United States Department of Agriculture **Forest Service** **Lake Tahoe Basin Management Unit**
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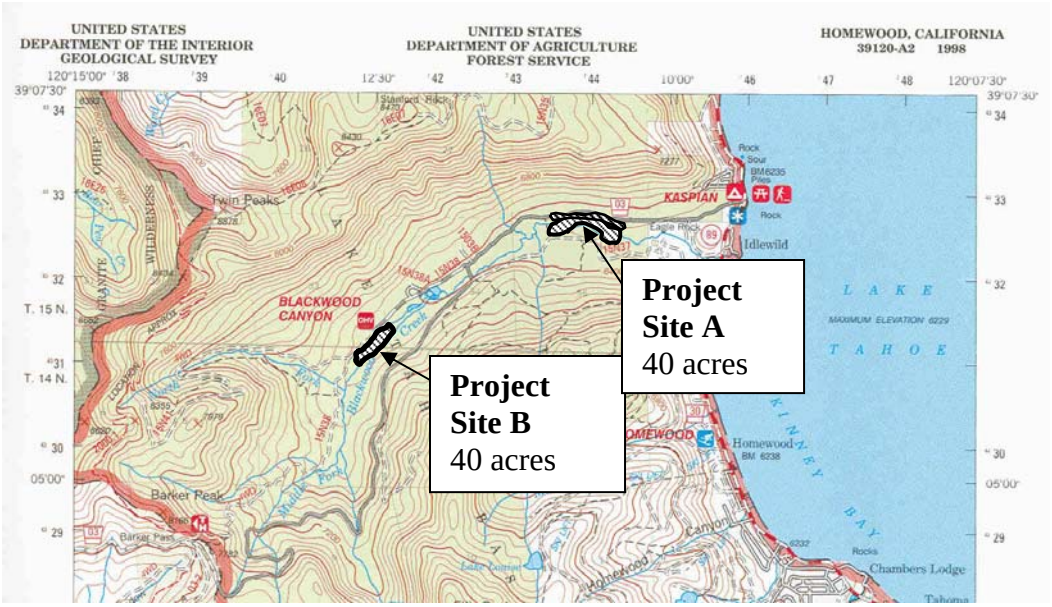
File Code: 1950-1 **Date:** November 16, 2007
Route To:

Subject: Blackwood Creek Phase 3 – Stream and Floodplain Restoration Project: NEPA Project Initiation Letter

To: Craig Oehrli – Hydrologist – Ecosystem Conservation



I would like you to serve as the Interdisciplinary Team (IDT) Leader for the Blackwood Phase 3 Stream and Floodplain Restoration Project.

Background

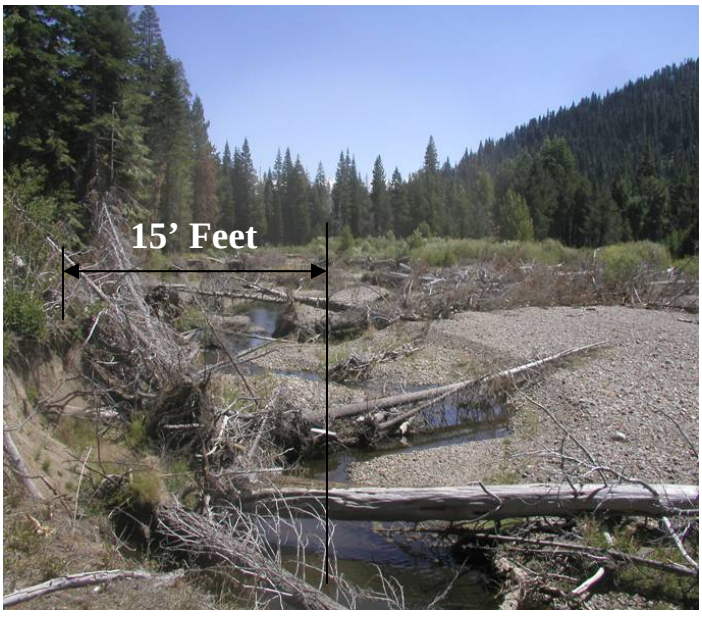
The Blackwood Creek Watershed delivers the largest volume of fine sediment, per square mile, of any of Lake Tahoe's tributary watersheds. These conditions are the result of historic land use activities such as canalization, in-channel gravel mining, road building, and logging. The cumulative effects from these activities, combined with a series of floods in the 1960's, initiated channel and floodplain instability along the lower 3.5 miles of Blackwood Creek's main stem. Upland streams and hill slopes are recovering and are continuing on that trajectory. On the other hand, the main channel continues to be unstable with excessive bank erosion below the Barker Pass Road Bridge. Above the bridge and upstream of the Phase 1 Blackwood Restoration, there is head cut in the channel propagating up the valley. The result has been chronic stream bank erosion, lower floodplain water table, and shift from a cottonwood-willow to a conifer dominated floodplain. Further propagation of the head cut would threaten functional river habitats upstream.

We have completed two of three phases recommended in the Swanson (2003) Blackwood Creek Restoration Plan. Activities in two earlier phases involved restoration at manmade impediments. We replaced a dilapidated fish ladder with a naturalized step pool channel in 2003, and replaced

a low water crossing and undersized culvert with a bridge and naturalized step pool channel in 2006. This final phase will address excessive bank erosion and channel incision as well as diminished nutrient uptake capacity along sections of Blackwood Creek's main-stem. Overall, the approach involves installation of physical structures made of boulders and logs, some re-contouring of existing floodplain surfaces and channel, plug and fill of existing gully channel, and some new channel construction. Riparian vegetation transplant and planting of containerized riparian stock will occur where needed. Each treatment type will provide a physical and vegetative platform, missing due to the effects of past land use, allowing the channel and floodplain to evolve back into a healthy, self-sustaining riparian ecosystem.

Project Site A

Much of the recent lateral channel instability (e.g. excessive bank erosion) occurs along a 1-mile section (Site A - Project Reach 6) of channel downstream of the Barker Pass Crossing. From 1965 thru 1996, this site remained intact physically, however the channel had incised but erosion rates where relatively slow. Incipient incision and channel instability were a result historic gravel mining and logging. Channel and floodplain condition changed abruptly when the flood of record in January 1997 occurred and triggered massive bank failures and bank retreat of approximately 100 to 300 feet in Site A. To add, catastrophic erosion converted an ecologically diverse meadow and floodplain ecosystem, to one with large, sparsely vegetated gravel bars having limited ecological value. Furthermore, the channel Site A is straighter, wider, and shallower than what occurs naturally in this setting and so aquatic habitat quality is now very low. Swanson (2003) believed this site was still unstable and without intervention, excessive bank erosion would continue unchecked for decades. They predicted that most of the erosion would occur during larger mid winter floods. Under these conditions, flood flows rise to level where they attack the base of 6-10 ft high vertical cut banks. Scour at the base of these banks would produce cut bank failure, quickly mobilizing and transporting fine sediment and organic material (nutrients) to Lake Tahoe This hypothesis was strongly supported when a recent flood (December 2005), triggered 10-15 feet of bank retreat along a portions of Reach 6; 1500 tones of alluvial sediment in one 500-foot section alone.



Bank erosion and tree throw following the 31 December 2005 flood at Site A

The triggering mechanisms for cut bank failure are these large scale, sparsely vegetated, cobble-gravel bars on the valley floor adjacent to these cut banks. These bars are immobile in all but the highest of flows. So during most flood events, the flow is forced to move laterally around the bar and into the cut bank.

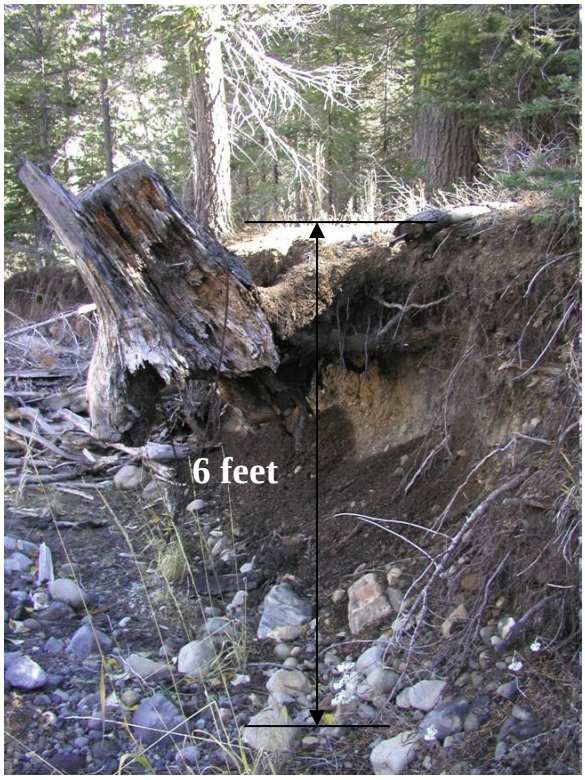
Furthermore, these presence bar forms delay channel and floodplain recovery resulting in chronically degraded aquatic and riparian habitats. The Lahontan Water Quality Control Board (2007) formally recognized this condition in a 'Bedded Sediment' TMDL for Blackwood Creek. Their study concluded that conditions at Site 'A' were by far the worst in terms of impacts to aquatic habitats from excess-bedded sediment in Blackwood Creek. During the early stages of development, Craig Oehrli, an LTBMU Hydrologist, worked closely with the Lahontan Water board to develop a TMDL with requirements that will be satisfied through the restoration of river and floodplain morphology and function; as opposed to a typical TMDL where the measure is compliance is a reduction in sediment or nutrient load. This collaborative effort resulted in a TMDL where the measures of compliance are (1) increased channel sinuosity (2) reduced bank erosion (3) recovery of riparian vegetation. The advantages to developing this approach are that the LTBMU can meet its management and TMDL compliance goals through river and floodplain restoration, simultaneously. Furthermore, this TMDL has 20-year timeframe, during which the LTBMU will implement its restoration plan, conduct effectiveness monitoring and document channel - floodplain process recovery. Finally, the LTBMU has the flexibility through Adaptive Management process, to take additional restoration or maintenance measures, should the need arise in the future.

Project Site B

While erosion characteristics and channel conditions in at Site B are the most dramatic expression in terms of poor stream condition, other areas are showing signs of continued channel and floodplain degradation, and also pose a threat to adjacent functional river habitats. An area of concern is a 0.5 mile section of stream (Site B – Project Reach 1) located just upstream of the fish ladder restoration site (Blackwood Creek Restoration Phase 1).

Historically, the stream at Site B was building and maintaining a gallery cottonwood forest atop a coarse grain glacial-fluvial fan deposit. Throughout most of a typical year, the stream appears to have flowed in a single channel along the northern edge of the floodplain, 2007 surveys confirm that this once historic channel appears to have sized itself naturally to carry the annual spring snowmelt flood. However, during the larger spring and mid winter floods, flows would exceed main channel capacity and spread out over the floodplain and into a series of disconnected swales and smaller channels.

Channel and floodplain function at Site B changed abruptly when gravel-mining operators in the 1960's canalized this section creek, and placed most of the flow in a ditch along the southern edge of the fan. Overtime this ditch became a deeply incised. Restoration actions (installation of a fish ladder and a series of boulder structures) in the 1980s improved conditions somewhat, however improvements were minor and head cutting, incision, and impacts to the floodplain ecosystem in this area continue (see photo taken at Site B – next page).



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

The impacts of canalization are:

1. Reduced the fine sediment and nutrient trapping potential on the surface of the fan
2. Channel geometry that supports the erosion of fine-grained forest soils along the forest-floodplain boundary.
3. Elimination of all but the highest flows in the historic main stem channel on northern edge of the fan, greatly reducing its value as high quality, perennial stream aquatic habitat.
4. A shift ecologically, from a historic gallery cottonwood floodplain to a drier, less desirable conifer dominated terrace.

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

The Lake Tahoe TMDL

Reducing fine sediment and nutrient delivery rates generated from stream banks in tributary watersheds and deposited into Lake Tahoe, is one of the primary focus areas for the Lake Tahoe TMDL under development currently. Recent scientific studies have identified Blackwood Creek as having the highest fine-sediment (X < 0.063mm) delivery rate per square mile (yearly average

of 844 Tons/year), for a Lake Tahoe tributary watershed (Simon, 2006). He estimated that approximately 200 Tons/year of this load is derived eroding stream banks. Putting this load level in Basin–wide context, Blackwood Creek generates approximately 30-percent of all stream bank erosion in the Lake Tahoe Basin, with the other largest offender being the Upper Truckee watershed at 40 to 50-percent. To add, the sites where Simon performed his analysis are the sites we have identified for restoration.

From a watershed perspective, Blackwood also has the highest suspended sediment delivery rate per square mile (yearly average of 1930 Tons/year) for Lake Tahoe tributary watershed. Nutrients (nitrogen and phosphorus – the primary food source of clarity-threatening algae) are also suspended in the water column. These generated primarily, from upland surface runoff and interflow through the soil. The conduit for these products into Lake Tahoe is also Blackwood Creek. The creek is agent because it does not have the sediment and nutrient trapping potential it once possessed. Previously, sediment and nutrient laden floodwater would spread out over bottom of the valley. Some erosion did occur; however, a diverse, densely vegetated floodplain was in place to trap sediment and take up nutrients. Currently, the channel is wider, deeper, and straighter; key areas of the active floodplain are either sparsely vegetated, or disconnected altogether from the channel because of incision.

Finally, the LTBMU hydrology group is actively participating in the development of the Lake Tahoe TMDL. Their participation in key focus groups and workshops, resulted in the recognition that (1) sediment and nutrient uptake by healthy functioning channels and floodplains is an important process, but has not yet been quantified and (2) healthy functioning channels and floodplains provide other benefits important in land resource stewardship and management. Through collaboration, the current direction in terms of Lake Tahoe TMDL compliance is for the Forest Service to continue to implement channel and floodplain restoration projects in Blackwood, as well other watersheds throughout the Tahoe Basin.

Purpose and Need

The purpose of this project is to restore sedimentary function and restore sediment trapping and nutrient uptake capabilities in two keys areas (Site's A & B) along Blackwood Creek's main-stem. We will do this by taking actions to restore the stream's morphological character as well as the stream bank-floodplain vegetative structure, typical of what is usually present in this geologic and hydrologic setting. The need to take action at the time is driven by the requirements of the Blackwood Creek TMDL, the Lake Tahoe TMDL, and the LTBMU Forest Plan.

We have developed a plan to address each of these areas:

1. Excess bedded sediment affecting aquatic and floodplain habitat at Site 'A' (Blackwood Creek TMDL). This will be accomplished by:

    - Removing some of the bedded sediment from the channel and floodplain
    - Reshaping and strengthening channel bars to restore a more-natural flow path
    - Rerouting portions of the existing channel to promote pool formation, riffle formation, and raise ground water elevation locally.
    - Strategically place wood (logs) in the channel and on the floodplain to promote a shallower ground water table and provide additional aquatic habitat in-stream

- Transplant and plant native riparian species (cottonwood –willow-grasses) to promote self-sustaining, stream bank and floodplain surface stability, stream shading, and food for macro-invertebrates.

- Monitor to ensure positive trends in stream sinuosity, stream bank stability, and riparian vegetative recovery.

2. Reduce fine sediment and nutrient delivery rate to Lake Tahoe (Lake Tahoe TMDL). This will be accomplished by:

- Constructing rock and log deflection structures to increase channel sinuosity, which promotes more storage of sediment in-channel (Site A)

- Construct rock and log structures to deflect flows away from stream terraces vulnerable to erosion during floods. Reshape terraces as needed. Currently, our hydraulic model predicts that these actions will reduce fine sediment delivery from these areas by much as 80-percent.

- Transplant and plant native riparian species to increase and sustain floodplain roughness, which improves sediment trapping and nutrient uptake capability on the floodplain (Site A)

- Install wood structures (logs) on the floodplain, which will promote floodplain stability and fine sediment deposition, as well as riparian plant colonization (Site's A & B)

- Restore flow in the historic channel at Site B, reconnecting the channel with the floodplain promoting over bank flooding, increasing fine sediment deposition and nutrient uptake capability.

- Direct channel construction at the downstream end of Site B, reconnecting this portion of the channel with the floodplain promoting over bank flooding, increasing fine sediment deposition and nutrient uptake capability.

- Fill and re-contour incised portions of the channel at Site B, which will reestablish these areas as functional floodplains, increasing fine storage and nutrient uptake capability

3. Restore a degraded riparian area back a self-sustaining, healthy stream and floodplain riparian zone (LTBMU Forest Plan). The LTBMU Forest Plan (1988) directs the Forest to take action to restore degraded riparian ecosystems in Blackwood Canyon. This direction was updated in the Sierra Nevada Forest Plan Amendment of 2004. These actions will address:

- *Water Quality* – as outlined in the actions needed to meet the requirements of the Blackwood and Lake Tahoe TMDL

- *Improving Plant and Animal Community Diversity* - the LTBMU is working with Dr. Mike Morrison mesh physical process and bio-restoration at these sites

- *Restoration of Floodplain and Water Table Function* – We believe these actions will raise the water table to level so that it can be utilized by riparian vegetation

throughout most of the growing season; the ultimate goal is dense, vigorous, self sustaining riparian vegetation community

- *Restoring Stream flow Patterns and Sediment Regimes* – consistent with the current plan, as outlined in the actions needed to meet the requirements of the Blackwood and Lake Tahoe TMDL
- *Restoration of Stream Banks* – consistent with the current plan, as outlined in the actions needed to meet the requirements of the Blackwood and Lake Tahoe TMDL

Proposed Action

This is the proposed action that will be used for public scoping. This project (see project area map on page 1) addresses two the problem areas: Site A – the direct treatment of 40 acres of channel, active floodplain, and terrace above the active floodplain, below the Barker Pass road crossing. Site B – direct treatment of 40 acres of canalized creek, abandoned gallery cottonwood floodplain, and terrace above the cottonwood floodplain, upstream of the recently restored fish ladder site (Blackwood Phase 1 restoration project).

At Site A (see figure 1), the proposed project involves:

- Skimming and reshaping in-channel bars to deflect flow away from vulnerable channel banks and terraces, greatly reducing the threat of wide scale bank erosion during floods, while promoting sediment storage and retention on lowered floodplain surfaces.
- Strengthening the heads of the flow deflection points with a combination of imported river boulders and logs, such that they are able to withstand the forces generated by a 25 to 50-year flood.
- Plant and irrigate native cottonwood, willow, and alder stock on the lee side of the deflector points, as a means of reestablishing riparian vegetation to restore floodplain roughness, stability, and sediment storage – sorting characteristics.
- Reshape portions of the existing channel to increase sinuosity, add roughness / stability elements, which promote in- channel sediment storage along with pool and riffle formation and frequency.
- Construction of floodplain features (examples: seasonally wet depressions or large wood roughness structures) that enhance suitable habitat for key wildlife and plant species such as cottonwood, willow, alder, and herbaceous vegetation. Features will also be effective at trapping fine sediments on the floodplain

15-Acre Terrace adjacent to Site A

- Harvest of conifers in adjacent aspen stands for aspen enhancement; use the logs to provide additional flood and channel roughness to improve stream and floodplain function at Site A. We estimate that approximately 200 to 400 logs, 10-20” in diameter, could be harvested in and around these aspen stands. A qualified vegetation specialist and wildlife biologist will direct the harvest so that we can maintain desirable forest structure and increase aspen stand health and vigor, adjacent to Site A.

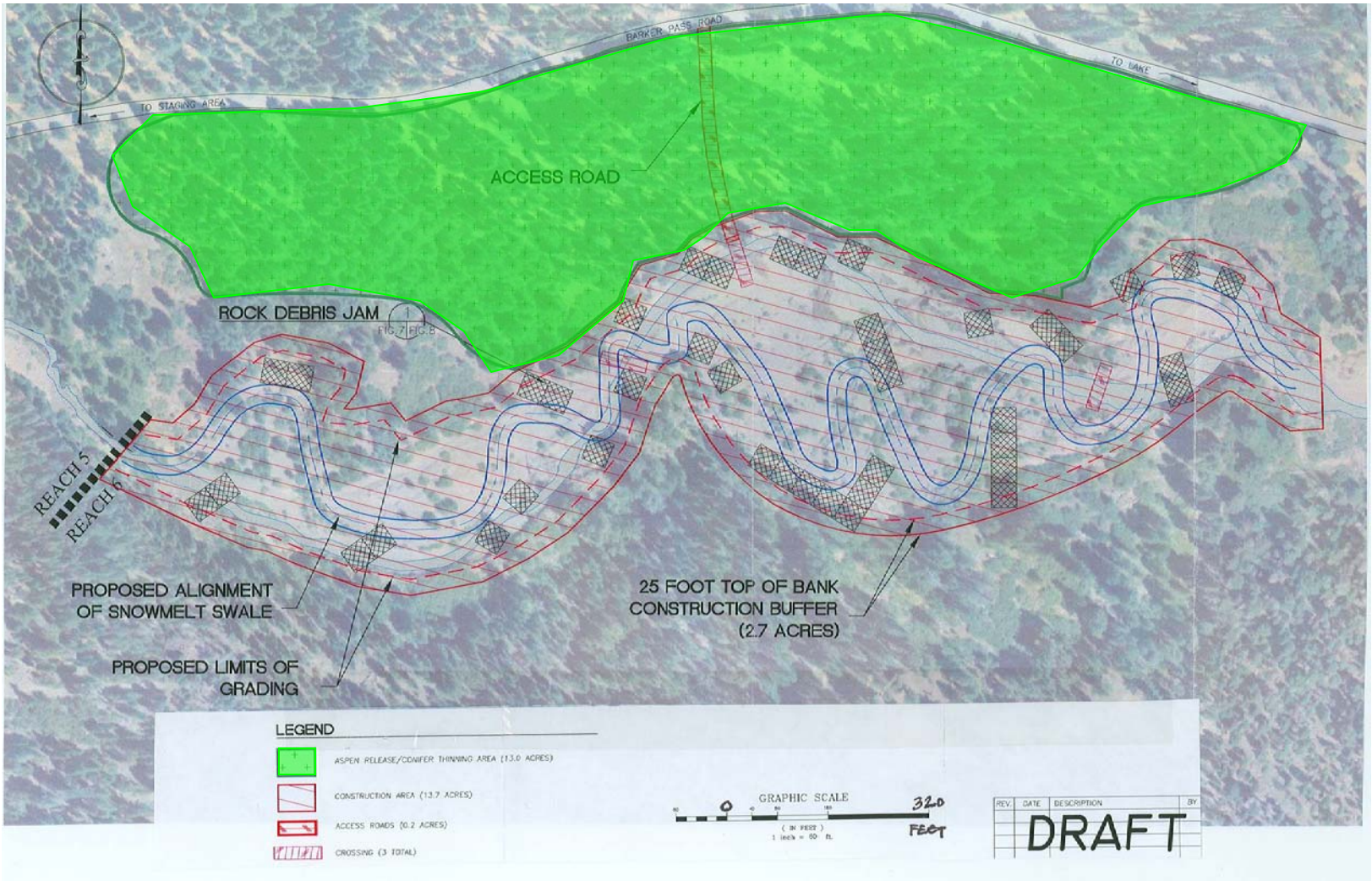


Figure 1. Reach 6 Project Area

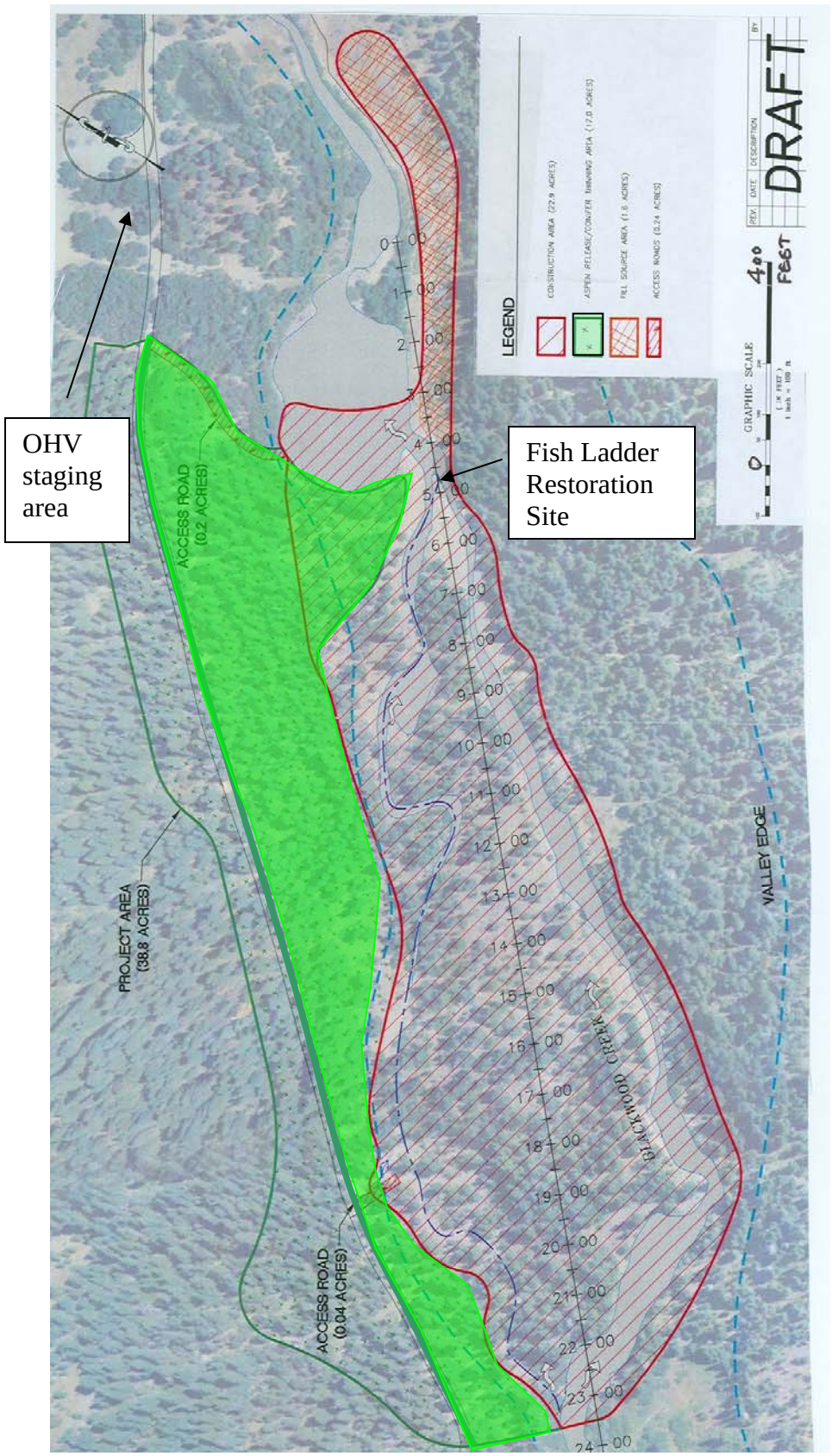


Figure 2 – Reach 1 Project Area

At Site B (see figure 2), the proposed project involves:

- Using a combination of coarse river substrate generated at Site A, imported river boulders, and logs, to plug off the existing dozer-built, gully channel
- Use a combination of local river substrate from site A and the fill source area, boulders, and logs to fill the incised portion of the historic channel and re-grade the adjacent floodplain surfaces.
- Reshape the historic main stem channel on the northern side of the fan; sculpt this channel were needed so that it functions as the main flow path during annual spring snowmelt floods as well as summer base flow
- Construct approximately 650 feet of new channel to connect the historic channel to the boulder step pool channel (e.g. old fish ladder site)
- Enhance floodplain depressions to increase floodplain roughness, stability, and promote sediment storage and sorting on the floodplain.
- Activate the historic channel to convey spring snowmelt and late summer base flow.

15-Acre Terrace adjacent to Site B

- Harvest of conifers in adjacent aspen stands for aspen enhancement; use the logs to provide additional flood and channel roughness to improve stream and floodplain function at Site A. We estimate that approximately 200 to 400 logs, 10-20" in diameter, could be harvested in and around these aspen stands. A qualified vegetation specialist and wildlife biologist will direct the harvest so that we can maintain desirable forest structure and increase aspen stand health and vigor, near Site B.

Issues / Concerns

Internal (LTBMU) shops as well as External (environmental and local permitting agencies) partners raised several concerns during the NFMA analysis (see Appendix A). You, as project leader evaluated and addressed these questions in the NFMA analysis; however, you will review these concerns with the team so that each member can provide a review and address these concerns in the environmental analysis as necessary. These concerns, as well as any generated during public scoping, will guide the development of alternatives. Please address all concerns in the effects analysis as necessary.

Scoping

Scoping for the overall restoration plan in Blackwood began in 2001, as we began analyze and develop a plan to restore the main stem of Blackwood Creek. Public and Agency scoping for Phase 1 occurred in 2002 for Phase 1, and we completed the project in 2003. Public and agency scoping for Phase 2 occurred in 2004, and we completed the project in 2006. Of note, scoping did not reveal any significant issues during analysis of these earlier phases of the Blackwood Restoration Plan.

Scoping with permitting agencies for Phase 3 began in 2004. After a change in design approach and completion of the NFMA analysis, an interagency field trip occurred in Sept 2007. The purpose of this trip was to introduce and discuss the scope, scale, and design rational of this project with potential NEPA analysis team members, as well as local permitting (Lahontan

Water Quality Control Board, Tahoe Regional Planning Agency, and US Environmental Protection Agency) and collaborating (California Tahoe Conservancy) entities. None of the permitting or collaborating agencies expressed significant concerns regarding this restoration approach

The public and local environmental agencies need to be involved throughout the environmental analysis process. It is especially critical that we maintain close contact with Lahontan Regional Water Quality Board and the Tahoe Regional Planning Agency, given that permits will necessary to implement this action in a timely manner. It is also critical that we keep the public informed so that they are fully aware of future construction activities, given the recreation activity level in Blackwood Canyon. This project is on the schedule of proposed actions (SOPA).

The official period for public scoping will begin once I have reviewed and approved of this document. I will direct Craig to develop and mail out a public scoping letter inviting agencies and interested / potentially affected publics to comment on this action. To add, we will place a legal notice in the local paper inviting the public to comment on this proposed action. At this time, the LTBMU is not planning any other field trips for this proposed action. No public meetings are planned; however, the project manager will be available to address concerns with permitting agencies and publics as needed.

Alternatives
My intent is to analyze this project against a no-action alternative initially. However, if scoping reveals a significant issue and the team is not able to resolve it, I will direct the team to develop alternatives to the preferred approach. The team will refine the alternatives, and then move ahead with the analysis.
Decision Framework and Responsible Official

The NEPA document will be an Environmental Analysis (EA) based on the scope and complexity of this project. A Forest Plan amendment is not anticipated.

The LTBMU will conduct this Environmental Analysis (EA), as well as the Biological Analysis (BEBA), in-house.

I am the responsible official. You will consult with me at these checkpoints:

- After the team has reviewed this document and discussed the concerns raised in the NFMA analysis.
- A briefing after scoping; particularly if scoping triggered the development of alternatives
- A briefing when the EA is complete and before release to the public.
- A briefing following the review of comments received on the EA.
- A briefing prior to the release of the Decision Notice / FONSI / 45-day appeal period

Land and Resource Management Plan
The Lake Tahoe Basin Management Unit Land and Resource Management Plan as amended by the Sierra Nevada Forest Plan Amendment Record of Decision of 2004 will provide the standards, guidelines, and management direction for this action.

Roles and responsibilities

Team Member	Role
Mike Lefevre	NFMA/NEPA coordinator
Cathryn Schoen	Engineering –Roads analysis
Robert Becker	Recreation effects analysis
Sarah Muskopf	Fisheries / Aquatic Resources (BEBA)
Julie K. Roth	Terrestrial / Biological Resources (BEBA lead)
Stuart Ousback	Botany/Noxious weeds review (BEBA)
Victor Lyon	Ecological conifer harvest - Aspen Release
Scott Parsons	Vegetation / fuels advisor – Aspen Release
Michael Weichman	Heritage Resources report
Craig Oehrli	Hydrology / Geomorphology evaluation- AM Monitoring Plan development – Team Leader

Craig will be responsible for the overall management, leadership, and coordination of the project. He is responsible for keeping me informed on the progress of the environmental analysis. He is responsible for conveying information (design milestones as well as project specification development and updates) to the team as whole, and meets with individual members of the team as necessary. He will be responsible for compiling specialists' reports, data, and all other documentation necessary for this analysis. Mike LeFevre will provide technical review and advice on NFMA/NEPA issues. Other Team members will be responsible for resource information, data, maps, reports and other information as needed. I need each of you to conduct a thorough and professional peer review of the draft EA prior routing the document for internal comments, as well as comments received on the EA after release for public comment. The attached program of work document (appendix B) identifies your expected commitment as well as the funding available for this action.

It is important that you interact early and often with each other, to keep me informed of your deliberations. I want the best collective effort that your dialogue and deliberations can bring. I am prepared to listen and provide direction as necessary to keep the environmental analysis on track and on schedule. If there are any concerns about the nature or quality of the analysis, I expect the team to bring them to me, through the team leader.

Blackwood Creek is very dynamic stream and floodplain environment, and so I expect a state-of-the-art approach to this problem that includes an adaptive management monitoring strategy to deal uncertainties inherent in management of dynamic environments.

Timeline
I anticipate the release of a Decision Notice on the proposed action no later than March 15 2008. Therefore, it will be critical to work expeditiously given the constraints imposed by public

comment period requirements. The anticipated date to start implementation in Reach 6 is August 1, 2008, for Reach 1 it is August 1, 2009. The Bureau of Land Management (BLM) thru the Southern Nevada Public Lands Management Act (SNPLMA round 7) is funding the work in project Reach 6 (See Appendix B - FY08 Work plan). We will request funding in SNPLMA Round 9 to complete the work in Reach I.

Summary

This is one of the largest and most complex restoration projects proposed by the Lake Tahoe Basin Management Unit to date. There is a great deal of interest by other Forests, the Regional Office, as well as state and local agencies, in our success. I encourage you to learn from the experience, work hard, and have fun.

Please keep me informed as to the progress of the analysis.

TERRI MARCERON
Forest Supervisor

APPENDIX A – Concerns identified during NFMA analysis

Internal (LTBMU)

Concern 1 – Construction Traffic during project implemenation. Preliminary engineers' estimates indicate that 8,000 cubic yards of coarse river substrate will be needed. This translates into approximately 425 truckloads of material. We anticipate needing public information signing (in the field) as well as notices to homeowners at the mouth of the canyon so that nearby residents and visitors are aware of construction activities. Additionally, the Forest Engineer has concerns with construction traffic impacting road use patterns as well as access road construction specifications, maintenance, and post project rehab. The EC-project lead will work with FS engineer to ensure that all issues pertaining to the road system will be addressed during the development of plans and specifications and where needed, written into contract task items.

Concern 2. – Coarse woody debris requirements i.e.logs needs for restoration. Informal consulation with Scott Parsons, LTBMU Vegetation Specialist, revealed there is a log source on a 12-acre parcel along Barker Pass road adjacent to the Site A project area. Briefly, this parcel was analyzed for fuels treatment under the Quail fuels reduction EA. Fuels were treated and included special treatments adjacent to aspen stands considered by the LWQCB specialists to be located in SEZs; consequently only those conifers with a DBH up to 14" could be removed, and that was done by hand. As a result, many of the larger trees adjacent to the aspens remain and still pose a threat to Stand survival. Informal consultation with Victor Lyon, LTBMU Wildlife Biologist, confirmed that the apsen stands in this 12-acre parcel are still at risk. Therefore, we proposed harvesting logs to further enhance channel and floodplain restoration at Site A and at the same time, improve the quality and vigor of aspen stands locally. Consulation and coordination, early on, with the State Waterboard will be required to develop an access, special cut harvest plan, and mitigation measures to ensure that all water quality laws are strictly adhered to. Scott also stated the need for use of specialized equipment, per TRPA standards, to harvest coarse wood from sensitive areas and only when site conditions are appropriate for such an action. EC project lead with work with Scott and otherLTBMU vegetation specialists, as well as TRPA and LWQCB staff, to ensure that all guidelines are adhered to for harvesting in environmentally sensitive areas.

Addtionally, LTBMU wildlife staff have expressed concerns regarding potential impacts to wildlife, by removing natural log structures in the channel and on the floodplain that exist currently. In recent consultation with the design consultant, EC project lead suggested that an objective of project design is to strategically place additional coarse wood and reposition utilize complexes present to improve sediment trapping efficiency and ecosystem function further. EC project lead will work with the consultant and LTBMU wildlife staff to ensure best use of logs and log jams in terms of sediment trapping efficiency and ecosystem function.

Concern 3 – Wildlife LOP's. Preliminary consultation with LTBMU EC – Wildlife staff indicates there are Protect Area Centers (PACS) near the project sites. The potential impacts to PACS will be analyzed in NEPA and construction plans will reflect schedules that adhere to all applicable LOPs if necessary. Preliminary review of the PIM and design report by FS wildlife staff indicates that the project will probably not impact and will likely improve habitats for key wildlife species such Northern Goshawk and Willow Flycatcher. EC Project lead will work with FS wildlife to incorporate restoration features that avoid impacts to PACs while improving wildlife habitats where possible.

Concern 4 – Noxious Weeds – Preliminary surveys indicate that Bull Thistle and Saint Johns Wort are present at Site A. Shana Gross, LTBMU Forest Botanist, considered Saint Johns Wort to be a threat to native riparian communities if not treated appropriately. One treatment approach may be to require burial of noxious plants on-site. Plant material could be buried at depth a safe distance below the point of maximum scour depth in the channel or constructed floodplain. In any case, measures will be developed to mitigate and iradicate this and anyother noxious weed, as well as protection of sensitive plants, in both project areas.

Concern 5 – Construction Access – Temporary access roads will be constructed to access both project areas. A construction access plan will be included in the construction plans and specifications. However, coordination with LTBMU resource specialists, as well LWQCB officials, will be required early and often to ensure that temporary disturbance to resources will be mitigated. EC project lead will work with LTBMU Engineering to minimize impacts to recreationalists and key user groups (Mountain Biking and OHV).

Concern 6 – Water Quality BMPs – both project areas involve construction in SEZs. A storm water pollution prevention plan (SWPPP) plan will be included in the construction plans and specifications. We will coordinate, through consultation and plan review, with LWQCB Officials to ensure that all State and Federal water quality laws will be strictly adhered to.

External (Permitting Agencies, Partners, Environmental Groups)

The NFMA interim report was sent to a select group of permitting agencies and to representatives of local environmental groups. They were instructed to review and provide comments in the project, so that their concerns could be addressed prior to converting the recommended approach into a proposed action. In general, no concerns were raised regarding the recommended approach. However, concerns were raised regarding the aspects of construction plans and environmental documentation specific to an agency or groups particular mission.

Lahontan Water Quality Control Board (Robert Larsen and Thomas Gavigan)

The staff had four specific concerns regarding potential water quality impacts. They are: 1) a dewatering plan to better handle variation in field conditions 2) assurance that elevations of reconstructed floodplain surfaces are sufficiently close to the local ground water table 3) development of a construction access plan to minimize impacts to sensitive forest and floodplain soils 4) ensure that metrics in the long-term monitoring plan match up with the performance metrics developed for the Blackwood TMDL

Forest Service Response

- ***Dewatering plan development.*** *A survey will be conducted in 2007 to assess potential stream and ground water release. Additionally, Several hand-constructed test pits will excavated to examine ground water levels; water elevations will be considered as an expression of maximum ground water depths given the excessively dry conditions currently. The pits will also be used as a tool to identify potential ground water recharge areas where additional implementation mitigation measures maybe necessary if wetter seasonal hydro-geologic conditions occur during construction. All information will be compiled and made available for TAC review as well as incorporated into a Storm Water Pollution Prevention Plan (SWPPP) development.*

- ***Optimize relationship of floodplain surface and seasonal ground water elevation.*** *Floodplain alluvium generated during test pit construction, mentioned previously, will be evaluated for moisture holding capacity and potential as growing media potential. This information will feed into the decisions regarding selection of finish elevations for floodplain surfaces, as well as the lee side of flow deflection structure surfaces, at Site A.*

- ***Mimize impacts from access trail construction and use.*** *A survey will be conducted in 2007 to evaluate for placement of access trails to and from construction Sites A&B. Trails will be constructed with attention given to soil type and compactability. The TAC will be given an opportunity to review access trail specifications as construction plans and specifications are developed.*

- ***Monitoring plan and TMDL development.*** *The monitoring plan (developed to 70-percent level currently) will updated to include TMDL performance metrics. Fortunately, the TMDL metrics are geomorphically based, and are similar in nature to commonly*

used channel and floodplain restoration performance metrics. Therefore, updates to make the monitoring plan TMDL compliant will be minimal.

Tahoe Regional Planning Agency (Mike Elam and Tim Hagan)

The staff had one concern regarding environmental documentation; assurance that sufficient thought had been given to alternatives to the recommended approach pertaining to reach 6 in particular.

Forest Service response

Analysis of restoration approach on the stream below the Barker Pass Road began in 2002. Two concepts analyzed were: floodplain grading as well as direct channel construction, and placement of engineered log debris dams. Retooling of the log debris jam restoration approach began in 2006.

The restoration approach of floodplain grading and direct channel construction was dismissed early on. Three reasons were given:

1. ***Reach 6 Flood dynamics**. Watershed geology and physiography promote high intensity floods naturally. Historically, locallized channel avulsion and floodplain scour was common. These short term disturbances however were held in check by surface roughness generated by the growth of a dense riparian forest and shrub community. These areas have been converted to sparsely vegetated coarse alluvial bars lacking the surface roughness and stability seen previously. Without adequate surface roughness, a constructed channel would have low probability of withstanding a large flood.*

2. ***Cost**. Initial engineers cost estimates suggest that floodplain grading and direct channel construction would be the most expensive option; an option with low probablity for success.*

3. ***Hypothetical channel behavior**. An assumption of the floodplain grading and direct channel construction option is that the channel will behave much like a typical meandering meadow stream. However, analysis of aerial photos, floodplain deposits, and remant functioning floodplain features suggest that the channel does not behave in this fashion. Therefore, floodplain grading and direct channel construction would be imposing a form not appropriate with the watershed dynamics in Blackwood.*

The engineered log structure plan was determined in 2003 to be the recommended approach. Analysis of remnants of functional floodplain features suggests that large, stable, buried and exposed, woody debris complexes are a key component floodplain and channel stability in Blackwood. These features are missing from most of channel and floodplain in project reach 6 Therefore, the goal was to use paritally buried, in-channel and floodplain structures constructed of wood to would provide the necessary roughness and geomorphic stability to allow the channel and floodplain to build up and recover naturally over the long term. Plans and specifications were developed to the 90-percent level in 2004. In 2006 the approach was reevaluated and dismissed as a recommended approach for four reasons:

1. ***Material availability and cost**. The plans called for 5000 logs. Logs were available locally in 2003 thru 05; however, funds were not available to secure logs until 2007. By this time the logs had been sold, harvested, and transported to a mill. Cost estimates to buy logs from a distant sources suggest that added costs to haul the logs rendered this approach to be cost prohibitive.*

2. ***Limited revegetation**. The log structure plan did not include any active revegetation scheme other than ultilizing vegetation displaced during structure installation.*

3. ***No channel construction**. The premiss of the log structure approach was to allow the channel seek its own pattern and cross section form induced by log structure layout.*

4. ***Recovery timescale uncertainties**. Another premiss of the log structure approach is that these structures will only be buried partially, and then buried over time as the valley aggrades. This*

implies that many of the log structures may not achieve full burial until several floods have occurred, thus there is risk that structures not in an relatively active depositional zone would be left high and dry, and may experience some level of decay i.e. loss of structural integrety over time.

The use of boulder structures that have logs, floodplain grading, and some channel construction, is now the recommended approach. This represents a hybrid of the two approaches considered originally. It is similar to direct floodplain and channel construction in that existing channel bar surfaces will be lowered, and that a portions of the existing channel will be re-routed at the boulder-log water deflection structures. It is also similar to the log structure approach in that a structure will be counted on to deflect flow across the valley and induce sediment deposition and sorting particularly during a critical period on the falling limb of wiinter rain-on-snow hydrograph during larger less frequently occurring floods.

There are four advantages to using this approach:

1. ***A Proactive floodplain revegetation plan**. The restoration crew will harvest native cottonwood, willow, and alder stock; transport to Neveda Department of Forestry's nursery; and plant the rooted stock where needed. Given enough time these plants will provide the necessary floodplain roughness components and floodplain surface stability long term.*

2. ***Partial grading of floodplains and channel rerouting**. In contrast to full floodplain grading, this grading approach permits some of protection of these surfaces via flow deflection around the boulder – log deflection structures. To add, many of the larger native riparian trees and shrubs will be transplanted directly back on to graded surfaces that are closer to the minimum seasonal ground water table, which increases the chance for tree and shrub survival long term. Furthermore, the grading of floodplains will decrease floodplain water levels, decrease erosive power, and increase fine sediment deposition potential; while the structures encourage flow to vector away from highly erosive stream terraces; a significant source of fine sediment in this watershed.*

   As mentioned earlier, this approach represents a hybrid of the two original, contrasting, restoration concepts in terms of channel construction. In this approach some channel will be constructed however, the channel not predicted to remain stationary and will likely go through a period of adjusment due to a combination of the coarse nature of floodplain and channel bank sediments, and the dynamic nature of Blackwood valley's stream environment. Fortunately, the defelection structures will dampen these adjustments by encouraging flood flow to veer across the valley reducing water surface slope, erosive power, and increasing sediment deposition potential

3. ***Deflection structure revegetation plan**. In contrast to the log structure design, the boulder-log structures will have an area on the lee side of each structure where rooted stock and direct transplanting will occur. This will promote surface roughness and strength as well as the and stablity of the deflection structures over the long term.*

4. ***Potential for shorter recovery timescale**. Due to floodplain grading and extensive vegetation plantings, transplanting, and log placement, the potential is higher for reducing the time it would take for full floodplain surface vegetative recovery. Consequently, shorter floodplain vegetation recovery times translate into increased streambank stability, recovery of a desired channel pattern and form, and reduction of excessive channel erosion.*

<u>California Department of Fish and Game (Jeff Drongesen)</u>

No comment at this time. Expressed a desire to be kept informed on mitigation of potential short term impacts on fish related to project design and construction activites. No DFG permit needed; per direction from Barry Hill, Regional Hydrologist for Forest Service Region 5.

<u>United States Army Corp of Engineers (Richard Gebhart – Field Office – Reno Nevada)</u>

No Comment at this time. Advised to contact Kevin Rouckey (Supervisor- Reno Field Office) to arrange for plan review and environmental documentation needed for issuance of Army Corp permit.

California Tahoe Conservancy (Scott Carroll and Adam Lewandowski)

No comments received. Advised to coordinate with Adam Lewandowski on project development for channel and floodplain restoration project on CTC land located downstream.

League to Save Lake Tahoe (Carl Young)

Mr Young had two concerns: 1) Advised to provide sufficient protection of soils when conducting conifer removal in aspen stands; 2) Advised to mitigate potential impacts to forest soils during access trail construction and use.