

RECLAMATION

Managing Water in the West

Reclamation's 2013 List of Tributary Habitat Projects Completed for the 2010 Federal Columbia River Power System Biological Opinion



U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Columbia/Snake River Office
Boise, Idaho

September 2014

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The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Photograph on front cover: View of the private road crossing on Hawley Creek after the project construction, Hawley Creek Culvert-to-Bridge Replacement Project.

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Acronyms and Abbreviations

BA	Biological Assessment
BiOp	Biological Opinion
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe
BPA	Bonneville Power Administration
CCD	Cascadia Conservation District
CCNRD	Chelan County Natural Resources Department
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
CRP	Columbia River Program
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CTWSRO	Confederated Tribes of the Warm Springs Reservation of Oregon
CWA	Clean Water Act
DSL	Department of State Lands
ESA	Endangered Species Act
FCRPS	Federal Columbia River Power System
gpm	gallons per minute
GRMW	Grande Ronde Model Watershed Project
GSWCD	Grant Soil and Water Conservation District
IDFG	Idaho Department of Fish and Game
IDIQ	Indefinite Delivery, Indefinite Quantity
LiDAR	Light Detection and Radar
LSWCD	Lemhi Soil and Water Conservation District
LWM	large wood material

MCR	Middle Columbia River
MSRF	Methow Salmon Recovery Foundation
NEPA	National Environmental Policy Act
NFWF	National Fish and Wildlife Foundation
NOAA Fisheries Service	National Oceanic and Atmospheric Administration National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
ODFW	Oregon Department of Fish and Wildlife
OSC	Office of Species Conservation
OWEB	Oregon Watershed Enhancement Board
POD	point of diversion
POW	Pipe of Washington
PRCC	Priest Rapids Coordinating Committee
PUD	Public Utility District
PWUA	Pioneer Water User Association
RCO	Recreation and Conservation Office
Reclamation	U.S. Bureau of Reclamation
RM	river mile
ROE	Right of Entry
RPA	Reasonable and Prudent Alternative
Sho-Ban Tribes	Shoshone-Bannock Tribes
SHPO	State Historic Preservation Office
TU	Trout Unlimited
UCR	Upper Columbia River
UCSRB	Upper Columbia Salmon Recovery Board
USBWP	Upper Salmon Basin Watershed Program

USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USWCD	Union Soil and Water Conservation District
WCC	Washington Conservation Commission
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington Department of Ecology
Yakama Nation	Confederated Tribes and Bands of the Yakama Nation

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INTRODUCTION

The Bureau of Reclamation (Reclamation), U.S. Army Corps of Engineers, and Bonneville Power Administration (BPA) contribute to the implementation of salmonid habitat improvement projects in Columbia River Basin tributaries to help meet commitments in the 2010 Supplemental Federal Columbia River Power System Biological Opinion (FCRPS BiOp).¹ The FCRPS BiOp includes a Reasonable and Prudent Alternative (RPA), or a suite of actions, to protect salmon and steelhead listed under the Endangered Species Act (ESA) across their life cycle. Reclamation's contributions to habitat improvement are all meant to be within the framework of the FCRPS RPA or related commitments. This document covers only habitat improvement projects with Reclamation involvement.²

ESA-listed fish species present in the Columbia River Basin include Upper Columbia River (UCR) spring Chinook salmon (*Oncorhynchus tshawytscha*) (endangered), Mid-Columbia River (MCR) spring Chinook salmon (*O. tshawytscha*) (threatened), Snake River spring/summer Chinook salmon (*O. tshawytscha*) (threatened), steelhead trout (*O. mykiss*) (threatened), Snake River sockeye salmon (*O. nerka*) (endangered), and Upper Columbia River bull trout (*Salvelinus confluentus*) (threatened). Pacific lamprey (*Entosphenus tridentatus*) are not ESA-listed, but are afforded actions through commitments in the 2008 Fish Accords agreement with the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO), and the Confederated Tribes and Bands of the Yakama Nation (Yakama Nation).

Habitat improvement projects in various Columbia River tributaries are one aspect of the RPA. Rehabilitation or improvement of altered stream habitat and formation of new habitat are generally accepted methods that benefit fish populations. Reclamation conducts tributary and reach assessments in the river subbasins specified in the FCRPS BiOp to maximize the success of habitat improvement projects benefiting anadromous species listed under the ESA (Figure 1). These assessments analyze the physical and ecological processes at work in the watershed and define environmental baseline conditions that can complement monitoring activities designed to evaluate the physical and biological responses to the improvement projects.

¹ NOAA National Marine Fisheries Service, Supplemental Consultation on Remand for Operation of the Federal Columbia River Power System, 11 Bureau of Reclamation Projects in the Columbia Basin and ESA Section 10(a)(1)(A) Permit for Juvenile Fish Transportation Program, May 20, 2010, F/NWR/2010/02096. The 2010 BiOp incorporates in whole the 2008 BiOp: *Consultation on Remand For Operations of the Federal Columbia River Power System, 11 Bureau of Reclamation Projects in the Columbia Basin and ESA Section 10(a)(1)(A) Permit for Juvenile Fish Transportation Program* [Revised and reissued pursuant to court order, *NWF v. NMFS*, Civ No. CV 01-0640-RE (D. Oregon)].

² For more information, see www.salmonrecovery.gov.



Figure 1. Map of 2013 Supplemental Federal Columbia River Power System Biological Opinion tributary subbasins with Reclamation involvement.

Reclamation provides technical assistance to states, tribes, federal agencies, and other local partners for identification, design, and construction of stream habitat improvement projects that primarily address streamflow, access, entrainment, and channel complexity limiting factors. Approximately 20 to 30 projects are completed annually at a total cost to Reclamation ranging from \$7.0 to \$9.0 million, with 60 to 80 projects in different stages of development during any year. Habitat improvement projects may take up to 3 years or more to implement from conception to completion. Construction activities associated with the more complex and costly projects usually continue across multiple years. Project costs vary, depending on the objectives, landowner cooperation, availability of construction funding from project partners, changes in project scopes, and other actions required to meet biological criteria in the FCRPS BiOp for endangered species.

Reclamation does not own, operate, or maintain the habitat improvement projects described in this report. Reclamation's role in these projects is providing technical assistance such as assessing, modeling, designing, and verifying designs so that the projects are sound from an engineering perspective and should perform hydraulically as intended. For continual improvement of project designs, Reclamation evaluates completed projects to determine if they are functioning as designed and incorporates the findings in future projects.

Projects described in this report are completed with contributions from many partners. Full descriptions of the projects and associated benefits are presented in this report even if Reclamation did not contribute to a particular project element. Consequently, benefits identified in this report are more comprehensive than the benefits that were reported by Reclamation in the FCRPS BiOp annual progress reports. Descriptions in this report also include partner objectives that often target rehabilitation goals that are broader than the goals Reclamation addresses to implement the FCRPS BiOp.

Expenditures for the total basin costs are included in each basin section and repeated for each subbasin. Those totals include the annual budgets spent for development, coordination, financial assistance to partners, contracts for architectural and engineering services, and project-specific activities for 2013 only. With 60 to 80 projects in different stages of development during each year, the development costs will not equal the expenditures for the basin in any given year. The development costs shown for each individual project include all years of project development summarized for the Reclamation contribution. Implementation costs that are given in this report are costs incurred by the partners, including construction of the specific project.

2013 Activities

In 2013, 24 fish habitat improvement projects were completed in the following 7 subbasins of the Columbia River Basin:

- Lemhi River
- Upper Salmon River
- Grande Ronde River
- Middle Fork John Day River
- Upper John Day River
- Methow River
- Wenatchee River

Objectives of the projects included, but were not limited to, removal of fish passage barriers; the redesign of irrigation structures to allow fish passage; improvement of instream habitat complexity, floodplain connection, and side-channel fish habitat.

Future Projects

Reclamation plans to continue providing technical assistance for habitat improvement projects that enhance tributary spawning and rearing habitat associated with implementing the FCRPS BiOp. Tributary and reach assessment analyses are currently being conducted for the Upper Grande Ronde in the Grande Ronde River subbasin and multiple reaches in the Entiat River subbasin. These assessments will be used to refine the designs for the proposed fish habitat improvement projects in those subbasins.

Reclamation will continue to assist non-Federal parties located in Idaho, Oregon, and Washington in complying with environmental and cultural resources regulations and producing engineering designs related to barrier removals, screens, and channel morphology (e.g., blockages, floodplains, and culverts) associated with implementing the FCRPS BiOp.

Acknowledgements

The major credit for the success to date of Reclamation's efforts to implement the FCRPS BiOp is due to the participation and cooperation of many partners, including landowners, local and state agencies, tribes, non-profit organizations, interest groups, and other federal agencies. Reclamation activities undertaken through this program support a larger, cooperative process which is generally controlled by non-federal partners who secure funding and implement the habitat improvement projects that address water, land, and other resource management challenges. Some provide their resources of time and money for a single project; others for multiple projects throughout the subbasins. In the following sections, partners and sponsors for the 2013 projects are listed under each subbasin in which they were active.

SALMON RIVER BASIN

From its headwaters in the Sawtooth Mountains, the Salmon River flows northerly about 180 miles (joined by the North Fork at river mile [RM] 237), and then heads westerly across central Idaho until it enters the Snake River at RM 188. The Salmon River subbasin drains approximately 14,000 square miles from elevations exceeding 10,000 feet to approximately 900 feet at its confluence with the Snake River. The Salmon River is the second longest undammed river in the Columbia River Basin.

Reclamation works in four subbasins: the Upper Salmon, the Lemhi, the Pahsimeroi, and the Little Salmon. In 2013, five projects were completed in the Lemhi River subbasin and two were completed in the Upper Salmon River subbasin.

ESA-listed fish species present in the Salmon River include Snake River spring/summer Chinook salmon (threatened), Snake River steelhead trout (threatened), Snake River sockeye salmon (endangered), and Columbia River bull trout (threatened).

Bureau of Reclamation Expenditures in 2013

Subbasin	Expenditures
Lemhi River	\$197,839
Upper Salmon River	\$1,436,427
Pahsimeroi	\$138,100
Total	\$1,772,366

LEMHI RIVER SUBBASIN

The Lemhi River (HUC 17060204) is a tributary to the Salmon River, entering it at RM 258.5, and has a drainage area of about 1,270 square miles. In 2013, five projects were completed in the subbasin that improved fish passage, streamflow and riparian habitat.

ESA-listed fish species present in the river include Snake River spring/summer Chinook salmon (threatened), Snake River steelhead trout (threatened), Snake River sockeye salmon (endangered), and Columbia River bull trout (threatened).

Project documentation including permits, as-built drawings, GIS files, additional photos, and other technical records are located at the Bureau of Reclamation, Pacific Northwest Regional Office, 1150 N. Curtis Road, Suite, 100, Boise, Idaho 83706. Files can be requested through the Columbia/Snake Salmon Recovery Office, 208-378-5057.

Projects

- Bohannon Creek Diversion Consolidation – Flow Enhancement Project
- Hawley Creek Culvert-to-Bridge Replacement Project (Bureau of Land Management)
- Hawley Creek Culvert-to-Bridge Replacement Project (Private)
- Lower Lemhi Streambank Enhancement Project
- Upper Lemhi Side Channel (Snyder) Project

Sponsors

- Idaho Department of Fish and Game (IDFG)
- Lemhi Soil and Water Conservation District (LSWCD)
- Private landowners

Partners

- Private landowners
- IDFG
- LSWCD
- State of Idaho, Office of Species Conservation (OSC)
- Upper Salmon Basin Watershed Program (USBWP)
- Bonneville Power Administration (BPA)
- Aspect LLC
- Intermountain Aquatics, Inc.

Funding Sources

- BPA
- NOAA National Marine Fisheries Service (NOAA Fisheries Service)
- Private landowners

Bureau of Reclamation Expenditures in 2013

Subbasin	Expenditures
Lemhi River	\$197,839

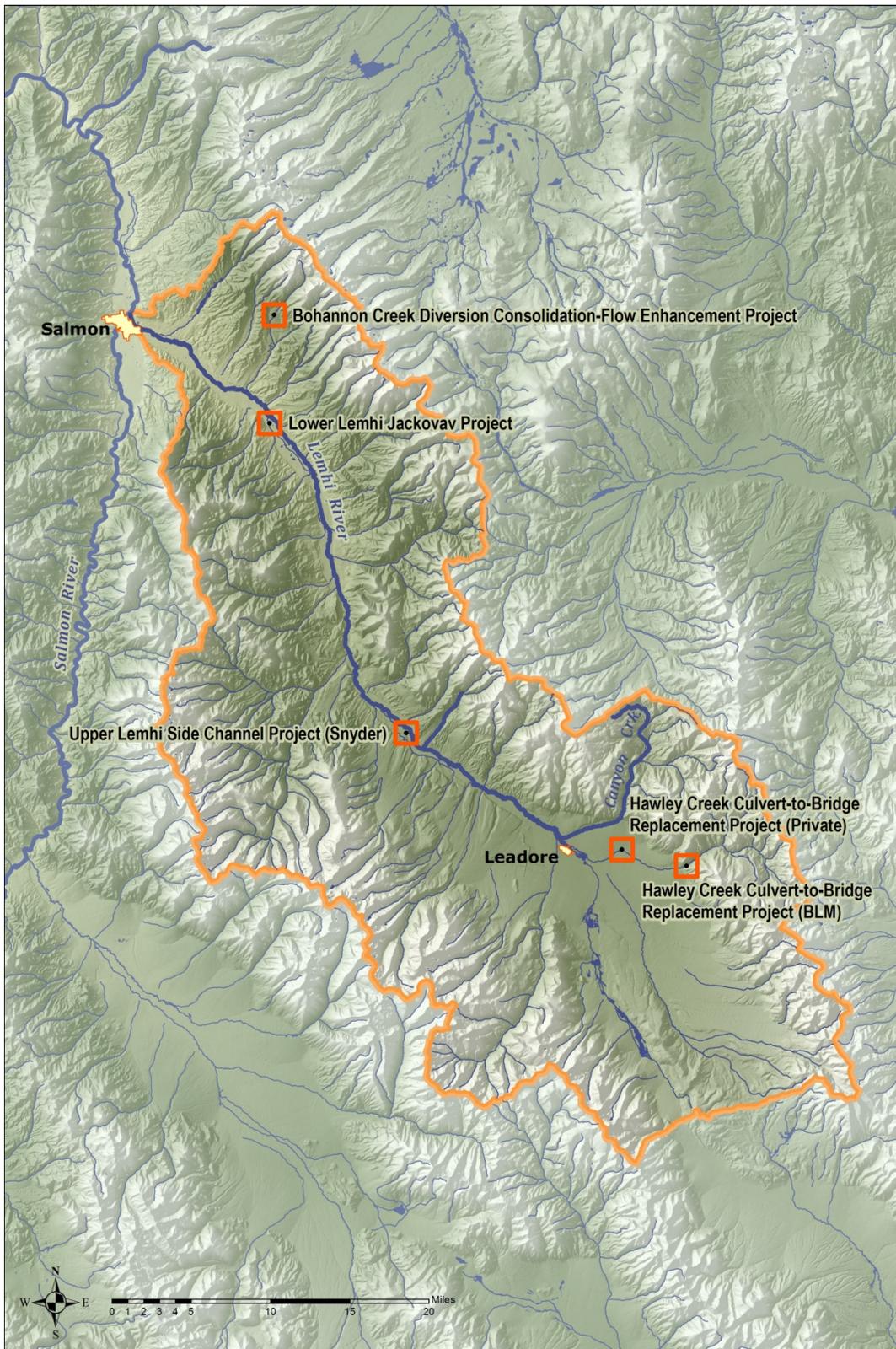


Figure 2. Location map of the projects completed in the Lemhi River subbasin in 2013.

Bohannon Creek Diversion Consolidation - Flow Enhancement Project

Project Name: Bohannon Creek Diversion Consolidation-Flow Enhancement Project				
Project Action: Consolidate/screen diversions, enhance flow and fish passage				
Project Sponsor: IDFG				
Project Design: Quadrant Consulting, Inc.				
Landowner(s): Eagle Valley Ranch				
Partners: Private landowner, IDFG, OSC, BPA			Reclamation Development Costs: \$5,000	
Funding Source(s): BPA (Idaho Accord)			Implementation Cost: \$ 453,922	
Project Location:	State: Idaho	County: Lemhi	Stream: Bohannon Creek	
	Latitude: 45°10' 48.05" N		Longitude: 113° 42' 15.02" W	
	Township:	Range:	Section:	¼ Section:
Project Status: Complete				
Project Phase: Monitoring				
Milestones	Funding: Secured Design: Completed Permitting: Completed Construction Start Date: April 15, 2012 Construction Completion Date: March 31, 2013			
Biological Benefit	Species: Spring/summer Chinook, steelhead, bull trout Benefit Type: Barrier removal, flow enhancement, fish screen			
Metric: 2-3 cubic feet per second (cfs) increased flow in 0.50 mile stream; eliminated 3 passage barriers; replaced 1 screen; 2.3 miles affected				
Project Objectives and Description: The objectives of this project were to improve fish passage and flow in an upper reach of Bohannon Creek, a tributary to the Lemhi River. The project entailed replacement of the BC9 diversion and associated road culvert. It also included elimination of the BC8 and BC11 points of diversion (POD), construction of 150 feet of stream channel, and construction of a new irrigation diversion at BC9 that consolidates the BC11 and BC8 diversions into the same POD as BC9. A fish screen was installed at BC9 to eliminate entrainment of fish into an irrigation distribution system, consisting of a flow meter, bifurcation structure, and 16,568 feet of pipeline that conveys water to pre-existing pivot sprinklers and land that is flood irrigated.				

Project Name: Bohannon Creek Diversion Consolidation-Flow Enhancement Project

Design, Permitting, and Construction Issues: The IDFG obtained project funding from BPA (Idaho Accord) which was administered by OSC. IDFG coordinated with the landowner and regulatory agencies, acquired necessary permits, and contracted for and managed design and construction contractors. IDFG retained the services of Quadrant Consulting to develop project design. Dahle Construction installed the diversion/distribution system and the IDFG Screen Shop constructed the fish screen components. The Light Detection and Radar (LiDAR) data and instream flow assessment data were collected for Bohannon Creek by Reclamation and provided to IDFG for use in project planning and design. A flow agreement for the maintenance of instream flow in Bohannon Creek will be developed between the Idaho Department of Water Resources and the landowner. Post-project monitoring will be conducted by IDFG.

Gallery:



Photograph 1. Bohannon Creek Diversion Consolidation-Flow Enhancement Project: BC8 diversion/culvert before removal.



Photograph 2. Bohannon Creek Diversion Consolidation Flow Enhancement Project: After removal of BC8 diversion/culvert.



Photograph 3. Bohannon Creek Diversion Consolidation-Flow Enhancement Project: BC9 diversion/road culvert before replacement.



Photograph 4. Bohnannon Creek Diversion Consolidation-Flow Enhancement Project: BC9 diversion/road culvert after replacement

Hawley Creek Culvert-to-Bridge Replacement Project (BLM)

Project Name: Hawley Creek Culvert-to-Bridge Replacement Project (BLM)				
Project Action: Channel access				
Project Sponsor: LSWCD				
Project Design: Fluckiger Engineering				
Landowner(s): BLM				
Partners: USBWP, OSC, LSWCD, BPA			Reclamation Development Costs: \$3,000	
Funding Source(s): BPA (Idaho Accord), NOAA Fisheries Service			Implementation Cost: \$138,354	
Project Location:	State: Idaho	County: Lemhi	Stream: Hawley Creek	
	Latitude: 44 39'37.10" N		Longitude: 113 12' 17.96" W	
	Township: 15N	Range: 27E	Section: 2	¼ Section:
Project Status: Complete				
Project Phase: Monitoring				
Milestones	Funding: Secured			
	Design: Completed on November 5, 2012			
	Permitting: Completed on August 30, 2012			
	Construction Start Date: April 2013			
Construction Completion Date: May 2013				
Biological Benefit	Species: Chinook salmon, steelhead trout			
	Benefit Type: Partial barrier removal			
Metric: 700 feet (0.13 miles) made accessible				
Project Objectives and Description: The objectives of these project were to improve fish passage and provide fish with access to additional habitat. This project is part of a USBWP plan that includes a suite of projects that, when completed, will reconnect Hawley Creek to the Lemhi River. On this project site, a perched culvert at a BLM road crossing over Hawley Creek prevented further upstream movement of fish. The culvert was replaced with a 24-foot-wide by 45-foot-long prefabricated steel bridge. Elimination of the culvert opened up access to 700 feet of stream to the next upstream passage barrier consisting of an irrigation diversion structure on BLM land.				
Design, Permitting, and Construction Issues: Fluckiger Engineering provided engineering/design for the replacement bridge. The OSC USBWP office carried out project planning and environmental compliance requirements for the project. Reclamation				

Project Name: Hawley Creek Culvert-to-Bridge Replacement Project (BLM)

provided the services of an archaeologist to complete a cultural survey of the project area and consult with the Idaho State Historic Preservation Office (SHPO). LSWCD administered the funding and provided a project manager to oversee bridge installation completed by a local private contractor.

Gallery:



Photograph 5. Hawley Creek Culvert-to-Bridge Replacement Project: Hawley Creek Culvert under the BLM road.



Photograph 6. Hawley Creek Culvert-to-Bridge Replacement Project: Hawley Creek Bridge replacement on the BLM Road.

Hawley Creek Culvert-to-Bridge Replacement Project (Private)

Project Name: Hawley Creek Culvert-to-Bridge Replacement (Private)					
Project Action: Channel access					
Project Sponsor: LSWCD					
Project Design: Fluckiger Engineering					
Landowner(s): Private landowners					
Partners: USBWP, OSC, LSWCD, BPA			Reclamation Development Costs: \$ 3,000		
Funding Source(s): BPA (Idaho Accord), NOAA Fisheries Service (Pacific Coast Salmon Recovery Fund)			Implementation Cost: \$ 113,876		
Project Location:	State: Idaho		County: Lemhi		Stream: Hawley Creek
	Latitude: 44° 40'40.28" N		Longitude: 113° 17' 13.75" W		
	Township: 16N	Range: 27E	Section: 31	¼ Section:	
Project Status: Complete					
Project Phase: Monitoring					
Milestones	Funding: Secured Design: Completed on November 5, 2012 Permitting: Completed on August 30, 2012 Construction Start Date: April 10, 2013 Construction Completion Date: April 25, 2013				
Biological Benefit	Species: Chinook salmon, steelhead trout Benefit Type: Full barrier removal				
Metric: 4.7 miles made accessible					
Project Objectives and Description: The objectives of this project were to improve fish passage and provide fish with access to additional tributary habitat. This project is part of a USBWP plan that includes a suite of projects that, when completed, will reconnect Hawley Creek to the Lemhi River. On this project site, two undersized/perched culverts at a private road crossing over Hawley Creek prevented further upstream movement of fish. The culverts were replaced with a 21-foot-wide by 35-foot-long prefabricated steel bridge. Elimination of the culverts opened up access to 4.7 miles of stream to the next upstream passage barrier consisting of a road culvert in Hawley Creek on BLM land.					
Design, Permitting, and Construction Issues: Fluckiger Engineering provided engineering/design for the replacement bridge. The OSC USBWP office carried out project					

Project Name: Hawley Creek Culvert-to-Bridge Replacement (Private)

planning and environmental compliance requirements for the project. Reclamation provided the services of an archaeologist to complete a cultural survey of the project area and consulted with the Idaho SHPO. The LSWCD administered the funding and provided a project manager to oversee bridge installation completed by a local private contractor.

Gallery:



Photograph 7. Hawley Creek Culvert-to-bridge Replacement Project (Private): Private road crossing on Hawley Creek before project construction.



Photograph 8. Hawley Creek Culvert-to-bridge Replacement Project (Private): Private road crossing on Hawley Creek after project construction.

Lower Lemhi Streambank Enhancement Project

Project Name: Lower Lemhi Streambank Enhancement Project				
Project Action: Channel complexity				
Project Sponsor: Private landowner				
Project Design: Intermountain Aquatics, Inc				
Landowner(s): Private landowner				
Partners: Aspect LLC, Intermountain Aquatics, Inc., Private landowner			Reclamation Development Costs: \$5,000	
Funding Source(s): Landowner			Implementation Cost: N/A	
Project Location:	State: Idaho	County: Lemhi	Stream: Lemhi River	
	Latitude: 45° 04'53" N		Longitude: 113° 42'57" W	
	Township: 20N	Range: 23E	Section: 10	¼ Section:
Project Status: Complete				
Project Phase: Monitoring				
Milestones	Funding: Secured			
	Design: Completed			
	Permitting: Completed			
Biological Benefit	Species: Spring/summer Chinook, steelhead, bull trout			
	Benefit Type: Restore main channel function			
Metric: 105 feet (0.02 miles) of increased complexity				
Project Objectives and Description: The objectives of this project were to utilize bioengineering techniques (i.e., engineered logjam, instream barb) to stabilize the eroding river bank, improve fish habitat and protect private property.				
Design, Permitting, and Construction Issues: The landowner retained the services of a private engineering/consulting firm to complete engineering and design. A local consultant was hired by the landowner to prepare necessary environmental compliance documents and obtain permits. The landowner also hired a local construction contractor/equipment operator to complete the construction. Reclamation provided LiDAR aerial topography/orthoimagery data, low level aerial photography and reach assessment data to the consultants for use in design preparation and attainment of permits.				

Gallery:



Photograph 9. Lower Lemhi Jakovac Project: Site 1 before construction.



Photograph 10. Lower Lemhi Jakovac Project: Site 2 after construction.



Photograph 11. Lower Lemhi Jakovac Project: Site 2 before construction.



Photograph 12. Lower Lemhi Jakovac Project: Site 2 after construction.

Upper Lemhi Side Channel (Snyder) Project

Project Name: Upper Lemhi River Side Channel (Snyder) Project					
Project Type: Channel complexity, riparian enhancement					
Project Sponsor: IDFG					
Project Design: IDFG					
Landowner(s): Private landowners					
Partners: OSC, Private landowners, IDFG, BPA			Reclamation Development Costs: \$2,500		
Funding Source(s): NOAA Fisheries Service (Pacific Columbia Salmon Recovery Fund), BPA (Idaho Accord)			Implementation Cost: \$87,872		
Project Location:	State: Idaho		County: Lemhi		Stream: Lemhi River
	Latitude: 44 47' 36.07" N		Longitude: 113 33' 25.36" W		
	Township: 17N	Range: 25E	Section: 32	¼ Section:	
Project Status: Complete					
Project Phase: Monitoring					
Milestones	Funding: Secured				
	Design: Completed				
	Permitting: Completed				
	Construction Start Date: July 2013				
Construction Completion Date: August 2013					
Contracting	Advertised: May 2013				
	Awarded: June 2013				
Biological Benefit	Species: Chinook salmon, steelhead, bull trout				
	Benefit Type: Side channel reconnection, riparian enhancement				
Metric: 630 feet of channel complexity and riparian enhancement					
Project Objectives and Description: The objectives of the project were to improve fish habitat by increasing flow, pool/riffle ratios, channel complexity, substrate diversity and riparian vegetation. The project entailed modification/excavation of 630 feet of an existing river side channel. Features included installation of a grade control structure in the mainstem Lemhi River at the inlet to the side channel. Pools and riffles were created within the side channel along with placement of woody material, bank stabilization, and grade control structures to insure long-term channel stability. Sod and riparian vegetation was					

Project Name: Upper Lemhi River Side Channel (Snyder) Project

planted along streambanks, disturbed areas were seeded, and riparian fencing was constructed to exclude livestock.

Design, Permitting, and Construction Issues: Project funding was provided by the NOAA Fisheries Service (Pacific Coast Recovery Fund) and BPA (Idaho Accord) which are both administered by OSC. IDFG coordinated with the landowner and regulatory agencies, acquired necessary permits and contracted for and managed construction. Reclamation provided technical assistance to IDFG by providing cultural resource survey and clearance from the Idaho SHPO. LiDAR data of the project area acquired by Reclamation was also provided to IDFG for use in project planning and design.

Gallery:



Photograph 13. Upper Lemhi River Side Channel (Snyder) Project: View of the upper Lemhi River side channel before construction.



Photograph 14. Upper Lemhi River Side Channel (Snyder) Project: View of the upper Lemhi River side channel after construction.

UPPER SALMON RIVER SUBBASIN

The Upper Salmon River subbasin (HUC 17060201) extends from its headwaters in the Sawtooth Mountains to its confluence with the Middle Fork Salmon River, excluding the Lemhi and Pahsimeroi River subbasins. The subbasin has a drainage area of approximately 2,425 square miles. In 2013, two projects were completed in the subbasin that improved fish passage and reconnected a side channel.

The focus of Reclamation's actions in the subbasin includes Snake River spring/summer Chinook salmon (threatened) Snake River steelhead trout (threatened), and Snake River sockeye salmon (endangered).

Project documentation including permits, as-built drawings, GIS files, additional photos, and other technical records are located at the Bureau of Reclamation, Pacific Northwest Regional Office, 1150 N. Curtis Road, Suite, 100, Boise, Idaho 83706. Files can be requested through the Columbia/Snake Salmon Recovery Office, 208-378-5057.

Projects

- Iron Creek 7 Diversion Improvement Project
- Yankee Fork Pond Series 2 Side Channel Development Project

Sponsors

- IDFG
- Trout Unlimited (TU)

Partners

- Private landowners
- BPA
- Shoshone-Bannock Tribes (Sho-Ban Tribes)
- State of Idaho, OSC
- IDFG
- TU
- U.S. Forest Service (USFS)
- BPA through the Shoshone-Bannock Accord
- BPA

Funding Sources

- BPA through the Shoshone-Bannock Accord
- BPA

Bureau of Reclamation Expenditures in 2013

Subbasin	Expenditures
Upper Salmon River	\$1,436,427

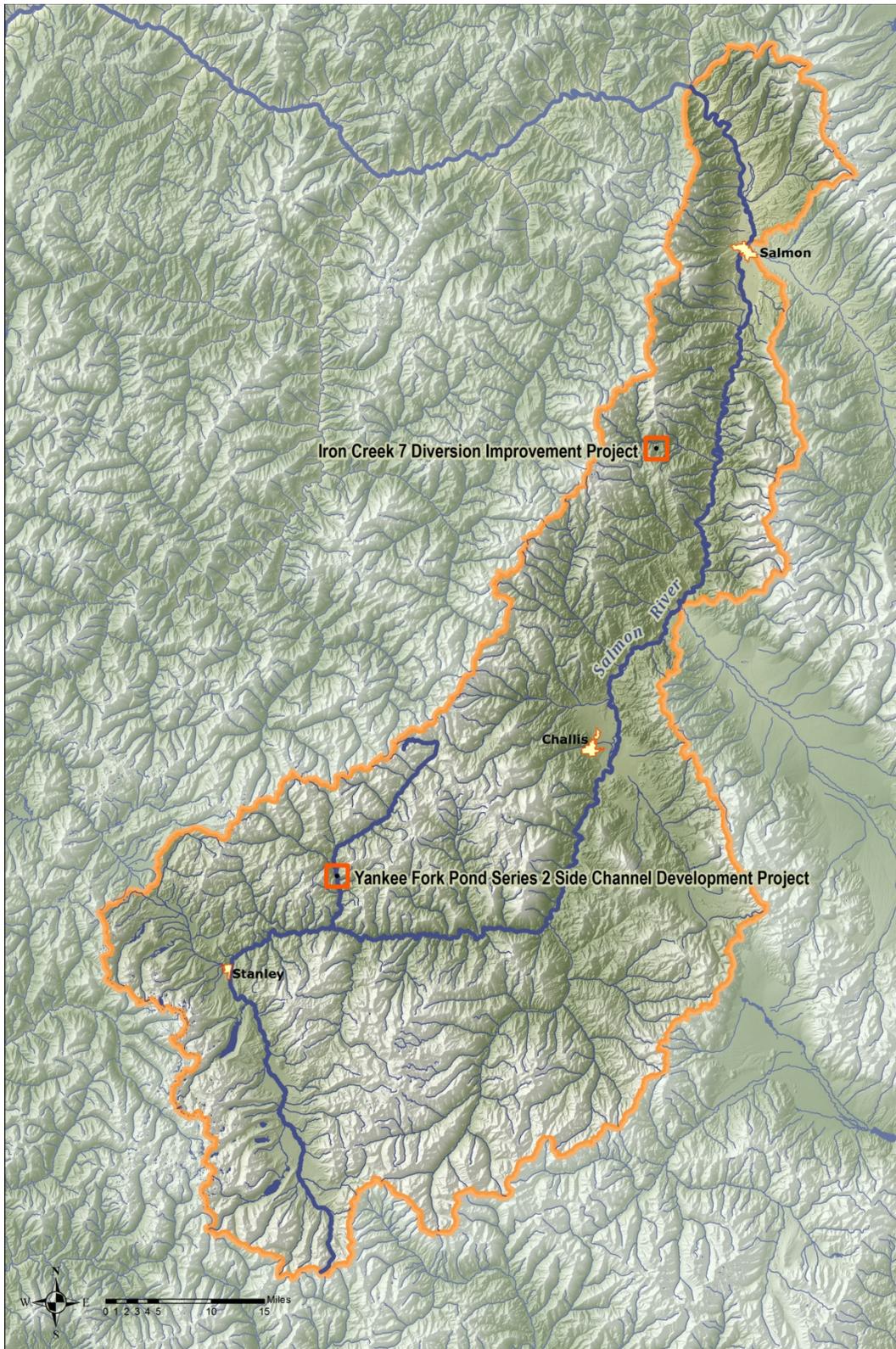


Figure 3. Location map of the project completed in the Upper Salmon River subbasin in 2013.

Iron Creek 7 Diversion Improvement Project

Project Name: Iron Creek 7 Diversion Improvement Project				
Project Action: Channel access				
Project Sponsor: IDFG				
Project Design: Reclamation				
Landowner(s): Private landowner				
Partners: BPA, IDFG			Reclamation Development Costs: \$52,055	
Funding Source(s): BPA			Implementation Cost: \$37,000	
Project Location:	State: Idaho	County: Lemhi	Stream: Iron Creek	
	Latitude: 44° 54' 38.4" N		Longitude: 114° 02' 04.8" W	
	Township:	Range:	Section:	¼ Section:
Project Status: Complete				
Project Phase: Monitoring				
Milestones	Funding: BPA through IDFG Screen Shop Design: Completed Permitting: Completed (IDFG) Construction Start Date: September 2013 Construction Completion Date: September 2013			
Biological Benefit	Species: Chinook salmon, steelhead			
	Benefit Type: Diversion dam, partial			
Metric: 4 miles made accessible				
<p>Project Objectives and Description: The Iron Creek 7 diversion is located 4.3 miles from the mouth of Iron Creek, which flows into the Salmon River near the town of Elk Bend, Idaho. The Iron Creek 7 diversion structure was a rock dam, with a drop of approximately 2.5 feet. The dam was impassable to juvenile salmon and steelhead at most flows. Chinook and steelhead spawn and rear in Iron Creek. Improving the passage conditions at this diversion allows fish improved access throughout the Iron Creek drainage, which extends at least 4 miles farther upstream.</p> <p>The diversion was removed and replaced with a V-shaped steel weir, covered and supported by large rock, with a notch in the weir for fish passage. Three more V-shaped weirs, constructed from large rock, were built downstream to help reduce the drop over the diversion. A new headgate structure was also installed, to allow the irrigator to control the flows out of the creek. The existing fish screen was left in place.</p>				

Project Name: Iron Creek 7 Diversion Improvement Project

Design, Permitting, and Construction Issues: IDFG Screen Shop handled all of the permitting and contracting issues. Reclamation completed the design and provided construction observation.

Gallery:



Photograph 15. Iron Creek 7 Diversion Improvement Project: The 30-inch drop across the diversion structure prevented fish movement upstream of the diversion at most flows.



Photograph 16. Iron Creek 7 Diversion Improvement Project: Iron Creek 7 diversion after the project. The drop was spread across several rock structures, allowing fish movement into the headwaters of Iron Creek.

Yankee Fork Pond Series 2 Side Channel Development Project

Project Name: Pond Series 2 – Side Channel Development Project				
Project Action: Channel complexity, channel access				
Project Sponsor: TU				
Project Design: Reclamation				
Landowner(s): Private landowner				
Partners: Private landowner, BPA, Sho-Ban Tribes, TU, OSC, USFS			Reclamation Development Costs: \$ 267,508	
Funding Source(s): BPA (Sho-Ban Tribes Accord)			Implementation Cost: \$ 130,000	
Project Location:	State: Idaho	County: Custer	Stream: Yankee Fork Creek	
	Latitude: 44° 20' 20.45" N		Longitude: 114° 43' 22.23" W	
	Township: 12N	Range: 15E	Section: 29	¼ Section:
Project Status: Complete				
Project Phase: Monitoring				
Milestones	Funding: Accord, Secured from BPA/Sho-Ban Tribes Design: Reclamation Permitting: Reclamation, BPA, TU Construction Start Date: October 1, 2013 Construction Completion Date: October 11, 2013			
Biological Benefit	Species: Chinook salmon, steelhead, bull trout Benefit Type: Side channel reconnection, barrier removal			
Metric: Approximately 0.5 miles of channel complexity; 3 barriers removed and 0.5 miles made accessible				
Project Objectives and Description: The objective of this project was to provide additional side channel juvenile rearing habitat that is currently lacking in the Yankee Fork drainage as a result of historic dredging activity associated with gold mining. The project entailed conversion of a chain of existing interconnected off channel ponds into complex side-channel spawning/rearing habitat that is more suitable for use by juvenile and adult Chinook salmon, steelhead and bull trout. Research shows these fish prefer side-channel habitat over pond habitat.				

Project Name: Pond Series 2 – Side Channel Development Project

Design, Permitting, and Construction Issues: The lead for this project was BPA. The Sho-Ban Tribes provided their BPA (Accord) funding for project construction. TU served as the project sponsor. Reclamation provided technical assistance to BPA/TU with development of project design. BPA was the lead for the National Environmental Policy Act (NEPA) and ESA compliance. Reclamation provided private consultants to assist BPA and TU with completion of NEPA/ESA compliance (BA, wetland delineation, Section 404 Clean Water Act (CWA) application, construction observation). A Reclamation archaeologist completed a cultural resource survey/SHPO consultation. As project sponsor, TU administered the BPA/Sho-Ban funding and managed construction contracts. Construction was completed in 2 weeks without any problems encountered.

Gallery:

Photograph 17. Yankee Fork Pond Series 2 Side Channel Development Project: Pond #6, before construction.



Photograph 18. Yankee Fork Pond Series 2 Side Channel Development Project: Pond #6, after construction.



Photograph 19. Yankee Fork Pond Series 2 Side Channel Development Project: Pond #7, before construction.



Photograph 20. Yankee Fork Pond Series 2 Side Channel Development Project: Pond #7, after construction.



Photograph 21. Yankee Fork Pond Series 2 Side Channel Development Project: Pond #7, log raft after construction.



Photograph 22. Yankee Fork Pond Series 2 Side Channel Development Project: Pond #7, outlet and floodplain after construction.



Photograph 23. Yankee Fork Pond Series 2 Side Channel Development Project: Pond #7, outlet and check dam before construction.



Photograph 24. Yankee Fork Pond Series 2 Side Channel Development Project: Pond #7, outlet and check dam after construction.

GRANDE RONDE RIVER BASIN

The Grande Ronde River is a tributary to the Snake River at RM 168 and has a drainage area of about 3,950 square miles. Its major tributaries include the Wallow River (RM 81.4) and Catherine Creek (RM 143.9). Catherine Creek extends from its headwaters in the Wallowa Mountains to its confluence with the Grande Ronde River.

In 2013, one project was completed in the basin that increased channel complexity. The focus of Reclamation's actions in the basin includes Snake River spring/summer Chinook salmon (threatened) Snake River steelhead trout (threatened), and Snake River sockeye salmon (endangered).

Project documentation including permits, as-built drawings, GIS files, additional photos, and other technical records are located at the Bureau of Reclamation, Pacific Northwest Regional Office, 1150 N. Curtis Road, Suite, 100, Boise, Idaho 83706. Files can be requested through the Columbia/Snake Salmon Recovery Office, 208-378-5057.

Projects

- CC-44 Phase 1 Habitat Enhancement Project

Sponsors

- Union Soil and Water Conservation District (USWCD)

Partners

- USWCD
- CTUIR
- Oregon Department of Fish and Wildlife (ODFW)
- Grande Ronde Model Watershed Project (GRMW)
- BPA

Funding Sources

- CTUIR
- USWCD
- BPA
- ODFW

Bureau of Reclamation Expenditures in 2013

Subbasin	Expenditures
Grande Ronde River	\$1,705,290
Total	\$1,705,290

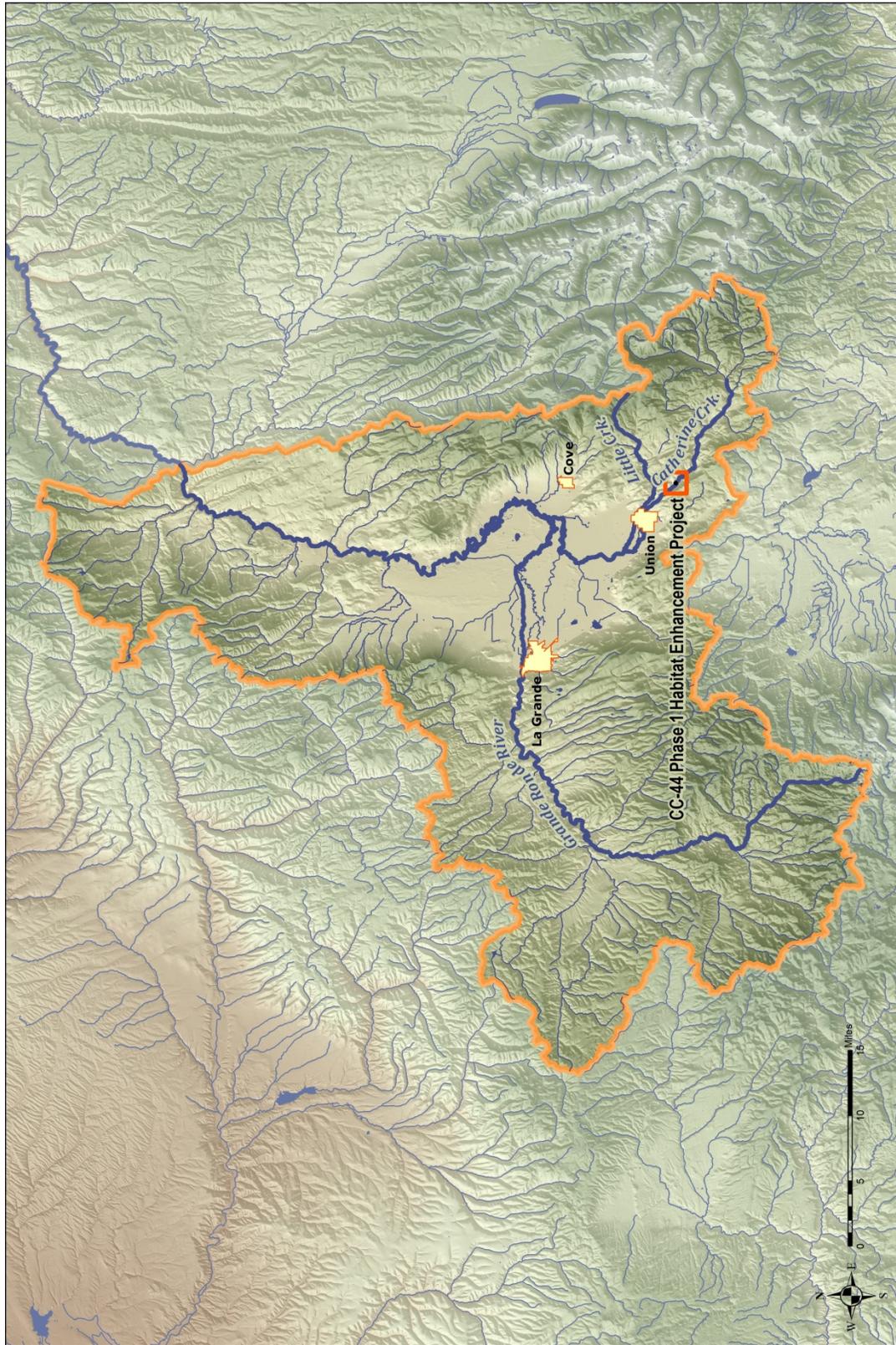


Figure 4. Location map of the project completed in the Upper Grande Ronde River subbasin in 2013.

CC-44 Phase 1 Habitat Enhancement Project

Project Name: CC-44 Phase 1 Habitat Enhancement Project					
Project Action: Channel complexity					
Project Sponsor: USWCD					
Project Design: Reclamation					
Landowner(s): Private landowners					
Partners: USWCD, CTUIR, ODFW			Reclamation Development Costs: \$1,027,953		
Funding Source(s): USWCD, BPA, CTUIR			Implementation Cost: \$198,638		
Project Location:	State: Oregon		County: Union		Stream: Catherine Creek
	Latitude: 45° 10' 30" N		Longitude: 117° 48' 33" W		
	Township: 4 & 5 S	Range: 39 & 40 E	Section: 28, 33, 34, 2, 3	¼ Section:	
Project Status: Complete					
Project Phase: Monitoring					
Milestones	Funding: Secured				
	Design: Completed				
	Permitting: Completed				
	Construction Start Date: July 1, 2013				
	Construction Completion Date: October 31, 2013				
Contracting	Advertised: May 31, 2013, June 3, 2013				
	Awarded: June 14, 2013				
Biological Benefit	Species: Spring Chinook salmon, steelhead, and bull trout				
	Benefit Type: Restore main channel function				
Metric: 0.5 miles of channel complexity; 2.32 acres of riparian plantings; habitat protection – development of riparian easements with four separate landowners.					
<p>Project Objectives and Description: The Catherine Creek – RM 44 Stream and Fish Habitat Restoration Project – Phase I (CC-44 Project) is a fish habitat complexity project. The CC-44 Project includes three construction phases of channel, floodplain, and riparian enhancement along Catherine Creek.</p> <p>Phase 1, completed in 2013, installed 18 large woody material (LWM) structures and 2.32 acres of riparian plantings in the stream to provide juvenile rearing cover at five key</p>					

Project Name: CC-44 Phase 1 Habitat Enhancement Project

locations in the reach. Large boulder and rock materials were also be placed to enhance in-channel complexity. All temporary impact areas were reseeded, planted, and restored following construction.

Phase 2 is proposed for construction in 2014.

The overall purpose of the CC-44 Project is to address critical habitat-limiting factors in Catherine Creek—a spawning and rearing tributary for spring-run Chinook salmon, summer steelhead, and bull trout in the upper Grande Ronde River basin—by protecting and restoring fish habitat within the natural character and function of the stream reach that extends from river mile (RM) 46.15 downstream to RM 42.75.

Primary project objectives include:

- Protect habitat: develop riparian easements with four separate landowners (CTUIR/BPA, ODFW easements, and/or CREP)
- Enhance riparian habitat conditions: increase riparian plant communities through planting, seeding, and natural recruitment.
- Enhance floodplain connectivity: remove channel confinement structures and expand floodplain.
- Enhance instream structural diversity and complexity: re-activate historic channel meanders to increase sinuosity and place bioengineered LWM structures within the active channel.
- Reduce excessive sediment: manage riparian grazing with exclosure fencing, stabilize existing erosion sites with wood structures, and reestablish riparian vegetation.
- Decrease summer peak temperatures: improve/increase riparian vegetative cover/shade to potentially decrease summer stream temperatures and increase winter temperatures.

Increase instream water quantity: consolidate points of diversion and purchase water rights (Phase 2 – 2014).

Design, Permitting, and Construction Issues: Phase 1 design was completed by Reclamation. Reclamation provided project coordination and design review.

NEPA compliance, cultural resources, and wetland delineation documents were completed by ICF International via a Reclamation Indefinite Delivery, Indefinite Quantity (IDIQ) contract. All permits were obtained prior to solicitation. Because the BPA HIP 3 Programmatic did not include consideration for adult salmonids, a variance had to be obtained that shifted the in-water work window from July 1 through August 15 to September 15, 2013 through October 15, 2013.

Partney Construction, Inc. (PCI) started hauling LWM to the site August 1, 2013 and started construction September 15, 2013. Instream work was completed by October 15, 2013. Final grade-out and cleanup was completed by October 31, 2013. The remaining fence placement and plantings was completed by the ODFW and CTUIR.

During construction some issues became apparent:

- Accounting of large wood pieces.
 - The large wood that was brought on site was not properly sorted and counted during delivery.

Project Name: CC-44 Phase 1 Habitat Enhancement Project

- Redds located within some construction work sites (issue arose because of the in-water work window variance)
 - Redds were found near site 2 and site 4. NOAA Fisheries Service and ODFW surveyed each site prior to construction to determine if construction should be limited within a specific distance of the redds. Construction was completed at sites 1, 3 and 5 while sites 2 and 4 were only partially constructed.
 - Site 2 and site 4 are to be completed during the Phase 2 work.

Gallery:

Photograph 25. CC-44 Phase 1 Habitat Enhancement Project: This photo of Site 1 shows the car bodies to be removed and vertical eroded banks (downstream structure location looking upstream). Proposed actions at this location included the removal of car bodies and installation of an engineered LWM structure to reform the bank, enhance the existing pool by concentrating scour around the proposed structure, and provide cover and habitat complexity throughout the bend.



Photograph 26. CC-44 Phase 1 Habitat Enhancement Project: Site 1 after removal of the car bodies and installation of the LWM structures.



Photograph 27. CC-44 Phase 1 Habitat Enhancement Project: Photo of Site 1 taken from the existing diversion location which would be removed as part of the consolidation (CC-44 Phase II) (looking at upstream structures location, looking upstream from diversion). Proposed actions at this site includes placement of a bleed-through engineered LWM structure at the upstream end. Four flow deflector structures would be installed downstream of the bleed-through structure, providing habitat complexity during high flows when the side channel is activated.



Photograph 28. CC-44 Phase 1 Habitat Enhancement Project: Photo of Site 1 showing the upstream end of the back water channel to be protected (looking towards the diversion structure) before construction. To the left is a log structure that was installed an earlier attempt by the irrigators to protect the diversion structure located near where the excavator is parked.



Photograph 29. CC-44 Phase 1 Habitat Enhancement Project: Site 1 after construction showing LMW structures in the side-channel.



Photograph 30. CC-44 Phase 1 Habitat Enhancement Project: Proposed actions for Site 2 included placement of a flow-through logjam at the upstream end of the meander, and five flow-through logjams at the downstream end, providing habitat complexity in the side channel. In addition, four sweeper logs will provide more complexity and aid in reducing erosion during high flow events. Photo looking upstream from Hwy 203.



Photograph 31. CC-44 Phase 1 Habitat Enhancement Project: Photo of Site 2 showing the same view as Photograph 7 with LWM structures installed on river left (in the background). Additional actions will occur at this location during Phase 2.



Photograph 32. CC-44 Phase 1 Habitat Enhancement Project: Photo of Site 2 showing upstream end of site where the proposed flow through logjam is to be installed. Also shows the eroded banks. View looking downstream.



Photograph 33. CC-44 Phase 1 Habitat Enhancement Project: After construction on Site 2, removed culvert.



Photograph 34. CC-44 Phase 1 Habitat Enhancement Project: This photo of Site 5 shows bank erosion in the vicinity of the existing pump intake (view looking downstream from pump intake site). This area includes the immediate area around the landowner's irrigation pump intake. LWM placement along this bank will create diversity in velocity distribution across the channel section and provide an area for juvenile refuge within the main channel. LWM placement will also protect the banks from further erosion and aid in creating/maintaining a pool for the irrigation pump intake.



Photograph 35. CC-44 Phase 1 Habitat Enhancement Project: Photo shows Site 5 from the same photo point as Photo #15 after the installation of woody material.

JOHN DAY RIVER BASIN

The John Day River is a tributary to the Columbia River at RM 204, entering about 13 miles upstream from the U.S. Army Corps of Engineers (Corps) John Day Dam. Within the John Day River watershed (HUC 17060209), Reclamation works in three subbasins: the Upper John Day, the North Fork John Day, and the Middle Fork John Day. In 2013, one project was completed in the Middle Fork John Day River subbasin and six projects were completed in the Upper John Day River subbasin.

Anadromous species present in the river include MCR steelhead trout (ESA-listed as threatened) and MCR spring-run Chinook salmon (not ESA-listed). Pacific lamprey are also present.

Bureau of Reclamation Expenditures in 2013

Subbasin	Expenditures
Middle Fork John Day River	\$508,130
Upper John Day River	\$210,031
Total	\$718,161

MIDDLE FORK JOHN DAY RIVER SUBBASIN

The Middle Fork John Day River (HUC 17070203) is a tributary to the North Fork John Day River, entering it at RM 32, and has a drainage area of about 785 square miles. In 2013, one project was completed in this subbasin that enabled fish passage.

Anadromous species present in the river include Middle Columbia River (MCR) steelhead trout (ESA-listed as threatened) and MCR spring-run Chinook salmon (not ESA-listed). Pacific lamprey are also present.

Project documentation including permits, as-built drawings, GIS files, additional photos, and other technical records are located at the Bureau of Reclamation, Pacific Northwest Regional Office, 1150 N. Curtis Road, Suite, 100, Boise, Idaho 83706. Files can be requested through the Columbia/Snake Salmon Recovery Office, 208-378-5057.

Project

- Austin Ranch Diversion Project

Sponsors

- Grant Soil and Water Conservation District (GSWCD)

Partners

- GSWCD
- CTWSRO
- BPA
- USFS
- ODFW)
- Oregon Watershed Enhancement Board (OWEB)

Funding Sources

- BPA
- CTWSRO
- OWEB

Bureau of Reclamation Expenditures in 2013

Subbasin	Expenditures
Middle Fork John Day River	\$508,130

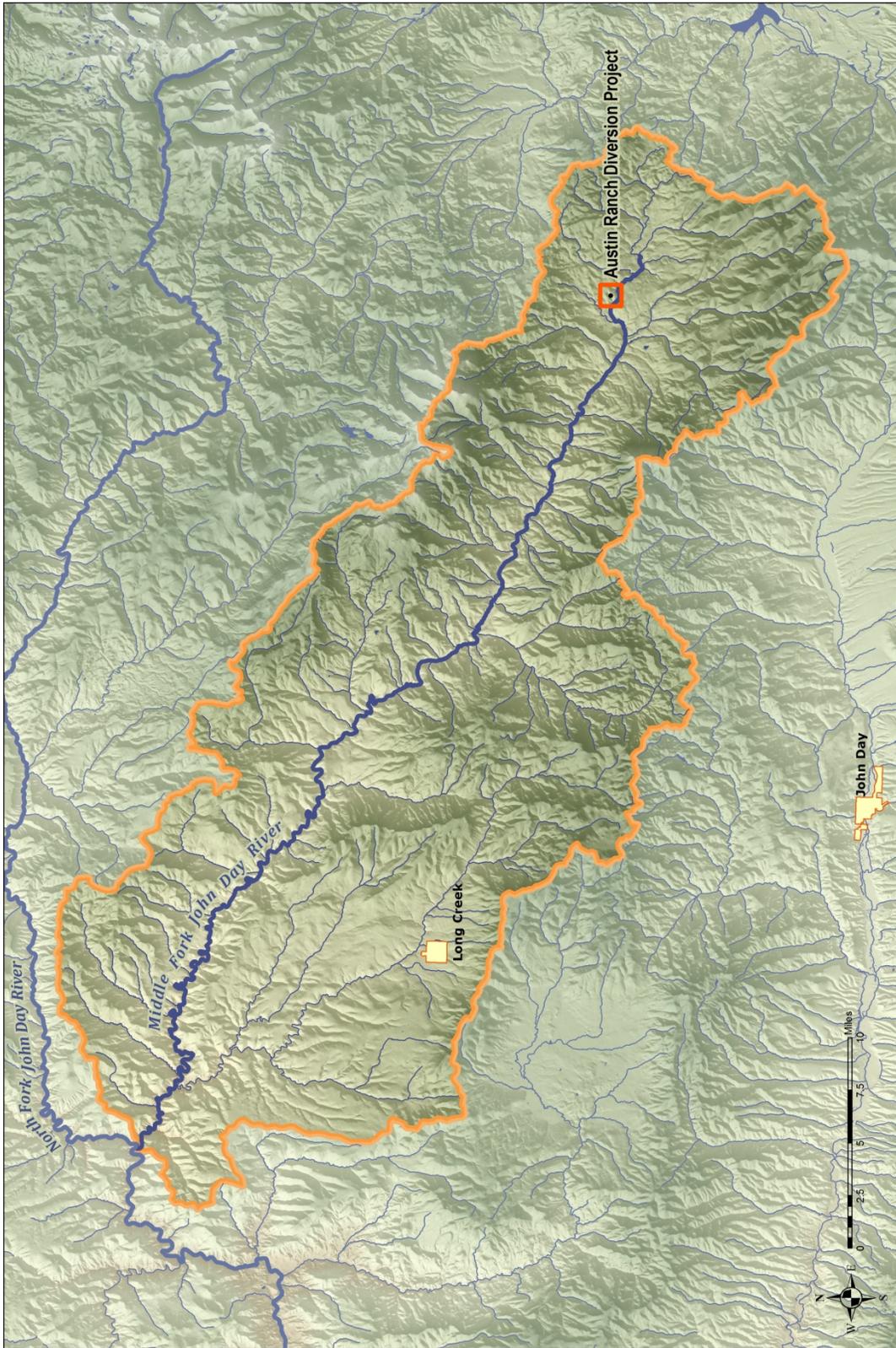


Figure 5. Location map of the project completed in the Middle Fork John Day River subbasin in 2013.

Austin Ranch Diversion Project

Project Name: Austin Ranch Diversion Project					
Project Action: Channel access					
Project Sponsor: GSWCD					
Project Design: GSWCD					
Landowner(s): Private diversion on U.S. Forest Service system land					
Partners: BPA, CTWSRO, USFS, ODFW, Private landowner			Reclamation Development Costs: \$15,100		
Funding Source(s): CTWSRO, BPA, OWEB			Implementation Cost: \$15,173		
Project Location:	State: Oregon		County: Grant	Stream: Middle Fork John Day River	
	Latitude: 44° 36.14" N			Longitude: 118° 28.5" W	
	Township:	Range:	Section:	¼ Section:	
Project Status: Instream construction complete					
Project Phase: Monitoring					
Milestones		Funding: Secured			
		Design: Completed			
Biological Benefit		Permitting: Completed			
		Construction Start Date: July 15, 2013			
Biological Benefit		Construction Completion Date: August 15, 2013			
		Species: Steelhead, Chinook salmon, lamprey, bull trout			
Biological Benefit		Benefit Type: Partial barrier removal			
Metric: 15 miles made accessible. There are no barriers further upstream.					
Project Objectives and Description: This diversion is one of the last diversions in the Upper Middle Fork John Day River that has not been modified for increased fish passage. The instream part of the structure was composed of large angular rocks and plastic. A small side channel adjacent to the rock diversion structure did provide an alternate fish passage route at higher flows. No headgate was present to control flow but was managed by blocking a culvert pipe with tarps. Preliminary review of the water rights indicated that this diversion has a water right for diversion of 3.5 cfs. The water right was modified in 2006 under an agreement with Oregon Water Trust, BPA, and Reclamation, requiring the diversion to be shut off July 20 of each year. This diversion is a partial barrier at lower flows and dependent on year-to-year construction of the dam. GSWCD, through discussions with Reclamation, ODFW, the CTWSRO, and the landowner, determined that the existing rock structure was fairly stable and provided good fish passage as long as					

Project Name: Austin Ranch Diversion Project

tarps and other materials were not added. GSWCD further determined that by piping the ditch to the fish screen, they could reduce the amount of head required, eliminating the need to add tarps to increase head. The newly installed structure design included a small metal headgate/trashrack structure connected to 170 feet of pipe to allow for full water right diversion with little or no disturbance to the instream rock structure. The headgate/trashrack unit allows positive shut off of the diversion and for placement of boards to reduce debris accumulation when the headgate is closed.

Design, Permitting, and Construction Issues: GSWCD completed the design with input from Reclamation and USFS, and completed the Oregon Department of State Lands (DSL) and Corps fill-and-removal permit applications on behalf of the landowner. Since the project was on USFS land, they completed NEPA through a Categorical Exclusion and ESA Section 7 consultation under their ARBO programmatic biological opinion. GSWCD received construction funding from BPA through the CTWSRO' Watershed Restoration Program and was the fiscal agent and contracting entity.

Gallery:

Photograph 36. Austin Ranch Diversion Project: Austin Ranch diversion prior to modification.



Photograph 37. Austin Ranch Diversion Project: New headgate/trashrack structure in place. Note side-channel fish passage at left edge of photo.



Photograph 38. Austin Ranch Diversion Project: Pipeline in place prior to backfilling.

UPPER JOHN DAY RIVER SUBBASIN

The Upper John Day River (HUC 17070201), which includes the South Fork John Day River, becomes the mainstem John Day River after it is joined by the North Fork John Day River. The Upper John Day River subbasin has a drainage area of about 2,130 square miles. In 2013, six projects were completed in the subbasin that improved fish passage, streamflow, and channel complexity and reduced entrainment potential.

Anadromous species present in the river include MCR steelhead trout (ESA-listed as threatened) and MCR spring-run Chinook salmon (not ESA-listed). Pacific lamprey are also present.

Project documentation including permits, as-built drawings, GIS files, additional photos, and other technical records are located at the Bureau of Reclamation, Pacific Northwest Regional Office, 1150 N. Curtis Road, Suite, 100, Boise, Idaho 83706. Files can be requested through the Columbia/Snake Salmon Recovery Office, 208-378-5057.

Projects

- Chouinard Groundwater Conversion Project
- Dads Creek #1 Siphon Project
- Dovenburg Pump Station Project
- Long Meadows Diversion Replacement Project
- ODFW Schneider Habitat Improvement Project
- Stimac Pump Station Project

Sponsors

- GSWCD
- ODFW
- CTWSRO

Partners

- GSWCD
- CTWSRO
- OWEB
- ODFW
- BPA
- U.S. Fish and Wildlife Service (USFWS)

Funding Sources

- CTWSRO
- OWEB
- ODFW
- Landowners
- BPA
- USFWS

Bureau of Reclamation Expenditures in 2013

Subbasin	Expenditures
Upper John Day River	\$210,031

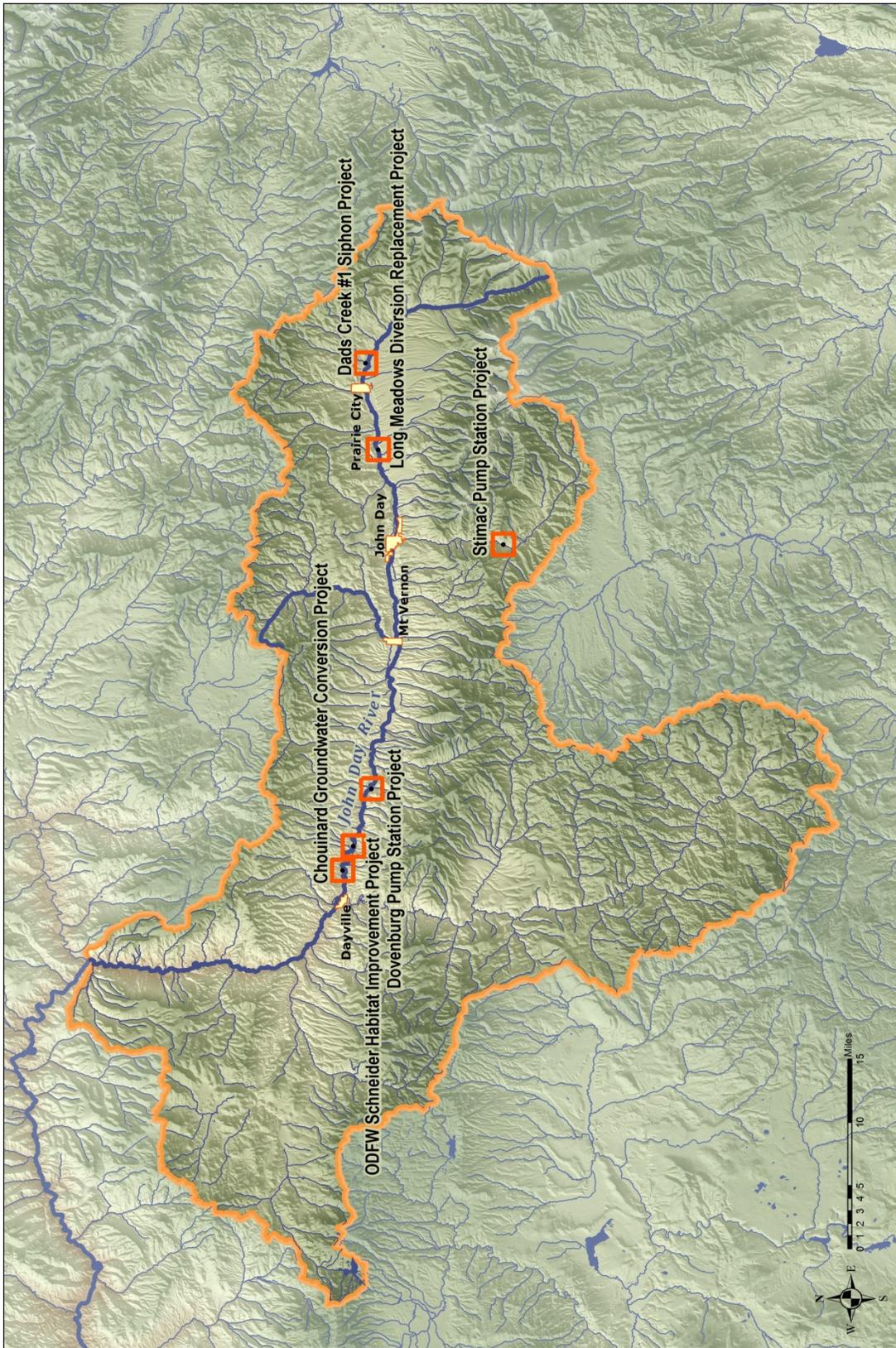


Figure 6. Location map of the projects completed in the Upper John Day River subbasin in 2013.

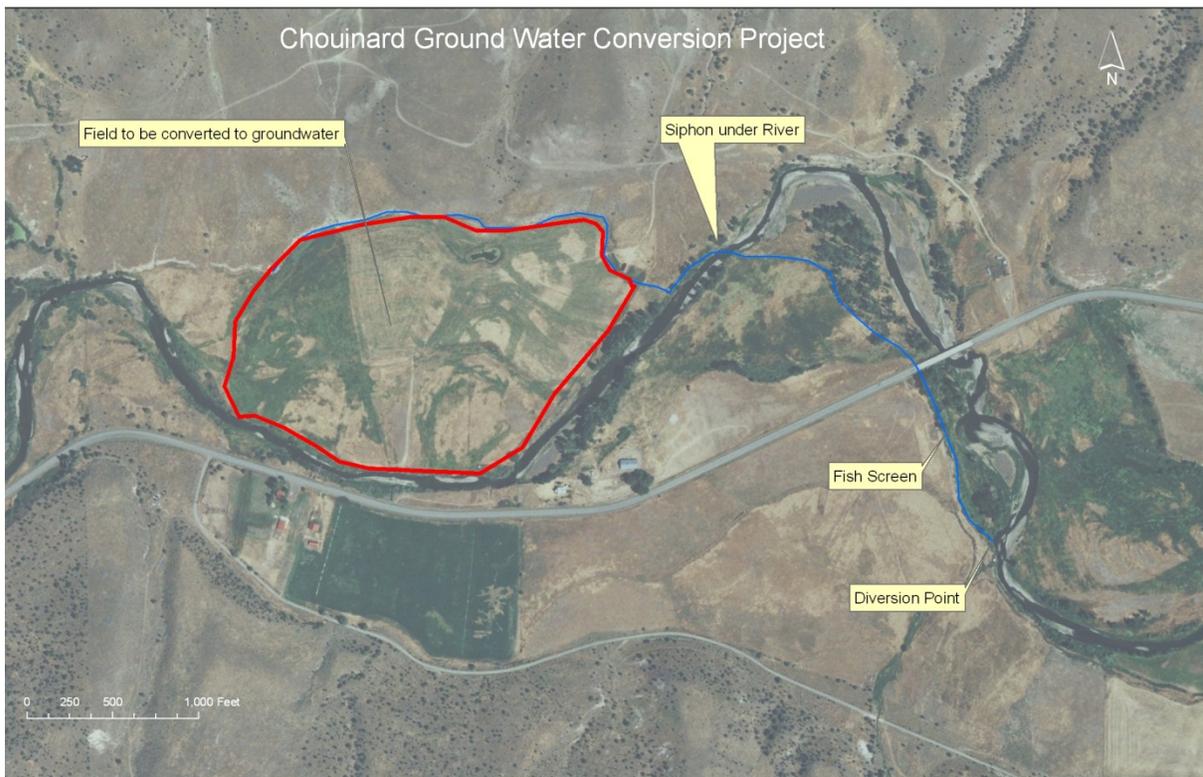
Chouinard Groundwater Conversion Project

Project Name: Chouinard Groundwater Conversion Project				
Project Action: Streamflow, entrainment, channel access				
Project Sponsor: GSWCD, CTWSRO				
Project Design: GSWCD				
Landowner(s): Private landowner				
Partners: GSWCD, CTWSRO, BPA, Private landowner			Reclamation Development Costs: \$86,491	
Funding Source(s): CTWSRO, BPA			Implementation Cost: \$69,963	
Project Location:	State: Oregon	County: Grant	Stream: Upper John Day River	
	Latitude: 44° 28.04" N		Longitude: 119° 28.54" W	
	Township:	Range:	Section:	¼ Section:
Project Status: Completed				
Project Phase: Monitoring				
Milestones	Funding: Secured			
	Design: Completed			
	Permitting: Completed			
	Construction Start Date:			
Construction Completion Date:				
Biological Benefit	Species: Steelhead, Chinook salmon, lamprey, bull trout			
	Benefit Type: Flow enhancement, partial barrier removal, passage/entrainment			
Metric: 1 mile made accessible (up to the next untreated diversion); 1.55 cfs instream flow for 3 miles downstream (entire irrigation season, in perpetuity), eliminated 1 fish screen				
Project Objectives and Description: The Chouinard Groundwater Conversion Project is located about 3 miles east of Dayville, Oregon. The landowner was diverting water from the John Day River using a push-up dam to irrigate approximately 62 acres. The existing fish screen was out of compliance as well. He successfully drilled a well on the 62 acres using his own funds and worked out an agreement with the CTWSRO and BPA to transfer his surface water rights instream in exchange for the construction of a center pivot utilizing the groundwater well as the source and costs and assistance with the associated water right transfers. The project permanently removed the push-up dam and converted the irrigation rights to instream rights held by the State of Oregon. Reclamation was asked to fund the water right examiner and associated application costs to facilitate the water right				

Project Name: Chouinard Groundwater Conversion Project

transactions. GSWCD provided the water right examiner services under contract with Reclamation. GSWCD also facilitated the purchase and construction of the center pivot system that was installed in 2010.

Design, Permitting, and Construction Issues: The GSWCD provided the technical services to complete the water right transfer through the State of Oregon's transfer process.

Gallery:

Photograph 39. Chouinard Groundwater Conversion Project: Aerial view of the project area before project implementation.



Photograph 40. Chouinard Groundwater Conversion Project: Noncompliant fish screen that is now abandoned.



Photograph 41. Chouinard Groundwater Conversion Project: Field with functioning center pivot supplied by groundwater well.

Dads Creek #1 Siphon Project

Project Name: Dads Creek #1 Siphon Project			
Project Action: Channel access			
Project Sponsor: GSWCD			
Project Design: GSWCD			
Landowner(s): Private landowner			
Partners: GSWCD, OWEB, ODFW, USFWS		Reclamation Development Costs: \$8,785	
Funding Source(s): OWEB, ODFW, USFWS		Implementation Cost: \$26,924	
Project Location:	State: Oregon	County: Grant	Stream: Middle Fork John Day River
	Latitude: 44° 27' 22" N		Longitude: 118° 40' 11" W
	Township:	Range:	Section: ¼ Section:
Project Status: Instream construction complete			
Project Phase: Monitoring			
Milestones	Funding: Secured		
	Design: Completed		
	Permitting: Completed		
	Construction Start Date: July 15, 2013		
Construction Completion Date: August 15, 2013			
Biological Benefit	Species: Steelhead, Chinook salmon		
	Benefit Type: Partial barrier removed		
Metric: 6.5 miles made accessible, 2 barriers removed			
Project Objectives and Description: The Dads Creek #1 Siphon Project is located about 2 miles east of Prairie City, Oregon. Dads Creek is a small intermittent tributary to the Upper John Day River. This small tributary is known to have a remnant population of spawning and rearing steelhead, but may provide rearing habitat for chinook salmon as well. Live flow is always present higher in the watershed where steelhead are able to survive until fall and winter flows provide escapement to the Upper John Day River. About one-quarter mile from the mouth, the stream is intercepted by two irrigation ditches (Galbraith Ditches) with no passage or screening provided. The ditch crossings are made by blocking Dads Creek with pushup dams or tarps. Spring runoff is partially intercepted by the ditches or flows overland, with only a small amount making it down the actual channel to the river. As a result, the stream channel is not well defined near the mouth and the stream drops several feet with questionable fish passage as it enters the Upper John			

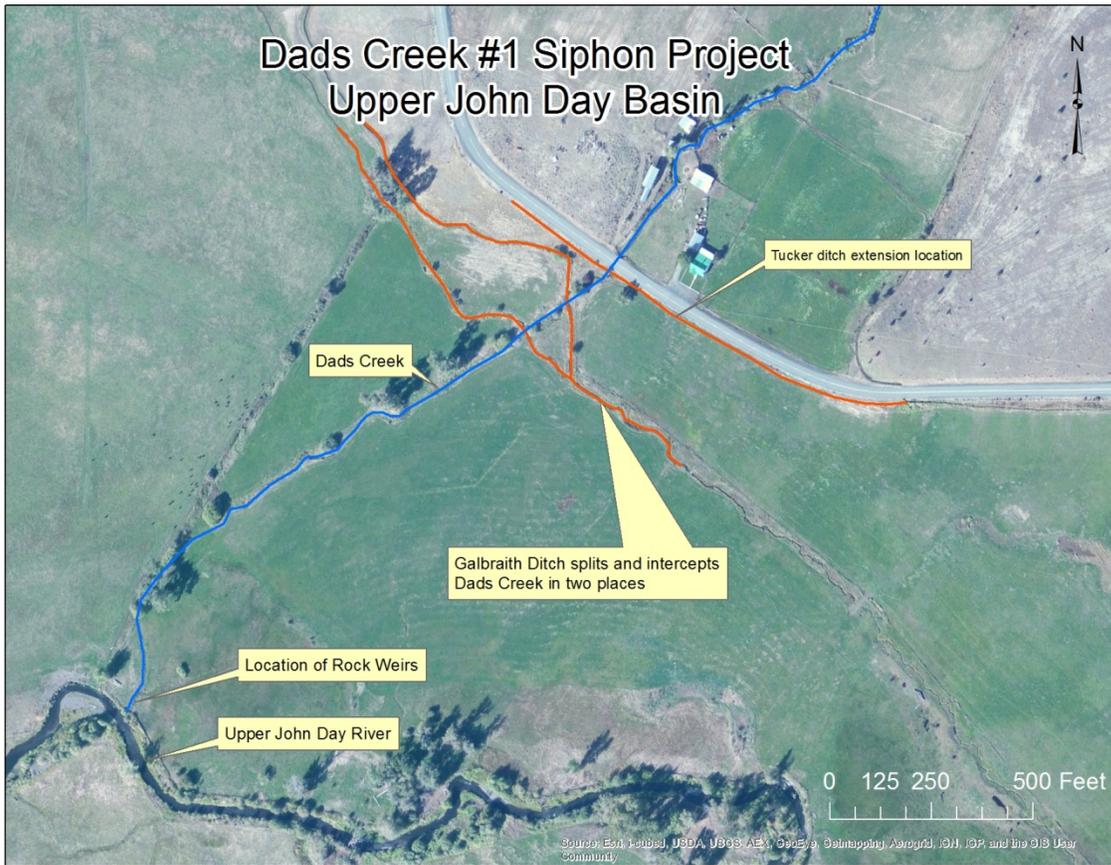
Project Name: Dads Creek #1 Siphon Project

Day River. Preliminary review of the water rights indicated that there was no legal right to divert Dads Creek water at the location of the ditch crossings so no diversion capability needed to be maintained. In the water rights review process, water rights from a third ditch (Tucker Ditch) were identified that serves ground across Dads Creek.

The project objectives were to eliminate the barriers associated with these ditches by installing siphons and placing rock weirs in the channel at the mouth of the stream to improve passage into the stream.

Design, Permitting, and Construction Issues: This project was one of five barrier projects on lower Dads Creek that were planned for treatment in 2011. Four out of the five projects were completed in 2011, but landowner concerns temporarily stalled the design of the siphon project. Through discussions with ODFW and GSWCD, the landowner agreed to move forward with the project. With grant money from OWEB, GSWCD restarted the design process. The design combined the two Galbraith ditches into one crossing location with a siphon under the stream channel and a turnout gate to divert flows back to the lower ditch. Because of the grade available from Tucker ditch, they designed a pipeline with turnouts and a flume pipe over Dads Creek to serve the small water-righted area west of the creek. A series of rock weirs were designed at the mouth of Dads Creek to provide better passage into the stream. The USFWS Partners program was the lead federal agency and covered ESA Section 7 consultation under their programmatic BiOp and covered the Corps fill-and-removal authorizations. They also completed cultural resources compliance documentation. GSWCD completed the DSL application, coordinated with the ODFW fish passage program for compliance, and completed permitting through the Grant County Flood Development process. Construction funding was received from OWEB and USFWS and the ODFW Screen Shop crew constructed the project.

Gallery:



Photograph 42. Dads Creek #1 Siphon Project: Aerial view of the project area.



Photograph 43. Dads Creek #1 Siphon Project: Upper ditch crossing prior to the project.



Photograph 44. Dads Creek #1 Siphon Project: Lower ditch crossing prior to the project.



Photograph 45. Dads Creek #1 Siphon Project: Completed siphon under Dads Creek.



Photograph 46. Dads Creek #1 Siphon Project: Completed Tucker Ditch flume.



Photograph 47. Dads Creek #1 Siphon Project: Rock weirs and modified slope into Upper John Day River.

Dovenburg Pump Station Project

Project Name: Dovenburg Pump Station Project				
Project Action: Channel access				
Project Sponsor: GSWCD				
Project Design: GSWCD				
Landowner(s): Private landowner				
Partners: GSWCD, CTWSRO, BPA, OWEB, Private landowner			Reclamation Development Costs: \$ 28,714	
Funding Source(s): Landowner, CTWSRO, BPA, OWEB			Implementation Cost: \$91,161	
Project Location:	State: Oregon		County: Grant	Stream: Upper John Day River
	Latitude: 44° 26.15" N			Longitude: 119° 21.01" W
	Township:		Range:	Section:
Project Status: Instream construction complete				
Project Phase: Monitoring				
Milestones		Funding: Secured		
		Design: Completed		
		Permitting: Completed		
		Construction Start Date: July 15, 2013		
		Construction Completion Date: August 15, 2013		
Biological Benefit		Species: Steelhead, Chinook salmon		
		Benefit Type: Partial barrier removal		
Metric: 3.6 miles made accessible (up to the next untreated diversion)				
Project Objectives and Description: The pump station required a gravel pushup dam across the river to maintain a pool deep enough for the pump intake fish screens to function correctly. Preliminary review of the water rights indicated this diversion has a water right for diversion of 6.4 cfs. The push-up dam was a partial barrier, depending on year-to-year timing and construction of the dam. GSWCD designed a series of large rock weirs in the existing meander bend to maintain a scoured out pool for the intake screens and updated the screen intakes and pump system to be more efficient.				
Design, Permitting, and Construction Issues: GSWCD completed the design, with review by Reclamation. GSWCD completed the joint fill-and-removal permit application for Oregon DSL and Corps on behalf of the landowner, as well as gaining approval from				

Project Name: Dovenburg Pump Station Project

ODFW fish passage program and coordination for the Grant County Flood Development permit. ESA Section 7 consultation was completed by the CTWSRO on behalf of BPA, resulting in a BiOp from both USFWS and NOAA Fisheries Service. Construction funding was from BPA through the CTWSRO program while GSWCD was the fiscal agent and contracting entity.

Gallery:



Photograph 48. Dovenburg Pump Station Project: Push-up dam in place prior to construction.



Photograph 49. Dovenburg Pump Station Project: Completed weirs and pump station.

Long Meadows Diversion Replacement Project

Project Name: Long Meadows Diversion Replacement Project				
Project Action: Channel access				
Project Sponsor: GSWCD				
Project Design: GSWCD				
Landowner(s): Private landowner				
Partners: GSWCD, CTWSRO, BPA, OWEB, Private landowner			Reclamation Development Costs: \$35,200	
Funding Source(s): Landowner, CTWSRO, BPA, OWEB			Implementation Cost: \$153,810	
Project Location:	State: Oregon	County: Grant	Stream: Upper John Day River	
	Latitude: 44° 26.23' N		Longitude: 118° 48.28' W	
	Township:	Range:	Section:	¼ Section:
Project Status: Instream construction complete				
Project Phase: Monitoring				
Milestones	Funding: Secured Design: Completed Permitting: Completed Construction Start Date: July 15, 2013 Construction Completion Date: August 15, 2013			
Biological Benefit	Species: Steelhead, Chinook salmon, lamprey, bull trout			
	Benefit Type: Partial barrier removed			
Metric: 2.5 miles made accessible (up to the next untreated diversion)				
Project Objectives and Description: The Long Meadow Diversion is about 7 miles east of John Day, Oregon. The former pushup dam consisted of river gravels and was maintained several times each year. No headgate was present to control flow. Preliminary review of the water rights indicated a diversion rate of 1.4 cfs. Because there is generally good bypass flow at this location, GSWCD designed a side channel diversion with an instream natural riffle grade control. The 6-foot-wide side channel was constructed out of driven sheet piling with the inlet sill of the side channel set 6 inches below the grade control. The headgate was set in the side channel and boards were placed across the narrow side channel to create head for the headgate. The constructed riffle was made with three driven sheet piling weirs to maintain the grade and hold the rock in place. The weirs are 9 inches below the river bed grade and not visible. The uppermost weir is in a				

Project Name: Long Meadows Diversion Replacement Project

upstream arc pattern with the center lower in elevation than the outside wings so that low flows are concentrated in the center of the channel. The intermediate weirs are straight across the channel with lower center sections. During the non-irrigation season, the boards are removed from the side channel so that debris and sediment can flush through the side channel.

Design, Permitting, and Construction Issues: This was a new style of a diversion structure utilizing the natural river channel as the fish passage component. GSWCD completed the design with input from Reclamation, and completed the joint fill-and-removal permit application for DSL and Army Corp of Engineers on behalf of the landowner. The Grant SWCD received approval from the ODFW Passage Program and coordinated the Grant County Flood Development permit. CTWSRO wrote a biological assessment on behalf of BPA that was submitted to USFWS and NOAA Fisheries Service for ESA Section 7 consultation. As lead Federal agency, BPA completed the Section 106 cultural resources compliance and NEPA. The GSWCD received construction funding from BPA through the CTWSRO's Watershed Restoration Program and was the fiscal agent and contracting entity.

Gallery:

Photograph 50. Long Meadows Diversion Replacement Project: Original gravel pushup dam.



Photograph 51. Long Meadows Diversion Replacement Project: Constructed riffle looking downstream. Side channel is on right edge of streambank.



Photograph 52. Long Meadows Diversion Replacement Project: Intermediate sheet pile weir with protective cap prior to finish grading of the channel bed.



Photograph 53. Long Meadows Diversion Replacement Project: Side channel entrance.



Photograph 54. Long Meadows Diversion Replacement Project: Headgate and board check in side channel.

ODFW Schneider Habitat Improvement Project

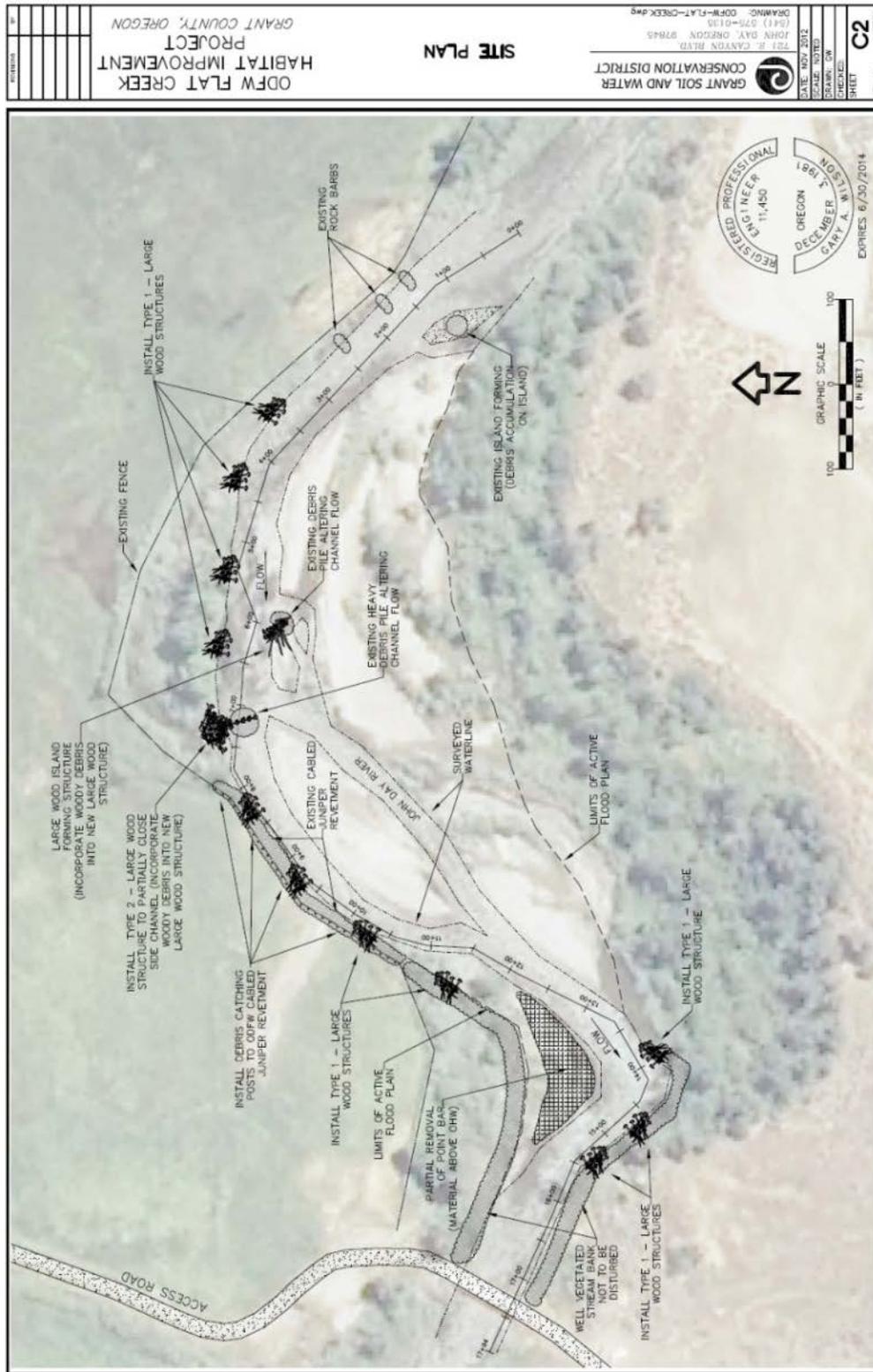
Project Name: ODFW Schneider Habitat Improvement Project					
Project Action: Channel complexity					
Project Sponsor: ODFW					
Project Design: GSWCD					
Landowner(s): Private landowner, ODFW					
Partners: GSWCD, ODFW, OWEB, Private landowner			Reclamation Development Costs: \$24,594		
Funding Source(s): Landowner, ODFW, OWEB			Implementation Cost: \$47,515		
Project Location:	State: Oregon		County: Grant		Stream: Upper John Day River
	Latitude: 44° 27' 23" N			Longitude: 119° 26' 32" W	
	Township:		Range:		Section: ¼ Section:
Project Status: Instream construction complete					
Project Phase: Monitoring by ODFW					
Milestones		Funding: Secured			
		Design: Completed			
		Permitting: Completed			
		Construction Start Date: July 15, 2013			
		Construction Completion Date: August 15, 2013			
Biological Benefit		Species: Steelhead, Chinook salmon, lamprey, bull trout			
		Benefit Type: Restore main channel function			
Metric: 0.3 miles of channel complexity					
<p>Project Objectives and Description: The State of Oregon owns property 18 miles west of Mt. Vernon, Oregon on the Upper John Day River. The property includes a recently rebuilt bridge across the John Day River that provides an important access point to the Phillip Schneider Wildlife Area. The river is actively migrating into private farm land and has eroded out the riparian buffer that was in place for many years, causing losses in bank vegetation and farm land. The river bank was overtopping and flow has been going across the field, depositing debris in the field. The flow would go behind the bridge with the potential of the entire river channel avulsing, which would result in it bypassing the bridge.</p> <p>The project area is about 800 feet in length. The reach has large gravel bars with a wide active floodplain on the south side of the river. While salmonids do not typically stay in this</p>					

Project Name: ODFW Schneider Habitat Improvement Project

reach during the summer months because of water temperatures, ODFW biologists have indicated that salmonids move to this section of river as soon as water temperatures cool for overwintering. There is a current lack of pools, cover, and habitat complexity. The project goals were to stabilize the active erosion into the farm ground and prevent the river from eventually bypassing the bridge, while improving the habitat complexity in this reach. The project consisted of the construction of 12 engineered logjams along the banks that maintain scour pools with cover, 2 island head logjams that help split high flows into secondary channels to the inside of the bend, and addition of posts and other woody material along the bank where the river has been overtopping the bank and leaving gravel and debris in the farm field. The posts and other woody material should act as a filter to allow water to pass through, but slow the water velocities and remove the debris and gravel before it gets out onto the field.

Design, Permitting, and Construction Issues: GSWCD completed the design with input from Reclamation and ODFW. Since the project was on State land, it was exempt from DSL permitting. The ESA Section 7 consultation with NOAA Fisheries Service was completed under ACOE SLOPES V programmatic biological opinion and a biological assessment was written by ODFW for USFWS ESA consultation, resulting in the issuance of a biological opinion from USFWS. GSWCD applied for and received a grant from OWEB for construction funding and ODFW supplied labor and equipment to deliver juniper trees for the project. GSWCD was the fiscal agent and contracting entity.

Gallery:



Photograph 55. ODFW Schneider Habitat Improvement Project: Project overview.



Photograph 56. ODFW Schneider Habitat Improvement Project: One of the logjams during construction, prior to backfilling.



Photograph 57. ODFW Schneider Habitat Improvement Project: Logjam along bank.



Photograph 58. ODFW Schneider Habitat Improvement Project: Island-head logjam to help split flow and add habitat diversity.

Stimac Pump Station Project

Project Name: Stimac Pump Station Project			
Project Action: Channel access			
Project Sponsor: GSWCD			
Project Design: GSWCD			
Landowner(s): Private landowner			
Partners: GSWCD, CTWSRO, BPA, Private landowner		Reclamation Development Costs: \$10,752	
Funding Source(s): Private landowner, CTWSRO, BPA		Implementation Cost: \$22,158	
Project Location:	State: Oregon	County: Grant	Stream: Canyon Creek, Upper John Day River
	Latitude: 44° 17' 39" N		Longitude: 118° 57' 16" W
	Township:	Range:	Section: ¼ Section:
Project Status: Pump station and the associated delivery system complete			
Project Phase: Monitoring			
Milestones	Funding: Secured		
	Design: Complete		
	Permitting: Complete		
	Construction Start Date: November 1, 2013		
	Construction Completion Date: December 10, 2013		
Biological Benefit	Species: Steelhead, Chinook salmon, westslope cutthroat		
	Benefit Type: Access - partial barrier removal		
Metric: 0.5 miles made accessible (up to the next untreated diversion)			
Project Objectives and Description: The Stimac pump station is located on Canyon Creek which flows into the Upper John Day River in John Day, Oregon. The diversion is located about 9 miles south of of the Town of John Day on Highway 395. The existing pump station requires a pushup dam in the channel to create a pool for the suction line. The water right for this pump station is 0.43 cfs from Canyon Creek. GSWCD designed a new pump station and delivery piping to move the pump station upstream about 100 feet to where there is a natural pool, eliminating the need for a pushup dam.			
Design, Permitting, and Construction Issues: GSWCD completed the design, with a review by Reclamation. Since this was a pump station and there was no instream construction component, permitting requirements were limited to cultural resources compliance. Construction funding was from BPA through the CTWSRO program while			

Project Name: Stimac Pump Station Project

GSWCD was the fiscal agent and contracting entity.

Gallery:



Photograph 59. Stimac Pump Station Project: Location of original pump station.



Photograph 60. Stimac Pump Station Project: Completed pump station.

UPPER COLUMBIA RIVER BASIN

The UCR basin, generally described as the Columbia River upstream from Grand Coulee Dam in Washington, has a drainage area of about 74,100 square miles, including approximately 39,000 square miles that extend into Canada. Reclamation works in three Upper Columbia River subbasins in the United States: the Entiat, the Methow, and the Wenatchee. In 2013, four projects were completed in the Methow River subbasin and five in the Wenatchee River subbasin.

ESA-listed anadromous fish species present in this part of the UCR basin include UCR spring-run Chinook salmon (endangered) and UCR steelhead trout (threatened). Also present are UCR summer/fall-run Chinook salmon (not listed). The Yakama Nation has a coho salmon reintroduction program in the Wenatchee River subbasin.

Bureau of Reclamation Expenditures in 2013

Subbasin	Expenditures
Methow River	\$1,467,024
Wenatchee River	\$1,036,735
Entiat	\$640,244
Total	\$3,144,004

METHOW RIVER SUBBASIN

The Methow River (HUC 17020008) is a tributary to the Columbia River at RM 523.9 and has a drainage area of about 1,820 square miles. The mainstem Methow River forms where the West Fork Methow and Lost River meet at RM 73. In 2013, four projects were completed in the subbasin that improved streamflows, removed passage barriers, and enhanced the riparian areas.

The focus of Reclamation's actions in the subbasin includes UCR spring run Chinook salmon (endangered), and UCR steelhead trout (threatened). Also present are UCR summer run Chinook salmon (not listed) and CR bull trout (threatened).

Project documentation including permits, as-built drawings, GIS files, additional photos, and other technical records are located at the Bureau of Reclamation, Pacific Northwest Regional Office, 1150 N. Curtis Road, Suite, 100, Boise, Idaho 83706. Files can be requested through the Columbia/Snake Salmon Recovery Office, 208-378-5057.

Projects

- M2 Obannion Project (WDFW)
- Twisp River Well Conversion Project
- Upper Beaver Creek Project
- Right and Left Elbow Project

Sponsors

- Washington Water Project of Trout Unlimited (TU-WWP)
- Methow Salmon Recovery Foundation (MSRF)

Partners

- Methow Conservancy
- Reclamation
- Washington Department of Ecology (WDOE)
- BPA
- Upper Columbia Salmon Recovery Board (UCSRB)
- Bonneville Environmental Foundation
- Priest Rapids Coordinating Committee (PRCC)
- USFWS
- Washington Department of Fish and Wildlife (WDFW)
- Natural Resources Conservation Service (NRCS)
- MSRF

- National Fish and Wildlife Foundation (NFWF)
- Anchor QEA
- Chelan-Douglas Tributary Committee
- Yakama Nation

Funding Sources

- Reclamation
- BPA
- WDOE
- PRCC
- NFWF
- Salmon Recovery Foundation Board (SRFB)
- HCP Tributary Committees
- NRCS Salmon Recovery Fund and Habitat Conservation Plan Tributary Funds

Bureau of Reclamation Expenditures in 2013

Subbasin	Expenditures
Methow River	\$1,467,024

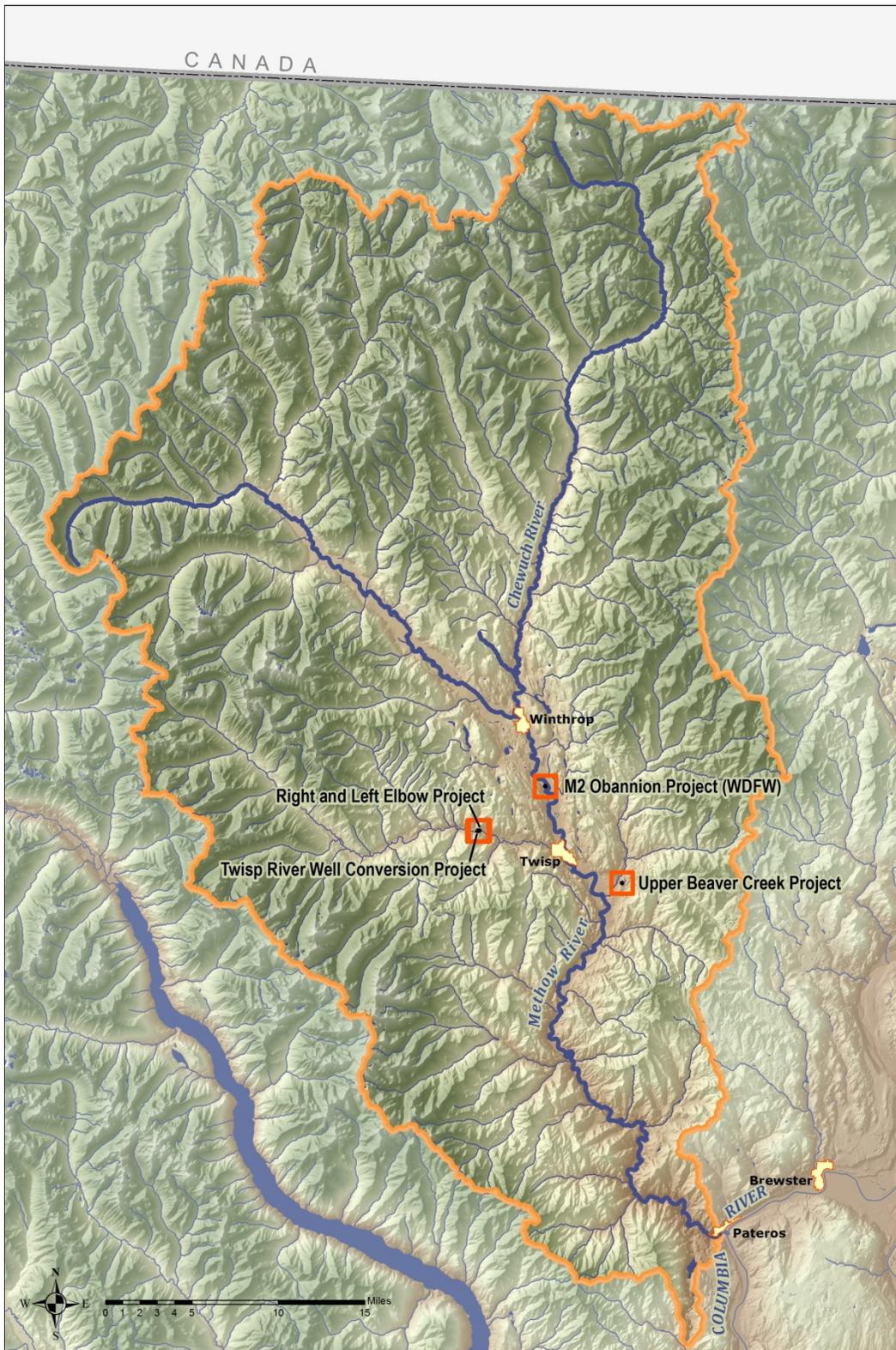


Figure 7. Location map of the projects completed in the Methow River subbasin in 2013.

M2 Obannion Project (WDFW)

Project Name: M2 Obannion Project (WDFW)					
Project Action: Channel complexity, riparian re-establishment					
Project Sponsor: MSRF					
Project Design: Anchor QEA					
Landowner(s): Private landowner, WDFW, DNR, Okanogan County Public Works					
Partners: Reclamation, MSRF, Anchor QEA, WDFW, UCSRB, BPA, PRCC, USGS			Reclamation Development Costs: \$1,366,094		
Funding Source(s): BPA, PRCC, Salmon Recovery Fund and Habitat Conservation Plan Tributary Funds			Implementation Cost: \$2,107,000		
Project Location:	State: Washington		County: Okanogan		Stream: Methow River
	Latitude: 48° 25' 4.4034" N		Longitude: 120° 8' 40.668" W		
	Township: 34	Range: 21, 22	Section: 25, 30	¼ Section: NW/SW of 30; NE/SE of 25	
Project Status: Complete					
Project Phase: Monitoring					
Milestones	Funding: Secured				
	Design: Completed				
Biological Benefit	Permitting: Completed				
	Construction Start Date: June 14, 2013				
	Construction Completion Date: October 23, 2013				
	Species: UCR spring Chinook salmon, UCR steelhead, Columbia River bull trout, Pacific lamprey				
Benefit Type: Restore main channel function, side channel reconnection, partial culvert replacement, riparian enhancement					
Metric: Improved habitat complexity on 0.3 miles of side channel and 0.5 miles of main channel via 24 engineered logjam structures, replacement of 2 culverts barriers, 1,000 feet of new floodplain channel created, 1,100 feet of levee removal to increase floodplain connectivity and riparian vegetation improvement on 12 acres; 0.3 miles made accessible.					
Project Objectives and Description: The M2 Obannion Project (WDFW) is a part of the larger Middle Methow (M2) Habitat Project, which is a coordinated effort between					

Project Name: M2 Obannion Project (WDFW)

Reclamation, MSRF, Yakama Nation (YN), WDFW, and private and public landowners. The project was awarded primary construction funding through the BPA-targeted solicitation process. The overall M2 Project is a reach-based approach to improve habitat within an 8-mile stretch of the Methow River, between the towns of Winthrop and Twisp in Okanogan County, Washington. The reach-based restoration approach was developed to improve habitat in and adjacent to the Methow River to support the short- and long-term recovery of ESA-listed fish species and allow effectiveness monitoring of the suite of restoration actions.

Specific projects were identified based on the information included in the Reclamation reach assessment and project alternatives analysis for the M2 Reach. Project actions were prioritized and selected based on both biological benefit, certainty of success and social considerations. The M2 Obannion Project was the second project to be developed based on the reach-based approach. The M2 Obannion Project was developed as three construction projects for implementation in 2012 and 2013 by three different contractors. This strategy was developed to increase opportunities for local contractor involvement.

The project area includes both banks of the mainstem of the Methow River at RM 46, a perennial side channel, and a wetland complex. The project goals were to improve floodplain connectivity, instream habitat complexity, and the connection between the river and off-channel areas to provide improved habitat for ESA-listed fish and wildlife dependent upon aquatic and riparian habitat.

Specific actions for the project area included:

- Reconnecting 30 acres of low floodplain by removing 1,100 feet of levee.
- Increasing floodplain connectivity by installing 3 main channel logjams designed to increase floodplain inundation during 2-year to 20-year flood events.
- Increasing instream habitat complexity by installing 7 engineered logjams in the main channel and 17 in the side channel.
- Reconnecting off-channel wetlands and rearing habitat by installing 2 bottomless arch culverts underneath the Old Twisp Highway.
- Improving fish access to off-channel wetlands by excavating 1,100 feet of new floodplain channel.
- Increasing instream habitat complexity by installing 7 engineered logjams in the main channel and 17 in the side channel.

Improving riparian conditions by planting 2 acres of new riparian vegetation and supplemental plantings in an additional 10 acres.

Design, Permitting, and Construction Issues:

Design Issues:

- Existing land uses, including private landowners and an irrigation diversion on river left constrained treatment options.
- Extensive modeling and design restrictions were required to allow levee removal without increasing flood risk to a private landowner within the project area.
- The project team and stakeholders had to balance opportunities to provide complex habitat with the requirement to minimize risks to recreational river users due to the

Project Name: M2 Obannion Project (WDFW)

popularity of the M2 as a recreational destination.

- All instream structures had to be evaluated to comply with new legislation adopted late in the design process (SHB 1194-landowner liability legislation passed in 2013). Two structures were redesigned to comply with the legislation.

Permitting Issues:

- WDFW revised requirements for Right of Entry (ROE) agreements for projects on state-owned land late in the design/development process. This was one of the first projects under the new framework, which included requirements for an adaptive management agreement and monitoring framework. The revised ROE process required considerably more effort than the previous process and was a learning experience for all parties.
- This project was also one of the first under revised Washington Department of Natural Resources safety checklist processing for instream large wood. The new process required additional documentation of potential effects on recreational river users.

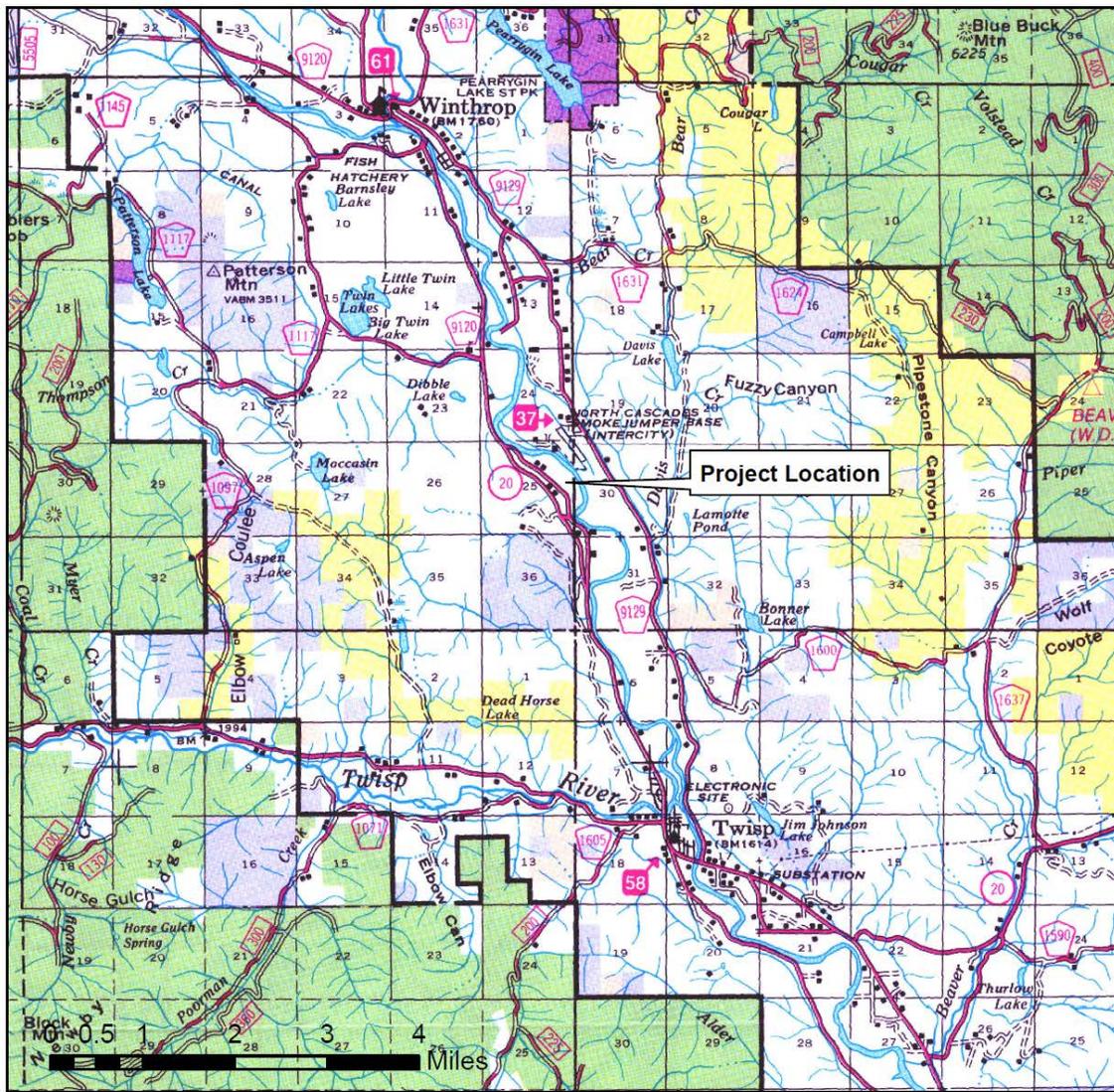
Construction Issues:

- Elevated flows during construction required increased effort for water control and added expense to the project for increased pumping, coffer dam materials, and labor. Methow River flows were considerably higher than previously recorded maximum flows for the time of year for 44 consecutive days during in-water construction.
- The substrate in the area of the south culvert was not suitable to support the culvert or for re-use as backfill. The material rejection required 2 feet of over-excavation to reach suitable material, additional material import and disposal of rejected material.
- Guardrail details depicted in the approved plans did not conform with site conditions. Communications challenges between the Contractor and County Engineer resulted in an initial requirement that the guardrail be constructed in conformity with the approved plans and later direction to alter the design following construction. These changes resulted in increased cost to the Project.

Additional Issues:

- Adjacent private landowners did not want proceed with project elements on their land unless MSRF acquired the property or acquired a conservation easement. MSRF successfully obtained funding for these project elements and successfully negotiated a land purchase and an easement allowing the project to move forward.

Gallery:



Project Location



**Obannon
Location Map**



Latitude: 48.41789° N Township: T34N
 Longitude: -120.14463° W Range: R21E & R22E
 Okanogan County Section: 25 & 30
 Methow River
 Approximately 4 miles north of Twisp

Figure 8. M2 Obannon (WDFW) Project Map 1: Location map of the project area.



Photograph 61. M2 Obannion (WDFW) Project: Aerial photo of the project area before initiation, 2012.



Photograph 62. M2 Obannion (WDFW) Project: Installing culvert sections and streambed soils.



Photograph 63. M2 Obannon (WDFW) Project: Excavated seasonal channel between south culvert and Methow River.



Photograph 64. M2 Obannon (WDFW) Project: South culvert at completion.



Photograph 65. M2 Obannon (WDFW) Project: Installing biological diversity structures in mainstem of the river.



Photograph 66. M2 Obannon (WDFW) Project: Installing engineered logjam structure with live plantings interspersed during construction.



Photograph 67. M2 Obannion (WDFW) Project: Completed apex engineered logjam in mainstem, at the head of the side channel.



Photograph 68. M2 Obannion (WDFW) Project: Example of one of the 13 "B" type engineered logjam structures constructed in the side channel.

Twisp River Well Conversion Project

Project Name: Twisp River Well Conversion Project					
Project Action: Point of diversion change, instream flow increase, irrigation efficiency					
Project Sponsor: TU-WWP					
Project Design: NRCS					
Landowner(s): Private landowner					
Partners: NRCS, MSRF, Chelan-Douglas Tributary Committee, NFWF, DOE			Reclamation Development Costs: \$5,500		
Funding Source(s): Chelan-Douglas Tributary Committee, NRCS, WDOE, Reclamation, NFWF			Implementation Cost: \$105,000		
Project Location:	State: Washington		County: Okanogan		Stream: Twisp River
	Latitude: 48° 22' 42.9" N		Longitude: 120° 13' 31.175" W		
	Township: 33	Range: 21	Section: 09	¼ Section: NW	
Project Phase: Construction is complete; TU will follow up with permanent change applications to the WDOE and compliance monitoring.					
Milestones	Funding: Secured Design: Complete Permitting: Complete Construction Start Date: April 2013 Construction Completion Date: November 2013				
Biological Benefit	Species: UCR spring Chinook, UCR steelhead, Columbia River bull trout				
	Benefit Type: Increased flow and access				
Metric: 4.5 cfs of increased streamflow for 5 years beginning in 2014. No surface diversion from this year forward. Prior irrigation season was April 15 through October 1, annually. Removal of one partial barrier (diversion). Flow increased to mouth for 6.5 miles.					
Project Objectives and Description: The <i>Upper Columbia Salmon Recovery Plan and Yakama Nation Stream Reach Assessment</i> (2011) identified instream flow and water temperature as primary Ecological Concerns in the Twisp River. This project is located in a Category 2 (high priority) watershed, as identified by the Upper Columbia Biological Strategy. This project is located on the Twisp River RM 6.5, a major spawning area for spring Chinook salmon and steelhead, as well as a core area for bull trout. The existing irrigation diversion was a potential cause of injury and mortality to ESA-listed fish species due to stranding and entrapment in the canal. Furthermore, the old flood					

Project Name: Twisp River Well Conversion Project

irrigation system required an excessive diversion quantity of 5 cfs to irrigate 25 acres. Thus the project objective was to improve habitat for ESA-listed fish by increasing instream flows and eliminate a potential source of injury and mortality from entrainment in the ditch. Completion of this project allows additional projects to move forward, which would reestablish an off-channel habitat connection.

The project eliminated a surface water diversion on the Twisp River, drilled a well, and replaced the flood irrigation system with an efficient piped K-Line irrigation system.

The project improves flows in the Twisp River by placing 4.5 cfs of saved water into a 5-year trust. This trust is a 5-year donation as a result of the water savings from surface water conversion to a well. The long-term goal is to negotiate with the landowner to place the 4.5 cfs into a permanent trust once the exact quantity is identified. At the current time, the landowner is exploring avenues of donating the water into a permanent trust in exchange for a tax deduction. It is not anticipated that there will be additional upfront project costs to secure the water as a permanent placement.

Design, Permitting, and Construction Issues:

The major issue encountered with this project was the construction of the first well. The well was installed at a depth of 38 feet because the well driller felt that the well produced enough water for the project, and also because the driller thought that he was on bedrock. During the initial pump tests the well did not produce the minimum 150 gallons per minute (gpm) necessary, because the bentonite in the well had collapsed. The well was then cleaned out, retested, and found to sufficiently produce 150 gpm. For this reason, the project was able to proceed.

From that point, all remaining construction ensued, including electrical, excavation, mainline, and the irrigation system. In July, the system was tested. The well began to suck air and the static level of water had dropped below the pump, pumping 85 gpm. When the first pump test was conducted the Twisp River was at the peak of its hydrograph and had since dropped 4 feet. The well was in direct continuity with the river. The irrigation company then lowered the pump to the bottom of the well. The system was again tested; however, only 110 gpm was produced from the well which was far less than the necessary minimum requirement of 150 gpm to irrigate 25 acres.

TU immediately secured additional funding to locate a new well site. Upon review with a hydrogeologist and hydrology experts, and assessment of the existing well, it was decided the best path forward was a new well, located approximately 150 feet from the first well and drilled to a depth of 80 feet, 48 feet deeper than the first well.

The second well was installed and developed. A pump test demonstrated that the minimum 150 gpm was available. The system was realigned to the new well. The system was started in November. The pumps were at the bottom of the well at 70 feet, and static water was maintained at 38 feet, with 170+ gpm being achieved. The K-Line Irrigation System performed as anticipated. Construction was successfully completed.

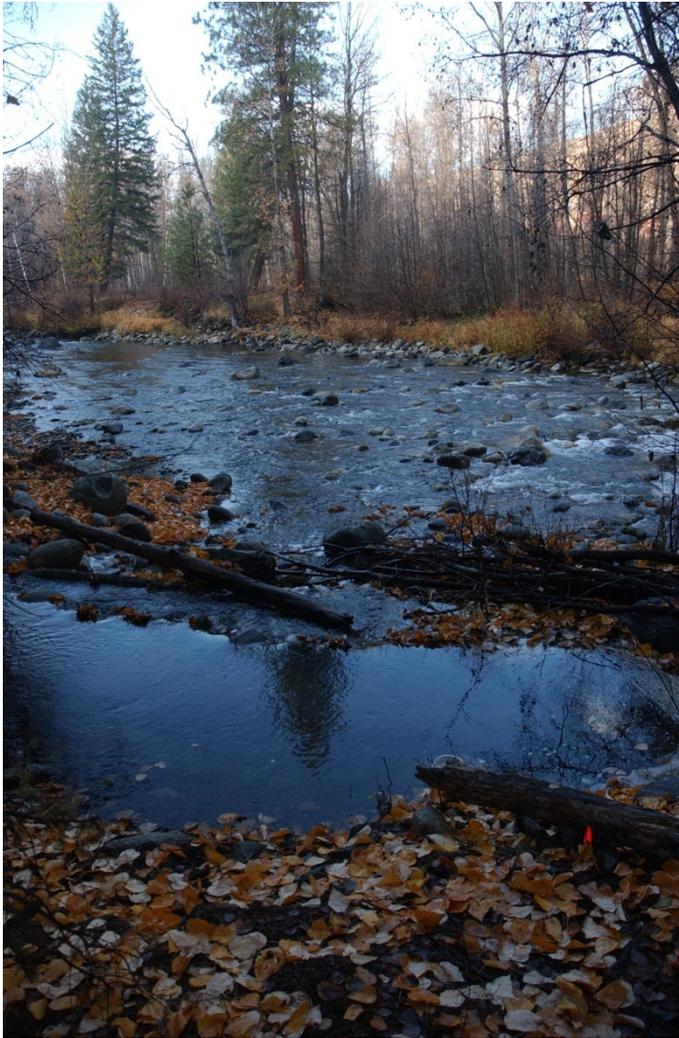
Gallery:



Photograph 69. Twisp River Well Conversion Project: The point of diversion on the Twisp River.



Photograph 70. Twisp River Well Conversion Project: Old irrigation ditch along the Twisp River.



Photograph 71. Twisp River Well Conversion Project: Portion of the old ditch along the Twisp River, view upstream.



Photograph 72. Twisp River Well Conversion Project: Pump electrical panel for the well pump.



Photograph 73. Twisp River Well Conversion Project: Well-drilling activities.



Photograph 74. Twisp River Well Conversion Project: Checking flow from the new well.



Photograph 75. Twisp River Well Conversion Project: Irrigation system in successful operation with the pumped groundwater.

Upper Beaver Creek Project

Project Name: Upper Beaver Creek Project			
Project Action: Channel complexity, access			
Project Sponsor: MSRF			
Project Design: Anchor QEA			
Landowner(s): Private landowner			
Partners: Reclamation, USFWS, Methow Conservancy		Reclamation Development Costs: \$53,511	
Funding Source(s): Tributary Fund, BPA, USFWS		Implementation Cost: \$674,300	
Project Location:	State: Washington	County: Okanogan	Stream: Beaver Creek
	Latitude: 48° 20' 22.6674" N	Longitude: 120° 2' 37.2834" W	
	Township: 34	Range: 22	Section: 35
Project Status: Complete			
Project Phase: Monitoring, adaptive management			
Milestones	Funding: Secured Design: Completed Permitting: Completed Construction Start Date: August 5, 2013 Construction Completion Date: November 25, 2013		
Biological Benefit	Species: UCR spring Chinook salmon, UCR steelhead, Columbia River bull trout Benefit Type: Restore main channel function, partial barrier removed		
Metric: 2,160 feet (0.4 miles) of main channel created/increased complexity with floodplain enhancement, one partial fish barrier removed, one fish screen installed			
Project Objectives and Description: Beaver Creek, a tributary of the Methow River, supports spawning and rearing habitat for wild steelhead and limited habitat for spring Chinook salmon. In response to flooding in the 1970s, a half-mile section of the stream was put into a roadside ditch lined with riprap. This isolated the creek from its floodplain, increased water velocities, and reduced both the quality and quantity of fish habitat in the reach. The Batie Irrigation Ditch, located at the midpoint of the project reach was the last unaddressed fish barrier in Beaver Creek. The historic diversion was a hand-placed rock dam that required			

Project Name: Upper Beaver Creek Project

annual maintenance, as well as plastic and blocked passage at most flows.

Reclamation and MSRF identified the reach as an opportunity to improve fish habitat and stream processes while improving passage and reliability at the irrigation diversion.

To address the stream channelization, the stream was redirected into a newly constructed channel on the floodplain that tied together a series of isolated floodplain swales with sections of newly excavated channel. The old armored channel was plugged at the top with buried large woody material, rock, and soil plug to prevent recapture. The irrigation diversion was relocated to the new channel and was constructed with a new headgate and grade control sill. A new concrete settling basin was built to house the fish screen, sluice control, and fish return. To ensure delivery of adequate irrigation volume, a portion of the irrigation ditch was piped to match grade with the remaining open ditch. About 600 feet of the new pipe was located within a filled section of the old armored stream channel.

The project objectives were:

- Reconnect Beaver Creek with its floodplain through the project reach, so that the floodplain would be active during annual flood events.
- Increase instream habitat diversity and complexity through the project reach from pre-project conditions.
- Provide improved fish passage at the irrigation diversion during the period between base flow and the 2-year flood.
- Provide improved sediment control capability at the irrigation diversion and settling basin/screen vault for the Batie ditch.
- Provide a fish screen facility for the Batie ditch that meets state requirements when ditch flows are between 0.5 and 5 cfs and stream flows range between 5 and 160 cfs.

Specific restoration actions for the Upper Beaver Creek project area included:

- Construct 975 feet of new channel connecting with existing floodplain channels.
- Place wood and rock within the new channel to increase habitat complexity.
- Construct a new irrigation diversion, headgate, settling basin, and fish screen structure.
- Pipe 1,250 feet of the irrigation ditch.

Provide crossroad drainage to connect the portion of the old channel left open that connects with existing wetland system.

Design, Permitting, and Construction Issues:

Design Issues:

- The project was designed and ready for construction in 2009, but was delayed due to late concerns raised by a stakeholder in the irrigation group. Between 2009 and 2012, the issues raised by the irrigator were largely resolved, and the majority of users voted to reauthorize the project for construction in 2013. Although the design concepts were complete, numerous small changes were required to be updated on a short timeline to address the landowner requirements.

Project Name: Upper Beaver Creek Project

- Water conservation agreements negotiated since 2009 by others resulted in a wider range of operating flows at the fish screen. Under the new flow regime, the fish screen needed to allow a diversion ranging from 5 cfs early in the year, while remaining in compliance during low flows with a diversion rate potentially as low as ½ cfs.
- Updating the 2009 designs to incorporate new information and requirements required a significant effort.
- Meeting requirements for the fish screen, new channel elevations, and existing ditch topography required piping 1,250 feet of the irrigation ditch, including a road crossing.
- Beaver Creek carries a high sediment load naturally which has been exacerbated by several recent wildfires. Irrigators raised concerns about sediment control at the screen structure and in the intake pipe and lower canal. The design was modified to include changes to the settling basin and two routes for sluicing sediment before it enters the pipe and one for clearing out the pipe itself.

Permitting Issues:

- Comments were received late in the design process from stakeholders and agencies that had provided different comments earlier. These comments required late redesign to accommodate concerns.
- Cultural surveys identified a historic homestead site and prehistoric lithic scatter, which precluded work in a portion of the project area intended for floodplain capacity.
- The original permits had expired after the project was delayed and required reapplication to be renewed to allow construction.

Construction Issues:

- The initial soils characterizations proved to be inaccurate with a significantly lower percentage of cobbles and gravels than expected in the excavated portions of the new channel. This required importing a large volume of cobbles from off-site to provide required initial stability.
- The pipe diameter supplied and installed for the fish return was smaller than specified in the plans. The error was not identified until it was poured into the structure. The element has been accepted on a watch and verify basis without payment.
- The tolerances in the design for the portion of the concrete structure for the stilling well and screen had very tight tolerances for the paddle wheel and fish screen to function properly. The concrete walls in these areas were out of tolerance by as much as 3/8 inch, resulting in difficulties installing the fish screen. This element has been accepted on a watch-and-verify basis without payment.
- The initial survey of the ditch at the downstream end of the project was inadequate at the point where the new pipe was intended to daylight to the gravity-fed ditch, which resulted in the pipe being half a foot below grade. This error required extension of the grading area downstream several hundred feet to match grade.

Project Name: Upper Beaver Creek Project

Post-Construction Issues/Monitoring:

- Icing is causing flow to be pushed up onto the newly constructed floodplain which is desirable; however, this will need to be monitored to insure that the new headgate is not damaged and that the old channel does not recapture the streamflow.
- Icing monitoring has already revealed a need to reinforce the levees that block flow into the plugged and abandoned channel in two locations.
- The performance of the newly-established stream channel will also need to be monitored during and after spring freshet to watch for the possibility of recapture into the old channel

Gallery:

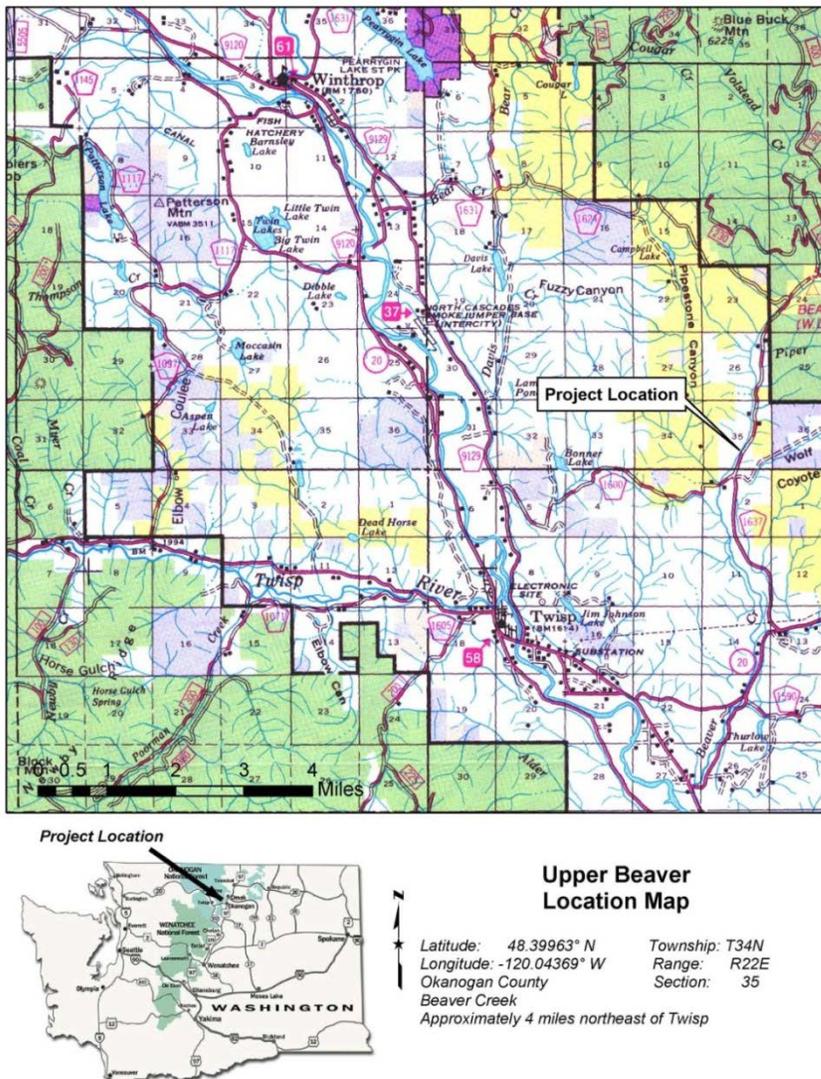


Figure 9. Upper Beaver Creek Project Map 1: Project location.



Photograph 76. Upper Beaver Creek Project: Project site before construction. The habitat was limited in the riprap-lined channel along the county road.



Photograph 77. Upper Beaver Creek Project: Project site before construction. The irrigation diversion was a pushup rock dam that was a fish barrier at most flows.



Photograph 78. Upper Beaver Creek Project: The new channel before excavation.



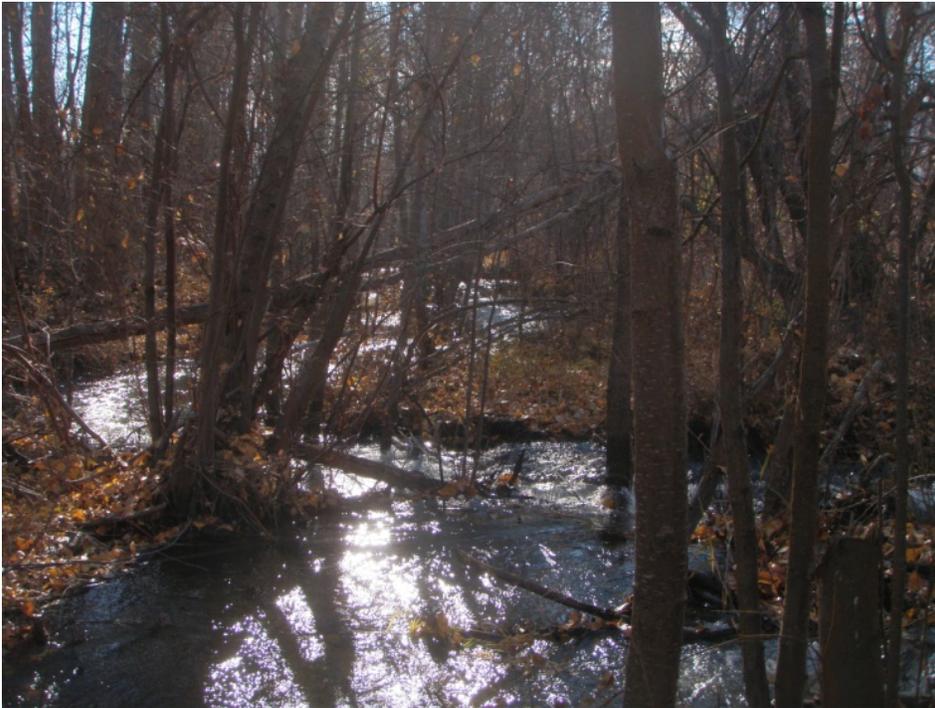
Photograph 79. Upper Beaver Creek Project: Excavating the new channel.



Photograph 80. Upper Beaver Creek Project: Laying out and forming for the settling basin slab.



Photograph 81. Upper Beaver Creek Project: Fish screen installed in settling basin.



Photograph 82. Upper Beaver Creek Project: The new channel and diversion after construction.



Photograph 83. Upper Beaver Creek Project: The new channel has more diverse habitat and floodplain interaction.



Photograph 84. Upper Beaver Creek Project: Looking upstream at the new channel station 0+00. The old channel flowed in from the right.

Right and Left Elbow Project

Project Name: Right and Left Elbow Project				
Project Action: Channel complexity				
Project Sponsor: MSRF				
Project Design: Design parameters were specified by Reclamation				
Landowner(s): Private, Okanogan National Forest, WDFW				
Partners: WDFW, USFWS, NFWS, WDOE, Bonneville Environmental Foundation			Reclamation Development Costs: \$12,000	
Funding Source(s): Tributary Fund, SRFB, Reclamation			Implementation Cost: \$77,000	
Project Location:	State: Washington		County: Okanogan	Stream: Twisp River
	Latitude: 48.37831		Longitude: -120.22754	
	Township: 33	Range: 21	Section: 8 & 9	¼ Section: NE & NW
Project Status: Complete				
Project Phase: Monitoring				
Milestones	Funding: Secured			
	Design: Completed			
	Permitting: Completed			
	Construction Start Date: October 23, 2013 Construction Completion Date: November 14, 2013			
Contracting	Advertised: September 17, 2013			
	Awarded: October 23, 2013			
Biological Benefit	Species: UCR spring Chinook salmon, UCR steelhead trout, Columbia River bull trout, coho salmon			
	Benefit Type: Side-channel reconnection			
Metric: 0.3 mile (1,500 feet) of increased complexity				
<p>Project Objectives and Description: The Elbow Coulee projects are proposed to improve access to rearing habitat in two groundwater-fed side channels of the Twisp River. The project includes two components, Elbow Coulee adaptive management on the left bank and the Right Elbow side channel immediately downstream and across the river. Push-up levees built in response to the 1972 floods disconnected the Twisp River from its floodplain and side channels. In 2008, MSRF implemented a Reclamation design and</p>				

Project Name: Right and Left Elbow Project

breached the levee on river left to reconnect the floodplain and a side channel during spring high flows. Post-project monitoring demonstrated project success through increased populations of juvenile spring Chinook salmon and steelhead, but also identified isolated stranding in the upper channel and sediment deposition in the side channel as threats to the long-term success of the project.

The Right Elbow site was an existing groundwater-fed side channel isolated from the river by a pushup levee across the inlet. The side channel had a downstream connection with the Twisp River at some flows. The side channel supported a low level of fish use.

The project was designed to improve access to the off-channel rearing habitat at the Right Elbow site, and provide flushing flows to address the threats to long-term success on river left. Specific restoration actions for the project areas include:

- Enlarge the existing levee breach at left elbow to improve the connection and allow flushing flows for channel maintenance.
- Define a thalweg through 75 feet of the existing side channel to reduce stranding at left elbow.
- Remove the levee to reconnect the side channel at Right Elbow with the Twisp River.
- Excavate 150 feet of new channel to connect the Right Elbow side channel during typical spring high flows.
- Fill an abandoned irrigation ditch at Right Elbow.

At Left Elbow, the restoration actions will increase flushing flows through the side channel by engaging the Twisp River when flow is greater than 150 cfs, significantly increasing velocity and volume at elevated flows. This action will reduce stranding of juvenile spring Chinook salmon and steelhead in the upper portion of the side channel and allow the side channel to be more self-sustaining by flushing sediment accumulations. At Right Elbow, the levee breach will create a new inlet to allow an upstream connection to the existing 800-foot-long groundwater-fed channel at flows greater than 150 cfs. This action will provide rearing habitat for juvenile spring Chinook salmon and steelhead.

Design, Permitting, and Construction Issues:

Design Issues:

- At both Left Elbow and Right Elbow, the channel inverts were set in the field based on field staking when river was at the targeted activation flow.

Permitting Issues:

- Work at Right Elbow required a right-of-entry agreement to work on WDFW land. Obtaining the permit was a time consuming processes; the final signed agreement came in 2 days after the Contractor's requested mobilization date.

Construction Issues:

- Right Elbow required coordination with a surface-to-groundwater conversion project managed by TU, which was delayed because of a failed well. The final portion of our project was delayed 2 weeks as we had to wait for their irrigation system to be fully tested before we could backfill the irrigation ditch.
- Both sites were difficult to reach with equipment. Access to the Right Elbow site is

Project Name: Right and Left Elbow Project

limited to small equipment because of a light duty bridge. Access to the Left Elbow site is limited to foot traffic only. Enlarging the levee breach at Left Elbow required removing large (4-foot diameter) rocks. The micro-blasting equipment – small scale explosives – the contractor used to break large rocks was an effective way to move rocks with minimal impact.

Gallery:



Photograph 85. Right and Left Elbow Project: Left Elbow entrance before 2013 blasting project.



Photograph 86. Right and Left Elbow Project: Left Elbow side channel entrance after blasting to lower the intake.



Photograph 87. Right and Left Elbow Project: Right Elbow side channel entrance breach.



Photograph 88. Right and Left Elbow Project: Looking down excavated pilot channel at Right Elbow.

WENATCHEE RIVER SUBBASIN

The Wenatchee River (HUC 17020011) is a tributary to the Columbia River at RM 468.4 and has a drainage area of about 1,350 square miles. There is a diversion weir at Wenatchee RM 17.5 serving the PUD and Wenatchee Reclamation District. In 2013, five projects were completed in the subbasin that added habitat complexity, improved instream flows, and removed barriers to side channel habitat and for passage.

ESA-listed fish species present in the river include UCR spring-run Chinook salmon (endangered) and UCR steelhead trout (threatened). Also present are UCR summer/fall-run Chinook salmon (not listed). The Yakama Nation has a coho salmon reintroduction program in the subbasin.

Project documentation including permits, as-built drawings, GIS files, additional photos, and other technical records are located at the Bureau of Reclamation, Pacific Northwest Regional Office, 1150 N. Curtis Road, Suite, 100, Boise, Idaho 83706. Files can be requested through the Columbia/Snake Salmon Recovery Office, 208-378-5057.

Projects

- First Bend Project
- Lower White Pine Reconnection Project
- Lower Wenatchee Instream Flow Project
- Lower Wenatchee Instream Flow Project (Pioneer Dam Removal)
- Upper Chumstick Barriers Project (Saliby)

Sponsors

- Chelan County Natural Resources Department (CCNRD)
- Yakama Nation
- Trout Unlimited – Washington Water Project (TU-WWP)

Partners

- USFWS
- BPA
- WDFW
- Burlington Northern Santa Fe (BNSF)
- Forsgren and Associates, Inc.
- Public Utility District No. 1 of Chelan County (PUD No. 1)

Funding Sources

- USFWS
- Yakama Nation and Yakama Nation Accord
- Salmon Recovery Foundation Board (SRFB)
- NFWF – Columbia Basin Water Transactions Program (NFWF-CBWTP)
- BPA – Fish and Wildlife Program
- Reclamation
- USFWS
- WDOE and Office of the Columbia River Program (CRP)
- Washington State Recreation and Conservation Office (RCO) - SRFB
- WDFW
- Washington Conservation Commission (WCC) - Irrigation Efficiencies Program
- UCSRB
- PUD No. 1 - Rock Island Habitat Conservation Plan Tributary Committee (Tributary)
- PUD No. 2 of Grant County
- PRCC Hatchery Subcommittee
- Cascadia Conservation District (CCD)
- Pioneer Water User Association (PWUA)

Bureau of Reclamation Expenditures in 2013

Subbasin	Expenditures
Wenatchee River	\$ 1,036,735

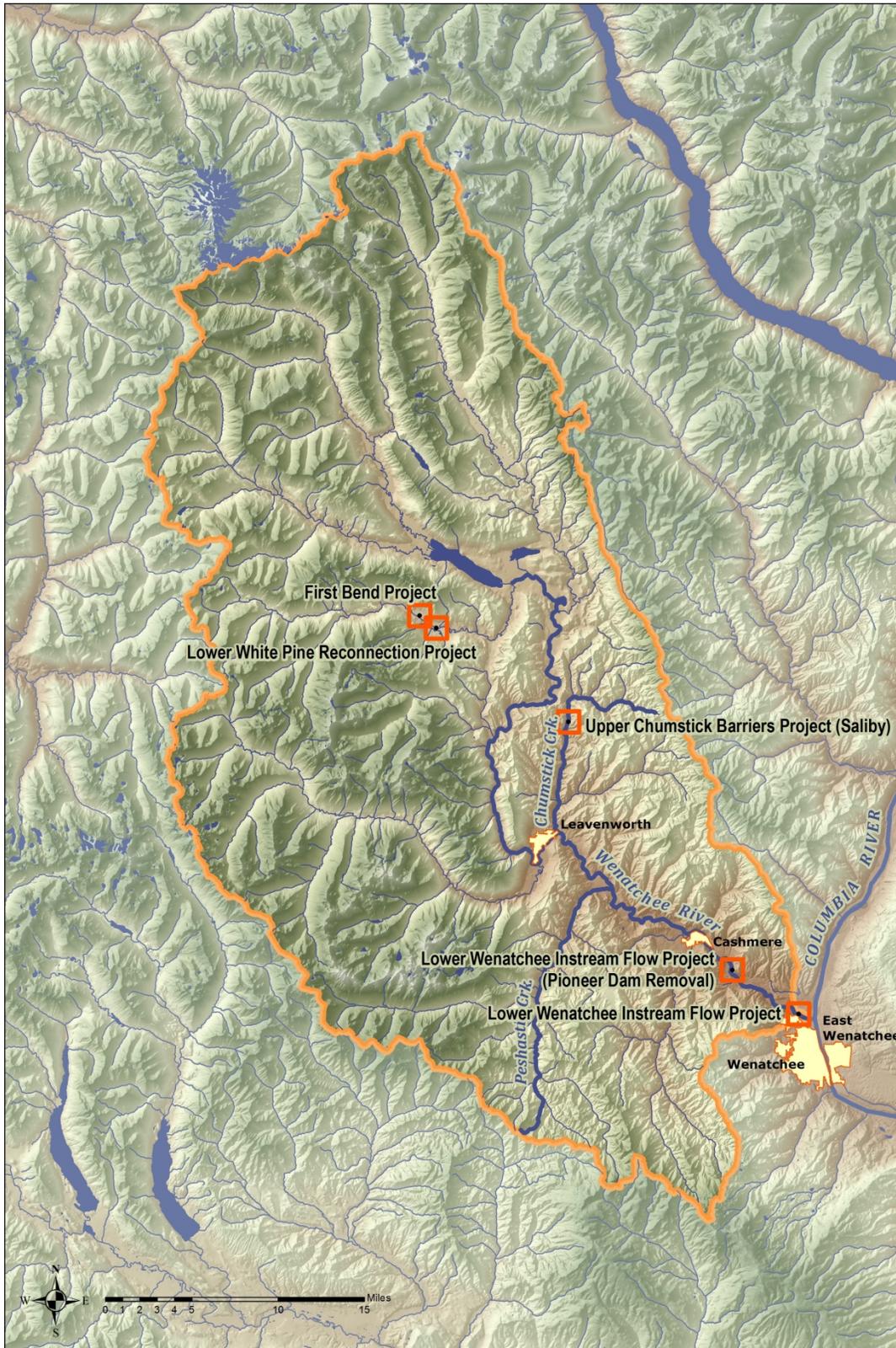


Figure 10. Location map of the projects completed in the Wenatchee River subbasin in 2013.

First Bend Project

Project Name: First Bend Project				
Project Action: Installation of five LWM structures, bank sloping, and riparian vegetation planting, addition of wood along river margins, stabilization of natural jam in Lower White Pine reach				
Project Sponsor: Yakama Nation				
Project Design: Interfluve				
Landowner(s): Private landowner				
Partners: BPA		Reclamation Development Costs: Nason Creek Tributary Assessment, Lower White Pine Reach Assessment		
Funding Source(s): Yakama Nation Accords		Implementation Cost: \$350,000		
Project Location:	State: Washington		County: Chelan	
	Stream: Nason Creek			
	Latitude: 47° 46' 40.95" N		Longitude: 120° 49' 44.11" W	
	Township: 26N	Range: 16E	Section: 3	¼ Section: NW
Project Status: Complete				
Project Phase: Monitoring				
Milestones	Funding: Secured			
	Design: Completed			
	Permitting: Completed			
	Construction Start Date: July 2013			
Construction Completion Date: August 2013				
Contracting	Advertised: N/A			
	Awarded: N/A			
Biological Benefit	Species: Steelhead, spring Chinook salmon			
	Benefit Type: Restore main channel function			
Metric: 0.13 miles (700 feet) of increased complexity and floodplain enhancement				
Project Objectives and Description: Increase LWM habitat and LWM recruitment through installation of LWM structures and riparian planting.				
Design, Permitting, and Construction Issues: N/A				

Gallery:



Photograph 89. First Bend Project: Project area before implementation.



Photograph 90. First Bend Project: First crossing after project completion.

Lower White Pine Reconnection Project

Project Name: Lower White Pine Reconnection Project					
Project Action: Channel complexity, channel access					
Project Sponsor: CCNRD					
Project Design: Reclamation IDIQ (ICF)					
Landowner(s): BNSF					
Partners: BPA, BNSF			Reclamation Development Costs: \$2,386,000		
Funding Source(s): PRCC, SRFB, BPA, Reclamation			Implementation Cost: \$1,546,747, does not include \$900,000 mitigation and maintenance payment to BNSF		
Project Location:	State: Washington		County: Chelan		Stream: Nason Creek
	Latitude: 47° 46' 6.53"		Longitude: 120° 48' 27.29"		
	Township: 26 N	Range: 16 E	Section: 11	¼ Section: NE	
Project Status: , Complete					
Project Phase: Monitoring					
Milestones	Funding: Secured				
	Design: Completed				
	Permitting: Completed				
	Construction Start Date: July 1, 2013				
	Construction Completion Date: October 22, 2013				
Contracting	Advertised: May 20, 2013				
	Awarded: June 24, 2013 (Hurst Construction)				
Biological Benefit	Species: Spring Chinook salmon, steelhead				
	Benefit Type: Full barrier removed				
Metric: Full barrier removal opening up access to 4,200 feet (0.8 miles) and 152 acres of secondary/off-channel and floodplain habitat. Additionally this action opened access to 0.75 miles on Roaring Creek (tributary stream), and 0.25 miles on Coulter Creek (tributary streams).					
Project Objectives and Description: Around 1900, the railroad constructed a dyke which isolated portions of Nason Creek from fish access. This project installed a new 86-foot bridge span to replace the previous culvert barrier on the railroad track and now allows ESA-listed salmonids to access the previously disconnected habitat for spawning and juvenile rearing. This project reconnects 152 acres of off-channel and floodplain habitats of Nason Creek,					

Project Name: Lower White Pine Reconnection Project

as well as reconnecting five smaller tributary streams which make up 15 percent of the total Nason Creek drainage area.

Design, Permitting, and Construction Issues: Initially, the project was envisioned as four bridges, then two, and finally one. The topography of this area is such that a “flow through” channel(s), as originally envisioned, was not geomorphologically feasible without significant rechanneling of Nason Creek. Project challenges on the BNSF right-of-way included significant public - private coordination issues which impacted the sponsor’s control over the project. Construction activity was heavily limited by train traffic, and as such, took longer than initially anticipated during pile-driving operations.

Gallery:



Photograph 91. Lower White Pine Reconnection Project: Culvert removal and bridge construction activities. Note the plastic barrier in the foreground to limit sedimentation and debris discharge into Nason Creek.



Photograph 92. Lower White Pine Reconnection Project: Culvert removal and bridge construction activities. Note the plastic barrier in the foreground to limit sedimentation and debris discharge into Nason Creek.



Photograph 93. Lower White Pine Reconnection Project3: Completed bridge.



Photograph 94. Lower White Pine Reconnection Project: Newly-connected habitat obtained through the elimination of the railroad grade culverts.

Lower Wenatchee Instream Flow Project

Project Name: Lower Wenatchee Instream Flow Project					
Project Action: Restore Instream Flows					
Project Sponsor: Trout Unlimited-Washington Water Project					
Project Design: Trout Unlimited/Forsgren and Associates. Inc.					
Landowner(s): Various private landowners					
Partners: Forsgren, PUD, BPA, WDFW,			Reclamation Development Costs: \$93,000		
Funding Source(s): BPA, WDOE, SRFB, Yakama Nation, WDFW, PRCC, WCC, Tributary Fund			Implementation Cost: \$2.9 million		
Project Location:	State: Washington		County: Chelan		Stream: Wenatchee River
	Latitude: 47° 27' 33.97" N		Longitude: 120° 20' 12.85" W		
	Township: 23N	Range: 20E	Section: 28	¼ Section: NW	
Project Status: Complete					
Project Phase: Monitoring					
Milestones		Funding: Secured			
		Design: Completed			
		Permitting: Completed			
		Construction Start Date: November 5, 2012			
		Construction Completion Date: April 11, 2013			
Contracting		Advertised: September 4, 2012			
		Awarded: Pipe of Washington			
Biological Benefit		Species: Spring Chinook salmon, steelhead, bull trout			
		Benefit Type: Instream flow			
Metric: 38.27 cfs increased instream flow for 7 miles; permanent, year-round					
Project Objectives and Description: This project resulted in changing a gravity earthen canal system into pressurized pump-back system to keep 38.27 cfs in the lower 7 miles of the Wenatchee River. TU Washington Water Project partnered with PWUA to make this project happen. In 2008, TU approached PWUA with a proposal to install a pump station at the confluence of the Wenatchee and Columbia rivers and pump the water back up the existing right-of-way in an enclosed pressurized system. Pipe of Washington, Pasco,					

Project Name: Lower Wenatchee Instream Flow Project

Washington, (POW) was awarded the contract to do the project. Groundbreaking was November 5, 2012, and for the next 5-plus months, the team and POW transformed the once earthen canal into a state of the art pressurized irrigation system, using less than half as much water as before.

In August 2013, the PWUA diversion dam was removed from its current location and the Wenatchee River side channel was returned back to its original profile. This work occurred with the addition of some localized habitat work in the side channel.

All in all, PWUA shareholders are happy with the new pressurized and the work that TU and POW performed.

Design, Permitting, and Construction Issues: The design and engineering was done by Forsgren and Associates, Inc. in Wenatchee and they were a big part of the team from start to finish, working closely with TU and PWUA to make the project a success. This project required 17 different permits, had 11 different funders, and cost approximately \$3.5 million in total.

POW was a good partner in the construction of the PWUA pump project. They were willing to make changes when asked to do so and were always looking for ways to save construction cost on the project.

Gallery:



Photograph 95. Lower Wenatchee Instream Flow Project: Inside the new pump-back station.



Photograph 96. Lower Wenatchee Instream Flow Project: Laying pipe for the pressurized system.



Photograph 97. Lower Wenatchee Instream Flow Project: Laying pipe for the pressurized system.



Photograph 98. Lower Wenatchee Instream Flow Project: View of pump back station on the banks of the Wenatchee River. The Columbia River is just beyond the bridge.

Lower Wenatchee Pioneer Dam Removal

Project Name: Lower Wenatchee Pioneer Dam Removal			
Project Action: Removed abandoned diversion dam			
Project Sponsor: Trout Unlimited (TU)			
Project Design: Forsgren Associates			
Landowner(s): Pioneer Water Users Association			
Partners: BPA, WDFW, TU		Reclamation Development Costs: See Lower Wenatchee Instream Completion Report	
Funding Source(s): NFWF - Columbia Basin Water Transactions Program; BPA - Fish and Wildlife Program; Reclamation; USFWS; WDOE - Office of the CRP; Washington State RCO – SRFB; WDFW; WCC – Irrigation Efficiencies Program; UCSRB; PUD No. 1 – Rock Island Habitat Conservation Plan Tributary Committee; PUD No. 2 – PRCC; Yakama Nation; CCD; PWUA			
Project Location:	State: Washington	County: Chelan	Stream: Wenatchee River
	Latitude: 47° 29' 37.19" N		Longitude: 120° 25' 16.48" W
	Township: 23 N	Range: 19 E	Section: 14
Project Status: Complete			
Project Phase: Monitoring			
		Design: Completed	
		Permitting: Completed	
		Construction Start Date: August 12, 2013	
		Construction Completion Date: August 26, 2013	
Contracting		Advertised:	
		Awarded: Pipe of Washington Contracting, Inc.	
Biological Benefit		Species: Spring Chinook salmon, steelhead	
		Benefit Type: Access - Partial barrier removal	
Metric: Partial barrier removal (Pioneer Dam); 0.1 miles access to the top of the side channel			
Project Objectives and Description: This project removed the historic side-channel-spanning Pioneer Diversion Dam, making the Wenatchee River free of dams until the Dryden Dam. The Pioneer Diversion Dam became obsolete after the completion of the newly installed pump-back system downstream at the confluence of the Wenatchee and			

Project Name: Lower Wenatchee Pioneer Dam Removal

Columbia rivers. The removal of the dam opened up passage on the side-channel where the dam was located and added some additional complexity and juvenile rearing habitat. In addition to the removal of the dam, TU-WWP also installed root wads and log structures at the old damsite to enhance habitat in the side channel.

Design, Permitting, and Construction Issues: N/A

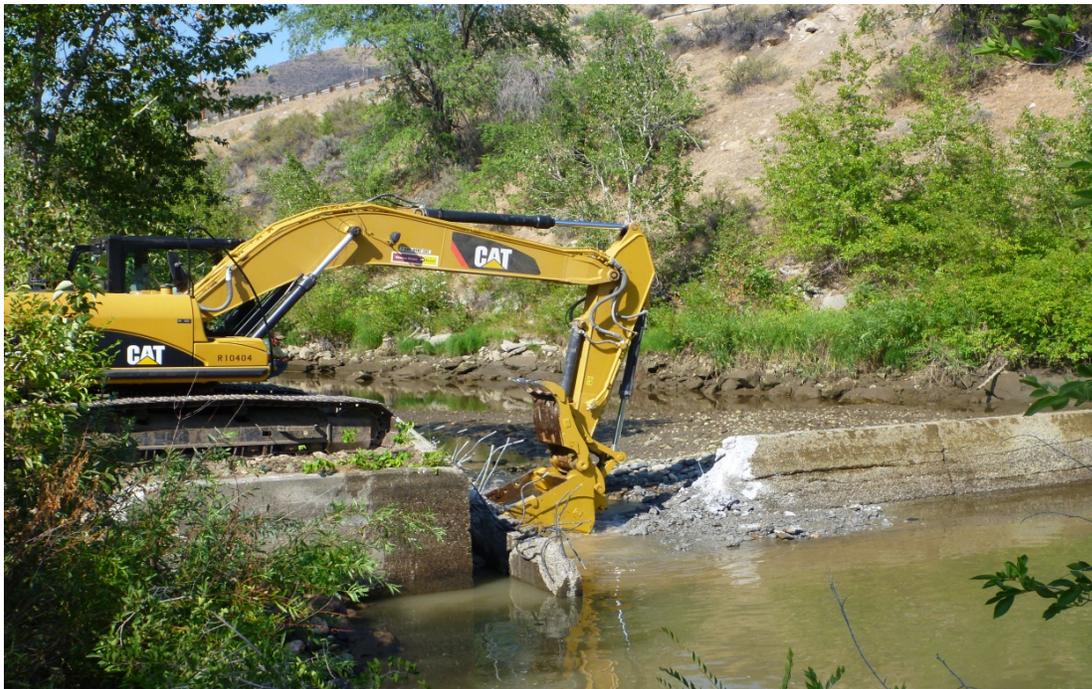
Gallery:



Photograph 99. Lower Wenatchee Instream Flow Project (Pioneer Dam Removal): Pioneer Diversion Dam before removal.



Photograph 100. Lower Wenatchee Instream Flow Project (Pioneer Dam Removal): After removal of Pioneer Dam, March 2014.



Photograph 101. Lower Wenatchee Instream Flow Project (Pioneer Dam Removal): Breaching the dam.



Photograph 102. Lower Wenatchee Instream Flow Project (Pioneer Dam Removal): Root wads and log structures were installed at the old damsite to enhance habitat in the side channel.



Photograph 103. Lower Wenatchee Instream Flow Project (Pioneer Dam Removal): Damsite after removal.

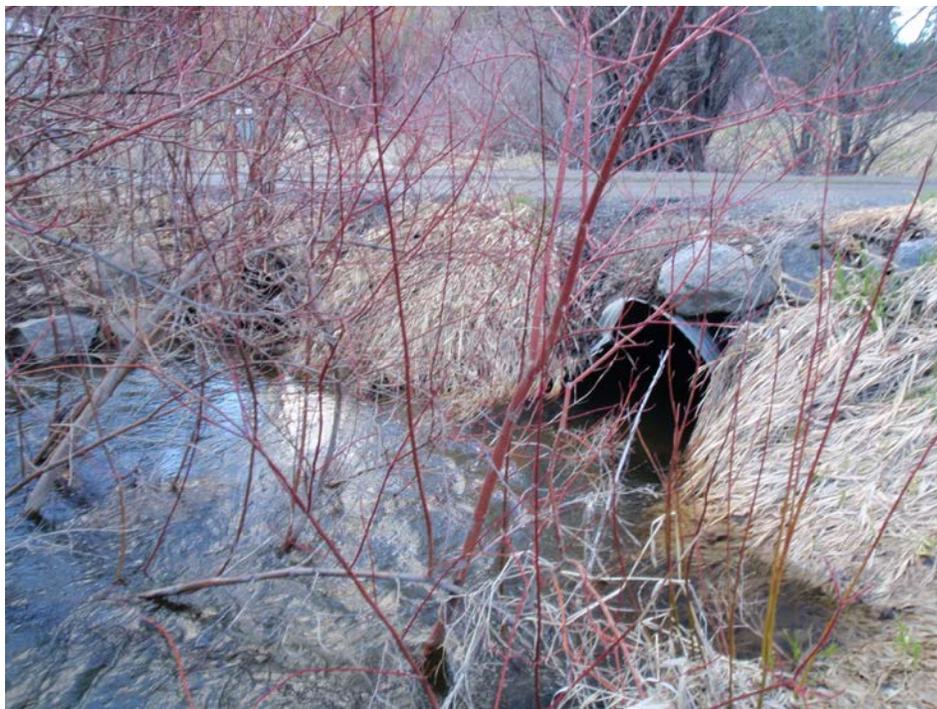
Upper Chumstick Barriers Project (Saliby)

Project Name: Upper Chumstick Barriers Project (Saliby)					
Project Type: Barrier Removal					
Project Sponsor: CCNRD					
Project Design: Reclamation					
Landowner(s): Private landowner					
Partners: USFWS			Reclamation \$384,000 (includes Cahail, Scheibler, Cann, Ott, and Baumann)		
Funding Source(s): USFWS, SRF Board			Implementation Cost: \$89,105 (Saliby only)		
Project Location:	State: Washington		County: Chelan		Stream: Chumstick Creek
	Latitude: 47° 41' 43" N		Longitude: 120° 38' 17.142" W		
	Township: 25N	Range: 18E	Section: 6	¼ Section: NE	
Project Status: Complete					
Project Phase: Monitoring					
Milestones	Funding: Secured				
	Design: Completed				
Contracting	Permitting: Completed				
	Construction Start Date: September 6, 2013				
	Construction Completion Date: October 31, 2013				
Biological Benefit	Advertised: July 22, 2013				
	Awarded: August 12, 2013 (Olin Construction)				
Biological Benefit	Species: Steelhead, spring Chinook salmon				
	Benefit Type: Access - partial barrier removal				
Metric: 1.8 miles of increased access (includes Cahail, Scheibler, Saliby, Cann, Ott, and Baumann stream crossings)					
Project Objectives and Description: This barrier removal was the last known passage barrier to the historic use of Chumstick Creek by ESA-listed species. This project completes a larger project, the Chumstick Creek Restoration Project, which provides passage to 8.8 miles of spawning, rearing and overwintering habitat for steelhead, spring Chinook salmon and bull trout. This project removed a barrier culvert that was a partial passage barrier and replaced it with a bridge. This, combined with Cann, Baumann, Scheibler, Ott, and Cahail projects, allows passage for an additional 1.8 miles upstream.					

Project Name: Upper Chumstick Barriers Project (Saliby)

Design, Permitting, and Construction Issues: Project design was provided by the NRCS Engineer. Landowner approval was reached by agreement to relocate the access road downstream parallel to the property boundary. This allowed use of the existing access road during construction of the bridge. Through a separate procurement contract the bridge was purchased from Pacific Bridge for \$36,427, including installation. A site-preparation contract including removal of the existing culvert was awarded to Olin Construction for \$39,038. Permitting was completed by CCNRD staff. A separate contract with Cascadia Archeology met the requirement for an archeologist to be on site during excavation. Revegetation was provided by USFWS and CCNRD staff.

Gallery:



Photograph 104. Upper Chumstick Barriers Project (Saliby): Project site before implementation.



Photograph 105. Upper Chumstick Barriers Project (Salby): Project site after completion.

