

RECLAMATION

Managing Water in the West

Bureau of Reclamation's 2012 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

April 2013

MISSION OF THE U.S. DEPARTMENT OF THE INTERIOR

PROTECTING AMERICA'S GREAT OUTDOORS AND POWERING OUR FUTURE

The U.S. Department of the Interior protects America's natural resources and heritage, honors our cultures and tribal communities, and supplies the energy to power our future.

MISSION OF THE BUREAU OF RECLAMATION

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 M2 Whitefish Island Improvement Project, looking up the side channel from the highway, November 9, 2012.

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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 Federal Columbia River Power System 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 spring Chinook salmon (*Oncorhynchus tshawytscha*) (endangered), Mid-Columbia River 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, Confederated Tribes of the Warm Springs Reservation of Oregon, 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 2012 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, and does not engage in project-level effectiveness monitoring in these subbasins. 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 2012 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.

2012 Activities

In 2012, 22 fish habitat improvement projects were completed in the following 9 subbasins of the Columbia River Basin:

- Lemhi River
- Pahsimeroi River
- Upper Salmon River
- Grande Ronde River
- Middle Fork John Day River
- Upper John Day River
- Entiat 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; the construction of engineered log jams to create pools and fish cover; and the improvement or construction of 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 2012 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 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 2012, 6 projects were completed in the Lemhi River subbasin, 1 was completed in the Pahsimeroi River subbasin, and 1 project was 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 2012

Subbasin	Expenditures
Lemhi River	\$572,100
Pahsimeroi River	\$175,761
Upper Salmon River	\$1,909,515
Total	\$2,657,376

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 2012, six projects were completed in the subbasin that improved fish passage, habitat access, streamflows, channel complexity, and removed barriers and entrainment potential.

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

- Canyon Creek Culvert Replacement Project
- Fourth of July Creek Culvert Replacement Project
- Fourth of July Creek Culvert Replacement Project
- L-50 Diversion Closure Project
- Lower Little Springs Channel Complexity Project
- Upper Little Springs Channel Complexity Project

Sponsors

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

Partners

- Private landowners
- LSWCD
- IDFG

- The Nature Conservancy (TNC)
- State of Idaho, Office of Species Conservation (OSC)
- Upper Salmon Basin Watershed Program (USBWP)
- Idaho Department of Water Resources (IDWR)
- Natural Resources Conservation Service (NRCS)
- Trout Unlimited
- Lemhi County

Funding Sources

- Bonneville Power Administration (BPA)
- NOAA Fisheries Service
- Landowners
- Trout Unlimited
- Pacific Coastal Salmon Recovery Fund (PCSRF)

Bureau of Reclamation Expenditures in 2012

Subbasin	Expenditures
Lemhi River	\$572,100

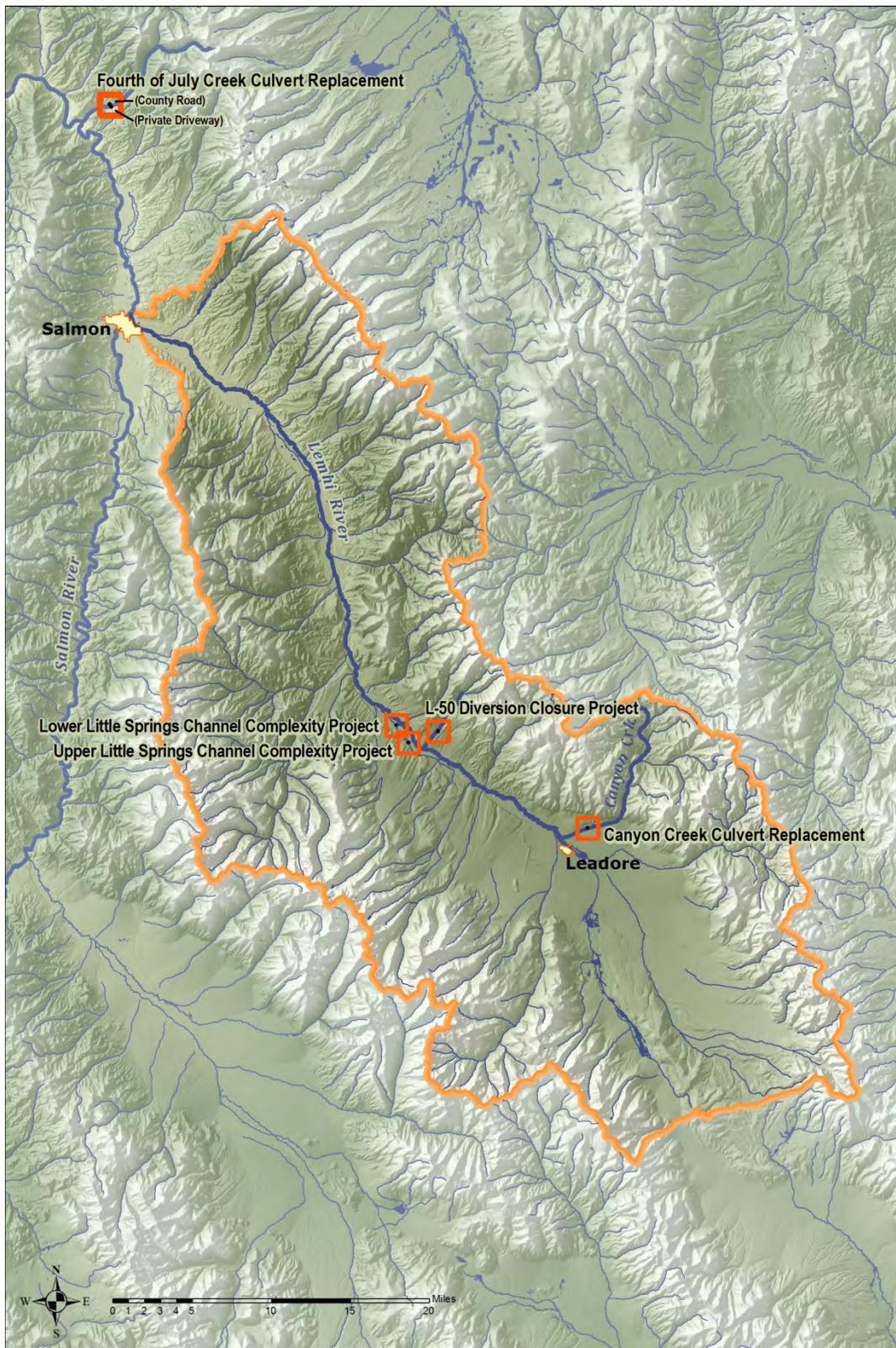


Figure 2. Location map of the projects completed in the Lemhi River subbasin in 2012.

Canyon Creek Culvert Replacement Project

Project Name: Canyon Creek Culvert Replacement (County Road)			
Project Type: Channel access			
Project Sponsor: Trout Unlimited			
Project Design: Bureau of Reclamation			
Landowner(s): Lemhi County			
Partners: Idaho & Montana Trout Unlimited, OSC, and USBWP		Reclamation Development Costs: \$122,691	
Funding Source(s): BPA (Accord)		Implementation Cost: \$137,000	
Project Location:	State: Idaho	County: Lemhi	Stream: Canyon Creek
	Latitude: 44 41' 31.53" N		Longitude: 113. 21' 14.43" W
	Local Landmark: Old Lemhi Road, ½-half mile from intersection with SH-29		
	Township: 16N	Range: 21E	Section: 28 ¼ Section: NE of NE
Project Status: Complete			
Project Phase: Complete			
Milestones	Funding: Secured		
	Design: Completed		
	Permitting: Completed		
	Construction Start Date: November 20, 2012		
	Construction Completion Date: December 7, 2012		
Contracting	Advertised: September 20, 2012		
	Awarded: November 2012		
Biological Benefit	Species: Chinook salmon, steelhead, bull trout		
	Benefit Type: Improve fish passage, full culvert removal		
Metric: 1.0 mile made accessible			
Project Objectives and Description: The objective of the project was to improve fish passage in Canyon Creek. Canyon Creek is a tributary to the Lemhi River. A 6-foot diameter corrugated metal pipe (i.e., culvert) conveyed Canyon Creek beneath a county road. The culvert was considered to be a velocity barrier to some or all stages of ESA-listed anadromous and resident species of fish.			

Project Name: Canyon Creek Culvert Replacement (County Road)

The project entailed construction of a temporary bypass for traffic; removal of the culvert and associated earthen fill; reconstruction of the streambanks and channel; installation of a 24-foot by 30-foot pre-fabricated modular steel bridge; placement of riprap along streambanks; and placement of asphalt road surfaces.

Design, Permitting, and Construction Issues: Trout Unlimited obtained project funding from the BPA (Idaho Accord) which, in Idaho, is administered by the OSC. Trout Unlimited coordinated with the County and adjacent landowners, acquired necessary permits, and contracted for and managed construction. Reclamation provided technical assistance to Trout Unlimited by providing a topographic survey, geologic investigation, engineering and design, cultural resource survey and clearance from the Idaho State Historic Preservation Office, environmental compliance, and permitting.

Gallery:

Canyon Creek Culvert Replacement Figure 1: Project location.



Canyon Creek Culvert Replacement Photograph 1: Canyon Creek crossing before the project.



Canyon Creek Culvert Replacement Photograph 2: Canyon Creek crossing after the project.

Fourth of July Creek Culvert Replacement Project

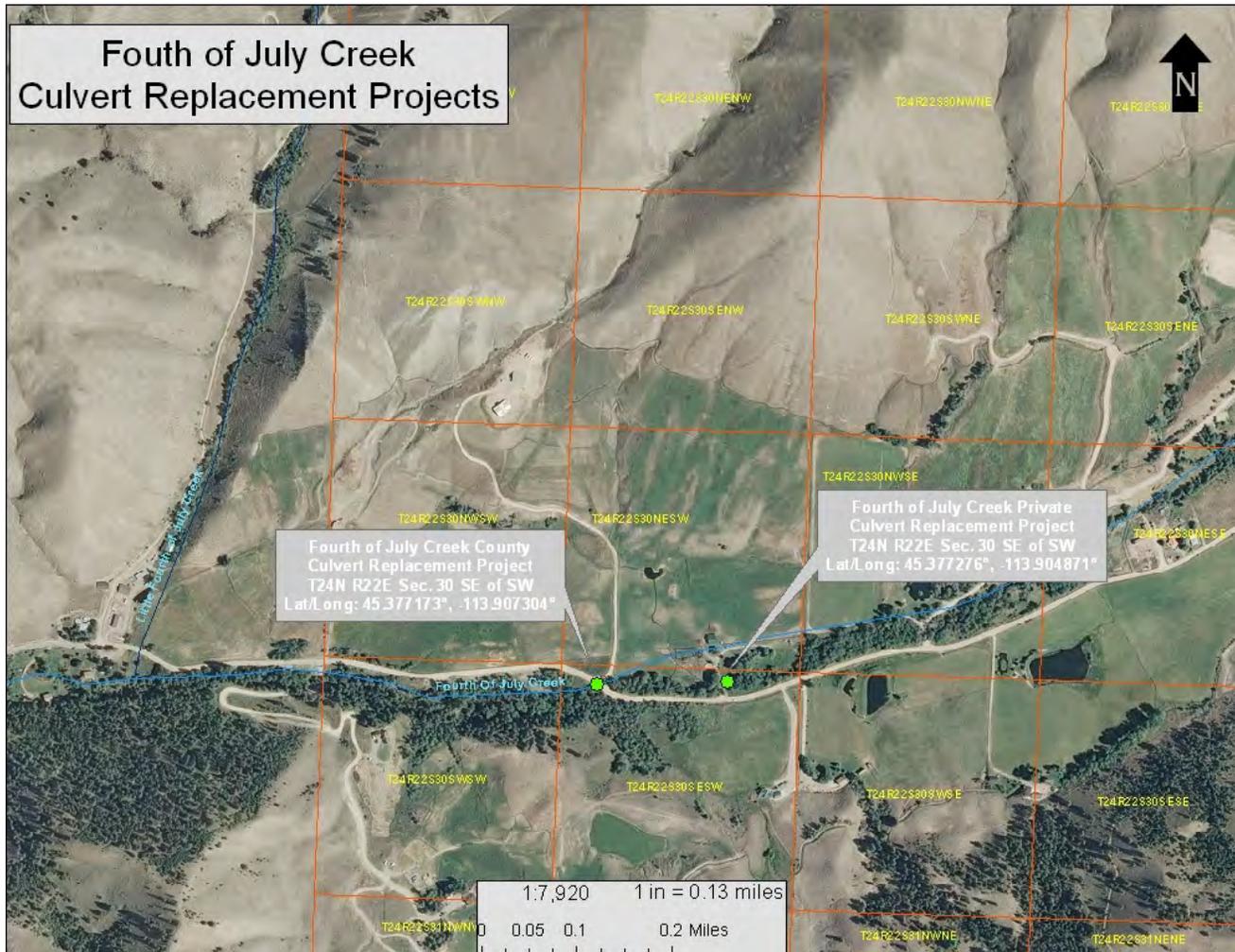
Project Name: Fourth of July Creek Culvert Replacement (County Road)					
Project Type: Channel access					
Project Sponsor: LSWCD					
Project Design: Idaho Soil Conservation Commission (ISCC)					
Landowner(s): Lemhi County					
Partners: LSWCD, Lemhi County, OSC, and USBWP			Reclamation Development Costs: \$2,500		
Funding Source(s): NOAA Fisheries Service (PCSRF), BPA (Accord)			Implementation Cost: \$144,000		
Project Location:	State: Idaho		County: Lemhi	Stream: Fourth of July Creek	
	Latitude: 45 22'45.37" N		Longitude: 113 54'26.99" W		
	Township: 24N	Range: 22E	Section: 30	¼ Section: SE of SW	
Project Status: Complete					
Project Phase: Complete					
Milestones	Funding: Secured Design: Completed Permitting: Completed Construction Start Date: October 2012 Construction Completion Date: October 2012				
Contracting	Advertised: August 2012 Awarded: September 2012				
Biological Benefit	Species: Chinook salmon, steelhead, bull trout Benefit Type: Improve fish passage, full culvert removal				
Metric: 0.1 mile made accessible					
Project Objectives and Description: The objective of the project was to improve fish passage in Fourth of July Creek which is a tributary to the Salmon River. A corrugated metal pipe (i.e., culvert) conveyed Fourth of July Creek beneath a County road. The culvert was considered to be a velocity barrier to some or all stages of ESA-listed anadromous and resident species of fish.					

Project Name: Fourth of July Creek Culvert Replacement (County Road)

The project entailed removal of the culvert and associated earthen fill; reconstruction of the streambanks and channel; installation of a pre-fabricated modular steel bridge; and placement of riprap along streambanks.

Design, Permitting, and Construction Issues: The Upper Salmon Basin Watershed Program and LSWCD obtained project funding from the NOAA Fisheries Service (Pacific Coast Salmon Recovery Fund) and BPA (Idaho Accord) which in Idaho are both administered by the OSC. LSWCD and USBWP coordinated with the County and regulatory agencies, acquired necessary permits and provided a contractor to assist the County Road and Bridge Department during bridge installation. Reclamation provided technical assistance to USBWP and OSC with provision of a cultural resource survey and clearance from the Idaho State Historic Preservation Office.

Gallery:



Fourth of July Creek Culvert Replacement Project Photograph 1: Aerial view of the project location.



Fourth of July Creek Culvert Replacement Project Photograph 2: County Road crossing before the project.



Fourth of July Creek Culvert Replacement Project Photograph 3: County Road crossing after the project.



Fourth of July Creek Culvert Replacement Project Photograph 4: County Road after the project.

Fourth of July Creek Culvert Replacement Project

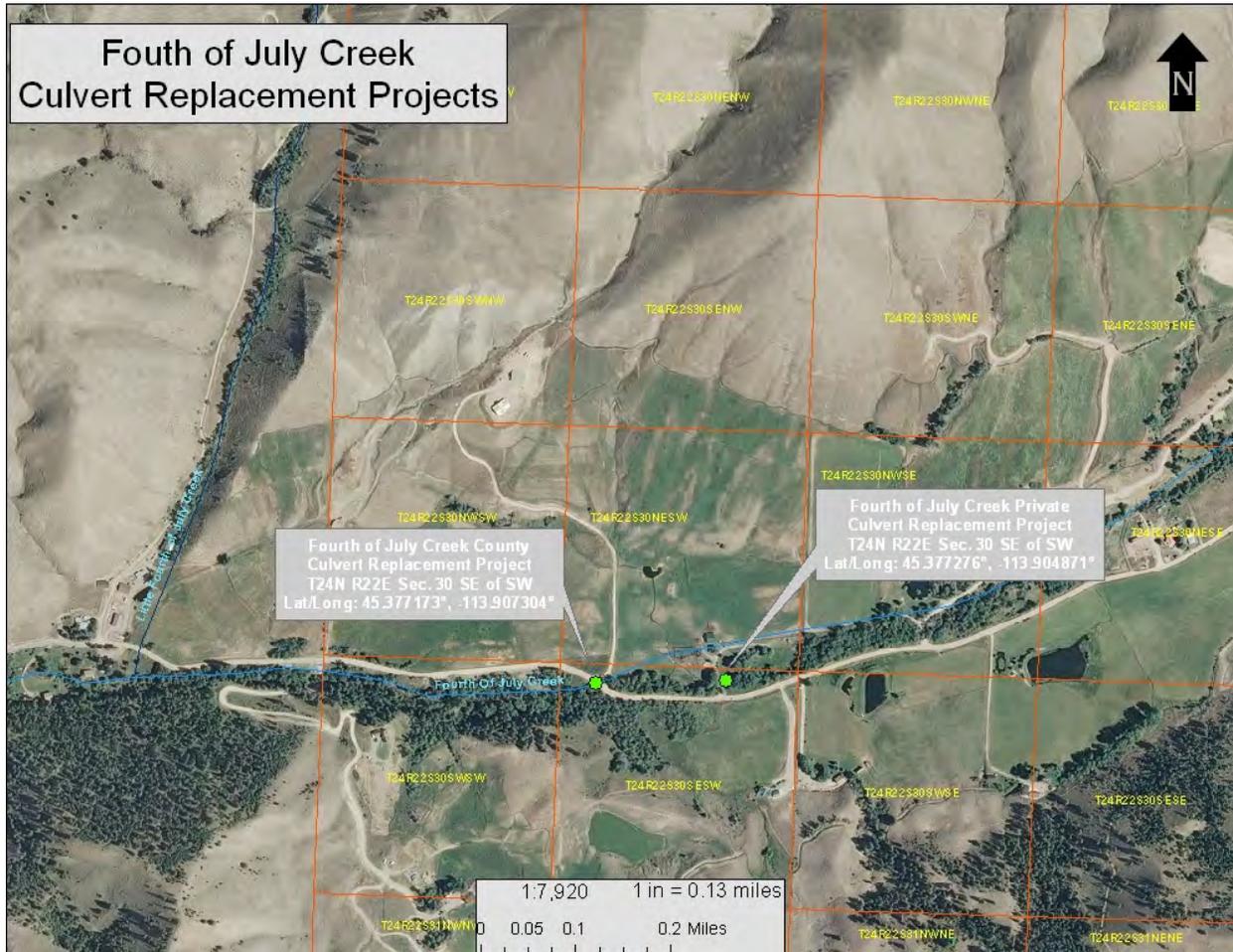
Project Name: Fourth of July Creek Culvert Replacement (Private Driveway)				
Project Type: Channel access				
Project Sponsor: LSWCD				
Project Design: Idaho Soil Conservation Commission (ISCC)				
Landowner(s): Private Landowner				
Partners: LSWCD, Landowner, OSC, and USBWP			Reclamation Development Costs: \$2,500	
Funding Source(s): NOAA Fisheries (PCSRF), BPA (Accord)			Implementation Cost: \$66,150	
Project Location:	State: Idaho		County: Lemhi	Stream: Fourth of July Creek
	Latitude: 45 22'37.37.90" N		Longitude: 113 54'17.34" W	
	Township: 24N	Range: 22E	Section: 30	¼ Section: SE of SW
Project Status: Complete				
Project Phase: Complete				
Milestones	Funding: Secured			
	Design: Completed			
Contracting	Permitting: Completed			
	Construction Start Date: October 2012			
	Construction Completion Date: November 2012			
Biological Benefit	Advertised: August 2012			
	Awarded: September 2012			
Biological Benefit	Species: Chinook salmon, steelhead, bull trout			
	Benefit Type: Improved fish passage, full culvert removal			
Metric: 8.4 miles made accessible				
Project Objectives and Description: The objective of the project was to improve fish passage in Fourth of July Creek, a tributary to the Salmon River. A corrugated metal pipe (i.e., culvert) conveyed Fourth of July Creek beneath a private driveway. The culvert was considered to be a velocity barrier to some or all stages of ESA-listed anadromous and resident species of fish.				

Project Name: Fourth of July Creek Culvert Replacement (Private Driveway)

The project entailed removal of the culvert and associated earthen fill, reconstruction of the streambanks and channel, installation of a pre-fabricated modular steel bridge, diversion headgate and pipe, and placement of riprap along streambanks.

Design, Permitting, and Construction Issues: The Upper Salmon Basin Watershed Program and LSWCD obtained project funding from the NOAA Fisheries Service (Pacific Coast Salmon Recovery Fund) and BPA (Idaho Accord) which in Idaho are both administered by the OSC. LSWCD and USBWP coordinated with the landowner and regulatory agencies, acquired necessary permits, and contracted and managed construction. Reclamation provided technical assistance to USBWP and OSC with the provision of a cultural resource survey and clearance from the Idaho State Historic Preservation Office.

Gallery:



Fourth of July Creek Culvert Replacement Project Photograph 1: Aerial view of project location.



Fourth of July Creek Culvert Replacement Project Photograph 2: Private drive crossing before project.



Fourth of July Creek Culvert Replacement Project Photograph 3: Private drive crossing after project.



Fourth of July Creek Culvert Replacement Project Photograph 4: Private drive after project.

L-50 Diversion Closure Project

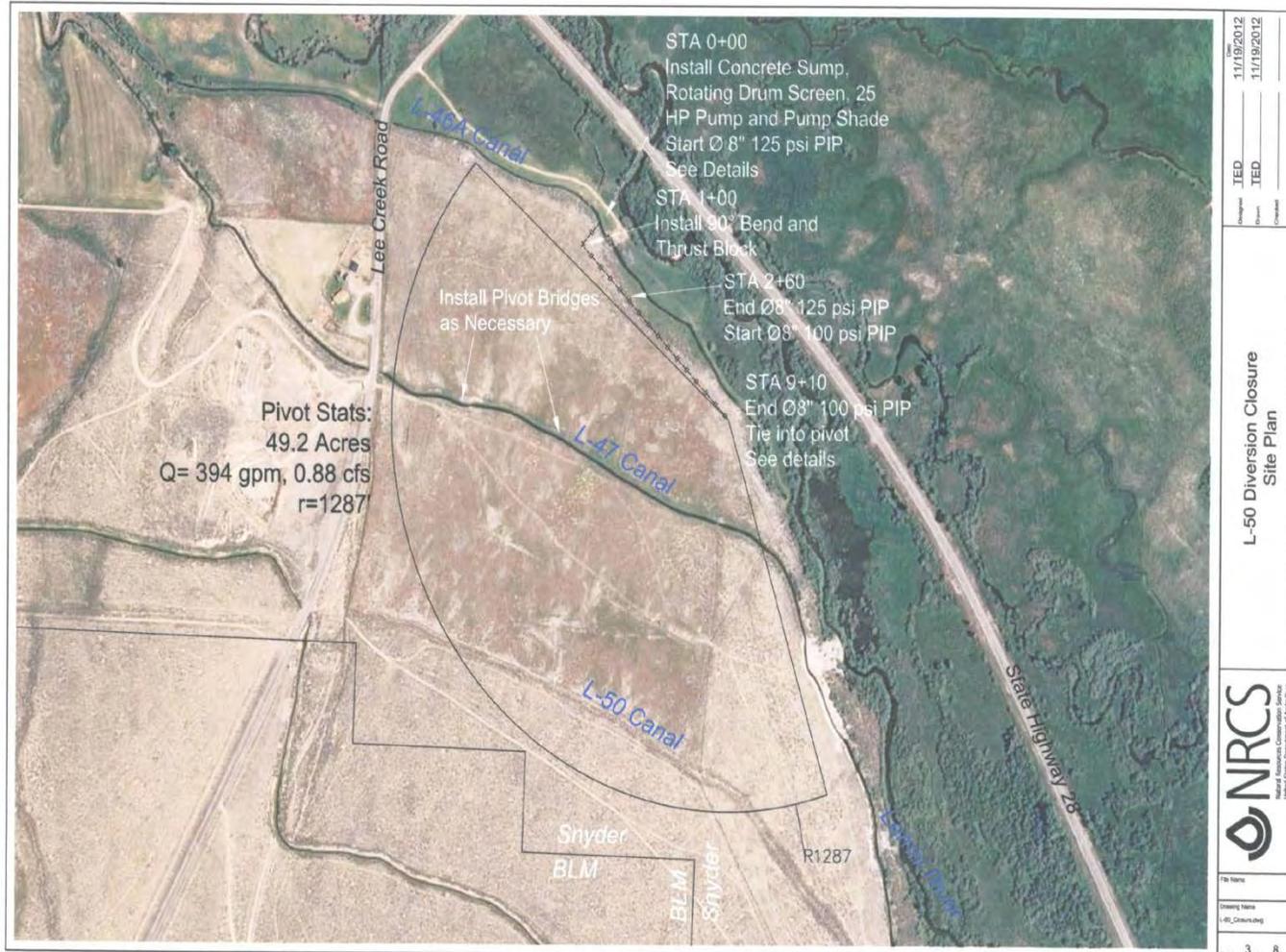
Project Name: L-50 Diversion Closure			
Project Type: Entrainment			
Project Sponsor: LSWCD			
Project Design: NRCS			
Landowner(s): Private landowner			
Partners: LSWCD, Landowner, OSC, USBWP, NRCS		Reclamation Development Costs: \$2,500	
Funding Source(s): NOAA Fisheries (PCSRF), BPA (Accord)		Implementation Cost: \$135,500	
Project Location:	State: Idaho	County: Lemhi	Stream: Lemhi River and Little Springs Creek
	Latitude: 44 47' 54.04" N		Longitude: 113 32' 26.99" W
	Township: 17N	Range: 24E	Section: 23 $\frac{1}{4}$ Section:
Project Status: Complete			
Project Phase: Complete			
Milestones	Funding: Secured		
	Design: Completed		
	Permitting: Completed		
	Construction Start Date: October 2012		
	Construction Completion Date: November 30, 2012		
Contracting	Advertised: NA		
	Awarded: October 2012		
Biological Benefit	Species: Chinook salmon, steelhead, bull trout		
	Benefit Type: Stream flow, fish passage, entrainment		
Metric: 0.9 cfs, 3.5 miles affected.			
Project Objectives and Description: The objective of the project was to close the L-50 irrigation diversion from the Lemhi River and close the unscreened LSC-3 irrigation diversion on Little Springs Creek. A total of 1.8 cfs of water was diverted from L-50 and LSC-3 and conveyed 4.3 miles via an open ditch to the point of use. The project entailed transfer of the point of diversion 3.5 miles downstream to the Lemhi L-46A diversion. A new pump station and pipeline was constructed behind the existing fish screen in L-46A to convey 0.9 cfs water via a pipeline to a new sprinkler irrigation pivot. The end result being			

Project Name: L-50 Diversion Closure

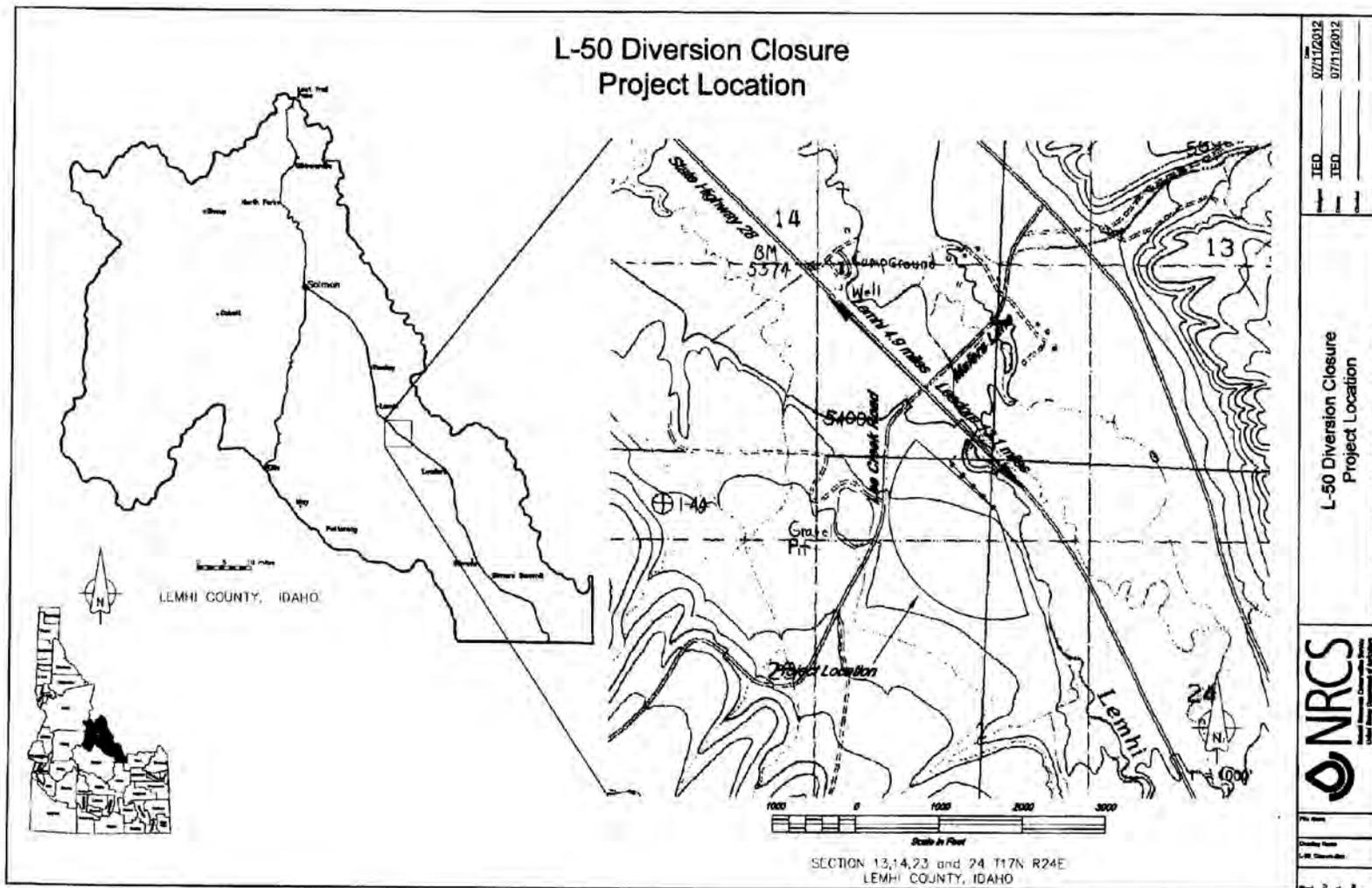
abandonment of the L-50 diversion and ditch and LSC-3 diversion and ditch.

Design, Permitting, and Construction Issues: The USBWP and LSWCD obtained project funding from the NOAA Fisheries Service (Pacific Coast Salmon Recovery Fund) and BPA (Idaho Accord) which, in Idaho, are both administered by OSC. LSWCD and USBWP coordinated with the landowner and IDWR for transfer of the point of diversion and contracted for purchase and installation of a more efficient irrigation system. Reclamation provided technical assistance to USBWP and OSC with provision of a cultural resource survey and clearance from the Idaho State Historic Preservation Office.

Gallery:



L-50 Diversion Closure Project Photograph 1: Aerial view of project location.



L-50 Diversion Closure Project Figure 1: Project location.



L-50 Diversion Closure Project Photograph 2: New irrigation pivot.



L-50 Diversion Closure Project Photograph 3: New pump station in L-46A Ditch.

Lower Little Springs Channel Complexity Project

Project Name: Lemhi Lower Little Springs Channel Complexity					
Project Type: Channel complexity					
Project Sponsor: IDFG					
Project Design: IDFG					
Landowner(s): Private Landowner					
Partners: IDFG, Landowner, OSC			Reclamation Development Costs: \$5,000		
Funding Source(s): NOAA Fisheries (PCSRF), BPA (Accord)			Implementation Cost: \$262,338		
Project Location:	State: Idaho		County: Lemhi		Stream: Lemhi River
	Latitude: 44 46'45.97" N		Longitude: 113 32'38.07" W		
	Local Landmark: Approximately 35 miles SE of Salmon, ID adjacent to SH 28				
	Township: 17N	Range: 24E	Section: 25	¼ Section:	
Project Status: Complete					
Project Phase: Complete					
Milestones	Funding: Secured Design: Completed Permitting: Completed Construction Start Date: August 2012 Construction Completion Date: September 2012				
Contracting	Advertised: July 2012				
	Awarded: August 2012				
Biological Benefit	Species: Chinook salmon, steelhead, bull trout				
	Benefit Type: Improve main channel function				
Metric: 0.4 miles of channel complexity					
Project Objectives and Description: The objective of the project was to improve fish passage, floodplain connectivity, riparian condition, fish habitat complexity, and increase available adult spawning and juvenile rearing habitat. The project entailed the construction of 0.4 miles of new stream channel to replace 0.35 miles of river channel adjacent to SH-28 that had been straightened. Bioengineering techniques were employed within the new stream channel for bank stabilization and fish habitat. A culvert near the lower end of the					

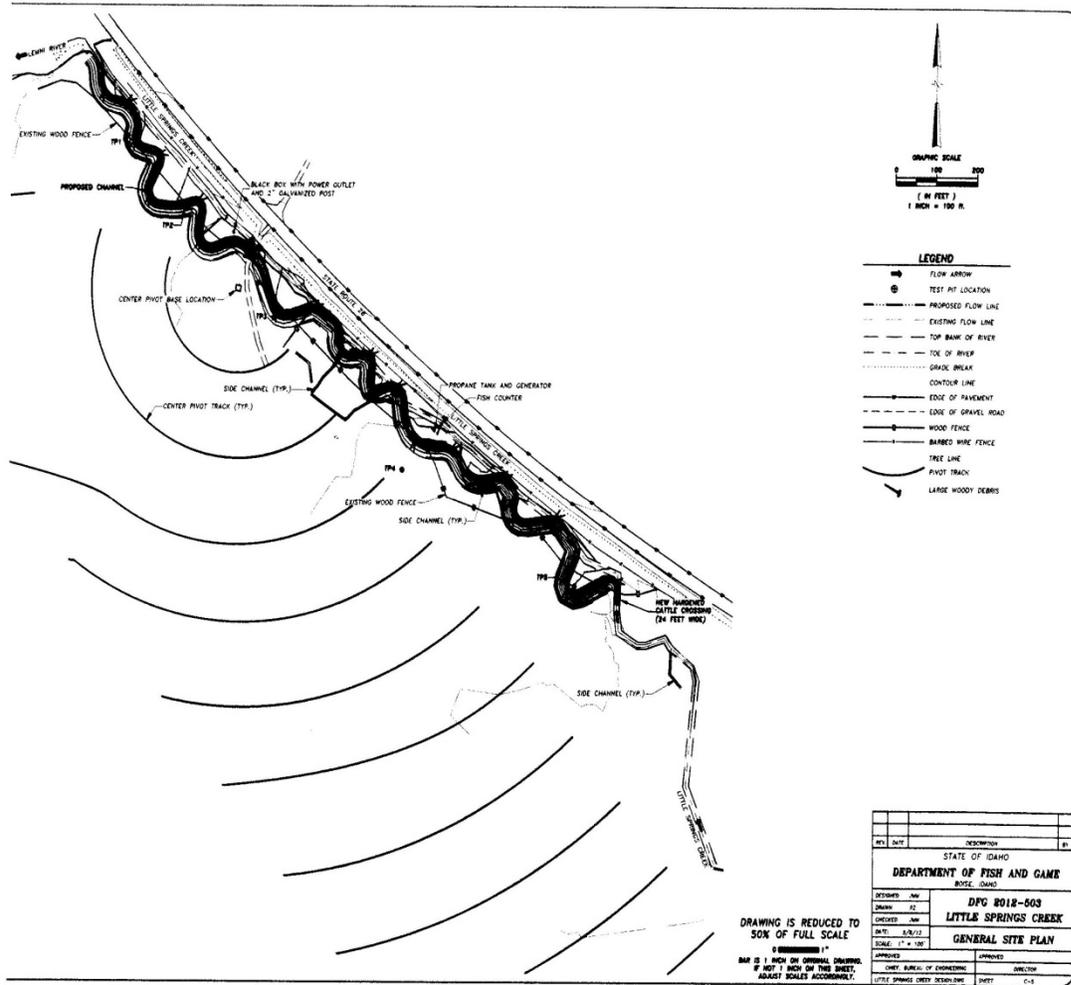
Project Name: Lemhi Lower Little Springs Channel Complexity

project reach, considered a fish passage barrier, was replaced to provide improved fish passage. Stream embankments and riparian areas were hydro-seeded, willows planted, and riparian fencing constructed to exclude livestock from accessing the newly constructed stream channel. A hardened stream crossing was constructed just above the upstream end of the project.

Design, Permitting, and Construction Issues: IDFG obtained project funding from the NOAA Fisheries Service (Pacific Coast Salmon Recovery Fund) and BPA (Idaho Accord) which, in Idaho, 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 a cultural resource survey and clearance from the Idaho State Historic Preservation Office. LiDAR data and aerial photos of the project area acquired by Reclamation were provided to IDFG for use in project planning and design. Post-project monitoring and maintenance will be conducted by IDFG.

Gallery:

Lower Little Springs Channel Complexity Photograph 1: Aerial view of Lower Little Springs Project reach.



Lower Little Springs Channel Complexity Figure 1: New Lower Little Springs channel design plans.



Lower Little Springs Channel Complexity Photograph 2: New Little Springs Creek channel after project (upstream view).



Lower Little Springs Channel Complexity Photograph 3: New Little Springs Creek channel after project (downstream view)



Lower Little Springs Channel Complexity Photograph 4: New culvert.



Lower Little Springs Channel Complexity Photograph 5: Hardened cattle crossing.

Upper Little Springs Channel Complexity Project

Project Name: Upper Little Springs Channel Complexity					
Project Type: Channel complexity					
Project Sponsor: Trout Unlimited					
Project Design: Westwater Consultants					
Landowner(s): Private landowner					
Partners: OSC, Landowners, Trout Unlimited, TNC, Reclamation			Reclamation Development Costs: \$3,000		
Funding Source(s): PCSRF, Trout Unlimited, Landowner			Implementation Cost: \$59,000		
Project Location:	State: Idaho		County: Lemhi		Stream: Lemhi River tributary
	Latitude: 44 45'35.47" N		Longitude: 113 30'11.68" W		
	Local Landmark: SH-28 Mile Marker				
	Township: 17N	Range: 25E	Section: 32,33	¼ Section:	
Project Status: Complete					
Project Phase: Complete					
Milestones	Funding: Secured				
	Design: Completed				
	Permitting: Completed				
	Construction Start Date: October 2012				
	Construction Completion Date: October 2012				
Contracting	Advertised: September 2012				
	Awarded: September 2012				
Biological Benefit	Species: Chinook salmon, steelhead, bull trout				
	Benefit Type: Improve main channel function				
Metric: 1.2 miles of channel complexity					
Project Objectives and Description: The objective of the project was to improve degraded fish habitat in the upper reach of Little Springs Creek, a tributary to the Lemhi River. This was accomplished by replacement of a culvert that was a potential fish migration barrier, stabilization of eroded streambanks, planting of riparian vegetation, and reconnecting Walters Creek with Little Springs Creek. Fish habitat quality and complexity was improved by narrowing over-widened sections of stream channel and reconstruction of					

Project Name: Upper Little Springs Channel Complexity

pools, riffles, and meanders.

Little Springs Creek is a spring-fed tributary that originates on private property that was placed under an easement agreement with The Nature Conservancy.

Improvement measures implemented in Little Springs Creek by Trout Unlimited resulted in improved and increased habitat for adult spawning and juvenile rearing. The project entailed removal of an irrigation diversion and re-establishment of streamflow from and a connection with a smaller headwater tributary called Walters Creek that historically flowed into Little Springs Creek. An undersized culvert in Little Springs Creek at the downstream end of the project area was replaced with a larger culvert to improve fish passage. At various locations throughout the 0.9-mile reach of Little Springs and 0.3-mile reach of Walters Creek, bioengineering and other treatments were implemented to improve degraded fish habitat, stabilize eroded streambanks, and re-establish riparian vegetation.

Design, Permitting, and Construction Issues: Trout Unlimited applied for and obtained project funding from the NOAA Fisheries Service (Pacific Coast Salmon Recovery Fund) which is administered in Idaho by OSC. Additional funding/cost share was provided by Trout Unlimited and the landowner. Trout Unlimited coordinated with the landowner and regulatory agencies, acquired necessary permits, and contracted for and managed construction. Reclamation provided technical assistance to Trout Unlimited with completion of a cultural resource survey for the project area and attained clearance from the Idaho State Historic Preservation Office. LiDAR data and aerial photos were also provided by Reclamation for use in project planning and design. Post-project monitoring of the project will be conducted by Trout Unlimited.

Gallery:



Upper Little Springs Channel Complexity Project Photograph 1: Aerial view of the Upper Little Springs-Walters Creek Rehabilitation Project Area.



Upper Little Springs Channel Complexity Project Photograph 2: Upper Little Springs culvert during replacement.



Upper Little Springs Channel Complexity Project Photograph 3: Upper Little Springs culvert after replacement.



Upper Little Springs Channel Complexity Project Photograph 4: Degraded streambank and channel being repaired.



Upper Little Springs Channel Complexity Project Photograph 5: Streambank and channel after repair completion.

PAHSIMEROI RIVER SUBBASIN

The Pahsimeroi River (HUC 17060202) is a tributary to the Salmon River, entering it at RM 304, and has a drainage area of about 825 square miles. In 2012, one project was completed in this subbasin that improved access to fish habitat.

Reclamation' actions in the subbasin focuses on ESA-listed fish species, including 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

- Lower Sulphur Creek Habitat Improvement Project

Sponsors

- Custer Soil and Water Conservation District (CSWCD)

Partners

- Irrigators
- Landowners
- Bonneville Power Administration (BPA)
- Bureau of Reclamation (Reclamation)
- Idaho Department of Fish and Game (IDFG)

Funding Sources

- BPA through CSWCD

Bureau of Reclamation Expenditures in 2012

Subbasin	Expenditures
Pahsimeroi River	\$175,761

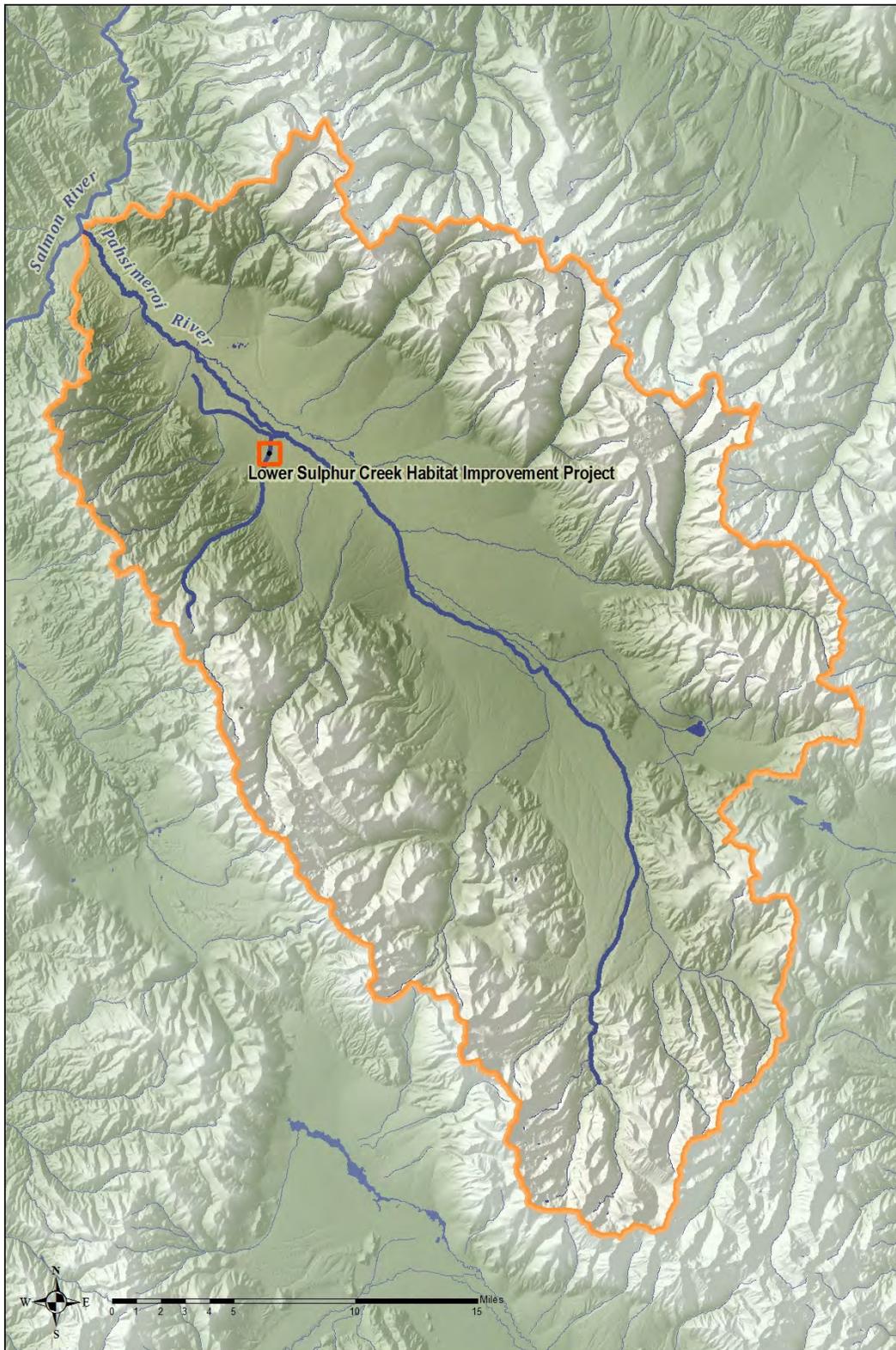


Figure 3. Location map of the projects completed in the Pahsimeroi River subbasin in 2012.

Lower Sulphur Creek Habitat Improvement Project

Project Name: Lower Sulphur Creek Habitat Improvement – Bridge Installation			
Project Action: Channel access			
Project Sponsor: CSWCD			
Project Design: Reclamation			
Landowner(s): Private Landowner			
Partners: BPA, IDFG, Irrigators, Landowner, Reclamation		Reclamation Development Costs: \$66,182	
Funding Source(s): BPA through CSWCD		Implementation Cost: \$180,000	
Project Location:	State: ID	County: Custer	Stream: Sulphur Creek
	Latitude: 44° 32' 55.5" N	Longitude: 113° 54' 57.8" W	
	Township:	Range:	Section: ¼ Section:
Project Status: Complete			
Project Phase: Monitoring			
Milestones	Funding: Secured		
	Design: Completed		
	Permitting: Completed		
	Construction Start Date: July 2012		
Construction Completion Date: September 2012			
Contracting	Advertised: June 2012		
	Awarded: June 2012		
Biological Benefit	Species: Chinook salmon, steelhead		
	Benefit Type: Partial diversion dam removal		
Metric: 0.8 miles made accessible			
<p>Project Objectives and Description: Sulphur Creek flows into the Pahsimeroi River approximately 12 miles up the valley from the Salmon River. Historically, irrigation diversions have dewatered the creek at certain times during the summer months. There were two irrigation pivots that had multiple stream crossings. In addition, there were several barriers that limited fish migration up the creek when there was water. A suite of projects, coordinated by multiple agencies, have been initiated to improve conditions in Sulphur Creek for anadromous salmon and steelhead. These projects include easements with the landowners and irrigators that will decrease the amount of water diverted from the creek and reduce the impacts to the stream from irrigation system crossings. Additionally, improvements to the stream channel, removal of culverts, removal of diversion structures,</p>			

Project Name: Lower Sulphur Creek Habitat Improvement – Bridge Installation

and installation of fish screens are among the projects identified to improve conditions in Sulphur Creek.

This project removed two irrigation ditch diversions, replaced an undersized culvert with a bridge, and regraded 550 feet of the creek that had been altered by the diversions and the roadway. Anadromous fish will be able to move freely through the project area.

Note: Increased project benefits will be realized when associated projects are completed in the following years.

Design, Permitting, and Construction: The structure design was conducted by Reclamation. IDFG provided fish salvage and hydro-seeding. CSWCD coordinated with landowners and provided environmental clearances and construction permits. Reclamation provided construction oversight.

Gallery:

Lower Sulphur Creek Habitat Improvement Photograph 1: View of the culvert before project.



Lower Sulphur Creek Habitat Improvement Photograph 2: Old measuring weir upstream of the Custer Road. It was a barrier to juvenile fish movement.



Lower Sulphur Creek Habitat Improvement Photograph 3: This irrigation diversion, located just downstream of Custer Road, restricted juvenile fish passage during the summer months. The diversion was removed as part of the habitat improvement project completed in 2012.



Lower Sulphur Creek Habitat Improvement Project Photograph 4: The culvert was replaced with a new steel bridge. The old measure weir was removed, and the stream channel was regraded.



Lower Sulphur Creek Habitat Improvement Project Photograph 5: Willows were planted at several locations along the reconstructed channel, and the disturbed areas were reseeded.

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 2012, one project was completed in the subbasin that increased channel complexity.

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

- Yankee Fork Pond Series 3 Side Channel Project

Sponsors

- Idaho Office of Species Conservation (OSC)

Partners

- Landowner
- Bonneville Power Administration (BPA)
- Shoshone-Bannock Tribes (ShoBan Tribes)
- OSC
- Idaho Department of Fish and Game (IDFG)
- Bureau of Reclamation (Reclamation)
- Trout Unlimited
- U.S. Forest Service

Funding Sources

- BPA through Shoshone-Bannock Accord

Bureau of Reclamation Expenditures in 2012

Subbasin	Expenditures
Upper Salmon River	\$1,909,515

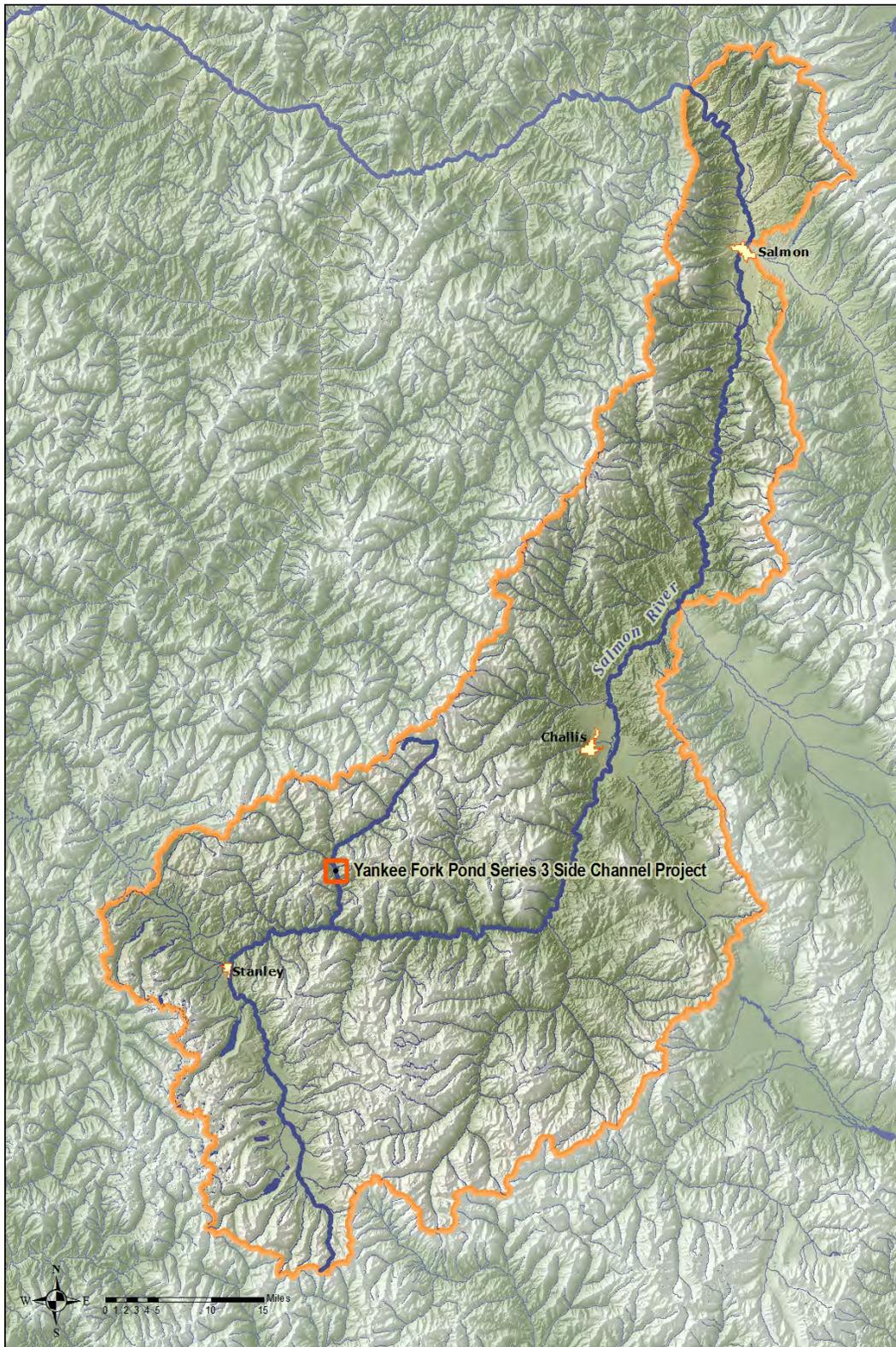


Figure 4. Location map of the project completed in the Upper Salmon River subbasin in 2012.

Yankee Fork Pond Series 3 Side Channel Project

Project Name: Yankee Fork Pond Series 3 Side Channel (PS3)				
Project Action: Channel complexity				
Project Sponsor: OSC				
Project Design: CH2M Hill, Reclamation				
Landowner(s): Private landowner and U.S. Forest Service				
Partners: BPA, OSC, Landowner, ShoBan Tribes, Reclamation, Trout Unlimited, U.S. Forest Service, IDFG			Reclamation Development Costs: \$1.5 million	
Funding Source(s): BPA (ShoBan Accord)			Implementation Cost: \$1.5 million	
Project Location:	State: ID		County: Custer	Stream: Yankee Fork of the Salmon River
	Latitude: 44° 20' 41.62" N		Longitude: 114° 43' 25.40" W	
	Township: 12N	Range: 15E	Section: 29	¼ Section:
Project Status: Complete				
Project Phase: Complete				
Milestones	Funding: Secured			
	Design: Completed			
	Permitting: Completed			
	Construction Start Date: September 18, 2012			
	Construction Completion Date: November 17, 2012			
Contracting	Advertised: August 2012			
	Awarded: September 2012			
Biological Benefit	Species: Chinook salmon, steelhead, bull trout			
	Benefit Type: Side channel reconnection			
Metric: 0.5 miles of channel complexity				
Project Objectives and Description: The objective of the project was to create high-flow refuge and year-round rearing habitat for juvenile Chinook salmon. This was accomplished by making major modifications to existing interconnected ponds situated among remnant dredge tailings. The ponds were only seasonally connected to the river. The project entailed excavation of an alcove in the river and construction of a new inlet to increase inflow from the river. An undersized culvert and water level control structures situated between the ponds were removed. Adjacent tailing piles were regraded to partially fill in the ponds and create a narrow meandering side channel containing a mixture of riparian, floodplain, and wetland habitats for migrating salmon to utilize. A mixture of riparian,				

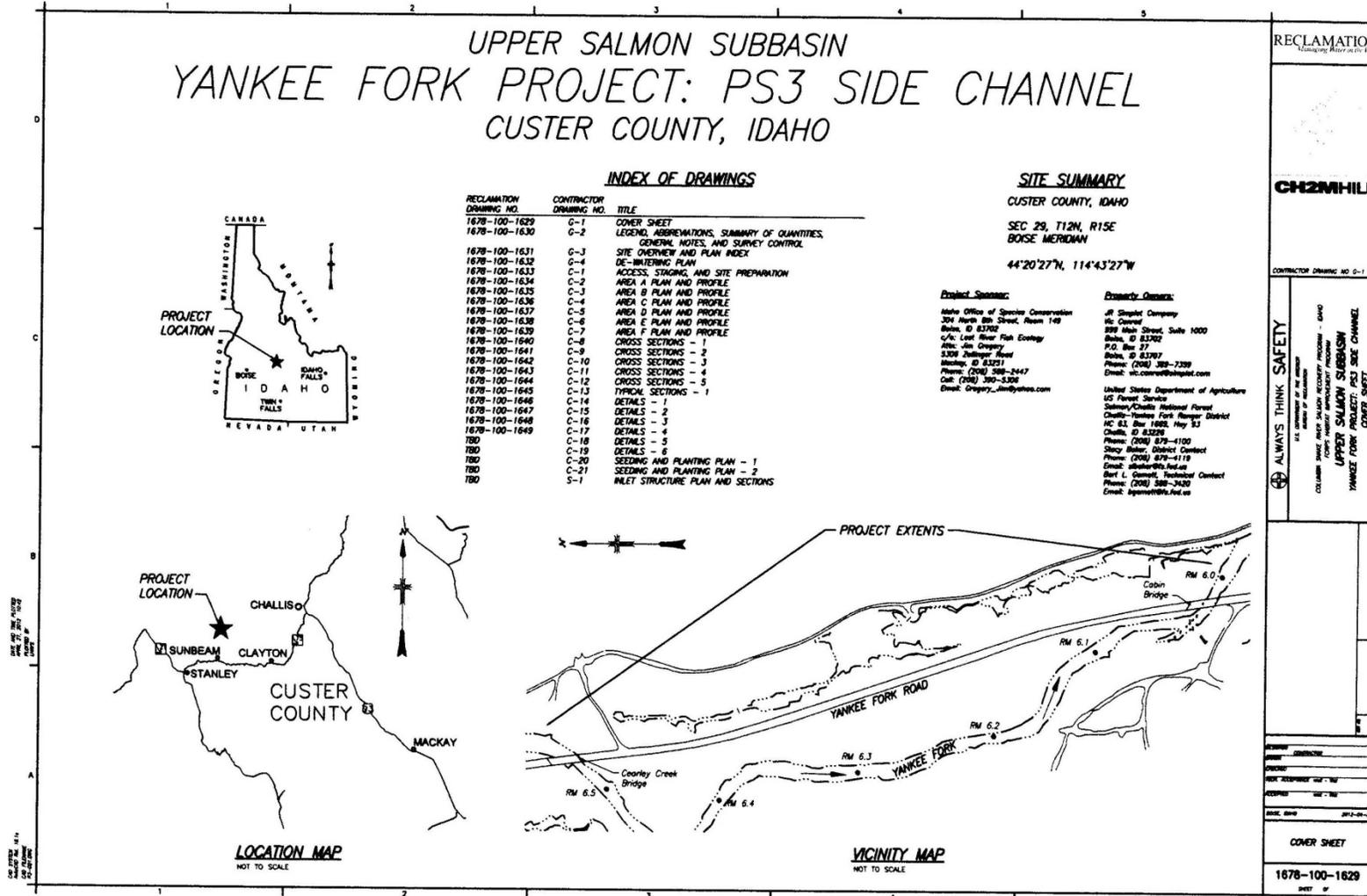
Project Name: Yankee Fork Pond Series 3 Side Channel (PS3)

wetland and upland species of vegetation will be planted in the spring of 2013 to hasten the development of a diverse habitat that can be utilized by migrating Chinook salmon and other species of fish and wildlife.

Design, Permitting, and Construction Issues:

Funding for construction was provided by BPA through the Columbia Basin Fish Accords. In the Yankee Fork, Accord funds are administered by the ShoBan Tribes and were made available for the construction of the PS3 project. Contracting and project management was handled by OSC. Trout Unlimited assisted in project development and outreach with the landowners, local interest groups, and State, Federal, and County government agencies. Personnel from the Salmon Challis National Forest, IDFG, NOAA Fisheries Service, U.S. Fish and Wildlife Service, and Idaho Parks and Recreation also participated in project planning and development. Reclamation provided technical assistance with project development, geologic and topographic survey, design, environmental compliance, attainment of permits, and construction engineering. The consulting firms of CH2M Hill and Lost River Ecology were heavily involved in design development and construction oversight.

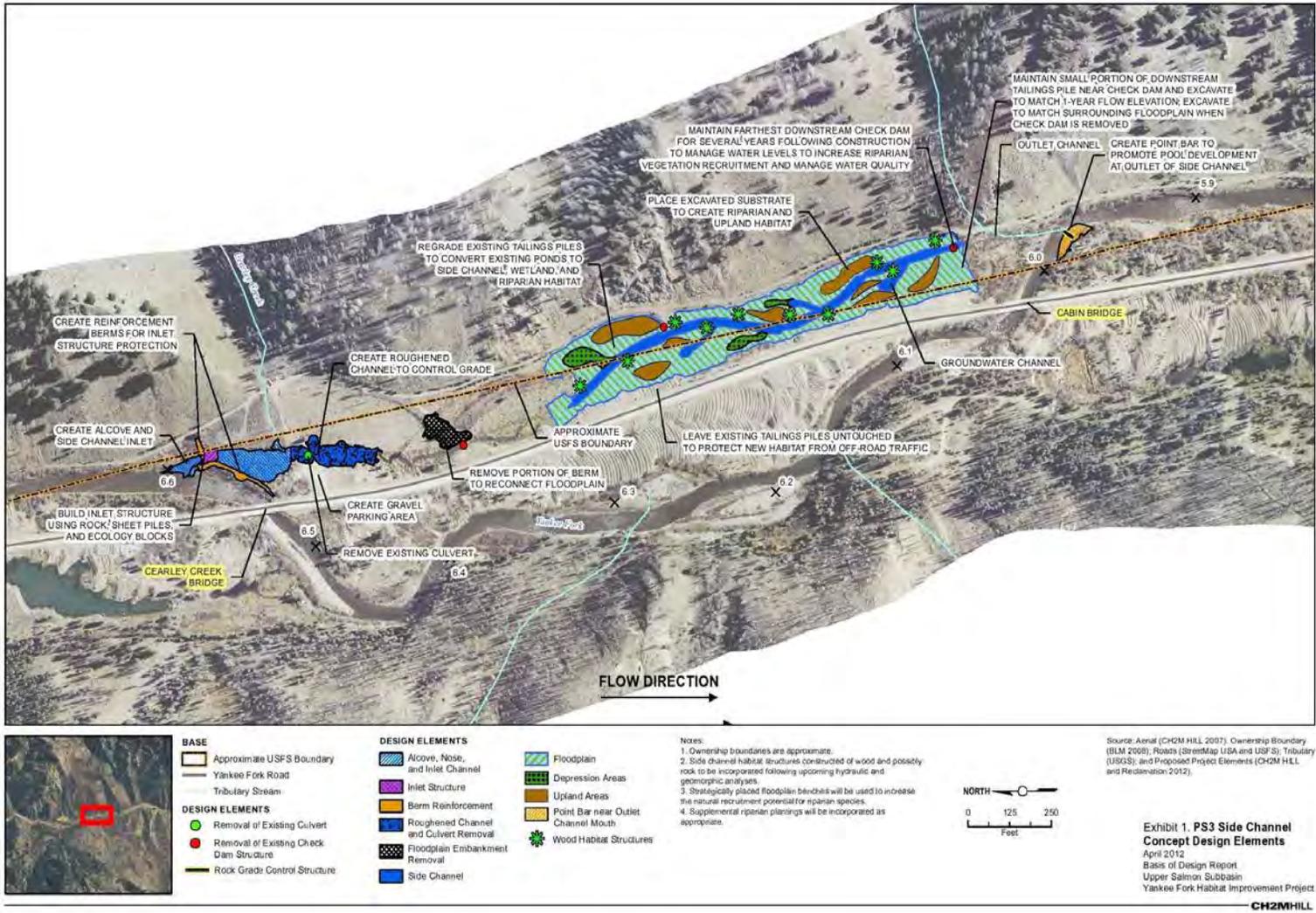
Gallery:



Yankee Fork Pond Series 3 Side Channel Project Figure 1: Project vicinity.



Yankee Fork Pond Series 3 Side Channel Project Photograph 1: An aerial view of the project area in 2010.



Yankee Fork Pond Series 3 Side Channel Project Figure 2: Conceptual view of the project design.



Yankee Fork Pond Series 3 Side Channel Project Photograph 2: View of the lower PS3 project area before construction.



Yankee Fork Pond Series 3 Side Channel Project Photograph 3: View of the lower PS3 project area 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 2012, two projects were completed in the basin that increased channel complexity and enhanced fish passages. One project was completed in the Catherine Creek tributary and one project was completed in the Little Creek, a tributary of Catherine Creek.

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-37 Meander Reconstruction Project
- Little Creek 1 Fish Passage Enhancement Project

Sponsors

- Union Soil and Water Conservation District (USWCD)

Partners

- USWCD
- Bonneville Power Administration (BPA)
- Oregon Department of Fish and Wildlife (ODFW)
- Confederated Tribes of the Umatilla Indian Reservation (CTUIR)
- Bureau of Reclamation (Reclamation)

Funding Sources

- CTUIR
- USWCD

- BPA
- Oregon Watershed Enhancement Board (OWEB)

Bureau of Reclamation Expenditures in 2012

Subbasin	Expenditures
Grande Ronde River	\$1,749,391
Total	\$1,749,391

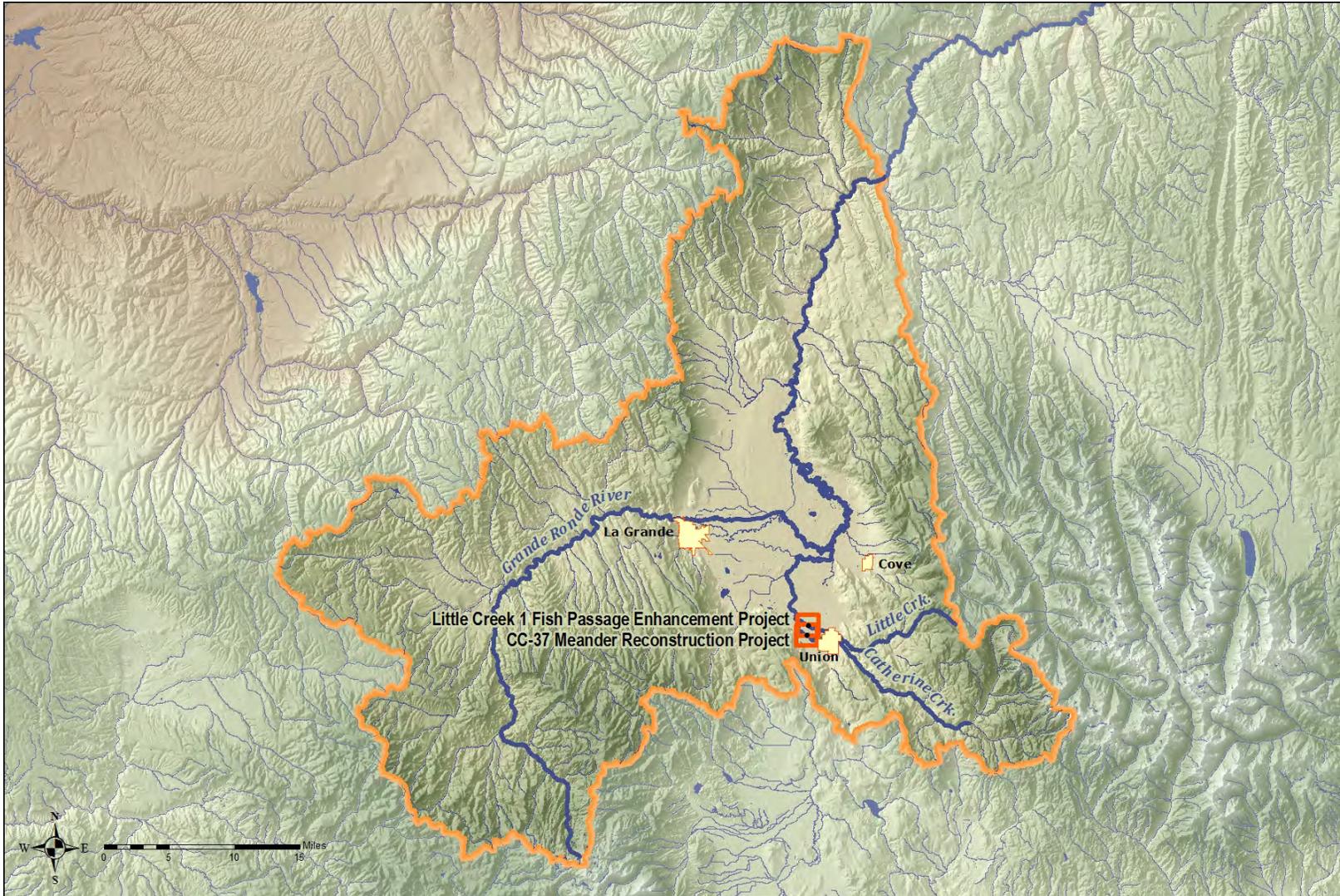


Figure 5. Location map of the project completed in the Upper Grande Ronde River subbasin in 2012.

CC-37 Meander Reconstruction Project

Project Name: CC-37 Meander Reconstruction			
Project Action: Channel complexity			
Project Sponsor: USWCD			
Project Design: Reclamation IDIQ (ICF International)			
Landowner(s): Private landowner			
Partners: USCWD, ODFW, CTUIR, BPA		Reclamation Development Costs: \$614,345	
Funding Source(s): CTUIR, BPA		Implementation Cost: \$313,445	
Project Location:	State: OR	County: Union	Stream: Catherine Creek
	Latitude: 45° 12' 55" N		Longitude: 117° 54' 14" W
	Township: 4S	Range: 39E	Section: 14 ¼ Section: W½
Project Status: Complete			
Project Phase: Monitoring			
Milestones	Funding: Secured		
	Design: Completed		
	Permitting: Completed		
	Construction Start Date: July 5, 2012		
Construction Completion Date: August 31, 2012			
Contracting	Advertised: May 30, 2012		
	Awarded: June 22, 2012		
Biological Benefit	Species: spring Chinook salmon, bull trout, steelhead		
	Benefit Type: Improve main channel function		
Metric: 0.8 miles of channel complexity			
<p>Project Objectives and Description: Prior to project construction, the project reach was in poor to fair condition, with stream segments exhibiting a lack of deep pools, little complex cover, channel incision, and poor riparian vegetation communities with some large trees and little overhanging vegetation. Prior channelization removed the meander bends and point bars. These items are essential to create and maintain deep pools. Channel pool locations were adjacent to existing car bodies and other informal riprap, under a private bridge, and near a few willow trees with localized scour. Generally, the localized scour was a result of sediment deposition in mid-channel bars and, to a lesser extent, initial starts of point bars forming as the creek slowly evolved back to a more meandering stream form.</p>			

Project Name: CC-37 Meander Reconstruction

Sediment storage in the channel caused localized bank erosion and over widening, resulting in the channel becoming shallower, which further exacerbated many of the problems already present in the area. Head cuts that incised the channel 3 feet, increasing the hydrologic disconnection to the floodplain, migrated upstream to the project area. Stream bank erosion was prominent along many portions of the creek, which had nearly vertical actively eroding stream banks, resulting in excessive sediment into Catherine Creek. Channelization and past intensive in-channel grazing practices led to:

- High channel width-to-depth ratio, at an average of 45.8.
- Loss and suppression of riparian vegetation, with the subsequent loss of future channel complexity.
- High summer water temperature and low winter temperature and icing.
- Streambank erosion and unstable streambanks, leading to excessive fine sediment loads in the channel.

The project objectives for the ¾-mile segment of Catherine Creek included protection of habitat, enhancement of floodplain connectivity, in-stream structural diversity and complexity, and enhancing riparian habitat conditions. The project increases water quality; reduces excessive sediment and high water temperatures; increases riparian vegetation; and creates complex fish habitat and stream channel, in particular with large complex pools and large wood structures. These improvements are a result of the stabilization of both bank sides with large woody structures and riparian plantings, as well as reconnection of back water habitat/oxbows, the creation of new stream channel, and enhancement of the existing stream channel. The project was placed under a conservation easement program which will benefit the ESA-listed fish populations and habitat.

Design, Permitting, and Construction Issues: The project design was completed by ICF International (ICF) via an IDIQ Contract with Reclamation. Reclamation provided project coordination and design review, in addition to oversight.

The delay in development of the initial design concept resulted in a significant delay in the starting of the actual design. ICF was contracted and started the design process on October 1, 2011. Numerous design review meetings were held with stakeholders during the initial design development. These meetings brought out agency concerns which were addressed early on in the process. By addressing these concerns, ICF was able to proceed quickly in developing the final designs. The design was finalized in May 2012.

NEPA compliance, cultural resources compliance, and wetland delineation were completed through ICF via an IDIQ Contract with Reclamation. Because of delays pertaining to design, the permit applications were not submitted until late February 2012. As a result of the hard work by NOAA Fisheries Service, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and Oregon Department of State Lands, ICF was able to obtain all permits for the project by July 1, 2012.

Construction funding was secured through BPA via the Grande Ronde Model Watershed. CTUIR provided funding for the landowner easement, plus fencing and plantings.

Partney Construction, Inc. (PCI) started mobilizing on July 5, 2012, and was ready to start construction on July 15, 2012 (first day of the open work window). Construction proceeded

Project Name: CC-37 Meander Reconstruction

ahead of schedule and at a rapid place. PCI completed all tasks by August 31, 2012, 45 days ahead of schedule. In mid-October, CTUIR secured the habitat easement for the project area. CTUIR has completed the plantings and is in the process of installing the easement fence.

Gallery:



CC-37 Meander Reconstruction Project Photograph 1: Backwater pool/side channel at Station 9, looking upriver.



CC-37 Meander Reconstruction Project Photograph 2: Full trees were placed at the lower end of the side channel at Station 9.



CC-37 Meander Reconstruction Project Photograph 3: Before construction; looking downstream at Station 15.



CC-37 Meander Reconstruction Project Photograph 4: After construction; boulders and woody debris at newly constructed meander on Catherine Creek, looking downstream at Station 15.



CC-37 Meander Reconstruction Project Photograph 5: Before construction; Stations 17 through 21.



CC-37 Meander Reconstruction Project Photograph 6: After construction; Stations 17 through 21 on newly cut channel and floodplain of Catherine Creek.



CC-37 Meander Reconstruction Project Photograph 7: Newly cut channel at Station 23, looking upstream with backwater extending to the left.



CC-37 Meander Reconstruction Project Photograph 8: Looking downstream at Station 26 of newly cut meander at Catherine Creek with woody debris, racking material, and salvaged sedges.



CC-37 Meander Reconstruction Project Photograph 9: Before construction; Station 29.



CC-37 Meander Reconstruction Project Photograph 10: After construction; removed culvert and excavated the connection between existing wetlands and Catherine Creek at Station 29.



CC-37 Meander Reconstruction Project Photograph 11: Woody debris and racking material, looking upstream from the newly cut flood plain at Station 31.



CC-37 Meander Reconstruction Project Photograph 12: Before construction; Station 34.



CC-37 Meander Reconstruction Project Photograph 13: After construction; Station 34. Notice the incised banks removed, creating a slope up to bank full floodplain.



CC-37 Meander Reconstruction Project Photograph 14: Woody debris and racking material inserted in the banks of Catherine Creek at Station 36.

Little Creek 1 Fish Passage Enhancement Project

Project Name: Little Creek 1 Fish Passage Enhancement			
Project Action: Channel access			
Project Sponsor: USWCD			
Project Design: Reclamation IDIQ (CH2M Hill)			
Landowner(s): Private Landowner			
Partners: USWCD, Reclamation		Reclamation Development Costs: \$274,162	
Funding Source(s): USWCD, OWEB, BPA		Implementation Cost: \$203,209	
Project Location:	State: OR	County: Union	Stream: Little Creek
	Latitude: 48° 13' 34.5 N		Longitude: 117° 54' 06" W
	Township: 4S	Range: 39E	Section: 11 ¼ Section:
Project Status: Complete			
Project Phase: Monitoring			
Milestones	Funding: Secured		
	Design: Complete		
	Permitting: Complete		
	Construction Start Date: August 1, 2012		
	Construction Completion Date: October 26, 2012		
Contracting	Advertised: April 27, 2012		
	Awarded: May 17, 2012		
Biological Benefit	Species: spring Chinook salmon, bull trout, and steelhead		
	Benefit Type: Full diversion dam removal		
Metric: 0.7 miles made accessible			
Project Objectives and Description:			
<p>Limiting factors for Little Creek include temperature, access, lack of screening, and lack of late season flows.</p> <p>This project addressed access and screening. A designed stanchion dam structure replaced a flashboard structure which had a 18-inch sill height that greatly reduced juvenile passage at all flows and restricted adults passage at most flows. The site was a total barrier when the flashboards were in place. The diversion point of diversion can be diverted either north or south of the structure. Each lacked screens.</p> <p>The diversion dam was replaced with a lay flat stanchion dam. Vertical fish screens were added to each diversion point and a fish ladder was added to provide fish passage around</p>			

Project Name: Little Creek 1 Fish Passage Enhancement

the dam when stop logs are in place. Measurement is to be added in the spring.

The overall project provides access to an additional 0.7 miles of Little Creek plus fish screens at each diversion point.

Design, Permitting, and Construction Issues:

The project design was completed by CH2M Hill via Reclamation IDIQ contract. Reclamation provided project coordination and design review and oversight.

During several Design Review meetings, several key issues were raised which required further consideration by Reclamation and CH2M Hill. The specific issues were:

- Fish ladder width and related updates to hydrology and design flows.
 - Through agreements and modeling efforts determined a ladder pool size of 4 feet wide and 6 feet long, with about 2 feet of additional depth to meet the required volume criteria. This was considered sufficient for Little Creek.
- Diversion structure width, elevations, and configuration and related development of hydraulic model.
 - Through modeling efforts, it was agreed a sill width of 20 feet with 5 bays best matched existing creek width at the site, did not constrict channel for flood concerns, and provided closest reasonable compliance with ODFW's stated velocity limit of 2.0 feet per second.
- Fish ladder performance relative to submergence.
 - Modeling efforts showed that the ladder would need adjusted based on flows. Below the 5 percent exceedance flow, the fish ladder would not be used.

NEPA compliance, cultural resources, and wetland delineation were completed through ICF International via a Reclamation IDIQ contract. All permits were obtained prior to solicitation with no apparent serious issues.

Funding was secured for construction through OWEB and funding for the fish screen was secured through BPA via GRMWP and ODFW fish screen shop Enterprise. ODFW Fish Screen Shop installed the screens on October 12, 2012.

Steve Lindley Construction started construction August 1, 2012, and had completed all in-stream work by October 15, 2012. Final grade out and clean up was completed by October 26, 2012. The remaining fence placement and plantings was completed by the landowner and USWCD.

During construction, some issues became apparent:

- The stanchion assembly, as designed, is heavier than one person can safely lift when extending them to the upright position. Further review will need to be completed to determine the best corrective measure.
- At low flow, livestock can pass through the center of the structure without encumbrance. A livestock barrier will need to be designed and placed in the structure to prohibit livestock movement. Further review will need to be completed to determine the best corrective measure.

Gallery:



Little Creek 1 Fish Passage Enhancement Project Photograph 1: LC-1 Diversion Dam, the original structure was a barrier during winter flowing; looking upstream.



Little Creek 1 Fish Passage Enhancement Project Photograph 2: LC-1 Diversion Dam, the original structure was a barrier during the irrigation season; looking upstream.



Little Creek 1 Fish Passage Enhancement Project Photograph 3: The new structure with passage, looking upstream. Note the open center where livestock can pass under the access walkway unencumbered from the adjacent landowner.



Little Creek 1 Fish Passage Enhancement Project Photograph 4: The new structure with low flow notch at the right, looking downstream.



Little Creek 1 Fish Passage Enhancement Project Photograph 5: Low flow notch looking upstream. The photo also shows the collapsed stanchions.



Little Creek 1 Fish Passage Enhancement Project Photograph 6: Extended upright stanchion.



Little Creek 1 Fish Passage Enhancement Project Photograph 7: A view of the 'V' notch weir fish ladder looking upstream from the bottom.



Little Creek 1 Fish Passage Enhancement Project Photograph 8: ODFW staff inserting the vertical fish screen into the south diversion.



Little Creek 1 Fish Passage Enhancement Project Photograph 9: The south diversion vertical fish screen, shown as installed.



Little Creek 1 Fish Passage Enhancement Project Photograph 10: Water gap as reconstructed.

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' 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 2012, one project was completed in the Middle Fork John Day River subbasin and three projects were completed in the Upper John Day River subbasin.

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.

Bureau of Reclamation Expenditures in 2012

Subbasin	Expenditures
Middle Fork John Day River	\$459,528
Upper John Day River	\$445,591
Total	\$905,119

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 2012, one project was completed in this subbasin that added channel complexity for fish.

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). 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

- Oxbow Conservation Area Dredge Tailings Rehabilitation Project, Phase II

Sponsors

- Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO)

Partners

- CTWSRO
- U.S. Fish and Wildlife (USFWS)
- Bonneville Power Administration (BPA)
- Bureau of Reclamation (Reclamation)
- Oregon Department of Fish and Wildlife (ODFW)

Funding Sources

- BPA
- Pacific Coastal Salmon Recovery Fund (PCSRF)
- Oregon Watershed Enhancement Board (OWEB)
- USFWS
- EcoTrust

Bureau of Reclamation Expenditures in 2012

Subbasin	Expenditures
Middle Fork John Day River	\$459,528

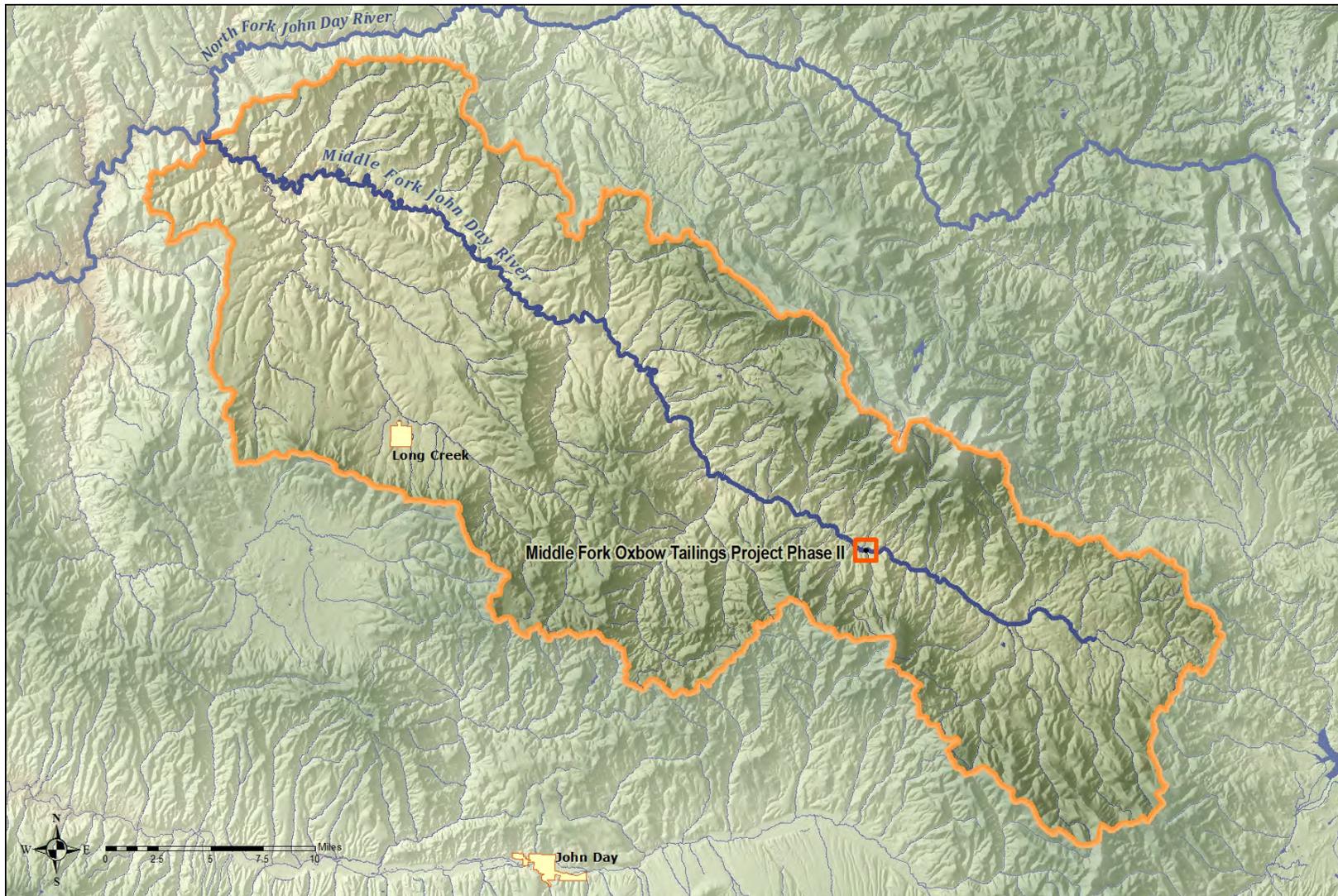


Figure 6. Location map of the project completed in the Middle Fork John Day River subbasin in 2012.

Oxbow Conservation Area Dredge Tailings Rehabilitation Project, Phase II

Project Name: Middle Fork Oxbow Tailings, Phase II				
Project Action: Channel complexity				
Project Sponsor: CTWSRO				
Project Design: Forest Service Enterprise Team through an Interagency Agreement with Reclamation				
Landowners: CTWSRO				
Partners: CTWSRO, USFWS, BPA, ODFW, Reclamation			Reclamation Development Costs: \$281,129	
Funding Source(s): BPA, PCSRF, OWEB, USFWS, Ecotrust			Implementation Cost: \$698,234	
Project Location:	State: OR	County: Grant	Stream: MF John Day, Granite Boulder Creek	
	Latitude: 44° 38' 31.83" N		Longitude: 118° 39' 6.67" W	
	Township:	Range:	Section:	¼ Section:
Project Status: Complete				
Project Phase: Monitoring				
Milestones	Funding: Secured Design: Completed Permitting: Completed Construction Start Date: June 2012 Construction Completion Date: September 2012			
Contracting	Advertised: N/A			
	Awarded: N/A			
Biological Benefit	Species: steelhead, Chinook salmon, bull trout, Pacific lamprey			
	Benefit Type: Side channel improvement. Improve main channel function			
Metric: 0.28 miles of constructed channel and full streamflow returned to 1.1 miles				
Project Objectives and Description: The Middle Fork John Day River on the CTWSRO's Oxbow Conservation area was dredged mined for gold in the early 1940s. Dredging operations left a dredge channel (North Channel) that cut off Granite Boulder Creek and split the flow of the river. The South Channel, which is the natural Middle Fork John Day River, is in an undisturbed floodplain. Since the North Channel was a ditch, it provided				

Project Name: Middle Fork Oxbow Tailings, Phase II

very little rearing habitat and took water flow away from the natural channel as well as intercepting cold water from Granite Boulder Creek. The Phase II project target was to rehabilitate land forms altered by the gold dredging back to a condition similar to pre-mining disturbance. These actions include: (1) construction of about 1,000 feet of new channel to reconnect Granite Boulder Creek to the natural Middle Fork River channel, (2) grading of tailings to rehabilitate topography to an alluvial fan condition and open additional floodplain to the river, (3) removal of about 3,400 feet of the North Channel ditch, (4) covering the regraded tailings surfaces with soil, (5) planting and seeding of the disturbed areas, and (5) fencing the new channel to maximize plant growth that would otherwise be suppressed by ungulate browse.

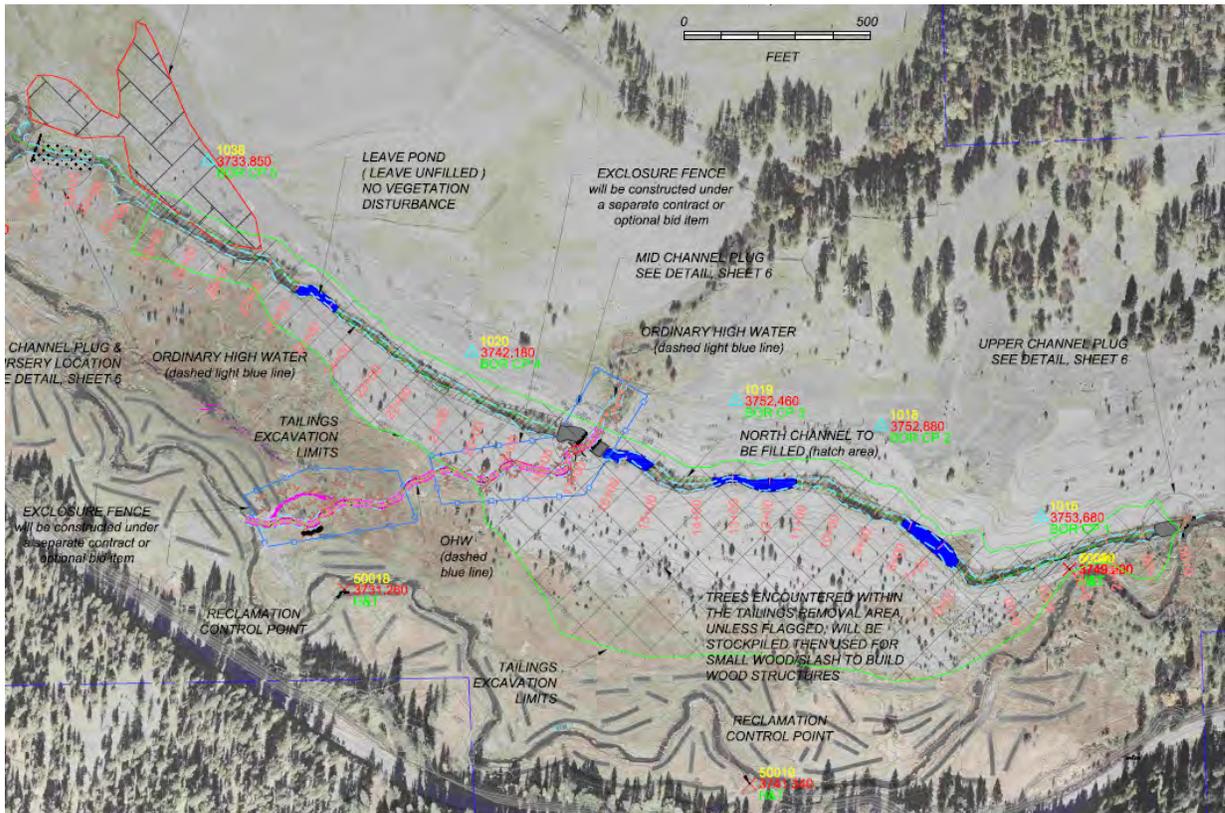
Design, Permitting, and Construction Issues: The design was completed by a Forest Service Enterprise Team under an Interagency Agreement with Reclamation. Reclamation also provided project coordination and design review and oversight.

ESA compliance was by the U.S. Fish and Wildlife Service under a pilot project under their programmatic ESA coverage, which required a detailed monitoring and maintenance plan which was written by the CTWSRO. USFWS also covered the U.S. Army Corps of Engineers fill-and-removal permit under the Nationwide 27 process. BPA provided NEPA and cultural resources coverage. Reclamation and the Forest Service Team drafted the Oregon Department of State Lands (DSL) permit application that was submitted by the CTWSRO.

The CTWSRO secured all the funding for construction of the project and administered all of the contracts. Reclamation funded the Forest Service Enterprise Team through another IA for onsite construction observation and survey staking.

Construction began in the uplands in late June prior to the instream work window and before the DSL permit was received. Construction began instream after July 15, after receiving the DSL permit. The new Granite Boulder Creek channel was completed in time for the fish salvage which occurred on July 26. All flow was directed into the new channel at that time. The remaining work of shaping the flood plains, planting vegetation, fencing, and regrading the dredge tailings and adding top soil lasted until late September 2012.

Gallery:



Middle Fork Oxbow Tailings Project Phase II Photograph No. 1: Aerial overview of Oxbow Conservation Area Tailings Rehabilitation Project - Phase II.



Middle Fork Oxbow Tailings Project Phase II Photograph 2: Constructed Granite Boulder Creek Channel. Note transplanted sedge clumps and alders. Disturbed area on left already growing grass.



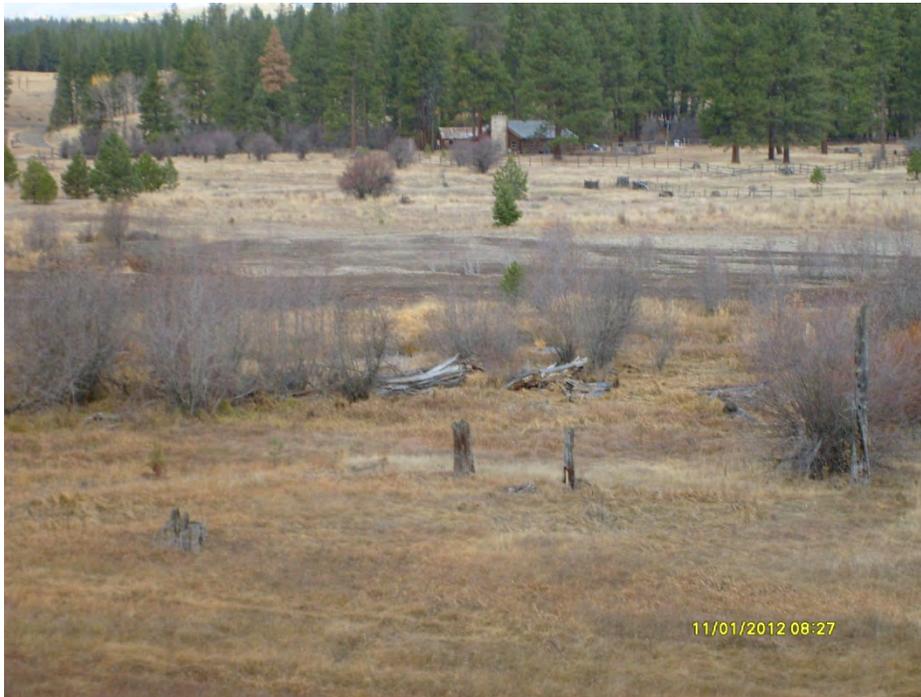
Middle Fork Oxbow Tailings Project Phase II Photograph 3: Log structure and constructed pool on new Granite Boulder Creek channel.



Middle Fork Oxbow Tailings Project Phase II Photograph 4: Portion of filled North Channel.



Middle Fork Oxbow Tailings Project Phase II Photograph 5: Removing Dredge Tailings down to natural flood plain elevation.



Middle Fork Oxbow Tailings Project Phase II Photograph 6: Dredge tailings removed and flood plain contour rehabilitated.



Middle Fork Oxbow Tailings Project Phase II Photograph 7: Deer- and elk-proof fence around flood plain corridor of the new Granite Boulder Creek channel to protect planted trees and other vegetation.

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 2012, three projects were completed in the subbasin that improved fish passage, streamflow, and channel complexity.

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.

Projects

- Beech Creek Moore Diversion Project
- Kennedy and Murray Ditch Diversion Project, Phase I
- Meredith Beech Creek Habitat Improvement Project

Sponsors

- Grant Soil and Water Conservation District (GSWCD)
- Oregon Department of Fish and Wildlife (ODFW)

Partners

- Private Landowners
- GSWCD
- Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO)
- Oregon Watershed Enhancement Board (OWEB)
- U.S. Fish and Wildlife Service (USFWS)
- Bureau of Reclamation (Reclamation)

- ODFW
- Bonneville Power Administration (BPA)

Funding Sources

- CTWSRO
- BPA through CTWSRO
- OWEB
- ODFW
- Landowners

Bureau of Reclamation Expenditures in 2012

Subbasin	Expenditures
Upper John Day River	\$445,591

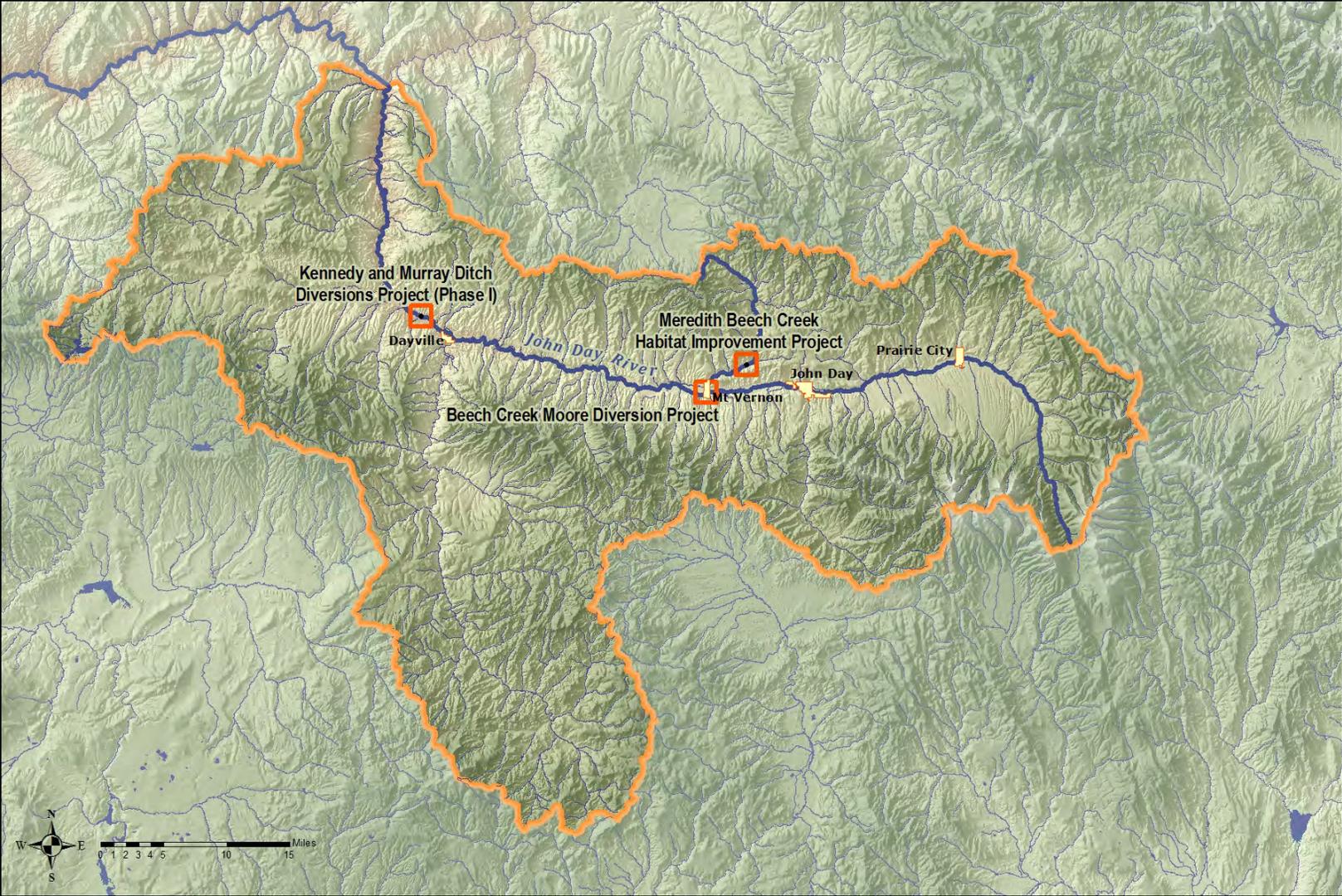


Figure 7. Location map of the projects completed in the Upper John Day River subbasin in 2012.

Beech Creek Moore Diversion Project

Project Name: Beech Creek Moore Diversion				
Project Action: Channel access				
Project Sponsor: GSWCD				
Project Design: GSWCD				
Landowner(s): Private Landowner				
Partners: GSWCD, CTWSRO, Reclamation			Reclamation Development Costs: \$24,629	
Funding Source(s): BPA through CTWSRO			Implementation Cost: \$93,484	
Project Location:	State: OR	County: Grant	Stream: Beech Creek	
	Latitude: 44° 24' 49" N		Longitude: 119° 06'52" W	
	Township:	Range:	Section:	¼ Section:
Project Status: Complete				
Project Phase: Monitoring				
Milestones	Funding: Secured			
	Design: Completed			
	Permitting: Completed			
	Construction Start Date: September 2011			
Construction Completion Date: August 31, 2012				
Contracting	Advertised: N/A			
	Awarded: N/A			
Biological Benefit	Species: steelhead, Chinook salmon			
	Benefit Type: Diversion dam, partial			
Metric: 2.0 miles made accessible				
<p>Project Objectives and Description: This diversion is the lowest diversion on Beech Creek. The instream part of the structure was composed of large rock, wood debris, and tarps. No head gate was present so flow control was managed by blocking the ditch with tarps. A preliminary review of the water rights indicated this diversion has a water right for 0.43 cfs. This diversion was a partial barrier depending on year-to-year construction of the dam, but generally dewatered the stream channel.</p> <p>The GSWCD assisted the landowner in moving the point of the diversion downstream to the John Day River and installed a pump station and center pivot. In order to move the point of diversion to the John Day River, a measurement device was installed in Beech</p>				

Project Name: Beech Creek Moore Diversion

Creek to measure low flows to verify that water is available in Beech Creek to satisfy the water right.

Design, Permitting, and Construction Issues: Design and permitting were fairly straight forward. It was discovered that another landowner had a very small piece of land under this water right which was inaccessible to him. The GSWCD assisted that landowner in transferring the point of use to another field. Construction of the pump station and center pivot was completed in 2011, but the instream measurement structure had to wait until August 2012.

Gallery:



Beech Creek Moore Diversion Photograph 1: Remnants of the large rock used in the pushup dam.



Beech Creek Moore Diversion Photograph 2: Completed pump station.



Beech Creek Moore Diversion Photograph 3: Measurement structure in place. When the water master needs to measure flow, a board is placed across the channel in the provided slots and all flow is forced through the ramp flume on the right edge (blocked in the photo by the board).

Kennedy and Murray Ditch Diversions Project (Phase I)

Project Name: Kennedy and Murray Ditch Diversions (Phase I)				
Project Action: Channel access, streamflow				
Project Sponsor: GSWCD				
Project Design: GSWCD				
Landowner(s): Private Landowner				
Partners: GSWCD, CTWSRO, Landowner, Reclamation			Reclamation Development Costs: \$70,000 (all phases)	
Funding Source(s): BPA through CTWSRO			Implementation Cost: \$128,498 (Phase I)	
Project Location:	State: OR		County: Grant	Stream: Upper John Day River
	Latitude: 44° 29.29" N		Longitude: 119° 34.29" W	
	Township:	Range:	Section:	¼ Section:
Project Status: Phase I of 3 Phases Complete				
Project Phase: Monitoring				
Milestones		Funding: Secured Design: Completed Permitting: Completed Construction Start Date: Construction Completion Date: January 31, 2012		
Contracting		Advertised: Awarded:		
Biological Benefit		Species: Steelhead, Chinook salmon, bull trout, Pacific lamprey Benefit Type: Increased instream flow		
Metric: No metrics were claimed for this project for FCRPS BiOp purposes in 2012				
Project Objectives and Description: The Kennedy (RM209) and Murray (RM 210.2) Ditch Diversions are owned by two landowners, each having irrigation rights out of both diversions. The diversions are located 2 miles west of Dayville on the John Day River. The current diversion structures are typical gravel pushup dams which are constructed and maintained with heavy equipment. The GSWCD designs called for two pump stations and associated pipelines to eliminate the instream structures. The configuration of the lands served by the two diversions made it more efficient to reorganize the water delivery system				

Project Name: Kennedy and Murray Ditch Diversions (Phase I)

to these lands so as to be more central to the pump stations, which also results in water being left instream over a longer distance. Thus these two diversions were proposed as a single project to facilitate reorganization.

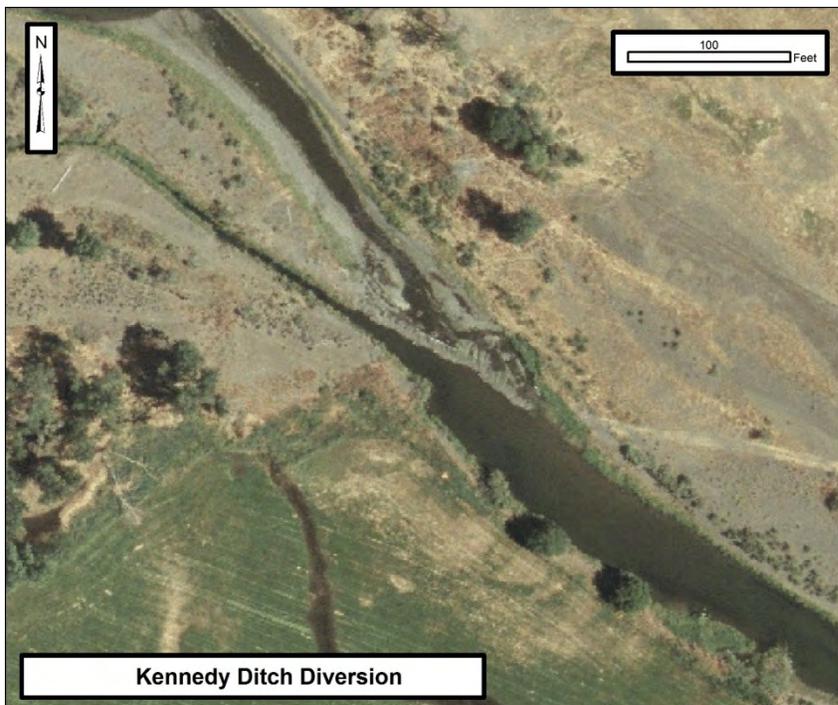
Phase I consisted of one of the pumping stations and the associated irrigation delivery system. While Phase I did not completely remove either of the pushup dams (see construction issues below), it did remove one-third of the water rights diverted at the Murray Diversion, reducing the size of the pushup dam and increasing the amount of flow past the diversion. The GSWCD assisted the landowner in a permanent transfer of the point of diversion from the pushup dam location to the pump station location which results in 0.87 cfs staying instream for another 1.5 miles.

Design, Permitting, and Construction Issues: Designs, permitting, and funding were all completed and in place; unfortunately, part way through construction in 2010 bankruptcy proceedings were started against one of the landowners, requiring GSWCD to stop construction. When the issue did not resolve itself, GSWCD modified the contracts and completed Phase I of the project in January 2012 on the non-affected lands, and put Phase II and III on hold until landownership is resolved.

Gallery:



Kennedy and Murray Ditch Diversions (Phase I) Photograph 1: Aerial view of the Murray Ditch Diversion.



Kennedy and Murray Ditch Diversions (Phase I) Photograph 2: Aerial view of Kennedy Ditch Diversion.



Kennedy and Murray Ditch Diversions (Phase 1) Photograph 3: Pump station installed at the Murray Diversion during Phase I.



Kennedy and Murray Ditch Diversions (Phase I) Photograph 4: Completed center pivot.

Meredith Beech Creek Habitat Improvement Project

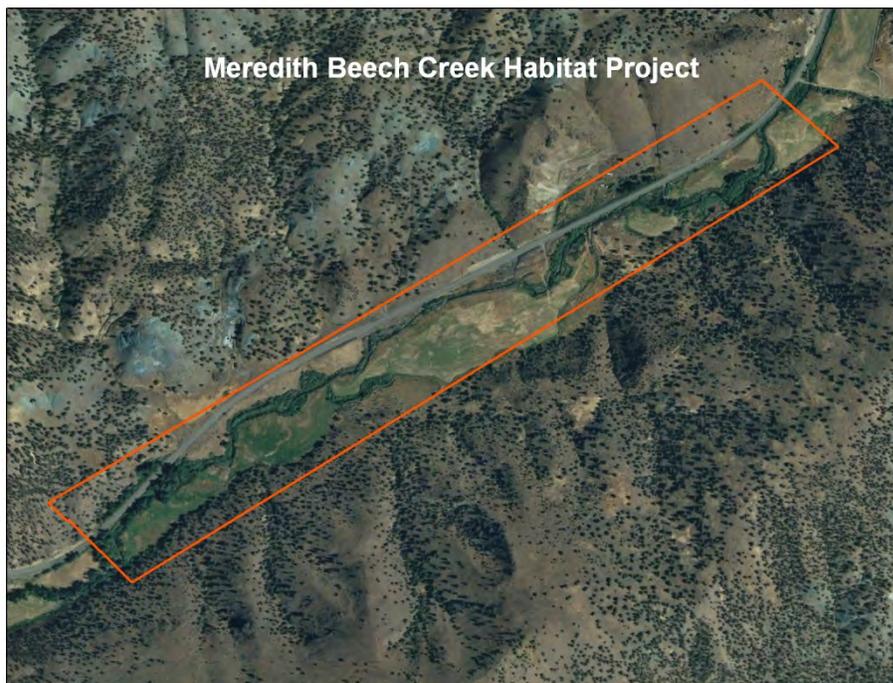
Project Name: Meredith Beech Creek Habitat Improvement				
Project Action: Channel complexity				
Project Sponsor: ODFW				
Project Design: Reclamation				
Landowner(s): Private Landowner				
Partners: GSWCD, ODFW, USFWS, CTWSRO, OWEB, Reclamation			Reclamation Development Costs: \$117,000	
Funding Source(s): ODFW, OWEB, Landowner, CTWSRO			Implementation Cost: \$70,680 (not including vegetation work or weed control)	
Project Location:	State: OR	County: Grant	Stream: Beech Creek	
	Latitude: 44° 26' 46" N		Longitude: 119° 03' 02" W	
	Township:	Range:	Section:	¼ Section:
Project Status: Instream construction is complete.				
Project Phase: Monitoring and vegetation planting and weed control by CTWSRO and GSWCD				
Milestones	Funding: Secured			
	Design: Completed			
	Permitting: Completed			
	Construction Start Date: July 11, 2012			
Construction Completion Date: August 17, 2012				
Contracting	Advertised: NA			
	Awarded: NA			
Biological Benefit	Species: steelhead, Chinook salmon			
	Benefit Type: Improve main channel function			
Metric: 1.6 miles of channel complexity				
Project Objectives and Description: Beech Creek is a medium-sized tributary that enters the Upper John Day River at the town of Mount Vernon, Oregon. The creek is intermittent during the late summer months with refuge areas providing habitat suitable for steelhead juvenile survival. The landowner owns at least 3.6 continuous miles of Beech Creek, with irrigated and non-irrigated fields on terraces along each side of the creek. A narrow riparian corridor is very well established with woody species and is improving slowly on its own, including some attempts by beavers to the build dams. The landowner was willing to remove agricultural production from some of the smaller, less productive fields and return them to riparian floodplains, along with instream habitat improvements to				

Project Name: Meredith Beech Creek Habitat Improvement

improve stream flow and provide additional habitat. The project goals were to: 1) increase instream habitat complexity, 2) raise the water table throughout the project reach by promoting aggradation of the streambed through increased reach-scale roughness, 3) increase frequency of flooding of abandoned agricultural fields, 4) increase active floodplain width and reduce stream energy in entrenched areas, 5) increase habitat characteristics that would support the stabilization and expansion of beaver population, and 6) stabilize the existing ford for landowner access.

Design, Permitting, and Construction Issues: Reclamation completed the design and the Oregon Department of State Lands fill-and-removal permit application on behalf of the landowner. The USFWS Partners in Wildlife program took the role of the lead federal agency and as such completed the cultural resources compliance, NEPA, ESA consultation, and U.S. Army Corp of Engineers fill-and-removal permitting. The GSWCD applied for and received an OWEB grant for construction funding and was the fiscal agent and contracting entity. ODFW provided design and planning review and was the onsite construction manager for the GSWCD as well as providing labor for some aspects of construction. The CTWSRO provided labor for stabilizing disturbed areas and is providing seed, plants, and enclosures for revegetation of disturbed areas and increasing species diversity throughout the project area. The construction bid was lower than expected so an addition 2,800 cubic yards of bank was excavated for inset flood plain construction and 970 cubic yards of additional rock riprap removed. In total, 31 log structures and 8 debris-catching post structures were built instream; 5,710 cubic yards of bank were removed for floodplain construction; and 970 cubic yards of riprap bank protection were removed.

Gallery:



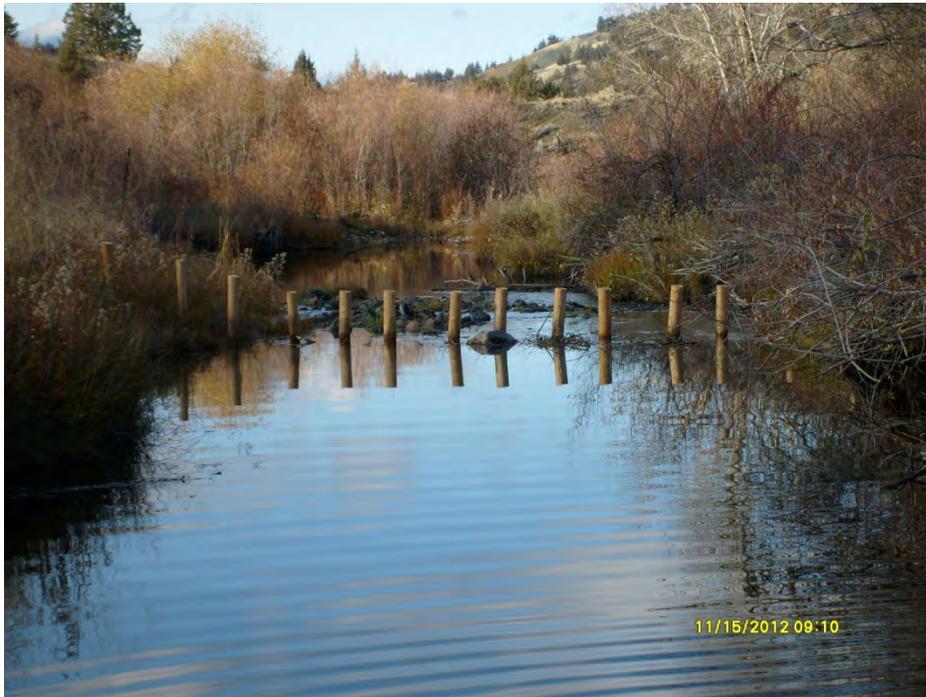
Meredith Beech Creek Habitat Improvement Project Photograph 1: Aerial view of the project area.



Meredith Beech Creek Habitat Improvement Project Photograph 2: Type 2 structures add channel roughness to aggrade streambed and add complexity.



Meredith Beech Creek Habitat Improvement Project Photograph 3: Completed Type 5 structure utilizes trees with root wads for added scour pool creation and cover.



Meredith Beech Creek Habitat Improvement Project Photograph 4: Debris catching posts.



Meredith Beech Creek Habitat Improvement Project Photograph 5: Completed flood plain terrace with erosion control fabric, flood plain logs, and fenced vegetative plantings.



Meredith Beech Creek Habitat Improvement Project Photograph 6: Levee removal area.



Meredith Beech Creek Habitat Improvement Project Photograph 7: Completed hardened access ford.

UPPER COLUMBIA RIVER BASIN

The Upper Columbia River (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 2012, one project was completed in the Entiat River subbasin, four in the Methow River subbasin, and three 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 2012

Subbasin	Expenditures
Entiat River	\$911,220
Methow River	\$2,132,742
Wenatchee River	\$1,482,363
Total	\$4,526,325

ENTIAT RIVER SUBBASIN

The Entiat River is tributary to the Columbia River at RM 483.7. The Entiat subbasin (HUC 17020010, officially the Upper Columbia-Entiat subbasin) has a drainage area of about 1,520 square miles. In 2012, one project was completed in the subbasin that added channel complexity for fish habitat.

ESA-listed anadromous species include UCR spring Chinook salmon (endangered) and UCR steelhead trout.

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

- Tyee Complexity Project

Sponsors

- Cascadia Conservation District (CCD)

Partners

- U.S. Forest Service (USFS)
- Bureau of Reclamation (Reclamation)

Funding Sources

- Bonneville Power Administration (BPA)
- Priest Rapids Coordinating Committee (PRCC)

Bureau of Reclamation Expenditures in 2012

Subbasin	Expenditures
Entiat River	\$911,220

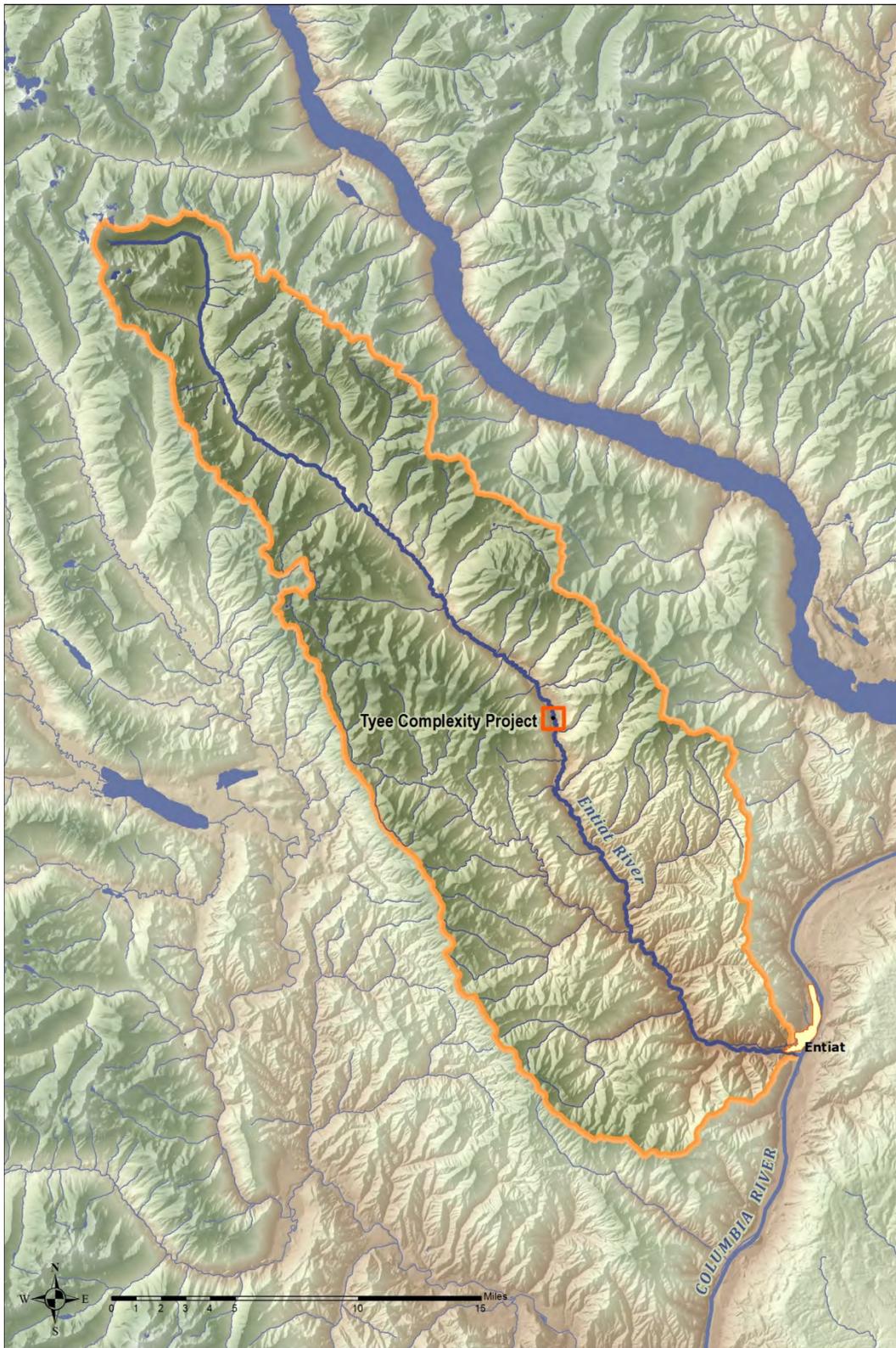


Figure 8. Location map of the projects completed in the Entiat River subbasin in 2012.

Tyee Complexity Project

Project Name: Tyee Complexity			
Project Action: Channel complexity			
Project Sponsor: CCD			
Project Design: ICF			
Landowner(s): Private Landowners			
Partners: USFS, Reclamation		Reclamation Development Costs: \$1,703,575	
Funding Source(s): BPA, PRCC		Implementation Cost: \$1,130,000; Conservation Easement \$470,000; \$21,000 Tyee 3B	
Project Location:	State: WA	County: Chelan	Stream: Entiat River
	Latitude: 47° 52' 9.88" N		Longitude: 120° 25' 28.64" W
	Township: 27N	Range: 19E	Section: 3 ¼ Section: NE
Project Status: Complete			
Project Phase: Monitoring			
Milestones	Funding: Secured		
	Design: Completed		
Contracting	Permitting: Completed		
	Construction Start Date: July 30, 2012 (Tyee); September 17, 2012 (Tyee 3B)		
	Construction Completion Date: November 15, 2012 (Tyee); September 19, 2012 (Tyee 3B)		
Biological Benefit	Advertised: May 31, 2012 (Tyee and Tyee 3B)		
	Awarded: June 24, 2012 (Tyee and Tyee 3B)		
Biological Benefit	Species: Spring Chinook salmon, steelhead		
	Benefit Type: Improve main channel function		
Metric: 0.6 miles of channel complexity (Tyee); 0.1 miles of channel complexity (Tyee 3B)			
<p>Project Objectives and Description: This project utilizes selective levee breaching and large woody material (LWM) structures to address limiting factors, namely:</p> <ul style="list-style-type: none"> • A reduction of riparian vegetation resulting from anthropogenic-related modifications in the floodplain (clearing for grazing and residences). • A disconnection of off-channel habitat resulting from levee construction. • A reduction in LWM as a factor of reduced riparian vegetation. 			

Project Name: Tye Complexity

Three levee breaches and nine LWM structures/structure groups were installed with the intent to:

- protect large, intact riparian areas.
- improve natural channel processes.
- enhance LWM recruitment and retention through improvement of degraded riparian areas.
- increase connectivity to off-channel habitat and floodplains at levee sites.
- increase habitat complexity through short-term LWM loading.

Design, Permitting, and Construction Issues: The design issues included working with the landowners to create a project that would be acceptable to them while providing significant biological benefit.

Permitting issues included an appeal of the substantial development permit as well as negotiating a viable work window. Due to high flows, the traditional work window needed to be extended. The extension period came with restrictions regarding work in proximity to spring Chinook salmon redds, and one LWM element had to be redesigned to accommodate the permit conditions.

During construction, the LWM pile driving needed to be changed to excavation. The contractor did not have the optimal equipment onsite for pile driving LWM, and the LWM did not hold up well to the forces being applied during driving operations. This may be in part because the wood had been bought and stockpiled the previous year in anticipation of construction in 2011. Also, the native rock fill for the control structure at the levee breach needed to be supplemented by imported rock to meet the gradation specified in the plans. Finally, there was a 2-week shutdown in September due to regional wildfires forcing the Washington Department of Natural Resources to raise the Industrial Fire Precaution Level, thereby requiring shutdown of construction machinery.

Gallery:



Tyee Complexity Project Photograph 1: Levee breach.



Tyee Complexity Project Photograph 2: LWM Structure 6-5.



Tyee Complexity Project Photograph 3: LWM Structure 6-7.



Tyee Complexity Project Photograph 4: 3B channel.

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 2012, four projects were completed in the subbasin that added channel complexity, 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

- Barkley Temporary Irrigation Pump Station Project
- M2 RM-46 Habitat Improvement Project (Phase I)
- M2 Whitefish Island Habitat Improvement Project
- Pete Creek Complexity Project

Sponsors

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

Partners

- Methow Conservancy
- Barkley Irrigation Company
- TU-WWP
- Bureau of Reclamation (Reclamation)
- Washington Department of Ecology (WDOE)
- Bonneville Power Administration (BPA)

- Wild Fish Conservancy
- U.S. Geological Survey (USGS)
- Upper Columbia Salmon Recovery Board (UCSRB)
- Town of Twisp

Funding Sources

- NFWF
- Reclamation
- BPA
- WDOE (Centennial Funds)
- Priest Rapids Coordinating Committee (PRCC)
- UCSRB
- National Fish and Wildlife Foundation (NFWF)
- Washington State Recreation and Conservation Office (WSRCO)
- Washington State Department of Ecology (WA State Ecology)

Bureau of Reclamation Expenditures in 2012

Subbasin	Expenditures
Methow River	\$2,132,742

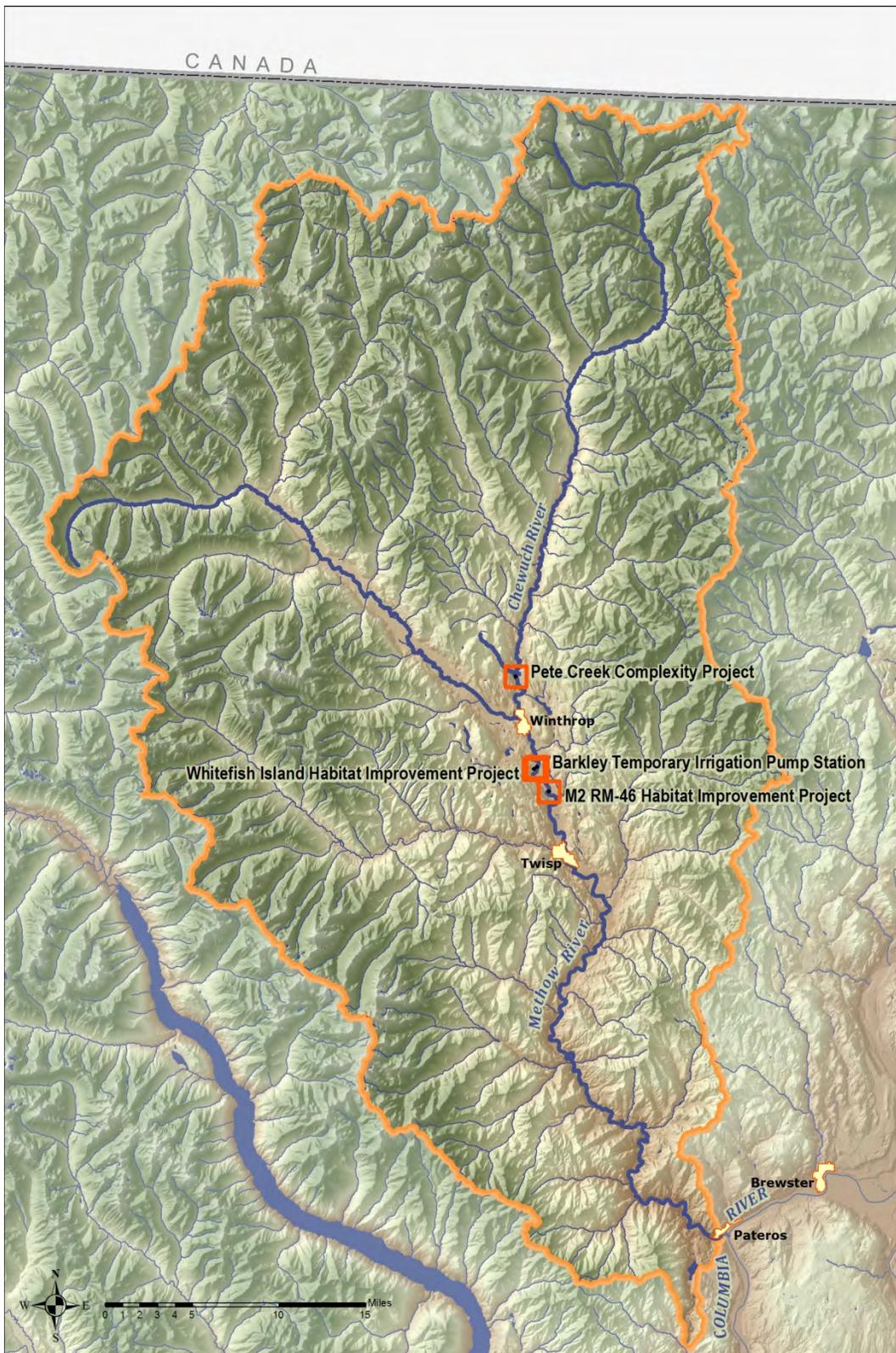


Figure 9. Location map of the projects completed in the Methow River subbasin in 2012.

Barkley Temporary Irrigation Pump Station Project

Project Name: Barkley Temporary Irrigation Pump Station				
Project Action: Installation of a temporary pump to supplement the eliminated pushup dam.				
Project Sponsor: TU-WWP				
Project Design: Anchor QEA, O'Connell Drilling				
Landowner(s): Private landowners, Barkley Irrigation Company				
Partners: Methow Conservancy, Barkley Irrigation Company, TU-WWP, Reclamation			Reclamation Development Costs: \$30,000	
Funding Source(s): PRCC			Implementation Cost: \$200,000	
Project Location:	State: WA	County: Okanogan	Stream: Methow River	
	Latitude: 48° 26' 6" N		Longitude: 120° 9' 27.36" W	
	Township: 34	Range: 21	Section: 13	¼ Section: NW
Project Status: Complete				
Project Phase: Monitoring				
Milestones	Funding: Secured			
	Design: Completed			
Contracting	Permitting: Completed			
	Construction Start Date: July 31, 2012			
	Construction Completion Date: September 1, 2012			
Biological Benefit	Advertised:			
	Awarded: July 15, 2012			
Biological Benefit	Species: spring Chinook salmon, steelhead, bull trout, Pacific lamprey			
	Benefit Type: Reduce mechanical injury and mortality			
Metric: The work in 2012 focused on reducing injury and mortality by eliminating the pushup dam in the mainstem Methow River. Specific metrics will be available once the pump is removed.				
Project Objectives and Description: In the past, Barkley Irrigating Company (Barkley) has diverted irrigation water from the Methow River by constructing a seasonal gravel pushup dam in the mainstem Methow upstream of its intake canal. This work was covered by a perpetual Hydraulic Project Approval (HPA) issued by the State of Washington in the mid-1980s. The annual construction required heavy equipment in the river and has raised concern of harm and injury to ESA-listed fish species. In the spring of 2012, in order to				

Project Name: Barkley Temporary Irrigation Pump Station

reduce harm to fish, NOAA Fisheries Service notified Barkley that they would no longer be able to construct the pushup dam and that they needed to find a better long-term solution that is less harmful to fish and aquatic habitat. In order for Barkley to meet its irrigation needs for the 2012 growing season, it consulted with Reclamation and Trout Unlimited to find a short-term solution while a longer term plan is being developed. NOAA Fisheries Service advocated for funding this short-term solution and as a result, Trout Unlimited was awarded funding by the PRCC to complete this task.

The project temporarily eliminates the need for a large pushup dam by installing a pump and fish screen in the Methow River to provide water for irrigation. The pump is capable of delivering 11 cfs, and the fish screen was installed about 1.45 miles below the existing Barkley fish screen. Large tote bags filled with washed gravel were placed at the head gate to check up the water surface to bring the total diversion rate up to 20 cfs. Handwork to remove a gravel bar at the head of the intake channel was also done to insure flows.

The pump station will be used for the next few years while Barkley works with Trout Unlimited and regulators to develop an alternative long-term irrigation strategy. Reclamation will provide technical assistance for this effort.

Design, Permitting, and Construction Issues: This project took place within an extremely compressed timeline and was essentially a simultaneous design-permit-build effort. NOAA Fisheries Service put Barkley on notice in the early spring 2012 and the project was constructed in August 2012. This project was successfully accomplished because resources from PRCC and Reclamation were made readily available to a very strong team of partners. The partnership included technical expertise from Reclamation, Anchor QEA, and OConnell Drilling. Project sponsor Trout Unlimited, with impressive assistance from the Methow Conservancy, provided expertise in permitting, execution of landowner agreements, management of relationships, and overall project management.

Anchor played a key role in evaluating and assessing the Wilson site to determine what specifications and equipment was needed to implement the Barkley pump station. Anchor worked closely with Trout Unlimited contractors to insure the appropriate pumps, screens, intake, discharge, and all other components were properly outfitted to make the system work. Anchor also provided construction oversight and completed a field report. In addition, Reclamation staff and a small army of technical expertise helped shape the end product: a working pump station and sufficient water for the Barkley irrigators. There were some lessons learned and some modifications will be made to create a smoother operation beginning in 2013, but all told, the short-term designed product works well.

The work in 2012 was conducted in an expedited fashion to prevent take in the side channel and to insure Barkley irrigators had sufficient water throughout the season. The efforts were supported by the permitting agencies in order to seize the opportunity to correct a long standing action that is detrimental to fish species in the Methow. In order to be compliant, Trout Unlimited, with Reclamation support, applied for a temporary change in point of diversion for Barkley from the WDOE and the change was granted. In addition, a Joint Aquatic Resources Permit Application (JARPA) was filed with Washington Department of Fish and Wildlife to obtain a new HPA for the pump station site. This allowed entry into the river at the Wilson site to place the suction line and fish screens in the river. Other permitting and action agencies were notified of the work and concurrence

Project Name: Barkley Temporary Irrigation Pump Station

of the environmental benefit was unanimous.

In the end, this project is an important effort and all of the parties engaged in 2012 made tremendous gains towards a long standing commitment in the Methow to protect fish and insure agriculture. The outcome of this year's effort will help pave the way to a longer lasting solution that works well for the Barkley Irrigating Company and improves conditions for ESA-listed spring Chinook, steelhead, and bull trout and Pacific lamprey.

Gallery:



Barkley Temporary Irrigation Pump Station Photograph 1: The initial problem; a CAT bulldozer constructing the pushup dam in the Methow River in 2011.



Barkley Temporary Irrigation Pump Station Photograph 2: The temporary solution: two 45-HP pumps.



Barkley Temporary Irrigation Pump Station Photograph 3: View of the fish screens.



Barkley Temporary Irrigation Pump Station Photograph 4: Checking up the flow at the headgate with large tote bags full of washed gravel.



Barkley Temporary Irrigation Pump Station Photograph 5: One of the many young of the year Chinook salmon spotted at the Barkley headgate, fall 2012.

M2 RM-46 Habitat Improvement Project (Phase 1)

Project Name: M2 RM-46 Habitat Improvement (O'Banion Phase 1)				
Project Action: Channel complexity				
Project Sponsor: MSRF				
Project Design: Anchor QEA, LLC				
Landowner(s): Private Landowner, Department of Natural Resources				
Partners: BPA, USGS, UCSRB, Reclamation			Reclamation Development Costs: \$57,951	
Funding Source(s): BPA, UCSRB, NFWF, Washington Department of Ecology Centennial Funds			Implementation Cost: \$86,000	
Project Location:	State: WA		County: Okanogan	Stream: Methow River
	Latitude: 48° 24' 54.66" N			Longitude: 120° 08' 27.97" W
	Township: 34N	Range: 22E	Section: 30	¼ Section: SW
Project Status: Complete				
Project Phase: Monitoring				
Milestones	Funding: Secured Design: Completed Permitting: Completed Construction Start Date: September 5, 2012 Construction Completion Date: September 21, 2012			
Contracting	Advertised: June 1, 2012 Awarded: August 6, 2012			
Biological Benefit	Species: Upper Columbia River spring Chinook salmon, steelhead, bull trout, Pacific lamprey Benefit Type: Improve main channel function			
Metric: 0.4 miles of channel complexity				
Project Objectives and Description: The RM-46 project is part of the first phase of the larger Middle Methow (M2) Habitat Project, which is a coordinated effort between Reclamation, MSRF, Yakama Nation, Washington Department of Fish and Wildlife (WDFW), USGS, and private and public landowners. The overall M2 Project aims to implement reach-based improvement actions along an 8-mile stretch of the Methow River between the towns of Winthrop and Twisp in Okanogan County. The purpose of this project is to improve habitat in and adjacent to the Methow River, improve tributary habitat				

Project Name: M2 RM-46 Habitat Improvement (O'Banion Phase 1)

conditions for the FCRPS BiOp, and support the short- and long-term recovery of ESA-listed fish species. The overall M2 project area is split into Reach 1 in the north, led by MSRF and Reclamation, and Reach 2 in the south, led by the Yakama Nation.

As part of the first phase of the M2 project, Reclamation and MSRF completed a reach assessment, a project alternatives assessment, and then selected several specific project sites within Reach 1 to provide a high level of both biological benefit and certainty.

The RM-46 Project site is part of one of the larger projects (WDFW Floodplain) identified through this process. The preferred alternatives for the WDFW Floodplain Project area were developed through further coordination between the design team, landowners, Methow Restoration Council, Yakama Nation, and Upper Columbia Regional Technical Team. The elements implemented at RM 46 were developed through this coordinated process. Further project planning and refinement continued through 2011 and into the spring of 2012 to refine selected project elements. A fourth project element originally planned for RM 46 was omitted from construction in 2012 following a change in land ownership. The removal of the single element does not threaten project integrity.

The RM-46 Project area is located on the left bank of the mainstem Methow River, below the intake to the Methow Valley Irrigation District (MVID) East canal system, and across from the larger WDFW Floodplain Project area. The area begins at the flow split between the side channel and main channel threads of the Methow River, which is approximately coincident with the location of the old diversion dam for the MVID and extends downstream approximately 2,100 feet to the point where the side channel returns to the main channel.

Specific actions for the RM-46 project area include:

- Installing one bank anchored engineered logjams (ELJs) along the main channel left bank.
- Installing two pile supported woody material (LWM) assemblies along the main channel left bank.
- Removing the large rocks and remnant timbers composing the remaining portions of the old diversion dam spanning the main channel immediately downstream of the side channel entrance.

The RM-46 project created three scour pools containing good cover and complex hiding cover at three locations along the left bank of a half-mile stretch of the mainstem Methow River. The left bank structures and dam removal elements of the larger WDFW Floodplain Project will assist with increasing complexity in the side channel and improving more appropriate side channel processes in the area formerly constrained by the old dam.

Design, Permitting, and Construction Issues: Design issues were:

- Several parcels changed hands during the permitting process, which required design and permitting modifications and required additional efforts for landowner relations.
- Washington State Department of Transportation Aviation Division initially approved a structure to be constructed on their property as long as permits were obtained;

Project Name: M2 RM-46 Habitat Improvement (O'Banion Phase 1)

however, prior to construction, permission was withdrawn based on liability concerns. As a result, that structure was deleted from the final plans.

- This project is part of a larger project, WDFW Floodplain, which was slated to be constructed as a single project. Failure to reach a cooperative agreement with WDFW early in 2011 required the right bank construction elements to be deferred to an out year. To avoid losing the full construction year, RM-46 elements were separated from the larger project. This change increased the work necessary for the design process, but was justified to preserve monitoring schedules and to take advantage of willing landowners.

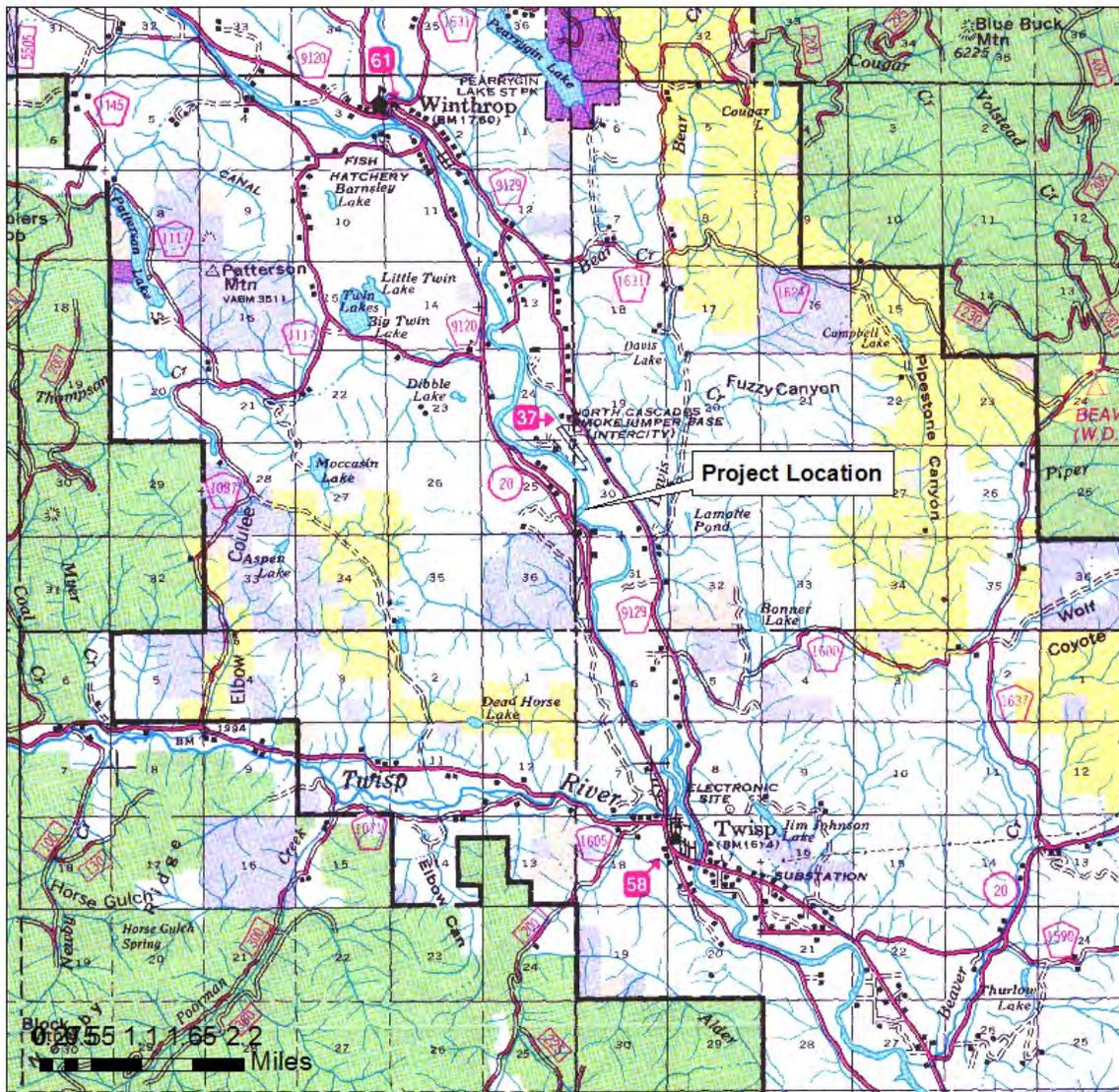
Permitting issues were:

- Securing permits to construct LWM structures within navigable waters is an evolving process. Although the Washington Department of Natural Resources (owner of State-owned aquatic lands) was engaged early in the process, receipt of permit/authorization took longer than was anticipated and was not in hand until 2 months after all other permits were approved and construction was underway. The majority of the work was able to be completed with verbal approval so that permit delay did not impact project completion.

Construction issues were:

- During construction, the contractor experienced challenges in achieving excavation depths for the engineered piles and in controlling slope failure in the resulting excavation holes. The Project Engineer was able to alter the pile depths and have them shallower, thus taking significantly less time to dig.
- The work area was isolated from live flows by placing super bags. Because of the bed cobble size, the contractor had to place native material as backfill behind the coffer dam to tighten the seal. While this was successful, this posed significant issues when attempting to remove the material during the removal of the coffer dam and resulted in release of turbidity to the river.
- A primary landowner for this project called the MSRF and requested a work stoppage affecting two of the structures just after the contractor had staged and begun to work. MSRF had a signed landowner agreement allowing the work to go forward. The landowner was alarmed because a neighbor had called her and described the work occurring on adjacent property as extremely damaging. Chris Johnson and Michael Notaro talked to her, sent photos of the work in progress and described the likely impacts of construction at her site. She allowed work to continue and work resumed after being suspended for just a few hours. This points out the value of continued landowner outreach and the need for constant communication with the public and landowners.

Gallery:



Project Location



**RM-46
Location Map**

Latitude: 48° 24' 55" N Township: T34N
 Longitude: 120° 08' 28" W Range: R22E
 Okanogan County Section: 30
 Methow River
 Approximately 4 miles north of Twisp

M2 RM-46 Habitat Improvement Project Figure 1: RM-46 Location Map.



M2 RM-46 Habitat Improvement Project Photograph 1: Aerial view of the project area after completion. Visible after the removed dam area and the installed engineered logjam (ELJ) structures on the left bank.



M2 RM-46 Habitat Improvement Project Photograph 2: Digging the foundation for B-3 ELJ structure.



M2 RM-46 Habitat Improvement Project Photograph 3: Building B-3 ELJ structure, September 12, 2012.



M2 RM-46 Habitat Improvement Project Photograph 4: Placing piles for L-1 structure.



M2 RM-46 Habitat Improvement Project Photograph 6: Looking downstream at L-1 structure, September 25, 2012.



M2 RM-46 Habitat Improvement Project Photograph 6: Dam removal, September 25, 2012.

M2 Whitefish Island Habitat Improvement Project

Project Name: M2 Whitefish Island Habitat Improvement (WFI)				
Project Action: Channel Complexity				
Project Sponsor: MSRF				
Project Design: Anchor QEA, LLC				
Landowner(s): Private landowner, MSRF, Washington Department of Natural Resources (WDNR), Washington Department of Transportation, and Okanogan County Right-of-Ways				
Partners: USGS, UCSRB, WA State Ecology Centennial Funds, Reclamation			Reclamation Development Costs: \$1,109,827	
Funding Source(s): BPA, WSRCO, WA State Ecology			Implementation Cost: \$1,091,000	
Project Location:	State: WA	County: Okanogan	Stream: Methow River	
	Latitude: 48° 26' 00 N		Longitude: 120° 09' 40" W	
	Township: 34N	Range: 21E	Section: 13	¼ Section: SW
Project Status: Complete				
Project Phase: Monitoring				
Milestones		Funding: Secured		
		Design: Completed		
		Permitting: Completed		
		Construction Start Date: August 20, 2012		
		Construction Completion Date: November 7, 2012		
Contracting		Advertised: May 4, 2012		
		Awarded: August 2, 2012		
Biological Benefit		Species: Upper Columbia River spring Chinook salmon, steelhead, bull trout, Pacific lamprey		
		Benefit Type: Side channel reconnection		
Metric: 0.3 miles of channel complexity				
Project Objectives and Description: The WFI Project is part of the first phase of the larger Middle Methow (M2) Habitat Project, which is a coordinated effort between Reclamation, MSRF, Yakama Nation, Washington Department of Fish and Wildlife (WDFW), USGS, and private and public landowners. The overall M2 Project aims to implement reach-based improvements along an 8-mile stretch of the Methow River between the towns of Winthrop and Twisp in Okanogan County. The purpose of this				

Project Name: M2 Whitefish Island Habitat Improvement (WFI)

reach-based rehabilitation is to improve habitat in and adjacent to the Methow River, improve tributary habitat conditions for the FCRPS BiOp, and support the short- and long-term recovery of ESA-listed fish species. The overall M2 Project area is split into Reach 1 in the north, led by MSRF and Reclamation, and Reach 2 in the south, led by the Yakama Nation.

As part of the first phase of the M2 Project, Reclamation and MSRF completed a reach assessment, a project alternatives assessment, and then narrowed in on several specific project sites within Reach 1. WFI was identified through this process, and further coordination between the design team, landowners, MRC, Yakama Nation, and UCRTT led to the development of the preferred alternative for the WFI project area. Further project planning and refinement through 2011 and into the spring of 2012 led to the completed design, which was constructed in the fall of 2012.

The WFI Project area includes actions within floodplain and riparian areas, a 1,500-foot-long seasonal side channel, a forested island, and the mainstem of the Methow River. The seasonal side channel is one of the few side channels in the upper M2 reach, but activated seasonally from about mid-April through mid-July. Prior to completion of this project, activation occurred at the inlet only when the Methow River was above 800 cfs. Following construction, a minimum of 20 cfs flow is anticipated when flows exceed 300 cfs.

Poor side channel and floodplain connectivity and low hydraulic and bedform complexity in the main channel limit habitat complexity in the WFI Project area. The conditions result from channel hardening and the loss of riparian forested areas in the upper watershed and periodic removal of large woody material (LWM) and logjams. These practices have resulted in simplified channel conditions and loss of complex structures that provide juvenile fish with critical cover and refuge habitat.

The goal of the WFI Project is to establish habitat complexity missing from the river, to enhance both immediate and long-term fish survival and production. Specific actions for the WFI Project area included:

- Installing two bar apex engineered logjams, one at the head of the island and one in the side channel.
- Installing five engineered logjams along the side channel left bank.
- Installing two large wood assemblies along the side channel left bank.
- Installing one live crib along the side channel right bank.
- Installing various large wood on gravel bars adjacent to the main channel and side channel.
- Improving riparian plant diversity and abundance within the side channel and river island environments.

The WFI Project will increase feeding, hiding, and resting habitat for juvenile fish, improve winter rearing conditions, and provide refuge habitat for these young fish as they migrate downstream.

Project Name: M2 Whitefish Island Habitat Improvement (WFI)

Design, Permitting, and Construction Issues: Design issues were:

- WFI is a large project located on a reach of the Methow River. The WFI project is valuable for improving tributary habitat conditions under the FCRPS BiOp and for addressing salmon recovery in a reach that is also highly valued for river recreation, agriculture, and as a residential area. This combination of uses presented challenges to balance improvement processes and providing biological benefit with concerns over loss of recreational access, risk and liability, river safety, and the landowner's desire for stability.
- The design process evaluated project alternatives based on level of effort from a minimum, or no action, alternative to a maximum alteration alternative focused solely on biological benefit. The alternatives were vetted both through a permitting review process and through a social review process with landowners and interest groups. The selected alternative represented a middle or balanced alternative with reduced biological benefit potential, but also reduced impacts on traditional user groups. While the majority of large in-channel wood structures were omitted, the WFI Project represents the largest and most complex improvement effort completed in the Methow River watershed.

Permitting issues were:

- Given the competing uses in the reach, conflict in the permitting process was anticipated. To reduce uncertainty, an expanded outreach effort and public scoping process was incorporated into the SEPA review. Ultimately, adverse comments were limited and were addressed without significant delay or loss of project function.
- Securing permits to construct LWM structures within navigable waters is an evolving process. Although the WDNR (owner of State-owned aquatic lands) was engaged early in the process, receipt of permit/authorization took longer than was anticipated and was not in hand until 2 months after all other permits were approved and construction was underway. The majority of the work could be completed in areas outside of WDNR jurisdiction so permit delay did not impact project completion.

Construction issues were:

- MSRF received only two qualified bids for the primary construction effort. Although the bids were deemed qualified, the bidders approached the project differently which was reflected by a large spread in estimated costs. The lower bid proposal was accepted due to its close alignment with the engineers estimate.
- The bid format allowed the Contractor to list equipment they had available to them as opposed to the equipment they planned to bring to the site. As a result, MSRF had little ability to address equipment deficiencies during the project.
- The Contractor did not have specific experience with the structure types specified at WFI and was not fully prepared for the site soils and groundwater conditions encountered. The difference between their expectations and the actual site conditions resulted in the Contractor requesting consideration of additional

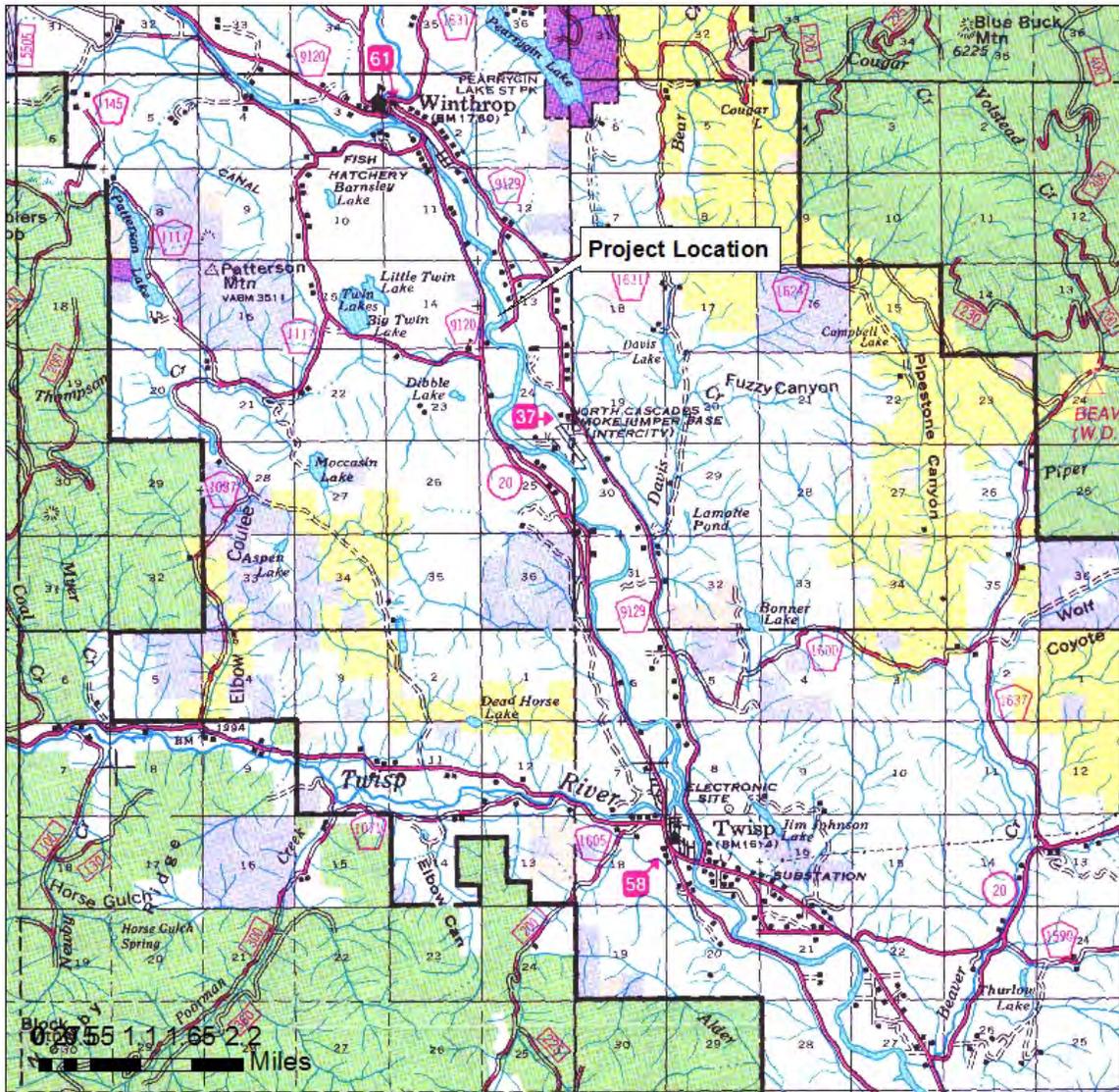
Project Name: M2 Whitefish Island Habitat Improvement (WFI)

compensation under a claim for changed conditions. The claim was denied by MSRF based on information provided during the bid process and lack of information requests in advance of accepting the award.

- Footing depths specified for several of the pile-supported buried structures required excavation to as much as 17 feet below river grade. The contractor experienced high rates of infiltration and low side slope stability at these depths resulting in larger than anticipated disturbance from excavation and dewatering needs.
- Field modifications to the large “B” structures were made by the Project Engineers to resolve construction challenges. These changes were made quickly and were well received by the Contractor and review agencies.

The construction window for in-water work in this reach of the Methow is short. Higher than anticipated flows in the spring required a several-week delay in start timing for in-water elements. Design and construction challenges experienced by the Contractor resulted in extension of the construction period by 3 weeks beyond the anticipated close date. The combination of delay and additional time resulted in higher than expected flows during project cleanup and during reconnection of the project area to the river.

Gallery:



Project Location



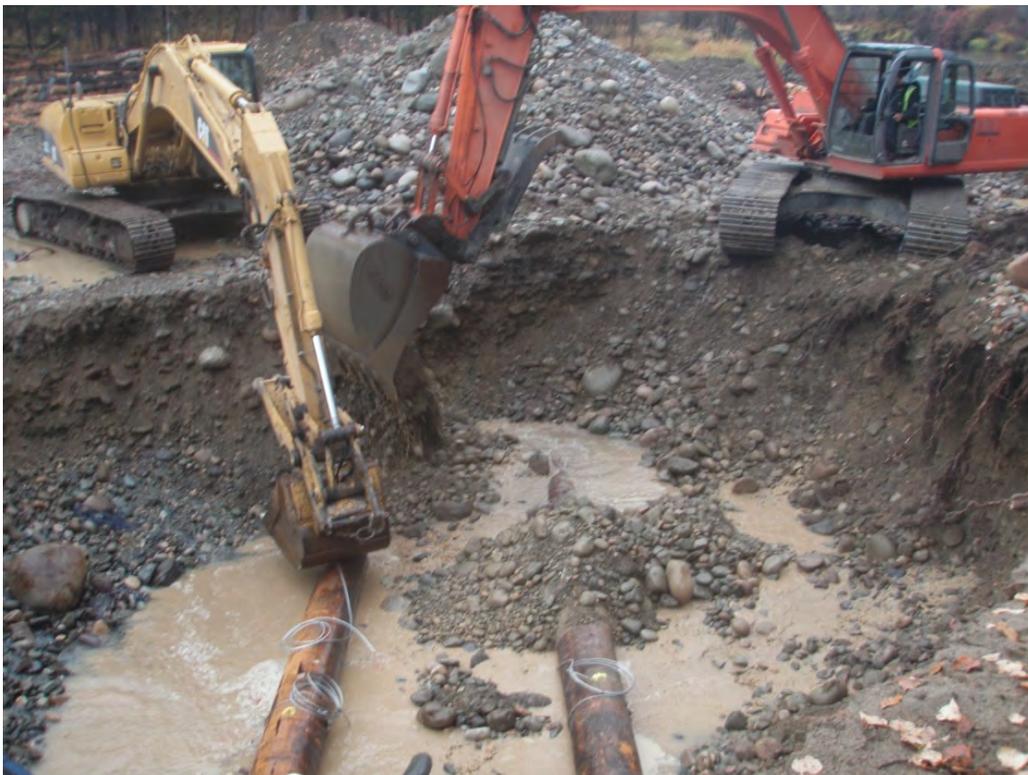
**Whitefish Island
Location Map**

Latitude: 48° 26' 00" N Township: T34N
 Longitude: 120° 09' 40" W Range: R21E
 Okanogan County Section: 13
 Methow River
 Approximately 6 miles north of Twisp

M2 Whitefish Island Habitat Improvement Project Figure 1: Whitefish Island location map.



M2 Whitefish Island Habitat Improvement Project Photograph 1: An aerial view of the project during construction. Water flows from the upper right to the lower left.



M2 Whitefish Island Habitat Improvement Project Photograph 2: B Structure 2, Layer 1.



M2 Whitefish Island Habitat Improvement Project Photograph 3: BP-5 1 testing excavation depths for piles, October 2012.



M2 Whitefish Island Habitat Improvement Project Photograph 4: Construction of the gravity "B" structure.



M2 Whitefish Island Habitat Improvement Project Photograph 5: BP-5 8; completed October 2012.



M2 Whitefish Island Habitat Improvement Project Photograph 6: Looking up the side channel from the highway, November 9, 2012.



M2 Whitefish Island Habitat Improvement Project Photograph 7: Live crib structure at project completion.



M2 Whitefish Island Habitat Improvement Project Photograph 8: Structure A at completion.

Pete Creek Complexity Project

Project Name: Pete Creek Complexity				
Project Action: Channel complexity, riparian enhancement				
Project Sponsor: MSRF				
Project Design: Reclamation – test wells; MSRF – wood placements; Methow Natives – revegetation				
Landowner(s): Private landowner, MSRF				
Partners: BPA, Town of Twisp, Wild Fish Conservancy, Reclamation			Reclamation Development Costs: \$20,000	
Funding Source(s): BPA, NFWF, Washington Ecology Centennial Funds			Implementation Cost: \$49,300	
Project Location:	State: WA		County: Okanogan	Stream: Chewuch River
	Latitude: 48° 30' 36" N		Longitude: 120° 11' 19" W	
	Township: 35N	Range: 21E	Section: 27	¼ Section: NE
Project Status: Complete				
Project Phase: Monitoring				
Milestones	Funding: Secured Design: Completed Permitting: Exempt Construction Start Date: August 2011 Construction Completion Date: May 2012			
Contracting	Advertised: Awarded:			
Biological Benefit	Species: Upper Columbia River spring Chinook salmon, steelhead, bull trout Benefit Type: Side channel reconnection, riparian			
Metric: 0.3 miles of channel complexity; 0.3 miles of stream length enhanced				
Project Objectives and Description: The Pete Creek Project is located on an MSRF-owned parcel of land on the Chewuch River, approximately 2.5 miles north of its confluence with the Methow River. MSRF acquired the property in 2007, with funding support from BPA to facilitate improvement of a reach of the Chewuch River with accelerated bank erosion and loss of complexity. The site was slated for residential development. An exempt well was installed and the riparian vegetation was removed. Fill was imported to create a building site.				

Project Name: Pete Creek Complexity

Improvement actions were initiated in 2010. Reclamation installed piezometers to collect baseline data on groundwater flow and depth at the site. These wells were needed to determine whether the available groundwater would be sufficient to support revegetation. In addition, the wells provided useful information for potential work used to improve abandoned channels or create alcoves, or off-channel ponds to be used for fish rearing and overwintering.

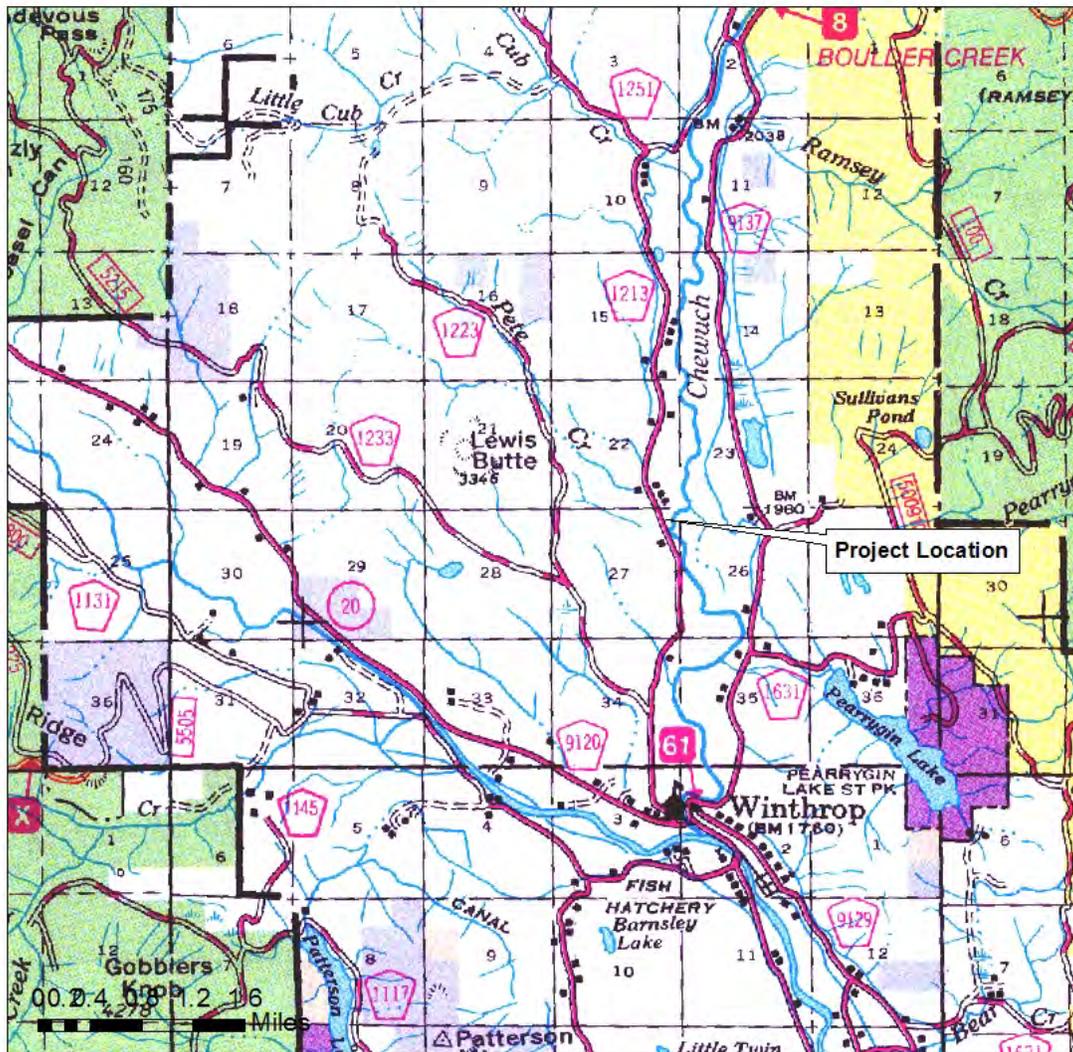
Based on initial results from the piezometers, MSRF initiated revegetation work in 2011. Presently there are three exclusion planting areas that have been established on the site. These actions have effectively revegetated the previously cleared floodplain area between the Chewuch River and the high water channel.

In addition to revegetation, MSRF added approximately 30 pieces of large wood in the main channel along the eroding face of the property's riverfront and along an overflow channel where high water flows are beginning to re-establish connectivity with the remnant channels. The large woody material placed in this area enhances an existing overland connection between the river and several beaver pond flood channel areas.

As the property is not intended for development and surrounding owners expressed support for improvement of the abandoned side channels, MSRF was able to experiment with unballasted wood placed to encourage additional wood recruitment. As these techniques have not been acceptable in many areas, the Pete Creek site provides an important role in evaluating lower impact improvement alternatives. MSRF will monitor the site annually for wood accumulation and shedding and use the information to help inform other projects.

Design, Permitting, and Construction Issues: There were no significant design, permitting, or construction issues.

Gallery:



Pete Creek Location Map

Latitude: 48° 30' 36" N Township: T35N
 Longitude: 120° 11' 19" W Range: R21E
 Okanogan County Section: 27
 Chewuch River
 Approximately 2 miles north of Winthrop

Pete Creek Complexity Project Figure 1: Pete Creek location map.



Pete Creek Complexity Project Photograph 1: View of MSRF's shoreline, along the Chewuch River, showing several wood placements following construction.



Pete Creek Complexity Project Photograph 2: View of one of the wood structures placed on the eroding riverbank.



Pete Creek Complexity Project Photograph 3: View of the enhanced channel to allow for floodwaters to access the floodplain.



Pete Creek Complexity Project Photograph 4: Large rootwads left on the bank to create floodplain habitat.



Pete Creek Complexity Project Photograph 5: One of the exclusion fencing areas, with workers adding vegetation.

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 2012, three projects were completed in the subbasin that removed barriers and applied adaptive management activities to a previous project.

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

- Upper Chumstick Barriers Project 1
- Upper Chumstick Barriers Project 2
- PID Fishway Repair Project

Sponsors

- Chelan County Natural Resources Department (CCNRD)

Partners

- U.S. Fish and Wildlife Service (USFWS)
- Confederated Tribes and Bands of the Yakama Nation (Yakama Nation)
- Bureau of Reclamation (Reclamation)

Funding Sources

- USFWS
- Yakama Nation
- Salmon Recovery Foundation Board (SRF Board)

Bureau of Reclamation Expenditures in 2012

Subbasin	Expenditures
Wenatchee River	\$ 1,482,363

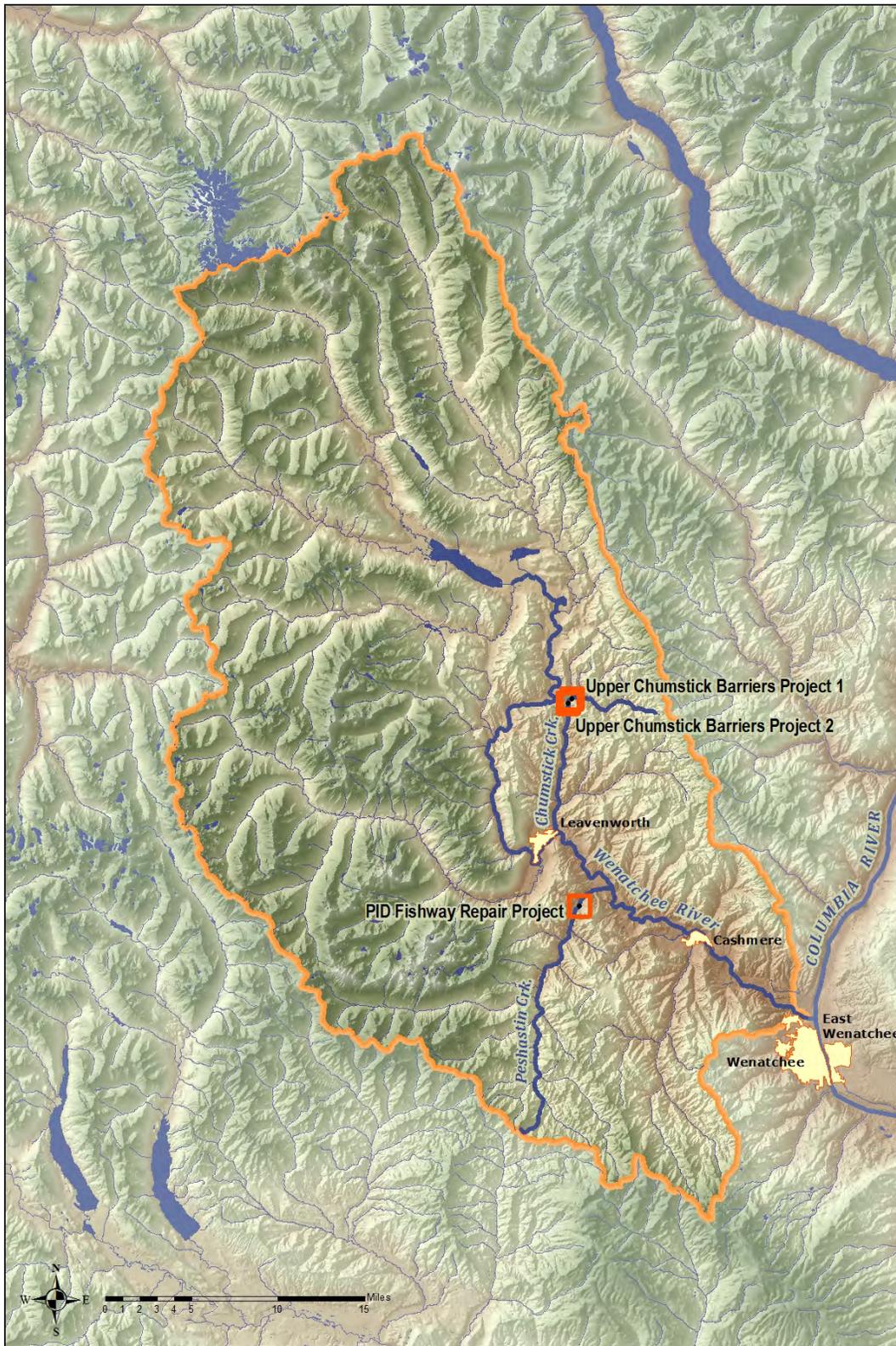


Figure 10. Location map of the projects completed in the Wenatchee River subbasin in 2012.

Upper Chumstick Barriers Project 1

Project Name: Upper Chumstick Barriers 1	
Project Type: Barrier removal	
Project Sponsor: CCNRD	
Project Design: Reclamation	
Landowner(s): Private Landowners	
Partners: USFWS, Reclamation	Reclamation Development Costs: \$384,000 (includes three parts of the larger project)
Funding Source(s): USFWS, SRF Board	Implementation Cost: \$141,000
Project Location:	State: WA County: Chelan Stream: Chumstick Creek Latitude: 47 42' 52.79" Longitude: 120 38' 8.31" Local Landmark: 0.25, 0.30 miles south of Second Creek Road Township: 26N Range: 18EWM Section: 31 ¼ Section: NE
Project Status: Completed	
Project Phase: Monitoring	
Milestones	Funding: Secured Design: Completed Permitting: Completed Construction Start Date: October 17, 2012 Construction Completion Date: November 1, 2012
Contracting	Advertised: July 16, 2012
	Awarded: August 7, 2012
Biological Benefit	Species: Steelhead, spring Chinook salmon
	Benefit Type: Adult and juvenile passage
Metric: 1.8 miles, 0.3 miles to the next partial culvert barrier	
Project Objectives and Description: This barrier removal is part of a larger project, the Chumstick Creek Rehabilitation Project, which will provide passage to 1.8 stream miles of spawning, rearing, and overwintering habitat for steelhead, spring Chinook salmon, and bull trout. This project removed two barrier culverts that were partial passage barriers and replaced them with two bridges. This, combined with other Upper Chumstick Barrier projects allows passage for an additional 1.8 miles of habitat upstream.	

Project Name: Upper Chumstick Barriers 1

Design, Permitting, and Construction Issues:

The utility relocation proved to be significantly more costly during construction than anticipated. Additionally, unsuitable foundation material at one site was encountered.

Gallery:



Upper Chumstick Barriers Project Photograph 1: First crossing prior to project work.



Upper Chumstick Barriers Project Photograph 2: First crossing after project completion.



Upper Chumstick Barriers Project Photograph 3: Second crossing prior to project work.



Upper Chumstick Barriers Project Photograph 4: Second crossing after project completion.

Upper Chumstick Barriers Project 2

Project Name: Upper Chumstick Barriers 2	
Project Type: Barrier Removal	
Project Sponsor: CCNRD	
Project Design: Reclamation	
Landowner(s): Private Landowner	
Partners: USFWS	Reclamation Development Costs: \$384,000 (includes four parts of the larger project)
Funding Source(s): USFWS, SRF Board	Implementation Cost: \$58,000
Project Location:	State: WA County: Chelan Stream: Chumstick Creek Latitude: 47 42' 38.44" Longitude: 120 38' 23.27" Local Landmark: 0.16 miles south of railroad overpass Township: 26N Range: 18E Section: 31 $\frac{1}{4}$ Section: NE
Project Status: Completed	
Project Phase: Monitoring	
Milestones	Funding: Secured Design: Completed Permitting: Completed Construction Start Date: October 10, 2012 Construction Completion Date: October 17, 2012
Contracting	Advertised: June 11, 2012
	Awarded: June 25, 2012
Biological Benefit	Species: Steelhead, spring Chinook salmon
	Benefit Type: Adult and juvenile passage
Metric: 1.8 miles (includes all four subprojects)	
Project Objectives and Description: This barrier removal is part of a larger project, the Chumstick Creek Rehabilitation Project, which will provide passage to 1.8 stream miles of spawning, rearing, and overwintering habitat for steelhead, spring Chinook salmon, and bull trout. This project removed one barrier culvert that is a partial passage barrier and replaced it with a bridge. This, combined with other parts of the Project, allows passage for an additional 1.8 miles upstream.	

Project Name: Upper Chumstick Barriers 2

Design, Permitting, and Construction Issues: The utility relocation proved to be significantly more costly during construction than anticipated.

Gallery:



Upper Chumstick Barriers Project Photograph 1: The crossing before the project.



Upper Chumstick Barriers Project Photograph 2: The crossing after the project.

PID Fishway Repair Project

Project Name: PID Fishway Repair	
Project Type: Adaptive management	
Project Sponsor: CCNRD	
Project Design: Anchor QEA	
Landowner(s): Peshastin Irrigation District (PID) and private landowners	
Partners: Yakama Nation. Reclamation	Reclamation Development Costs: \$93,206
Funding Source(s): Yakama Nation	Implementation Cost: \$101,000
Project Location:	State: WA County: Chelan Stream: Peshastin Creek Latitude: 47 32' 29.16" N Longitude: 120 36' 51.22" W Local Landmark: RM 2.2 on Peshastin Creek Township: 24N Range: 18E Section: 29 ¼ Section: SE
Project Status: Complete	
Project Phase: Monitoring	
Milestones	Funding: Secured Design: Complete Permitting: Completed Construction Start Date: August 30, 2012 Construction Completion Date: September 15, 2012
Contracting	Advertised: August 2012
	Awarded: August 2012
Biological Benefit	Species: Steelhead, spring Chinook salmon
	Benefit Type: Adaptive Management
Metric: No additional metric benefits to ESA-listed species are anticipated as a result of this action; however, passage at this diversion, which was accomplished by an earlier project, is further improved and will be protected by addressing landowners' issues.	
Project Objectives and Description: The project is located in the Wenatchee River subbasin on Peshastin Creek near the city of Peshastin, Washington. The diversion structure and adjacent fishway were designed by Reclamation and built by CCNRD in 2005. The structure was modified subsequently which altered the intent of the original structure. Modifications included removal of a portion of the right retaining wall and stoplog guides in the fishway, which were designed to control the amount of flow in the fishway during low-flow periods.	

Several large flood events have occurred since project completion as well. These events caused bank erosion along the left bank and deposited large amounts of sediment upstream of the structure, which has changed the river planform near and upstream of the structure. The combination of physical alterations of the fishway and the deposition upstream of the structure has influenced the ability of PID to withdraw water at low flows.

This project 1) addressed erosion and flood control along the upstream left bank to adjacent private landowner and 2) re-engineered the structure to provide minimum instream flows of 3.5 cfs in the fishway such that excess flows will be easily obtained by PID.

Design, Permitting, and Construction Issues: Design complications included designing a fishway capable of handling high flows, bedload, and ice flows that Peshastin Creek experiences while not creating a negative impact for the adjacent landowner or the irrigation district. Sediment accumulation has changed the site drastically and it is difficult to ascertain the cause of the deposition.

Gallery:



PID Fishway Repair Project Photograph No. 1: Photo showing erosion on left bank before the project.



PID Fishway Repair Project Photograph No. 2: Photo before showing ice accumulation in the yard on left bank.



PID Fishway Repair Project Photograph No. 3: Photo after showing new wall along fishway.