# Peshastin Creek Reconnection Alternatives Analysis (RM 3.9) Chelan County Natural Resource Department 10<sup>th</sup> Round Funding Cycle August 28<sup>th</sup>, 2009

Anticipated Request from Tributary Committee:	\$ 12,690
Anticipated Request from SRFB:	\$ 71,916
Anticipated TOTAL Project Budget	\$ 84,606
Anticipated Other Contributions/Matches:	\$0
Anticipated TOTAL Project Budget:	\$84,606

## **Proposal Changes**

Summary of changes since the June 5, 2009 Pre-proposal.

- 1) Included a map showing parcel boundaries within the study area.
- 2) Clarified project phasing in Section 2(b).
- Clarified stakeholder coordination efforts in Section 2(b).
- 4) Reduced effort for Alternatives Analysis and Conceptual Designs.

# SRFB/TRIB Proposal Checklist

Proposal Contents	✓ Received
A) Title Page: includes sponsor, project title, and funding request	
B) Proposal Changes Page	
C) Scope of Work (project description)	
(3) Non-capital projects (excluding barrier inventories);	
D) Maps (general vicinity and work site, parcel map, WSDOT maps)	
E) Project Photos	
F) Parcel Map	
G) Other Materials (optional) Cost Estimate	

Project Title: \_\_ Peshastin Creek Reconnection Alternatives Analysis (RM 3.9)\_\_\_\_

**Reviewer**: Please confirm all the sections of the proposal are in the packet in the following order and check received.

**Sponsor**: Please change content titles to match the titles in your proposal (e.g. Design Report would be changed to read "BOR 2009 Fir Creek Design Report"). Label attachments alphabetically in Prism so they coincide with the proposal checklist.

## PROJECT PROPOSAL – NON-CAPITAL PROJECTS AND COMBINATION PLANNING/ACQUISITION PROJECTS (EXCLUDING BARRIER INVENTORIES)

INSTRUCTIONS: Salmon Recovery Funding Board applicants must respond to the following items. Please respond to each question individually -- do not summarize your answers collectively in essay format. Local citizen and technical advisory groups will use this information to evaluate your project. Contact your lead entity for additional information that may be required. Limit your response to eight pages.

Submit information via PRISM attachment process. Application checklists and attachment forms may be downloaded off the SRFB Web site at <u>http://www.rco.wa.gov/srfb/docs.htm</u>.

#### 1) **PROJECT OVERVIEW**

Explain your project overall and include the following elements:

a) List your primary project objectives, such as how this project will contribute to understanding or restoring salmonids within the ecosystem. For example, the objectives might be to characterize the extent and nature of a certain factor limiting salmonid productivity, identify sources that contribute to the problem and prioritize restoration and management activities to address the problem; to assess landowner willingness to participate in a future land acquisition or restoration project; or to determine project location, feasibility, and design.

The primary project objectives are to assess landowner willingness, conduct a project alternatives analysis, and prepare 30% designs in order to reconnect 2,400 linear feet of historic channel and floodplain habitats at Peshastin Creek. This reconnection will lead to increased refuge and rearing habitat, increased floodplain connectivity, and the restoration of natural channel processes in the project reach.

b) State the nature, source, and extent of the problem or gap in knowledge that the project will address, including the primary causes of the problem, not just the symptoms. Explain how achieving the project objectives will help solve the problem. For fish passage design/feasibility studies, concisely describe the passage problem (outfall, velocity, slope, etc); the current barrier (age, material, shape, and condition); whether it is a complete or partial barrier; and the amount and quality of habitat to be opened if the barrier is corrected.

The primary habitat-limiting factors within Peshastin Creek are related to increased channel confinement and decreased stream sinuosity, impaired riparian condition, reduced flood plain connectivity and gravel recruitment (Andonaegui 2001; UCSRB 2007; UCRTT 2008). Past human activities that have most notably impacted river processes include highway construction, mining and placement of mine tailing piles, logging of riparian forest, continued development, and flood protection (small levees, bridges, riprap, and roads).

Andonaegui (2001) indicated that the Peshastin Creek channel, from the mouth to Tronsen Creek at RM 14.9, has been reduced in length by 0.8 miles due to the construction of US 97 in the 1956 (Primary State Highway 2 at the time of construction). Two attached maps show the original creek alignment and the proposed highway. What is now the disconnected stream channel is shown flowing to the north of the highway alignment. The highway construction also resulted in the disconnection of 194 acres of the total acres of floodplain (565 acres) along Peshastin Creek (Andonaegui 2001). The reduced length and floodplain capacity has had a negative effect on the creeks morphology

by increasing the longitudinal slope which increases bed shear stress and in turn increase the rate of sediment transport beyond the natural condition. The reduction in length has also had a negative impact on salmonid habitat by eliminating desirable channel diversity that is associated with sinuosity (e.g., variations in depth, accumulation of LWD at bends, overhanging banks, etc.).

The highway construction changed the creek channel alignment through the project study area (See attached original plans). The project study area includes 1,800 feet of existing Peshastin Creek channel and 2,400 feet of dislocated Peshastin Creek channel between RM 3.56 and RM 3.90 that would have bisected the road alignment at two locations. The creek was relocated to remain on the east side of the road which created the existing straight channel. When the creek was relocated from the former meander to the existing straight channel, the channel length was reduced by 600 feet and the slope of the channel was steepened. The reduction in length at this site accounts for 14% of the total reduction in channel length attributed to construction of US 97.

There have been ongoing bank erosion problems at the upstream end of the channel relocation, at the point where the creek is forced to follow the new channel instead of the original meander. WSDOT has had to repair the roadway due to erosion multiple times after flooding events in recent history. The repairs have included replacing lost fill from the roadway embankment and adding riprap armoring at the point where the creek is eroding the bank. The CCNRD is working with WSDOT's Chronic Environmental Deficiencies Program to look at long-term fixes to this erosion problem in conjunction with reconnection of the disconnected channel. This project proposes to reconnect Peshastin Creek within the historic stream channel. This will result in the lengthening of stream channel, increased sinuosity and decreased channel slope, increased floodplain capacity, and increased habitat area. This will increase juvenile rearing habitat, increase adult spawning habitat, and allow the channel to dissipate energy and manage sediment loads.

c) Describe the fish resources (species and life history stages present, unique populations), the habitat conditions, limiting factors, and historic factors important to understanding this project. Be specific-- avoid general statements. Which salmonid species and life cycle stage(s) are targeted to benefit by this project?

From Andonaegui (2001):

Historically, spring chinook, steelhead/rainbow, and bull trout used the Peshastin Creek watershed in greater numbers than occur there today. Steelhead were likely the more populous anadromous species spawning in this system, however coho may also have been more abundant than spring chinook (MCMCP 1998) before coho were extirpated from the region. Currently, spring Chinook redds have been observed between Mill and Ingalls Creeks (RM 5.2 and 9.4), while rearing spring Chinook have been observed from the mouth up to RM 14.8. Steelhead/rainbow trout use Peshastin Creek for spawning, rearing, and as a migration corridor, although thought to do so in low numbers. Historically, bull trout occurred in the watershed where habitat existed and access was not blocked by natural barriers. Very low numbers of bull trout have been observed in the Peshastin Creek mainstem. Summer chinook do not use the Peshastin Creek drainage, being mainstem Wenatchee spawners, except for possibly very limited rearing at the mouth.

Current, known salmon, steelhead, and bull trout use in Peshastin Creek (Andonaegui 2001):

Species	Rearing	Spawning	Migration
Spring chinook	Х	Х	Х
steelhead	Х	Х	Х
Bull Trout			Х

Peshastin Creek is a Category 2 watershed and contains Major spawning area for steelhead and minor spawning area for spring Chinook, and is a bull trout core area (UCRTT 2008). The construction of US 97 in 1956 has had a very significant negative impact on Peshastin Creek by reconstructing 19,317 feet of stream channel (Andonaegui 2001). This reconstruction effectively reduced the channel length by 0.8 miles from the mouth to river mile 14.9, and disconnected 1194 acres (34%) of the total acres of floodplain along Peshastin Creek. This action has reduced channel migration, riparian habitat, floodplain function, stream sinuosity, and gravel recruitment (UCRTT 2008). Instream habitat complexity is low within Peshastin Creek in terms of low pool depth and frequency, low LWD counts, and a significant reduction in off-channel habitat (Andonaegui 2001). Low instream flows also impede upstream salmonid migration, and reduce rearing habitat (UCRTT 2008).

Species	Rearing	Spawning	Migration	Passage	High-water refugia
Chinook salmon	Х	Х			Х
steelhead	Х	Х			Х
Bull Trout			х		Х

The reconnection of off-channel habitats as proposed by this project will benefit the following life-history stages:

d) Describe how this project fits within your regional recovery plan or local lead entity strategy (i.e., Does the assessment fill a data gap identified as a priority in the lead entity's strategy or regional recovery plan? Does the project address a priority action, occur in a priority area, or target priority fish species?).

Restoration of Peshastin Creek habitat is identified as one of the top priorities in the Upper Columbia Salmon Recovery Plan (UCSRB 2007). The Wenatchee Watershed Implementation Schedule identified the reconnection of the historic main channel at this project site as a priority habitat restoration project within Peshastin Creek (Implementation Schedule PC-1411). This alternatives assessment and landowner coordination will lead to the reconnection of the mainstem and floodplains on Peshastin Creek. Within Peshastin Creek, the reconnection of floodplain and lengthening of the mainstem is a Biological Strategy Tier 1 action and top priority for addressing limiting habitat factors and the recovery and long-term viability of salmonids in Peshastin Creek (UCRTT 2008, UCSRB 2007). This project will directly benefit ESA-listed spring Chinook salmon and steelhead, and bull trout.

e) Has any part of this project been previously reviewed and/or funded by the Salmon Recovery Funding Board? If yes, please provide the project name and SRFB project number (or year of application if a project number is not available). If the project was later withdrawn for funding consideration or was not awarded SRFB funding, please describe how the current proposal differs from the original.

No.

When possible, list your sources of information by citing specific studies, reports, and other documents.

### 2) PROJECT DESIGN

a) Describe the location of the project in the watershed, including the name of the water body(ies), upper and lower extent of the project (if only a portion of the watershed is targeted), and whether the project occurs in the nearshore, estuary, main stem, tributary, off channel, or other location.

The project study area includes 1,800 feet of existing Peshastin Creek channel and 2,400 feet of dislocated

Peshastin Creek channel between RM 3.56 and RM 3.90 (See attached figures) in Township 23 North, Range 18 East, Sections 5 and 6, and Township 24 North, Range 18 East, Sections 31 and 32, Willamette Meridian. Through the project study area the existing and dislocated creek channels are adjacent to US Highway 97 from Milepost (MP) 181.85 to MP 182.19. See attached location Map.

b) If the project will occur in phases, explain individual sequencing steps and which steps are included in this application.

This application represents Phase I of the project. This reconnection project has complex technical and social attributes. The reconnection through WSDOT road prism will require detailed project hydraulic and structural engineering, while the site involves multiple private landowners (See attached figure). Through CCNRD's experience of implementing similar complex projects, the successful implementation of the first phase of this project relies on a dual approach:

1) Stakeholder Coordination: This action will expand upon stakeholder coordination to include over 10 total landowners and stakeholders. The CCNRD will continue to work with the WSDOT to evaluate potential reconnection alternatives. As shown in the attached figure additional stakeholders that have ownership or Right-of-Way within the project areas include multiple private landowners. The primary purpose of the stakeholder coordination effort is to initiate project scoping with private landowners and obtain Landowner Acknowledgement Forms. This effort will include an informational mailing and public meeting to educate landowners about the Upper Columbia Salmon Recovery Plan, the Peshastin Creek Reach Assessment and the specific opportunities at this site. Additional public and private meetings will be arranged as necessary to accommodate private landowners.

Stakeholder coordination would incorporate the information generated in the alternatives analysis in educating landowners of the potential project effects. This coordination effort would seek to identify and to the degree possible address landowner issues associated with projects. This would include coordination with the Chelan Douglas Land Trust and Washington Rivers Conservancy for conservation easement and water rights issues.

2) Project Alternatives Analysis and 30% Design: The Alternatives Analysis will use data and guidance provided within the Yakama Nation's Peshastin Creek Reach Assessment (summer 2009). This document will provide a detailed assessment of hydrogeomorphic and habitat conditions within the project reach. While the Reach Assessment will utilize existing LiDAR data, topographic mapping of the former meander should be conducted using traditional ground survey methods. Overall, the Reach Assessment data will be used to assess project alternatives as developed through working with project partners including WSDOT, the Yakama Nation, and members of the Wenatchee Habitat Subcommittee. The final Alternatives Analysis will evaluate the various alternatives selected for addressing the reconnection of the historic channel through social, biological, and construction feasibility factors. The Alternatives Analysis will result in the selection of a preferred project alternative and drafting of 30% conceptual designs. This will include preparation of surveyed site plans, documentation of hydrologic, hydraulic, geomorphic, and biologic site conditions, and the preparation of design drawings and an engineer's cost estimate for the preferred alternative.

As this project will be completed in coordination with the WSDOT Chronic Environmental Deficiencies Program (CED), the CCNRD Alternatives Analysis will adhere to methods used by WSDOT staff. Guidance documents include the Reach Analysis Guidelines in the Integrated Streambank Protection Guidelines (Saldi-Caromile, K., K. Bates, P. Skidmore, J. Barenti, D. Pineo. 2004). The analysis will also follow where appropriate the Bureau of Reclamation's Alternatives Evaluation Report methodologies.

The completion of the Alternatives Analysis is Phase I in a long-term effort to return the channel to its former meander at this site. The CCNRD will work with the WSDOT CED Program to submit the preferred alternative and 30% conceptual designs to the CED for project ranking in 2010. The successful nomination to the CED will open this project to potential construction funding through WSDOT. The deadline for the proposal of a preferred alternative for the CED is April 2010. The CCNRD will then work with the CED to obtain funding for detailed engineering, design,

and permitting for Phase II. Phase III of this project will be construction.

- c) Describe what products will be produced (i.e., project deliverables). If a project design will be produced, what stage of project development is proposed (conceptual, preliminary, or final-- refer to Appendix D Project Development Phases Defined)?
- Landowner Acknowledgement Forms
- Alternatives Analysis Report
- 30% Design Report with Drawings and Cost Estimate.
- d) Explain how the results of the project will lead directly to habitat restoration projects that benefit salmonids.

This Phase of the project will provide a preferred alternative, 30% designs, a construction estimate to facilitate future project funding, and landowner cooperation. The completion of future phases will lead to the reconnection of 2,400 linear feet of historic channel. This would increase the current channel length (1,800 feet) by 600 feet and return the channel slope to the original creek slope (decrease by 0.2%). This will result in the lengthening of stream channel, increased sinuosity and decreased channel slope, increased floodplain capacity, and increased habitat area. This will increase juvenile rearing habitat, increase adult spawning habitat, and allow the channel to dissipate energy and manage sediment loads.

#### PROJECT DEVELOPMENT

e) List the individuals and methods used to identify the project and its location.

The CCNRD has been working closely with WSDOT and the Yakama Nation during the development of this project. A key component to the project timeline is coordination with WSDOT and the nomination process within the Chronic Environmental Deficiencies Program. The successful nomination to the CED will open this project to potential construction funding through WSDOT. The deadline for the proposal of a preferred alternative for the CED is April 2010. Data to be used in the Alternatives Analysis will be provided in the Reach Assessment under preparation by the Yakama Nation and scheduled for delivery in September 2009. It is the goal of this project to meet the April 2010 CED nomination timeline.

As background, the project site has two relevant histories. One history is the ongoing bank erosion problems experienced at the highway. The other history is the CCNRD's identification of this project in 2009 as providing an excellent opportunity to address salmonid limiting habitat factors on Peshastin Creek.

There have been ongoing bank erosion problems at the upstream end of the channel relocation, at the point where the creek is forced to follow the new channel instead of the original meander. WSDOT has had to repair the roadway due to erosion multiple times after flooding events in recent history (January 2009). The repairs have included replacing lost fill from the roadway embankment and adding riprap armoring at the point where the creek is eroding the bank.

The Wenatchee Watershed Implementation Schedule identifies this project site (PC-1413) as a priority channel reconnection project. The CCNRD completed a Site Reconnaissance in February 2009 to explore the potential for channel reconnection at this site. This assessment concluded:

The Peshastin Creek RM 3.56 to RM 3.90 Channel Reconnection Project provides an excellent opportunity to reconnect a former meander and restore natural channel processes and habitats. The project offers complexities, primarily coordinating the needs of multiple public and private landowners and will be moderately expensive due to the need for constructing two bridges.

Since this assessment, the CCNRD has been working with WSDOT to explore a collaborative effort to providing a

long-term fix at the project site that 1) remedies the chronic maintenance problem at the site, and 2) provides benefit to ESA-listed salmonids through full channel reconnection. Following a meeting with WSDOT representatives in May 2009 the CCNRD agreed to pursue funding to complete a site-specific Alternatives Analysis in collaboration with the WSDOT Northcentral Region. The CCNRD also agreed to lead the effort regarding landowner facilitation and coordination at the project site.

This Alternatives Analysis is structured to build upon the Peshastin Creek Reach Assessment currently underway by the Yakama Nation and scheduled for completion in the summer of 2009. The Reach Assessment will document existing conditions from Ingalls Creek to the Confluence with the Wenatchee River and will provide scientific information for identifying, prioritizing and implementing salmon habitat improvement projects. The CCNRD will rely on the data and guidance provided within the Reach Assessment to select alternatives and prepare the Alternatives Analysis. The CCRND will work closely with the Yakama Nation, WSDOT, and the Wenatchee Habitat Subcommittee to develop project alternatives for evaluation and during the selection of the preferred alternative.

f) Explain how the project's cost estimates were determined.

Costs include all costs to conduct the stakeholder coordination and complete an alternatives analysis. Stakeholder coordination will be conducted by staff within the CCNRD. Personnel estimates involve using the hourly rates for each staff person and the percentage of their time that is anticipated for that person per project. The alternatives analysis will be subcontracted by the CCNRD. Estimates for subcontracted work are based on actual costs as proposed by a subcontractor.

g) Describe other approaches and design alternatives that were considered to achieve the project's objectives.

In February 2009 the CCNRD conducted a site reconnaissance to assess the feasibility of returning Peshastin Creek to its former channel. Part of this reconnaissance used LiDAR generated topographic maps to create cross sections comparing the existing channel profile to the historic channel profile. LiDAR topography indicates the elevations of the former creek channel at the upstream and downstream ends are nearly the same as the existing creek channel (See attached figures showing LiDAR and cross sections A, B, and C.). The existing creek channel is possibly 1 or 2 feet lower than the former channel at the connection points and at equal elevation near the midpoints. Reestablishing the former meander as the creek channel could be accomplished with relatively minor amounts of excavation within the former meander itself. The installation of 2 bridges would be required to allow complete reconnection of the flow through the former meander. Bridges would likely be at least 150' in length to provide adequate hydraulic capacity and allow for geomorphic function of the creek at the crossing. A full channel connection is the primary goal of this project however additional alternatives examining a partial reconnection will be examined through this proposal. The purpose of this application is to develop feasible project alternatives for the reconnection and select a preferred alternative.

h) Describe the consequences of not conducting this project at this time. Consider the current level and imminence of risk to habitat in your discussion.

Failure to implement the project would fail to capitalize upon excellent collaboration that the CCNRD has built with the landowner – WSDOT North Central Region and the CED. The CED has opened the door to potential future funding matches if the CCNRD can complete the Alternatives Analysis and 30% Designs. The consequences for not implementing this particular project would be to maintain existing conditions and degraded habitats, which will continue to limit the productivity of listed salmonids within Peshastin Creek.

i) Include a Partner Contribution Form, when required, from each partner outlining its role and contribution to the project. This form may be downloaded off the SRFB Web site. State agencies are required to have a local partner that is independently eligible to be a project sponsor. A Partner Contribution Form is also required from partners providing third-party match.

No partner contributions apply.

j) List all landowner names. Include a signed Landowner Acknowledgement Form (download off the SRFB Web site) from each landowner acknowledging their property is proposed for SRFB funding consideration. If an assessment covers a large area and encompasses numerous properties, Landowner Acknowledgement Forms are not required. For sponsors proposing feasibility/assessment work on their own property this form is not required. For multi-site acquisition projects involving a relatively large group of landowners, include, at a minimum, signed Landowner Acknowledgement Forms for all known priority parcels.

The attached map shows the multiple landowners at the project site. The CCNRD will be leading the landowner outreach effort. The goal of this phase of the project is to obtain signed Landowner Acknowledgement Forms.

 k) Describe your experience managing this type of project. List the names, qualifications, roles and responsibilities for all known staff, consultants, and subcontractors who will be designing and implementing the project. If unknown, describe the selection process.

Chelan County Natural Resource Department – Project Lead Sponsor. The CCNRD will be responsible for stakeholder coordination and selecting a contractor to develop the alternatives analysis and 30% designs. Mike Kane and Alan Schmidt from the CCNRD will be the primary contacts during contractor selection and stakeholder coordination.

Washington Department of Transportation – Landowner and Technical Review Wenatchee Watershed Habitat Sub-Committee – Technical Review Upper Columbia Regional Technical Team – Technical Review

#### Citations

Andonaegui, C. 2001. Salmon, Steelhead, and Bull Trout Habitat Limiting Factors for the Wenatchee Subbasin (Water Resource Inventory Area 45) and Portions of WRIA 40 within Chelan County (Squilchuck, Stemilt and Colockum drainages). Washington State Conservation Commission. Olympia, WA.

Saldi-Caromile, K., K. Bates, P. Skidmore, J. Barenti, D. Pineo. 2004. Stream Habitat Restoration Guidelines: Final Draft. Co-Published by the Washington Departments of Fish and Wildlife and Ecology and the U.S. Fish and Wildlife Service, Olympia, Washington.

(UCRTT) Upper Columbia Regional Technical Team. 2008. A Biological Strategy to Protect and Restore Salmonid Habitat in the Upper Columbia Region. April 30, 2008. Available online at <u>http://www.ucsrb.com/resources.asp</u>.

(UCRTT) Upper Columbia Regional Technical Team. 2009. Draft priorities for reaches and actions for implementing habitat actions. February 11, 2009.

(UCSRB) Upper Columbia Salmon Recovery Board. 2007. Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan. August 2007. Available online at http://www.ucsrb.com/plan.asp or http://www.ucsrb.com/UCSRP%20Final%209-13-2007.pdf.

#### 3) TASKS AND SCHEDULE

List and describe the major tasks and time schedule you will use to complete the project. Non Capital projects should be completed within two years of funding approval.

Item/Milestone	Outcome	Target Date (Month/Year)
Reach Assessment	Preparation of hydrogeomorphic and habitat data.	9/09
Develop project alternatives with stakeholders	Select alternatives for analysis	12/09
Draft Alternatives Analysis	Present draft alternatives analysis to stakeholders	3/10
Select Preferred Alternatives	Select Preferred Alternatives	4/10
Draft Conceptual Plans	Present draft conceptual plans for the Preferred Alternatives to WSDOT CED.	4/10
Landowner Coordination	Work with WSDOT and private landowners through the alternatives analysis and through 2010	12/10

#### 4) CONSTRAINTS AND UNCERTAINTIES

Each project should include an adaptive management approach that provides for contingency planning. State any constraints, uncertainties, possible problems, delays, or unanticipated expenses that may hinder completion of the project. Explain how you will address these issues as they arise and their likely impact on the project.

With the early cooperation between the CCNRD, the landowner (WSDOT), all parties are aware of the project schedule and committed to meeting the timeline. The timeline to produce 30% conceptual plans for the preferred alternative is April 2010 to meet CED funding cycle requirements. Meeting this deliverable depends upon the success of the landowner outreach. If this deadline is missed the CCNRD will work with the CED to place the project in the 2011 funding cycle.







Source: Aerial, Natural Resource Conservation District, 2006 LiDAR, Watershed Sciences, 2007



Major Contours (10 ft)

**Existing Conditions** 

Peshastin Creek RM 3.56 to RM 3.90 Channel Reconnection Project Site Reconnaissance and Feasibility Analysis 200 100 0 200 Feet

0





**Channel Reconnection Project** 





Photo 1. US 97 at MP 182 facing upstream at January 2009 repair.



Photo 2. US 97 damage in January 2009 at the location of the proposed channel reconnection.



Photo 3. US 97 at MP 182 facing downstream at January 2009 repair.



Photo 4. Home adjacent to old meander channel.







### CCNRD Peshastin Creek Reconnection Alternatives Analysis (RM 3.9)

Task	Cost	Description
CCNRD Stakeholder Coordination	\$15,212	CCNRD Staff coordination with
		watershed stakeholders and
		landowners.
Conduct Alternatives Analysis	\$36,394	Refine alternatives, field
(includes field assessment,		assessment, calibrate hydraulic
hydraulic modeling, alternatives		model, assess alternatives based
development and analysis)		on biologic, hydraulic, and social
		criteria.
Complete 30% Concept Plan Set	\$18,000	Complete 30% plan set of
		preferred alternative.
Professional Topo Survey	\$15,000	Topographic survey
Total	\$84,606	

## Cost Estimate – August 28, 2009