Species such as the Delta smelt, fisher, mountain yellow-legged frog, and Tahoe yellow-crested salamander are not known to occur within the project site, do not have critical habitat within the project site, and would not experience adverse effects due to Blackwood Project activities. Overall, effects to special status species would be less than significant, while the habitat restoration implemented under the Blackwood Project would achieve long-term benefits to special status species.

Based on field surveys conducted 2003 and 2007, biological evaluations/biological assessments prepared for the CTC, consultation with local agencies (TRPA and LTBMU)

wildlife occurrence records and current management documents, special status species are not believed to occupy the Blackwood Project area (EDAW 2003 and 2007). A population of Tahoe yellow-cress is known to occur elsewhere in the Tahoe Basin, but no construction activities are planned in the beach zone of Blackwood Creek in the area between the lake's beach zone and the forest edge where the Tahoe yellow-cress is more likely to be found. With the implementation of proper mitigation measures and due to the temporal and geographic limits of construction activity, there would be no indirect effects to special status species as a result of the Blackwood Project. Based on the assessment of the special status species provided below, it was not required by the Corps to initiate formal Section 7 consultation with the USFWS and to submit a Biological Assessment on direct, indirect, and cumulative effects on federally listed threatened species Delta smelt, nor request their Biological Opinion.

Delta Smelt. No suitable habitat for the Delta smelt exists within the Blackwood Project site. The nearest suitable habitat for the delta smelt is present in the San Francisco estuary, nearly 200 miles from the project area. The Blackwood Project would not affect Delta smelt or critical habitat.

Mountain Yellow-Legged Frog. Suitable aquatic habitat for candidate status mountain yellow-legged frog (*Rana muscosa*) includes upper elevation lakes, ponds, bogs, and slow-moving alpine streams. Suitable habitat for the mountain-yellow legged frog is not present within the project site. In addition, field surveys were conducted for special status wildlife in 2007 and no mountain yellow-legged frog were identified within or near the proposed project area (EDAW 2007). The only currently known population of mountain yellow-legged frogs in the Tahoe Basin exists at Hell Hole. Due to the lack of suitable habitat on the site, the Blackwood Project would not affect mountain yellow-legged frog populations or critical habitat.

Fisher. Preferred habitat for fisher is characterized by dense (60-100 percent canopy closure), multistory, multi-species mature coniferous forests with a complex physical structure near the ground (Buskirk and Ruggerio 1994). Although, fisher use a variety of other habitat types, they depend on a well-connected expanse of late-successional forest. High quality habitat includes close proximity to forested riparian corridors that are used as travel-ways and an interspersed of small (<1 acre) openings with good ground cover used for foraging (Spencer et al. 1983; Freel 1991; Raphael and Jones 1991). Riparian corridors or other means for dispersal are necessary to fishers to provide safe and frequent movements through poor habitat areas and between habitats. While suitable habitat is present within the project area, fishers are considered extirpated from the Lake Tahoe Basin (Schlesinger and Romsos 2000). The Blackwood Project would not directly or indirectly affect fisher populations.

Tahoe Yellow Cress. This plant is a Federal candidate species that is indigenous to the Lake Tahoe area. The Tahoe yellow cress grows only in sand near the mouths of streams or in back-beach depressions around the shoreline of the lake. Threats to the plant include destruction of habitat by the construction of piers and other structures, high levels of recreation, and varying water levels (FWS 2002). Efforts are currently being made by a multiagency technical advisory group to develop a conservation strategy for the plant. The group is composed of representatives from TRPA, Federal and State agencies, the Tahoe Lakefront Homeowners' Association, local environmental groups, developers, and consultants (TRPA, 2003).

Tahoe yellow-cress is typically found growing in the transition area between the beach along the lake and the forest where there is a soil mixture consisting of small cobble, sand, and dirt. A population of Tahoe yellow-cress is known to occur elsewhere in the Tahoe Basin, but no suitable dune habitat is present in the Blackwood Project area or downstream where the creek discharges to Lake Tahoe. The project would therefore not directly or indirectly affect Tahoe yellow-cress.

3.2.3.3 Mitigation

No section 7 consultation is required for this project, since there are no effects to Federally listed species. If environmental conditions change due to natural disasters causing the loss of nearby habitat there remains a potential that listed wildlife species could begin using the area. While there are no effects to Federally listed species as a result of this project, the following mitigation measures would be implemented during construction. Any sighting of listed species, sensitive species, or location of nest or dens of these species will be reported and a qualified biologist would survey and delineate a protective buffer and consultation would be initiated with the USFWS pursuant to the ESA. If special status wildlife species with agency-mandated protected activity centers and limited operating periods (LOP) are found breeding in the project area, a protected activity center will be delineated by a qualified biologist and a LOP will be implemented.

3.2.4 Fisheries

3.2.4.1 Existing Conditions

Blackwood Creek is one of the major spawning streams in the Lake Tahoe Basin. There are nine fish species that may use the creek. Native species that occur in Blackwood Creek include the Tahoe sucker (*Catostomus tahoensis*), mountain sucker (*Catostomus platyrhynchus*), Lahontan redbreast (*Richardsonius egregius*), speckled dace (*Rhinichthy osculus*), and Paiute sculpin (*Cortus beldingi*). Gamefish species include rainbow trout (*Oncorhynchus mykiss*), brook trout (*Salvelinus fontinalis*), and brown trout (*Salmo trutta*). There is a remote possibility that kokanee salmon (*Onchorynchus nerka*) spawn in the creek, but since high stream flows are necessary to gain access to Blackwood Creek, kokanee have access only during high flows in wet years. Salmonids typically migrate from Lake Tahoe and use the stream to spawn. (CWQCB/LRWQCB, 2001).

Generally, the quality of fish habitat in Blackwood Creek is capable of supporting both migratory and resident fish populations. However, fish populations are being adversely affected by the existing stream geomorphology of Blackwood Creek. Upstream of the project area, various activities such as logging and gravel mining over the years have caused erosion of streambanks, sediment deposition, loss of riparian vegetation, and reduction of pool habitats. These activities have created poor conditions for both spawning and rearing migratory and resident fish. Portions of runs, riffles, and pools have been reduced to levels considered less than ideal but sufficient to support life histories of the variety of fish species. (Tetra Tech 2001) Table 3 lists general spawning periods for the nine fish species.

Table 3: Fish Species Occurring in Blackwood Creek and Spawning Periods

Species	Spawning Period
Tahoe sucker	May through July
mountain sucker	October to November
Lahontan redbreast	mid-September to January
speckled dace	October to November
Paiute sculpin	April to June
Rainbow trout	Late-May through August
brook trout	June and July
brown trout	May through mid-August
Kokanee salmon	May through August

(Source: Tetra Tech 2001)

3.2.4.2 Effects

Basis of Significance. An alternative would be considered to have a significant effect on fisheries resources if it would result in a reduction in fish populations or substantially degrade the water quality of fish habitat by increasing the concentrations and total amounts of suspended solids or toxic substances.

No Action. This alternative would have continued water quality effects and no benefit to the fisheries and aquatic resources of Blackwood Creek. There would be a continued loss of habitat and water quality degradation for fish because less riparian vegetation would be available to help stabilize the stream channel banks and provide cover. Continued bank erosion would cause sediment to continue to settle on the existing spawning and rearing areas where there are riffles and holding or pool areas. In addition, backwater effects from the culvert at the Highway 89 Bridge would continue since suspended fine sediments and larger cobble and boulders would continue to contribute depositing and settling and falling out in the upstream areas extending up to Reach 3. Considering the project area is in close proximity to where the creek flows into the mouth at Lake Tahoe, there would also be continued effects to the water quality of Lake Tahoe. Because fish reside in the lake and seasonally use the project area, especially during their spawning runs, the No Action alternative would result in large amounts of fine sediment continuing to fall out of suspension at the terminus of Blackwood Creek. The No Action alternative would continue to effect fisheries, from an accelerated loss of riparian vegetation, a loss of substrate for the fish to feed upon, a loss of hiding cover, and increased thermal water quality effects on fish habitat.

Preferred Alternative. The project could have temporary construction related effects on aquatic resources while working within the existing river channel. Work is proposed to include realignment of Blackwood Creek, streambank stabilization treatments, and creation of in-stream riffles. Dewatering from Blackwood Creek would be conducted prior to any stream work and dewatering structures would be maintained throughout the period of channel construction. Significant effects to aquatic resources could occur during these time periods. In addition, indirect effects to aquatic species could occur in the event of a sediment discharge from the project. Appropriate BMPs for water quality and sediment control are further discussed in

Section 3.2.1.3 above. The temporary effects to aquatic resources caused by this alternative are outweighed by the overall benefits the project would provide to these resources through aquatic habitat enhancement measures.

Benefits to fisheries and aquatic resources include the addition of roughness elements which increase the ability of the river to flow and sort fine sediment from gravels, and the creation of proper pool-riffle-run complexes that increase fish habitat and cover. These roughness elements include rock and log revetment structures, debris jams, boulder clusters, rock riffles. Woody debris would be placed within the rock riffles to provide immediate cover following construction for juvenile and adult fish. In addition, imported spawning gravels representing the appropriate sizes needed by spawning salmonids would be placed at the site. Benefits include improved rearing and spawning conditions for fish and increased habitat for macroinvertebrate populations. The potential benefits of the project may extend to Lake Tahoe fisheries immediately downstream. The Blackwood Project supports the TRPA's environmental thresholds, goals, and policies for fisheries in the Lake Tahoe Basin. With the implementation of the proposed mitigation measures described below, the project would not directly or indirectly have a significant affect on fisheries.

3.2.4.3 Mitigation

Fish rescue shall be performed prior to dewatering or partial diversion of water from the stream course or other aquatic habitats in the project area where fish may be present, in order to avoid stranding of fish during construction activities. Before construction activities commence within lower Blackwood Creek (i.e., before creek diversion and dewatering), a qualified biologist would conduct fish capture and translocation activities within the construction impact area, and areas approximately 100 feet upstream and downstream of that area. Block nets with 1/8-inch mesh would be placed at the upstream and downstream extent of the fish removal area to prevent fish from moving into the area during fish removal and subsequent construction activities. All captured fish species would be immediately released to suitable habitat upstream of the construction work area. Following construction, CTC would conduct annual adult spawning and juvenile surveys for three to five years to determine whether fish passage objectives for the project have been met.

3.2.5 Traffic

3.2.5.1 Existing Conditions

The roadways in and near the project area include SR 89, residential streets, and unpaved maintenance roads. Highway 89 runs along the west side of Lake Tahoe and connects the south lake area and the City of South Lake to Tahoe City and Truckee. The state route crosses Blackwood Creek through an existing culvert. A pedestrian bridge lies parallel to the culvert to allow for foot-traffic to cross the roadway. Types of traffic on SR 89 include cars, sport utility vehicles, trucks, and motorcycles.

The California Department of Transportation (Caltrans) records traffic counts on the roadways in Placer County. Table 1 shows the annual average daily traffic (AADT) counts on

SR 89 near the Blackwood Project area (Caltrans, 2006). The months of July and August are the peak-use months when the daily traffic counts are the highest on SR 89. Consequentially, Caltrans does not allow road construction in the Tahoe Basin area that would require traffic control from July 1 through Labor Day weekend, in order to eliminate traffic congestion during the busy summer months.

Table 4: Traffic Volumes on State Route 50 near the Project Area

Roadway	Location	AADT ¹	
		North/East of Location	South/West of Location
SR 89	Mc Kinney Creek Road	6,900	5,500
SR 89	Ward Creek Bridge	8,200	6,900
SR 89	Fir Avenue (Fanny Bridge)	13,200	8,200

¹ Annual average traffic volumes in 2006 from Caltrans online traffic counts
 AADT = Annual average daily traffic

3.2.5.2 Effects

Basis of Significance. An alternative would be considered to have a significant effect on traffic if it would cause an increase in vehicle traffic that is substantial in relation to the existing load and capacity of a roadway or an increase in vehicle safety hazards, or a substantial deterioration of the physical condition of area roadways.

No Action. This alternative would have no affect on existing vehicle traffic in the region. The types and volume of traffic would be expected to remain the same.

Preferred Alternative. Worker commute traffic would have only a minimal effect on traffic volumes due to the small size of construction crews (approximately 10 to 20 workers) involved. Construction traffic use of the paved roadways would be sporadic throughout the day and would not have a measurable effect on traffic volumes. No lane or road closures would be expected as a result of the project as there would be no work on Highway 89 nor on adjacent roadways. Area roadways would only be used to access the construction site.

Additional truck trips would be generated as a result of the Blackwood Project. Approximately 72 truck trips would be conducted related to materials import over the duration of project construction. Approximately 250 truck trips would be needed over the duration of the project to remove the excess material excavated during construction. The increased truck trips generated as a result of the project would occur during the summer months when traffic is heaviest in the Tahoe Basin. With the implementation of the mitigation measure described below, the project would not have a direct or indirect significant affect on traffic.

3.2.5.3 Mitigation

To avoid or reduce any potential adverse effects on traffic to less than significant, a traffic control plan would be prepared before initiation of construction. The traffic control plan would address project construction traffic and parking, and emergency access. At a minimum,

the traffic control plan shall address truck haul routes, truck turning movements at the project staging areas and spurs, traffic control signage, bicycle and pedestrian traffic, and monitoring of the in-place traffic control plan to implement traffic control revisions, if necessary.

3.2.6 Air Quality

3.2.6.1 Existing Conditions

Regulatory Background. The Federal Clean Air Act (CAA) was enacted in 1969. The CAA established the National Ambient Air Quality Standards (NAAQS) and delegated primary enforcement of the CAA to the states. The NAAQS established the air quality levels that all states must meet. The Federal Environmental Protection Agency (EPA) is the Federal agency responsible for establishing the air pollution thresholds for the U.S. The majority of air quality law enforcement is delegated to the individual states (EPA 2003).

The California Clean Air Act (CCAA) was passed in 1988. The CCAA authorized the Air Resource Board (ARB) to regulate mobile air pollution sources. The ARB has been designated as the responsible agency for air quality regulation in California and as such regulates the local air pollution control districts in California. The ARB established the California Ambient Air Quality Standards in 1967, updated as needed. The ARB has in turn delegated responsibility to the local air pollution control districts. There are 35 air pollution control districts responsible for regulating activities that could affect air quality in the State. The 35 air pollution control districts form 15 air basins to manage air pollution, which are responsible for attaining and maintaining State and Federal ambient air quality standards (ARB 2003).

The Placer County Air Pollution Control District (PCAPC) regulates Placer County air quality. The PCAPC is a part of the Sacramento Valley Air Basin, the Mountain Counties Air Basin, and the Lake Tahoe Air Basin. The eastern part of Placer County is part of the Lake Tahoe Air Basin (ARB 2003). The project area is entirely within the Lake Tahoe Air Basin. The PCAPC has adopted local thresholds of significance, which are stricter than State and Federal thresholds (Placer County 2002).

In the 1990's, the EPA developed the General Conformity Rule to implement Section 176(c) of the CAA. The rule became effective on January 31, 1994. The underlying principle of the General Conformity Rule is that Federal actions must not cause or contribute to any violation of a NAAQS. A conformity determination is required for each pollutant where the total of direct and indirect emissions caused by a Federal action in a nonattainment area exceeds *de minimus* threshold levels listed in the General Conformity Rule (40 CFR 93.153(b)). However, the project area is within an air basin (Lake Tahoe Air Basin) that is in attainment for all Federal ambient air quality standards. Therefore, a general conformity determination is not required. The local construction emission standards for the project area are shown in Table 5.

Table 5: Project Air Emission Thresholds for State and TRPA Criteria Pollutants in Non-attainment

Criteria Pollutant ¹	Peak Emissions (Pounds/Day)
NO _x	6.6
PM ₁₀	4.4
VOC	17.6
SO ₂	6.6
CO	22.0

¹NO_x = nitrogen oxides
PM₁₀ = particulate matter
VOC = volatile organic compounds (ROG)
(Source: TRPA 2007)

Attainment Status. The project area is located entirely within the Lake Tahoe Air Basin. According to the 2007 Area Designation for State and National Ambient Air Quality Standards (CARB, 2007), the Lake Tahoe Air Basin is in attainment or unclassified for all Federal ambient air quality standards. The Lake Tahoe Air Basin is non-attainment for California ambient air quality standards for PM₁₀ and ozone (CARB 2007). Ongoing monitoring for carbon monoxide, ozone, particulate matter, and visibility is done by the Lake Tahoe Air Basin.

Pollution Sources. The main sources of particulate matter in the project area are vehicle traffic on paved and unpaved roadways, residential wood burning, and forest fires. Ozone in the project area is produced by the combination of NO_x and hydrocarbon gases in sunlight. Ozone levels increase during the summer because of hot air trapping the ozone close to the ground and increased number of sunny days increases the production rate. High concentrations of ozone in the Tahoe region are associated with atmospheric transport from outside of the region. Carbon monoxide levels are closely related to traffic congestion in the region.

Sensitive Receptors. Sensitive receptors are those individuals and/or wildlife that could be affected by changes in air quality due to emissions from the project. Sensitive receptors are often associated with facilities such as residences, schools, playgrounds and parks, and hospitals. The sensitive receptors in the project area include residents, visitors, and wildlife.

3.2.6.2 Effects

Basis of Significance. An alternative would be considered to have a significant effect on air quality if it would violate any ambient air quality standard, contribute on a long-term basis to an existing or projected air quality violation, expose sensitive species or humans to substantial pollutant concentrations, or not conform to applicable Federal, State, or local standards.

No Action. This alternative would have no effects on existing air quality in the project area. Air quality would continue to be influenced by climatic conditions, and local and regional emissions from vehicles and fireplaces.

Preferred Alternative. There could be short-term or temporary impacts to air quality as a result of the Blackwood Project. The operation of vehicles and heavy equipment including excavators, trucks, and loaders would produce emissions such as exhaust and PM₁₀. In addition, there would be short-term increases in PM₁₀ due to clearing and grading, soil excavation, operation of vehicles and heavy equipment, import and export of material and other miscellaneous activities associated with project construction. An estimated 250 truck trips would be required over the course of the project. These short-term emissions have been evaluated and are not expected to exceed Federal, State, or regional air quality standards, and no sensitive receptors would be exposed to substantial pollutant concentrations. In addition, there would be no long-term effects on air quality in the region. As a result, there would be no significant direct or indirect effects on air quality. Daily construction emissions for the project were estimated using URBEMIS 2007 and are shown in Table 6.

Table 6: Estimate of Construction Generated Emissions

Source	ROG (lb/day)	NO _x (lb/day)	PM ₁₀ (lb/day)
Fine Grading Dust			10.0
Off-Road Equipment Exhaust	6.3	59.5	2.8
On-Road Equipment Exhaust	0.9	14.1	0.6
Worker Trips	0.2	0.2	0.0
Total Unmitigated Emissions	7.4	73.8	13.4

(Source: Data prepared by EDAW 2008)

3.2.6.3 Mitigation

Placer County is the Air Quality Management District for the project area. The CTC will submit to Placer County and receive approval for a fugitive dust control permit prior to breaking ground. Dust control measures included within the Placer County, Air Quality Management District Fugitive Dust Control Permit would be followed throughout the period of construction.

3.2.7 Cultural Resources

3.2.7.1 Existing Conditions

Prehistoric Background. Native American occupation in the Lake Tahoe area has been consistent for approximately 8,000 years. The earliest known cultural expression in the area is the Pre-Archaic postglacial Tahoe Reach Phase. Outside of Parman projectile points, little is known of the Phase, which dates from 8000 to 7000 years before present (BP). The Early Archaic, Spooner Phase dating from 7000 to 4000 BP produced both Pinto and Humboldt series projectile points (Moratto 1984).

The Middle Archaic Martis Phase is divided into Early, Middle, and Late Martis. Early Martis, 4000 to 3500 BP, is characterized by contracting stem points (Elko and Martis Series). There is a proliferation of large basalt artifacts that are associated with the Martis artifact assemblage. Middle Martis, 3500 to 2500 BP, retains the earlier Elko points and large basalt

artifacts, but Steamboat projectile points enter the artifact assemblage. Late Martis, 2500 to 1500 BP, retains the basalt tools, but new projectile points include the Martis and Elko Corner-notched and Eared projectile points, and large untyped side-notched points.

During the early Kings Beach Phase, 1500 to 800 BP, the bow and arrow replaced the atlatl and dart as hunting tools. The arrow points are the Rose Springs and Eastgate series. Chert cores and utilized flakes replaced the earlier, formalized basalt tools. The Washoe-Lake Kings Beach, 800 BP to historic, is the final phase. During this phase, the Washoe became indefinable as a separate cultural group exhibiting specific cultural traits. Associated artifacts include Desert Side-notched and Cottonwood series arrow points, and chert tools similar to the previous phase.

Ethnography. Blackwood Creek falls directly within the Washoe cultural area, which covers a region approximately 120 miles long by 40 miles wide and encompasses the Lake Tahoe area. Information specific to the Washoe occupation of the Blackwood Project area (northwest quadrant of Lake Tahoe) was researched by Reno Nevada consultant Penny Rucks under contract to the State of California Department of Parks and Recreation. Rucks' report (2002) was prepared to identify Washoe use of the Sugar Pine Point State Park, which is approximately 4 miles south of Blackwood Creek on the Lake Tahoe shoreline.

Lake Tahoe and its main tributary streams provided the Washoe with important food and other resources (Rucks 2002). Every summer the Washoe would leave their winter homes and go to Lake Tahoe for fishing and plant harvesting. They would return to their summer camps, which were located along the streams. The annual journey included reestablishing the camps to gather plants and acorns, hunt game, and fish for cutthroat trout in the early spring and other fish later in the summer. These plants, game, and fish were used for food, medicines, clothing, tools, and building materials. The journey afforded other opportunities for the Washoe to visit with Miwok friends, spend time in a warmer climate, and also gather redbud bark, soap root brushes, and medicines.

Archeological evidence of these activities is found in the form of broken flaked of stone tools and debris tools in temporary small hunting camps along the mountainsides. More permanent base camps in the high valleys show occupation through the presence of flakes, tools, grinding implements, and house depressions. The camp at Blackwood Creek was used as stopping area for fishing and a staging area for the acorn gathering trips. The camp was on the south side of a hill on the north side of Blackwood Creek, and was used as a staging area for Washoe groups heading west by the Georgetown route.

Historic Background. John C. Fremont and his scout Kit Carson first encountered Lake Tahoe in February 1844. Activity in the area increased greatly after discovery of gold in Coloma in 1848. Many people moved west into northern California by following trails on the north and south ends of Lake Tahoe. Travelers camped in the meadows and valleys, and stopped to rest and get resupplied with necessary provisions.

Blackwood Creek was named for the first settler, Hampton Craig Blackwood, arrived in 1863. In 1864, sheep ranching came to Blackwood Canyon, and by the 1870's and 1880's, sheep ranching was by far the favored use of the land, with some cattle grazing in the lower,

flatter reaches. However, overstocking eventually became a problem in the Blackwood Canyon. During the late 1920's, overgrazing led to restrictions being placed on grazing. After 1930's grazing was allowed by assigned grazing allotments to individual permittees.

Clear-cut logging has also taken a toll on the canyon. Logging first began in the late 1880's (Hardy 1987). Between 1889 and 1905, the eastern 1.5 miles of the drainage had been extensively logged. Clear cutting is evidenced by the even stands of mixed conifers in the logged area. Logging then seems to have abated until 1953 when two parcels totaling 80 acres were logged along the lower reaches of the north slope above Blackwood Creek.

3.2.7.2 Literature Search and Previous Surveys

A records and literature research was conducted at the North Central Information Center at California State University, Sacramento, on October 1, 2001. One formal survey was reported in the area, with two sites recorded near the Area of Project Effect (APE). The APE is surrounded by land that is owned primarily by the California Tahoe Conservancy, which is in turn surrounded by the Tahoe National Forest. U.S. Forest Service (USFS) archeologists or volunteer archeologists were responsible for the surveys and site recordation. Hardy's (1987) survey report listed seven previous reconnaissance surveys that were done by USFS personnel that were in the files at the USFS, but not at the Information Center. Three of the seven surveys, ARR #05-19-42, 62, and 87 did not have written reports.

In 1987, USFS archeologists surveyed 290 acres in Sections 2, 3, 4, 5, 6, 7, 8, 15, 16, and 17 on the Homewood, California, topographic map. The survey was conducted for the Blackwood Canyon Erosion Control Project (Hardy 1987) and covered an area that was far more extensive than the Corps' project. Their survey only located one historic site, a trash dump that was given the field number 05-19-214 and named the Blackwood Canyon Dump. This site was given a permanent trinomial site number of CA-PLA-661-H, with a primary number of P-31-787-H, which was appended after the California site form system was revised in the mid-1990's. Hardy's original summary form regarded the trash dump as "semi-historic" (Hardy 1987).

A multi-component site was rerecorded by USFS volunteer archeologist Herschel Davis (1991). The site was originally known as Freed 15 and D'Azevedo 119. The site with the trinomial number CA-PLA-40 is the same campsite that was mentioned under "Ethnology." Davis turned in a very thorough 22-page site record form. This site had been given an earlier USFS field number of 05-19-127PH. The site as recorded by Davis consisted of two can/rubbish dumps and at least seven grinding slicks and/or shallow bedrock mortars, which definitely indicate ethnohistoric use of the site. The family of Washoe informant Hank Pete had used the site for many years.

Surveys. Four archaeological field surveys have been conducted within the Blackwood Project area:

- Ludwig, 2006. Cultural Resources Survey, Blackwood Creek Restoration Project, East of Highway 89;
- Medin, 2005. Historical Archaeological Resource Evaluation Report for the Highway 89

Rehabilitation Project, Placer County. Division of Environmental Analysis, California Department of Transportation, Sacramento, CA;

- EDAW, 2003. California Tahoe Conservancy Forest Habitat Enhancement Program, Blackwood Creek Pilot Study: Cultural Resources. EDAW, Inc. Sacramento, CA.
- Perry, 2002. An Archaeological Survey of 1.5 Miles Along Blackwood Creek in Placer County, California for the Proposed Blackwood Creek Aquatic Ecosystem Restoration Program. U.S. Army Corps of Engineers, Sacramento District, Sacramento, CA.

Previous cultural resources investigations cover a significant portion of the Lower Blackwood Creek project area. These surveys documented four sites, one multi-component and three historic. The prehistoric component consists of bedrock mortars near Blackwood Creek and the historic sites are related to recreational activities, early logging, and Basque shepherding. Of these, only CA-PLA-40/H and P-31-2806-H are potentially eligible for inclusion into the National Register of Historic Places (NRHP).

Native American Consultation

Traditional Cultural Properties (TCP) are established through consultation with Native American representatives identified by the California Native American Heritage Commission. Native American consultation for restoration within the project area was first initiated in 2001 with the Native American Heritage Commission (NAHC) requesting a list of suitable native representatives and tribal contacts that might have concerns with or interest in the proposed project and a search of the NAHC Sacred Lands File to determine if any properties of cultural concern to the Native American community were located within or near the project area (EDAW 2007). No properties of cultural concern had been documented in the area and phone calls were made to the Washoe Tribe regarding the project with no responses. In 2003, the Washoe Tribe was again contacted regarding Eagle Rock specifically as a potential ceremonial site. According to the Washoe Tribe, Eagle Rock was not a site that was used historically by the Washoe Tribe for traditional observances (EDAW 2007). The search conducted by the Corps listed Ms. Linda Shoshone as a representative of the Washoe Tribe of Nevada and California as a point of contact. Ms. Shoshone contacted Corps archeologist Mr. Richard Perry expressing her interest and concern for any project work along Blackwood Creek, especially CA-PLA-40/H. Mr. Perry informed her that the site should be avoided by a 50 meter buffer zone.

3.2.7.3 Effects

Basis of Significance. An alternative would be considered to have a significant adverse effect on cultural resources if it would diminish the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Types of effects include physical destruction, damage, or alteration; isolation or alteration of the character of the setting; introduction of elements that are out of character with the property; neglect; and transfer, lease, or sale of the property.

No Action. Even under the No Action alternative, some cultural resources may remain at risk. Further development could affect cultural resources by destroying or damaging them. Natural processes such as erosion, root and rodent intrusion, flooding, and grazing could destroy

prehistoric sites. Vandalism, through deliberate looting and collecting, is a national problem and is expected to continue.

Preferred Alternative. The restoration project would have no adverse effects on any known cultural resource sites or finds as the project will flag and avoid CA-PLA-40/H and P-31-2806-H, which are considered eligible for the purposes of this project. Ground-disturbing activities could potentially affect buried cultural resources. Through appropriate mitigation measures, all sites and finds would be avoided and/or protected.

3.2.7.4 Mitigation

The Corps has initiated consultation with the State Historic Preservation Officer (SHPO), and to mitigate for adverse effects to the cultural resources, the SHPO has concurred with the following measures (Appendix F). As mentioned in the Native American Consultation Section, the archaeological site CA-PLA-40/H would be avoided by the designation of a 50 meter buffer zone. In addition, resource BC-4 (P-31-2806-H, Basque tree carvings) has been fully recorded and includes mapped locations of each tree and photographs and drawings of each glyph, in accordance with SHPO consultation. Recent work at both of these sites indicates that the historic components are part of the same occupation and may be eligible for inclusion into the NRHP. Due to their spatial proximity and related nature, the two sites will be combined into a single site with a new trinomial and analyzed for their NRHP eligibility status. The original buffer zone will be expanded to incorporate those portions of P-31-2806-H that originally would not have been avoided. Further, a qualified archaeologist will flag the 50 meter buffer zone, identify the location to the contractor to ensure avoidance, and monitor during project activities occurring within the vicinity of the avoidance area. This documentation and eligibility assessment will be provided to the SHPO prior to construction.

Due to the sensitivity of the APE, an archaeologist would be onsite during all subsurface ground-disturbing restoration activities. This will ensure that if any buried cultural resources are found, they would be avoided or, if necessary, evaluated for their potential for listing in the National Register of Historic Places. If buried or previously unidentified resources are discovered during project activities, all work in the vicinity of the find would cease, and the SHPO would be contacted for additional consultation per 36 CFR 13(b), Discoveries Without Prior Planning. If human remains are discovered, State law procedures regarding the discovery would be implemented.

3.2.8 Flooding

3.2.8.1 Existing Conditions

Runoff events responsible for significant flooding of Blackwood occur with the onset of snowpack melting induced by warming temperatures in late spring or by warm rain-on-snow events. These latter events appear to be responsible for a shift in the annual peak discharge frequency curve recorded by the USGS gage for events greater than 1600 cfs. The Corps has analyzed flood frequency for Blackwood Creek in 2001. The results of this analysis are presented in Table 7 below (CTC and DGS 2007).

Table 7: Peak Flood Recurrence Intervals Calculated at USGS Gage for Blackwood Creek

Annual Recurrence Interval (years)	Peak Discharge (cfs) Corps (2001)	Peak Discharge (cfs) USGS (2002)
100	2800	2710
50	2500	2070
25	2200	-
10	1800	-
5	1100	-
2	400	-

(CTC and DGS 2007)

Within the project area, as the channel passes near the Tahoe Pines subdivision approximately 500 feet upstream of the highway 89 culvert, the capacity of the creek reduces to about 1800 cfs, which is equal to the 10-year return interval flow. During larger flood events, part of the flow is forced out of the channel towards the south (location of the subdivision). The extent of the overbank flooding under existing conditions is indicated on FEMA's Flood Insurance Rate Map included in Plate 8 (FEMA 1998).

The culvert at Highway 89 is a hydraulic constriction for flood flows, and due to the configuration of the channel and culvert opening, the culvert is subject to debris blockage that worsens during flood conditions. Under a worst case scenario, the culvert is assumed to be completely blocked by debris and flood elevations would rise to the level of Highway 89, approximately 6242 feet. Under this condition the portion of the Tahoe Pines development extending 1000 west of the highway would be inundated. If the culvert is assumed to be free of debris and flood flows are limited by the capacity of the channel (1800 cfs), the Highway has a backwater effect only for approximately 400 feet west of the highway (CTC and DGS, 2007).

3.2.8.2 Effects

Basis of Significance. An alternative would be considered to have a significant effect on flooding if it would cause an increase in base flood elevations, or increase the frequency or occurrence of flooding.

No Action. This alternative would have no effect on existing flood frequency or elevations. Flooding would continue to occur in the Tahoe Pines subdivision at the same frequency and elevation as under existing conditions.

Preferred Alternative. A primary objective of the Blackwood Project is that the project would not increase the risk of flooding to neighboring properties. As part of the project design, the project engineer modeled future flooding conditions and concluded that the project would not cause increased flooding risks (CTC and DGS 2007). Through the implementation of proper mitigation and based on the engineered design, the project would not induce any higher incidence of flooding the residential houses currently found within the floodplain or cause significant effects on humans than what has occurred in the past. The restoration design would

not induce flooding since habitat features consisting of logs would be constructed to deflect the flows away from the eroding bank on the south side of the creek where the houses are located.

3.2.8.3 Mitigation

The Conservancy shall submit a final engineering report prepared by a qualified professional to TRPA, Placer County, and LRWQCB for review and approval. The report shall include an updated analysis of future flooding conditions to evaluate any changes related to the upstream USFS restoration activities and the project's final design. The report shall demonstrate that the project will not increase flood hazards to persons or property relative to existing conditions.

3.2.9 Recreation

3.2.9.1 Existing Conditions

Recreation is one of the main reasons people visit the Lake Tahoe Basin. According to a survey by the Tahoe Center for a Sustainable Future (1997), 42 percent of visitors come to Lake Tahoe for recreation. The two peak tourist seasons in the Lake Tahoe Basin are during the summer between the 4th of July and Labor Day weekend, and during the winter ski season.

The Blackwood Project area is heavily used for a variety of recreational activities. Recreational facilities along the Lower Reach consist of well established trails. Summer recreational activities include fishing, hiking, hunting, backpacking, horseback riding, camping, and nature study. In the winter, cross-country skiing and snowmobiling are popular. The USFS maintains a winter snow park and semi-primitive campsite in the valley bottom of Blackwood Canyon near Highway 89 (USFS, 1999).

The network of trails within the project area is small and consists of short loops connecting Highway 89 with access points along Blackwood Canyon Road; the trails generally lead to Eagle Rock which lies between Blackwood Creek and Blackwood Canyon Road/Barker Pass Road. The existing trail system within the project site contains several trails that lead to the top of Eagle Rock. There are also several trails which dead end at the base of volcanic cliffs. Most of the trails are on steep, eroding slopes, and the main approach to Eagle Rock from the south is located under existing power lines, and ascends directly up the slope (CTC and DGS, 2007). In addition, there is a formal bicycle/pedestrian trail on the east side of the Highway 89 Bridge and informal trail on the north side of the creek regularly used for hiking and jogging

3.2.9.2 Effects

Basis of Significance. An alternative would be considered to have a significant effect on recreation if it would cause a substantial loss of recreational area or access to a recreational area.

No Action Alternative. This alternative would have no effects on existing recreation in the area. The area available for recreation and access to recreational areas would be expected to remain the same.

Preferred Alternative. Construction activities for the Blackwood Project would result in temporary effects to recreation due to closure of the dirt path north of Blackwood Creek and to the informal trail network within the project area. Entry to the project site west of Highway 89 would be via a 650-foot long, 12 ft wide roadway that follows an existing dirt path north of Blackwood Creek (Plate 3). Construction equipment and vehicles will use this roadway to access the staging areas and restoration work sites. Four temporary river access routes (one on the east side of Highway 89) will be constructed to allow heavy equipment to enter the creek in areas where excavation or rock treatment is required. In addition, access to the formal bicycle/pedestrian trail on the east side of the Highway 89 Bridge may be temporarily restricted during the rock revetment work that will occur immediately below the bridge.

Project improvements are expected to enhance local recreational opportunities through the improvement of the informal trail network within the project area. The Blackwood Project would also benefit recreational wildlife viewing opportunities through riparian vegetation enhancement and improved fish spawning habitat. Effects to recreation would be temporary during the period of construction activities and the informal trails just outside of the project boundaries would be rerouted to Eagle Rock or upstream to Blackwood Creek. After construction is completed, recreational access would return. There would be no long-term direct or indirect effects to recreation as a result of the Blackwood Project.

3.2.9.3 Mitigation

During construction, recreational activity would be directed to trails to the north of the project area. Upon completion of the project, existing recreational activities will be allowed to resume. The restoration project would benefit recreation by increasing fishing opportunities and enhancing the quality of the natural experience during hiking and nature study through the proposed revegetation and aspen habitat enhancement measures.

4.0 CUMULATIVE EFFECTS

Concern over the integrity of the Blackwood Creek watershed dates back to the 1920's. Since that time, various management and structural measures have been taken to help preserve or improve the quality of the watershed (USFS, 1999). More recently, concerns over the deteriorating quality of Lake Tahoe have led to additional measures to control the inflow of sediments into the lake. A 2003 watershed analysis (Swanson et. al., 2003) determined that deteriorating conditions in the river corridor have an adverse impact to ecosystem health in Blackwood Creek. These cumulative adverse effects under the no action alternative 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 (USFS 2008). 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 indicated in Table 8 below.

Table 8: Cumulative Effects, Projects on Blackwood Creek

Project Title	Project Type	Project Purpose	Year
Road Restoration and Upgrades	Infrastructure	Decommissioning 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	Replaced existing culvert on Barker Pass road where it crosses Blackwood Creek with a 100-year flood capacity bridge.	2006
Quail Vegetation and Fuel Treatment Projects	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
Placer County Erosion Control Project (Tahoe	Infrastructure	Implement erosion control measures within Tahoe Pines residential unit.	2009

Project Title	Project Type	Project Purpose	Year
Pines)			
USFS Stream and Floodplain Restoration Project (Phase III)	Channel/ Floodplain Restoration	Restore channel stability and improve floodplain connectivity by: 1) Restore aquatic habitat through reconstruction of critical channel features, 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, and 3) Restore the degraded riparian plant community through the stabilization of stream channels and reconnecting channels to floodplains.	2010-2011

Source: (USFS 2008)

All projects would be required to comply with applicable Federal, State, and local environmental laws and regulations. The Blackwood Creek project would result in the cumulative loss of conifers in the Blackwood watershed. However, the restoration effort is designed to create higher value riparian and aspen habitats for wildlife use, and thereby, offset the cumulative effects of removing conifers. Conifers would be cut to encourage aspen regeneration where the conifers are currently outcompeting the aspen. There would be no significant cumulative effects from the implementation of the Blackwood Creek project when considered in combination with these other projects. Most of the projects were implemented for the purpose of SEZ restoration and erosion control and will produce an environmental benefit to the watershed. Because no listed species are known to exist in the vicinity of the project area, no significant cumulative effects to listed species would result from these projects. In addition, because project timing is staggered within the watershed, there would be no cumulative effect to fisheries or fish habitat. The Blackwood Creek project would have a cumulative benefit in conjunction with these other Federal, State, and local projects to protect and improve the environment of Blackwood Creek and the Lake Tahoe Basin.

5.0 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

The relationship of the project alternatives to applicable Federal, State, and local environmental requirements is summarized below. The project would be in compliance with all laws, regulations, and Executive Orders before implementation of construction.

5.1 Federal

Clean Air Act (42 U.S.C. 1857 et seq.), as amended and recodified (42 U.S.C. 7401 et seq.). *Compliance.* The project is not expected to violate any Federal or State air quality standards, or hinder the attainment of air quality objectives in the local air basin. The project would have no significant adverse effects on the future air quality of the area and is in compliance with this act. Prior to construction the CTC would be responsible for preparing a dust control plan and obtaining a Dust Control Permit from Placer County.

Clean Water Act (33 U.S.C. 1251 et seq.). *Compliance.* Because this project involves the discharge of dredged or fill material into waters of the United States, the sponsor is required to obtain a Department of the Army permit under section 404 of the Clean Water Act. The Section 404 permit application is expected to be submitted by September 2010. Additionally, the local sponsor will seek water quality certification under Section 401 of the Clean Water Act from the State of California, Lahontan Regional Water Quality Control Board by September 2010. Any additional requirements included as part of the water quality certification will be incorporated into the project. The project would include BMPs to avoid or minimize adverse effects to water resources plus any other conditions necessary to ensure that adverse effects to the environment are minimal. The filling of the existing Blackwood Creek channel in specific locations to create a more stable slope would require verification of GP 16 from the USACOE and Section 401 Water Quality Certification or a waiver of waste discharge from LRWQCB.

The project would also require an NPDES permit due to construction disturbance of greater than one acre of land. Prior to construction, the CTC would prepare a SWPPP and then submit a Notice of Intent (NOI) form to the State of California, Water Resources Control Board (SWRCB) indicating their intent to comply with Board Order No. R6T-2005-0007. The SWPPP would identify BMPs to be used to avoid or minimize adverse effects of construction on surface waters and outline a stormwater sampling program for project related effects with associated contingency measures. Once the work is completed, the CTC would be responsible for submitting a Notice of Termination (NOT) in order to terminate coverage by the NPDES permit.

Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. 103 et seq.) *Compliance.* CERCLA provides federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. A Phase I Environmental Site Assessment was conducted for the Blackwood project site in 2002. Investigation of potential HTRW sites was conducted and no HTRW sites were observed within the project area. The project would not release or threaten to release HTRW.

Endangered Species Act (16 U.S.C. 1531 et seq.). *Compliance.* In accordance with Section 7(c), the project proponents requested that the U.S. Fish and Wildlife Service (USFWS) provide a list of federally listed and proposed species likely to occur within or around the project area. This list is included in Appendix A. Based on the determination that there is no suitable habitat to support Federally listed species, no known occurrences observed during the Natural Diversity Database search, and no indication from the Service's field biologist during the site visit that there was suitable habitat to support listed species, the Corps has found it is not necessary to request concurrence and has made a finding of no affect to listed species.

Executive Order 11988, Floodplain Management. *Compliance.* This order directs all Federal agencies approving or implementing a project to consider the effects that the project may have on flood plains and flood risks. The project has been designed to not increase the frequency or likelihood of flooding in nearby developed areas. Flood elevations would not increase as a result of the project.

Executive Order 11990, Wetlands Protection. *Compliance.* This order directs all Federal agencies to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. The project would not result in the destruction, loss or degradation of wetlands. Wetland areas may increase as a result of the project.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. *Compliance.* The order directs all Federal agencies to identify and address adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. Temporary construction-related effects as a result of the proposed project to adjacent residential properties including traffic, noise, or visual effects would not have a disproportionate effect to low income and/or minority populations. There are not large populations of low-income or minority groups within or adjacent to the project area. The proposed project would benefit all residents by preserving and enhancing Blackwood Creek water quality and functions and wildlife habitat. In addition, the trails and recreational opportunities that would be created and enhanced by this project would be available to the public.

Farmland Protection Policy Act of 1981 (7 U.S.C. 4201, et seq.). *Compliance.* This act requires a Federal agency to consider the effects of its actions and programs on the Nation's farmland. There is no prime and unique farmland in the project area.

Federal Emergency Management Agency (FEMA) Coordination. *Compliance.* The project was designed to not increase the risk of flooding to neighboring properties. The Blackwood Project would not alter base flood elevations and floodway boundaries.

Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.). *Compliance.* The Corps has conducted coordination with the U.S. Fish and Wildlife Service, Sacramento Office. The USFWS has prepared a Planning Aid Letter for the UTR Project dated June 18, 2008 in compliance with the Act (Appendix A). The recommendations provided in the Planning Aid Letter will be implemented at Reaches 3 and 5. Within Reach 4, the USFWS did not recommend construction of a new channel as proposed in the Preferred Alternative. Construction of a new channel within Reach 4 was included within the Preferred Alternative because the hydrology and geomorphology of the site indicate that a new channel at this location would increase channel stabilization and reduce sediment loading to Lake Tahoe.

Migratory Bird Treaty Act (15 U.S.C 701-18h). *Compliance.* Construction would be timed, as much as feasible, to avoid destruction of active bird nests or young of birds that breed in the area. A pre-construction field survey would be conducted by a qualified biologist to detect any active nests. If active nests are located, a protective buffer would be delineated and the entire area avoided preventing disturbance of nests until they are no longer active.

National Environmental Policy Act (42 U.S.C. 4321 et seq.). *Compliance.* This Final EA is in compliance with this act and includes a FONSI and comments and responses resulting from public review enclosed within Appendix E. Because this project involves the discharge of dredged or fill material into waters of the United States, the sponsor is required to obtain a

Department of the Army permit under section 404 of the Clean Water Act. The Section 404 permit application is expected to be submitted by [give timeframe]. Additionally, the local sponsor will seek water quality certification under Section 401 of the Clean Water Act from the State of California by [give timeframe]. Any additional requirements included as part of the water quality certification will be incorporated into the project.

National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470 et seq.). The SHPO concurred with the eligibility determinations and avoidance procedures proposed by the Corps for historic properties located within the boundaries of the project work area on December 29, 2009 (Appendix F). The SHPO would be consulted in accordance with 36 CFR 800.13 if unknown cultural resources are found during construction.

5.2 State of California

California Environmental Quality Act (PRC Sections 21000 et seq., 14 CCR 3, Sections 25000 et seq.). A Draft CEQA Initial Study/Mitigated Negative Declaration is being prepared by the CTC and will be available for public review and comment.

California Regional Water Quality Control Board – Lahontan Region. Prior to construction, 401 Water Quality Certification or a waiver of discharge and an exemption to the 100-year floodplain and SEZ prohibition would be obtained from the LRWQCB. The LRWQCB and State Water Resources Control Board (SWRCB) would also regulate waste discharge associated with construction activities under a National Pollutant Discharge Elimination System (NPDES) General Permit. Prior to construction a Notice of Intent (NOI) would be submitted to the SWRCB, with a copy to the LRWQCB and a SWPPP would be prepared by the CTC in accordance with NPDES guidelines.

California Fish and Game. Section 1600 of California Fish and Game Code requires that the Department of Fish and Game (DFG) is notified before beginning an activity that will substantially modify a river, stream, or lake. The CTC is responsible for meeting DFG requirements.

5.3 Tahoe Regional Planning Agency

Tahoe Regional Planning Agency Compact, as amended (Public Law 96-551), December 19, 1980, and the Tahoe Regional Planning Agency Code of Ordinances. *Compliance.* The project is in compliance with the TRPA Compact, as amended, and the TRPA Code of Ordinances. All avoidance, reduction, and minimization measures would conform to the requirements in TRPA's Handbook of Best Management Practices (TRPA, 1988) for construction in the Tahoe Basin.

6.0 COORDINATION AND REVIEW OF THE EA

The Draft EA was circulated for 30 days to agencies, organizations, and individuals known to have a special interest in the project. Two comments were received. They are considered, responded to, and incorporated into this final EA, (Appendix E).

If there are significant changes in, or additions to, the existing conditions or design of TCRP or modification of the project during future design refinements or construction, any required environmental documentation will be prepared and submitted to appropriate agencies to ensure compliance with Federal, state, and local laws and regulations.

6.1 List of Agencies, Organizations and Persons Consulted

Consultation for the Blackwood Project has included three TAC meetings held December 10, 2007, May 21, 2008, and December 3, 2008 as well as a public scoping meeting held on July 3, 2008. On-going communication has been conducted with agencies and homeowners in the area. Agencies and organizations consulted through this process include:

California Department of Fish and Game
Caltrans
Department of General Services
Lahontan Regional Water Quality Control Board
Placer County
Placer Legacy
Tahoe City Public Utility District
Tahoe Regional Planning Agency
US Forest Service, Lake Tahoe Basin Management Unit
US Fish and Wildlife Service

7.0 CONCLUSIONS

The proposed Blackwood Project includes components related to sediment source control and habitat restoration including channel realignment and restoration of Blackwood Creek. To construct the new channel alignment and create additional riparian and aquatic habitat, approximately 5,300 cubic yards of soil would be excavated and 1,800 cubic yards of soil would be reused on site. No effects on Federally listed species or historic properties is expected to result from the proposed project as evidenced by habitat assessments, surveys, and/or literature review.

The Blackwood Project would restore approximately 1 acre of riparian habitat, and 1,100 feet of creek channel, restore the adjacent stream environment zone (SEZ) including riparian habitat and natural floodplain, and create aquatic and terrestrial wildlife habitat within the lower Blackwood Creek watershed. These efforts would increase wildlife and fish diversity and use, and enhance recreational opportunities. In addition, the project will help preserve and enhance Lake Tahoe water quality by reducing the discharge of suspended sediment, lowering water temperatures, and increasing dissolved oxygen levels in the creek itself at the mouth of the creek where it empties into the lake.

Based on the effects analysis presented in this Final EA, the restoration project would have no significant adverse effects on the environment, and no mitigation beyond avoidance and implementation of best management practices would be required. The project would meet the requirements for actions permitted following completion of a FONSI as described in 40 CFR

1508.13. These actions would not have a significant effect on the human environment and do not require preparation of an environmental impact statement. After the 30-day public review period closed on November 9, 2009, the comments were adequately addressed and the conclusion of no significant effects was based on the context of the comments presented during the public review period and the effects analysis. The FONSI is expected to be signed by the Colonel and accompany this Final EA.

8.0 LIST OF PREPARERS

8.1 List of Preparers

Chris Conway
Hydrologist/Environmental Scientist, Huffman & Carpenter, Inc.

Laura Coston
Environmental Scientist, Huffman & Carpenter, Inc.

Susanne Heim
Environmental Planner, Huffman & Carpenter, Inc.

Leon Jiang
GIS Specialist, Huffman & Carpenter, Inc.

Alan Welch, Ph.D.
Hydrologist/Hydrogeologist, Huffman & Carpenter, Inc.

8.2 List of Reviewers

Richard Perry
Archaeologist, US Army Corps of Engineers

Nikki Poulson,
Archaeologist, US Army Corps of Engineers

Mario Parker
Environmental Manager, US Army Corps of Engineers

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