DEVELOPMENT/RESTORATION FINAL REPORT

Sponsor Name: Chelan County Natural Resource Dept. **RCO Project Number: 06-2248**

Project Name: Beaver Creek Passage Program **RCO Invoice Voucher Number: 8**

Worksite Name: Beaver Creek Culvert Replacement Complex

1. Reporting period: Contract Start: 12/20/06 Project Completion: 11/30/08

2. Provide a site plan identifying the development completed in this project [2 copies, no larger than 11" x 17" size or an electronic copy]. Please date the plans. SEE ATTACHED

3. Provide a copy of long-term Stewardship Plan if applicable. See attached

4. Did this project include elements as part of a mitigation plan? No ☑ Yes ☐ If yes, explain:

5. Type and number of facilities developed [be specific]: Replaced 3 passage barrier culverts with pre-cast concrete bridges.

Sponsor Comments "Identify any changes from approved project scope": Original project located bridges at culvert location. Property owners at 2 locations requested the bridges be re-located. This was accomplished within the project budget and time.

I hereby certify that this project has been completed in accordance with the project agreement. Further, I certify the completed project is consistent with both the scope of the project as approved or (as amended) by the Recreation and Conservation Office

Alan Bclmitt

Sponsor Signature Date 2-18-2009 Title Habitat Program Manager

Telephone 509-667-6567

Chelan County Natural Resource Department
316 Washington Street, Suite 401, Wenatchee, Washington 98801
Phone (509) 667-6533 Fax (509) 667-6527

website: http://www.co.chelan.wa.us/nr/nr_main.htm

Project Title: Beaver Creek Culvert Replacement

SRFB Project Number: IAC #06-2248R

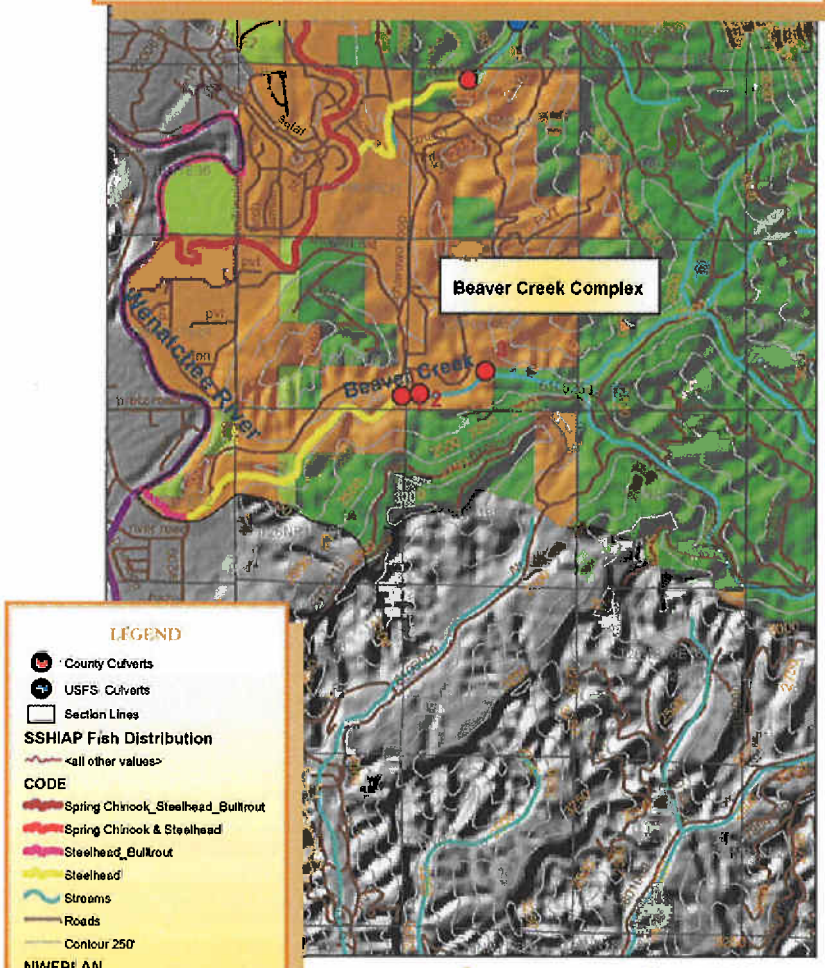
Introduction

Beaver Creek is a tributary of the Wenatchee River at RM 46.2, a few miles below the junction of the Wenatchee and Chiwawa River (Figure 1 and 2). Beaver Creek is just off the Chiwawa Loop Road near Plain, Washington in T 26, R 18, Sec 5. This drainage is 6,310 acres in size and is primarily within USFS ownership in the mid and upper reaches with much of the federal portion designated Late-Successional Reserve (LSR). The lower portions are within private ownership.

Purpose

The Beaver Creek Culvert Replacement project was a collaborative effort between the Chelan County Natural Resources Department, U.S. Forest Service, Bureau of Reclamation and 3 separate private property owners to replace 3 passage barrier culverts on lower Beaver Creek. Project sites were located RM 1.9, RM 2.0, and RM 2.5. Removing the 3 passage barriers and providing access to approximately 1 river mile of tributary habitat directly benefited ESA listed spring Chinook and summer steelhead. As the full biological benefit would be realized by replacing all the culverts at the same time it was decided to address all sites with one construction contract. After review of all sites with Bureau of Reclamation engineers it was determined that a bridge structure would best provide a simulated stream channel while staying within the project budget. The bridges are rated for highway loads, designed for the 100-year storm event and will be able to withstand any anticipated stormwater flows as well as the winter ice/snowmelt conditions. Chelan County advertised for bids to furnish and install bridge structures in May 2007.

Upper Wenatchee Passage Program
Beaver Creek Complex



LEGEND

- County Culverts
- USFS Culverts
- Section Lines

SSHIAP Fish Distribution

- <all other values>

CODE

- Spring Chinook_Steelhead_Bulltrout
- Spring Chinook & Steelhead
- Steelhead_Bulltrout
- Steelhead
- Streams
- Roads
- Contour 250'

NWFPLAN

- <all other values>

PLAN

- LSR
- MATRIX
- Private

0 0.15 0.3 0.6 Miles

Map generated by
Chelan County Natural Resource Dept
January 1, 2006
SSHIAPS(WDFW 2003)
Chelan Culverts (Harza 2000)
USFS Culverts (USFS)

Relationship to Wenatchee Watershed Management Plan
Beaver Creek culverts #1, #2 and #3 were given a "high" priority for replacement by the Upper Columbia Regional Technical Team (Table 2; UCRTT 2006). In addition, Beaver Creek culverts are included in the Implementation Schedule (UCSRB 2006).

Current Conditions
Species Use
Upper Columbia steelhead, spring Chinook and bull trout are known to spawn and rear in the Middle Wenatchee Assessment Unit (Table 1). Table 3 shows the known and presumed fish presence in Beaver Creek up to and beyond each culvert.

Table 3. Fish presence in Beaver Creek.

Beaver Creek				
Fish Presence (pre-construction)				
Species	**Mouth to Barrier 1**	**Barrier 1 to 2**	**Barrier 2 to 3**	**Barrier 3 to 8% gradient**
Steelhead	X[1,3,11]	0	0	0
Chinook	x	0	0	0
Bull trout	X[1]	0	0	0
Coho	X[1]	0	0	0
Sockeye	x	0	0	0
Westslope cutthroat	x	0	0	0
Rainbow trout	x	0	0	0

Key:
X: known presence
x: presumed presence
0: none documented

Presumed presence:
For rainbow trout, possible presence reflects known steelhead presence. For other species, possible presence indicates that a tributary adjoins the stream with known fish presence and no barriers would hinder their use of the area.

Habitat Condition

Harza/ BioAnalysts completed a habitat survey in the reach directly upstream of the Beaver Creek barrier culvert #2. Two hundred meters of stream habitat were measured in terms of pool and riffle habitat dimensions, riparian and instream cover conditions, dominant substrate, and qualitative rating of spawning and rearing potential. Channel conditions for reaches further upstream were taken from USGS topographic maps and included drainage area and channel gradient. These data were analyzed using the WFDW Habitat Priority Index (PI) (1998). The Fish Passage Priority Index (PI) model consolidates variables which affect a project's potential resource benefit, (species utilization, passage improvement, production potential, habitat gain, project cost, and fish stock mobility and health) resulting in a numeric indicator of relative priority. Results from this analysis showed spring Chinook with a Priority Index (PI) of 6.5, steelhead with a PI of 3.5, cutthroat trout with a PI of 6.1, rainbow with a PI of 3.1, and bulltrout with a PI of 2.5 for a total Priority Index for Beaver Creek at 21.7.

Desired Conditions

Benefit to other species

By replacing the fish barrier culverts with pre-cast concrete bridges, the project will provide year-round fish passage to all species at all life stages. Pre- and post-construction effectiveness monitoring will document the species that actually benefit from the project. Native species that are known to exist in the Wenatchee subbasin and could potentially benefit from culvert replacement projects include westslope cutthroat trout, rainbow trout, coho, sculpin, dace, lamprey, peamouth, chiselmouth, suckers and whitefish. It is unlikely that all of these species will be present at the project site. However, if they are present they will not be impeded in their upstream or downstream migration by the new bridges.

Species	Rearing	Spawning	Migration	Passage	High-water refugia
Sockeye salmon					
Coho salmon	X				X
Chinook salmon	X				X
Steelhead	X	X			X
Other (list)					
Bulltrout	X				X

Providing access in Beaver Creek will directly benefit ESA listed summer steelhead for at a least one life stage and will add 2.0 linear miles of habitat. Summer steelhead are known to be present to the first barrier (Jackie Haskins, personal communication, 2006, WFDW 2005); in 2004 during steelhead surveys, 15 steelhead reds were found in Beaver Creek near the mouth (Forest Service 2004). Beaver Creek also has a known presence of coho and bulltrout (WFDW 2005). Summer steelhead are the target species; however, some life stages of spring Chinook, bulltrout and coho will likely derive some benefit from this program (Figure 2) .

Beaver Creek Passage Program Design Concept

The Washington Dept. of Fish and Wildlife "Design of Road Culverts for Fish Passage Manual" will be applied in designing the replacement structures. Engineering designs will reflect that most current research regarding replacement of barrier culverts and will be designed for the 100 year flow event. After discussion with Washington State Department of Fish and Wildlife personnel and with respect to addressing the intent of WAC 220-110-070 which states in part "***In fish bearing waters, bridges are preferred as water crossing structures by the department in order to ensure free and unimpeded fish passage for adult and juvenile fishes and preserve spawning and rearing habitat.***" The proposed design concept for the Wenatchee Passage Program is to utilize modular steel bridge super structures set in place on pre-cast concrete abutments (see Figure 3a and b photos below). Manufacturers claim low initial cost, prompt delivery, and fast easy installation. Furthermore, load ratings and normal maintenance practices are preserved. Construction costs were reduced by allowing the contractor to mobilize equipment and purchase materials for all three sites instead of one at a time. For example, mobilization of heavy construction equipment will require transport of approximately 30 miles over county roads. The same heavy equipment is required for each site; therefore the equipment can be used at each site before transport back to the contractors shop.

Purchase of materials for all three sites allows the supplier to more efficiently transport such items as the modular bridge superstructures, pre-cast concrete abutments, ecology blocks, and rip rap slope retention rock. As result of the recent fuel price increases, all suppliers and contractors are including in their contracts a provision for a "Fuel Surcharge". While it is difficult to estimate fuel price increases, much of the increased costs can be avoided by grouping each sub-basins three sites under one contract. Permitting costs could be reduced by replacing all the culverts in each of the sub-basins by taking advantage of the Consolidated Permit provision provided by Washington Department of Fish and Wildlife.

The Beaver Passage Program addressed 3 passage barriers within a 0.6 mile reach of the Beaver Creek sub-basin. All sites are located on private property and are similar with respect to topography and proposed solution. Bridge abutments and pre-cast concrete superstructure were delivered by truck to the project site. The associated roads were closed during the permitted work period. Work began on Beaver #3 with the installation of fish screens, diversion system and pumps isolating and/or diverting the stream around the work site. U.S. Fish and Wildlife removed all fish within the work area after which the contractor dewatered the site and prepared the subgrade for the precast concrete abutments. The existing culverts were removed and hauled off site. Crushed surfacing was imported to provide sufficient base for the abutments. The simulated stream channel including the imported streambed gravel and rock weirs as shown on the plans were installed before the bridge structure was installed. After completing the structures construction and road restoration native riparian vegetation was planted by the Washington Conservation Corps in the disturbed sites to restore and enhance riparian habitat as well as minimize erosion and noxious weed establishment.

Maintenance and Monitoring

The Natural Resources Department discussed with each landowner responsibilities regarding maintenance of the riparian zone and the bridge structure. Signed Landowner Agreements for each site is provided. Plant survival will be monitored to ensure an appropriate level of plant cover is achieved. Monitoring of rock weirs and channel features will also be monitored.

Monitoring and Evaluation will consist of implementation monitoring and Level I effectiveness monitoring as described in "Project Monitoring: A Guide for Sponsors in the Upper Columbia Basin" (Hillman 2005).

Implementation Monitoring

Implementation Monitoring will be conducted by the Chelan County Natural Resources Department to ensure that the Beaver Creek Culvert Replacements are implemented as planned. This will be an administrative review and will not include measurement of any parameters. Photos will be obtained pre- and post-construction to document project completion. The implementation monitoring will address the design goals of the installed structures. The data collected will include the number and location of fish passage structures installed and Engineering specifications (e.g., HS20-44 rating, length of bridge; stream slope; presence of substrate; bridge span to streambed width ratio; and fill depth)

Effectiveness Monitoring

Level 1 effectiveness monitoring will focus on addressing the biological goals and objectives of the project. Level I effectiveness monitoring will be performed to establish baseline conditions prior to project construction, and then following the installation of the fish-friendly structures. The Chelan County Natural Resources Department will implement the Level 1 effectiveness monitoring. For all culvert replacement projects, data (including photographs) will be collected at least once before implementation of the project and then annually for five years following replacement). Other data collected will include maximum water velocity within culverts; maximum water depth within culverts;

outfall drop; presence/absence of steelhead redds; presence/absence of juvenile or adult steelhead.

Photographs of each culvert (taken upstream, downstream, and each culvert) will be collected during high-flow and low-flow periods before and after installation of the bridges. Photographs will be taken from the same locations during each survey period.

Adaptive Management Plan

Based on monitoring results, Natural Resources Department staff will coordinate with Bureau of Reclamation and others to determine the most appropriate action for resolving any project issues. Maintaining the function for juvenile salmonid rearing and high water refugia will be the goal of any adaptive management decisions.

Challenges

Each of the three sites is located on separate parcels of private property with a different owner. This required negotiating with each landowner and creating three separate landowner agreements. The original owner of the Beaver #2 site sold the property during the winter of 2007. The new owner, Mr. Scott Campbell would not allow the culvert replacement bridge to be located at its planned location. Mr. Campbell was agreeable to locate the replacement bridge on his property about 500-feet upstream of the original location. After review with the Bureau of Reclamation and Washington Department of Fish and Wildlife area biologist and engineer it was agreed that the new location provided at least as much biological benefit as the original plan. A new JARPA was submitted and a construction change order was approved for the contractor to return during the 2008 work window to complete the project. Final Acceptance was issued October of 2008.