

Final Report

Project #13-1342, Icicle Boulder Field Passage Design

Submitted by Aaron Penvose on 12/08/2016

Accepted by Marc Duboiski on 12/09/2016

CONTACTS

Primary Sponsor: Trout Unlimited-WA Water Proj

Lead Entity: Upper Columbia Sal Rec BD LE

Managing Agency: Rec. and Conserv. Office

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DESCRIPTION OF THE COMPLETED PROJECT

Project Start Date: 12/04/2013

FundingEnd Date: 10/14/2016

RCO Closure Date:

Trout Unlimited - Washington Water Project's (TU-WWP) Icicle Creek Boulder Field Passage Design Project completed preliminary designs for fish passage at the boulder field in Icicle Creek and assessed upstream falls above the major barrier in the boulder field. Icicle Creek is the major fish-bearing tributary to the Wenatchee River, in WRIA 45. This project built on TU-WWP's recent work of assessing the potential for fish distribution in the 23 miles above the boulder field. The design focused on habitat connectivity for bull trout and steelhead. This phase focused on various design alternatives and narrowed the design to one specific design for final refinement as the project moves to construction.

SITE LOCATION

General Area of Project: Southwest of Leavenworth

Waterbodies:

Cong District 2012: 08
County: Chelan
HUC: Wenatchee
Leg District 2012: 12
Salmon Recov Reg 05: Upper Columbia
Section: 28
Township/Range: T24NR17E
WAU: Enchantment
WRIA: Wenatchee

Sponsor Clarifications:

Sponsor verified the above information is correct and complete.

PROJECT NARRATIVE

TU and our primary partner Waterfall Engineering have been working on the boulder field project since a prior assesment phase that was initiated in 2012. This project has come a long way since early inception and the concept development has moved beyond early development to site specific designs for a single option. The complexity of this project has been steep and bumpy at times, much like the site itself. However the project team and technical advisroy group has been able to lasso most of the complex questions into managable pieces over the coarse of the design phase to reach a specfic design for implementation, option 5.

When the Option 4 layout was modified and Option 4b created, the extent of excavation around Boulder 14 changed to the point that Boulder 14 had to be removed. In addition, closer inspection of the pool under Boulder 14 revealed a "small cave" and a very deep, stable pool which could be utilized and possibly enhanced. Looking at the risk and potential level of disturbance, Option 5 was developed as an additional alternative. Under this option three new steps and pools would be developed downstream of Boulder 14. Drops will range from 4 to 5 feet per step. Pools will be 8 feet deep at low flow. The key to making Option 5 effective for fish passage is raising of the tailwater by placing boulders in the gaps of existing large boulders and modifying the main flow path down the falls by removing two large boulders which deflect the flow. These modifications to the main falls will only be noticeable at flows less than 1000 cfs. Above 1000 cfs, water flow from high velocity and turbulence will overwhelm these modifications.

Also additional survey upstream brought to light new considerations based on similar drops for fish passage in the Icicle basin. There are other small falls within Icicle Creek, like Gage Falls, Bridge Falls and Icicle Gorge Falls, which all have drops around 6 feet at low flow. This evalutation upstream has lead to further consideration with in the boulder reach to gain certainty with in the passage channel. To optimize the hydraulic function of Option 5, some manipulation of boulders and debris upstream of Boulder 14 (upper extent of passage channel) would be required in addition to minor changes in the channel. Based on water levels measured at the upstream end of the channel and calibration of a HEC RAS model for the reach, flows in the channel would vary. These variations can be found in the design report.

Some lessons for consideration on projects of similar dynamics might include, smart and excessive outreach to stakeholders and affected parties, early permitting pathways when rock breaking is a consideration, and multi year survey and geo tech spefic field work is a must.

No contracting snafu's occured on this one.

Outcomes of the project include a full assesment of the City of Leavenworth's waterline, a full design report detailing the design process and specific details of the design, a full plan set showing option 5 and all of the engineering attrinbutes as concieved at this time, an appendix investigation of falls/drops upstream of the boulder field from RM6 to ~RM20 and preliminary budget. The best outcome is that the team is still intact and unscathed and remains super excited about moving into the construction phase, which we hope bolsters listed species populations and provide a future sanctuary against human related climate change effects.

AMENDMENTS

#	Type	Applied Date	Description
3	Time Extension	10/13/2015	The project period of 12/04/2013 to 10/15/2015 is extended to allow the contracting party until 10/14/2016 to complete the project.
1	Cost Change	05/26/2015	TU is adding 15% match to this "design only - no match" grant agreement to receive a time extension beyond the 18 month limit.
2	Time Extension	05/15/2015	The project period of 12/04/2013 to 06/04/2015 is extended to allow the contracting party until 10/15/2015 to complete the project.

EQUIPMENT

Item Description	Model #	Purchase Date	Amount	Serial #
			\$0.00	

OVERALL PROJECT COSTS

Funding Formula:	Requested		Original		Final	
Salmon Federal Projects:	\$0.00	(0%)	\$179,000.00	(100%)	\$171,532.42	(85%)
Salmon State Projects:	\$179,000.00	(100%)	\$0.00	(0%)	\$0.00	(0%)
Sponsor Match:	\$0.00	(0%)	\$0.00	(0%)	\$30,270.20	(15%)
Total:	\$179,000.00	(100%)	\$179,000.00	(100%)	\$201,802.62	(100%)
Paid To Date:	\$171,532.42				Last Released Billing: 12/09/2016	
Remaining RCO Funds:	\$0.00				Pending Billing: No	
Advance Balance:	\$0.00		Match Bank:	\$8,785.38	Number of Billings: 12	
Admin Limit:	\$0.00		Admin Spent:	\$0.00		
A&E Limit:	\$0.00		A&E Spent:	\$0.00		

Billed Cost Summary:		Original Agreement	Expended	Non-Reimbursable	Total Billed
Non-Capital					
	Non-Capital Costs		\$153,880.90	\$41,657.37	\$195,538.27
	Equipment		\$17,651.52		\$17,651.52
	Non-Capital Total	\$210,588.00	\$171,532.42	\$41,657.37	\$213,189.79
Total		\$210,588.00	\$171,532.42	\$41,657.37	\$213,189.79

Project Cost Metrics:		Original Agreement	Final
PCSRF Federal Funds (A.10):		\$171,532.42	\$171,532.42
State Funds (A.11):			
Other Federal Funding:			
Pending Billing - RCO Share Approved:			
Retainage - RCO amount retained:			\$0.00
Amount of other monetary funding (A.12):		\$0.00	\$41,658.00
		0	
Project identifier for the other monetary funding (A.12.b):		NA	NA
		0	
Source of other monetary funding (A.12.a):		NA	TU
		0	
Value of Donated Unpaid Labor (Volunteers) (A.13.a.2):		\$0.00	\$0.00
		0	
Source of Donated Un-paid labor contributions (A.13.a.4):		NA	NA
		0	
Number of hours volunteers contributed to the project (A.13.a.1):			0
Describe how the value of the volunteers was determined (A.13.a.3):			NA
Value of Donated Paid Labor (A.13.b.1):		\$0.00	\$0.00
		0	
Source of Donated Paid Contributions (A.13.b.2):		NA	NA
		0	
Value of Other In-Kind Contributions (A.13.c.1):		\$0.00	\$0.00
		0	
Source of Other In-Kind Contributions (A.13.c.3):		NA	NA
		0	
Description of other In-Kind contributions (A.13.c.2):		NA	NA
		0	

PROJECT METRICS			
		Original Agreement	Final
Completion Date			
Projected date of completion:		5/31/2015	10/14/2016
Project Goals			
Goals, purpose, and expected benefits (A.17):		To design a cool project providing fish passage over big boulders.	Project designed fish passage for bull trout and steelhead through a boulder field to open up 23 miles of habitat.

WORKSITE #1: Icicle Boulder Field

Worksite Description: Worksite is RM 5.6-RM 5.7 of Icicle Creek upstream of Snow Creek Parking lot at the Icicle Boulder Field. Site Survey, Geologic Investigation.

Driving Directions: IPID Irrigation Access Road from Snow Creek parking lot.

Coordinates for Worksite Directions - Latitude: 0.00 **Longitude:** 0.00

Sponsor Clarifications:

Sponsor verified the above information is correct and complete.

WORKSITE #1 COSTS

Worksite Billed Cost:	Estimated	Expended	Non-Reimbursable	Total Billed
Equipment		\$17,651.52		\$17,651.52
Non-Capital Costs	\$179,000.00	\$153,880.90	\$41,657.37	\$195,538.27
Worksite Total	\$179,000.00	\$171,532.42	\$41,657.37	\$213,189.79

Worksite Costs by Category:	Original Agreement	Final
Design for Salmon restoration Funding:	\$179,000.00	\$213,190.00

WORKSITE #1 METRICS

	Original Agreement	Final
Targeted salmonid ESU/DPS (A.23):	Steelhead-Upper Columbia River DPS	Steelhead-Upper Columbia River DPS
Targeted species (non-ESU species):	Bull Trout	Bull Trout
Area Encompassed (acres) (B.0.b.1):	21.9	21.9
Miles of Stream Affected (B.0.b.2):	0.32	0.32
Design for Salmon restoration		
Preliminary design		
Total cost for Preliminary design:	\$179,000.00	
Name of the Plan:	Dominguez, L., P. Powers, E.S. Toth, and S. Blanton. 2013. Icicle Creek Boulder Field Fish Passage Assessment. Prepared for Trout Unlimited-Washington Water Project, Wenatchee, WA.	Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan, Several Authors, August 2007, http://www.ucsrp.org/Assets/Documents/Library/Plans/UCSRP/UCSRP%20Final%209-13-2007.pdf

Description of the Plan:

The Icicle Creek Boulder Field Fish Passage Assessment (Dominguez, L., 2013) identified two primary areas of fish passage impediment in the 2,700 foot study reach: one large boulder (the "Anchor Boulder") and the material that collects behind it, is the primary impediment during the majority of flows (with a 21 foot vertical drop and 30% gradient) and the second impediment is the upstream irrigation diversion dam during the low flows. The assessment provided conceptual designs and construction cost estimates for 4 passage alternatives for the Anchor Boulder and 2 passage alternatives for the diversion dam, which were narrowed to one preferred option at each impediment: Channel Profile Adjustment at Anchor Boulder and Pool and Chute Fishway at diversion dam.

The Upper Columbia Salmon Recovery Plan from August 2007 is for spring Chinook and steelhead. The Upper Columbia Salmon Recovery Board, a regional non-profit organization, implements the plan to restore viable and sustainable populations through collaborative, economically sensitive efforts, combined resources, and wise resource management. All recovery efforts are transparent and evolving. The plan is the culmination of several conservation efforts, including state and tribal-sponsored recovery efforts, subbasin planning and watershed planning. The plan is non-regulatory and does not force private landowner involvement. All implementation efforts are voluntary. The recovery plan covers the Upper Columbia River and six major "subbasins" (Crab, Wenatchee, Entiat, Lake Chelan, Methow and Okanogan basins). Currently there are three independent spring Chinook and five steelhead populations in the Upper Columbia. The recovery actions identified in the plan are for all four major sectors (Harvest, Hatcheries, Hydropower, and Habitat). Implementation of specific recovery actions are coordinated with local stakeholders to determine feasibility, including socio-economic interests, benefits and costs.

SPONSOR CERTIFICATION

- ☒ I certify that this project has been completed in accordance with the project agreement.
- ☒ I certify that, to the best of my knowledge, the information in the Final Report is true and correct.

Submitted by Aaron Penvose on 12/08/2016