RECLAMATION

Managing Water in the West

Reclamation's 2015 List of Tributary Habitat Projects Completed for the 2010 Federal Columbia River Power System

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

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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.

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: Large woody debris at Catherine Creek River Mile 44 Stream and Fish Habitat Enhancement Project, Oregon.

Acronyms and Abbreviations

BiOp	Biological Opinion
BPA	Bonneville Power Administration
cfs	cubic feet per second
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CTWSRO	Confederated Tribes of the Warm Springs Reservation of Oregon
ESA	Endangered Species Act
FCRPS	Federal Columbia River Power System
LWD	large wood debris
Reclamation	U.S. Bureau of Reclamation
RM	river mile
RPA	Reasonable and Prudent Alternative
Sho-Ban Tribes	Shoshone-Bannock Tribes
UCR	Upper Columbia River
Yakama Nation	Confederated Tribes and Bands of the Yakama Nation

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INTRODUCTION

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

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

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

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

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

Figure 1. Map of 2014 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 to $9 million, with 30 to 50 projects in different stages of development during any year. Habitat improvement projects may take up to 3 years or more to implement from conception to completion. Construction activities associated with the more complex and costly projects usually continue across multiple years. Project costs vary, depending on the objectives, landowner cooperation, availability of construction funding from project partners, changes in project scopes, and other actions required to meet biological criteria in the FCRPS BiOp for endangered species.

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

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

Expenditures for the total basin costs are included in each basin section and repeated for each subbasin. Those totals include the annual budgets spent for development, coordination, financial assistance to partners, contracts for architectural and engineering services, and project-specific activities for 2015 only. With 30 to 50 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.

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2015 ACTIVITIES

In 2015, Reclamation and partners completed 23 fish-habitat improvement projects in the following eight subbasins of the Columbia River Basin:

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

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

FUTURE PROJECTS

Reclamation plans to continue providing technical assistance for habitat improvement projects that enhance tributary spawning and rearing habitat associated with implementing the FCRPS BiOp.

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 support multiple projects throughout the subbasins. In the following sections, partners and sponsors for the 2015 projects are listed under each subbasin in which they were active.

SALMON RIVER BASIN

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

Reclamation works in four subbasins: the Upper Salmon, the Lemhi, the Pahsimeroi, and the Little Salmon. In 2015, eight projects were completed in the Lemhi River subbasin, four projects were completed in the Pahsimeroi River subbasin, and two projects were completed in the Upper Salmon River subbasin.

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

Bureau of Reclamation Expenditures in 2015

Subbasin	Expenditures
Salmon River	$1,736,746

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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 2015, eight projects were completed in the subbasin that improved channel access, streamflow and channel complexity.

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 may be requested through the Columbia/Snake Salmon Recovery Office, 208-378-5057.

Projects

- Carmen Creek 3 Flow Enhancement/Water Rights Transfer
- Eighteenmile Creek Culvert to Bridge Project
- Hawley Eighteenmile Intercept/Irrigation Project
- Lower Bohannon Creek Private Culvert Replacement Project
- Mabey Lane Side Channel Project
- Pratt Creek Culvert Replacement Project
- Upper Hawley Creek Water Rights Transfer (LHaC-03)
- West Fork Bohannon Creek Culvert to Bridge Project

Sponsors

- Lemhi Soil and Water Conservation District
- Lemhi Regional Land Trust
- Idaho Department of Fish and Game

Partners

- Lemhi Soil and Water Conservation District
- Idaho Governor’s Office of Species Conservation
- Idaho Department of Fish and Game
- Idaho Department of Water Resources
- Natural Resources Conservation Service
- Idaho Water Transaction Board
- Bonneville Power Administration
- Idaho Soil and Water Conservation Commission
- Lemhi Regional Land Trust
- Bureau of Land Management

Funding Sources

- Bonneville Power Administration
- Idaho Department of Fish and Game
- Natural Resources Conservation Service
- National Oceanic and Atmospheric Administration National Marine Fisheries Service

Bureau of Reclamation Expenditures in 2015

Subbasin	Expenditures
Lemhi River	$239,710

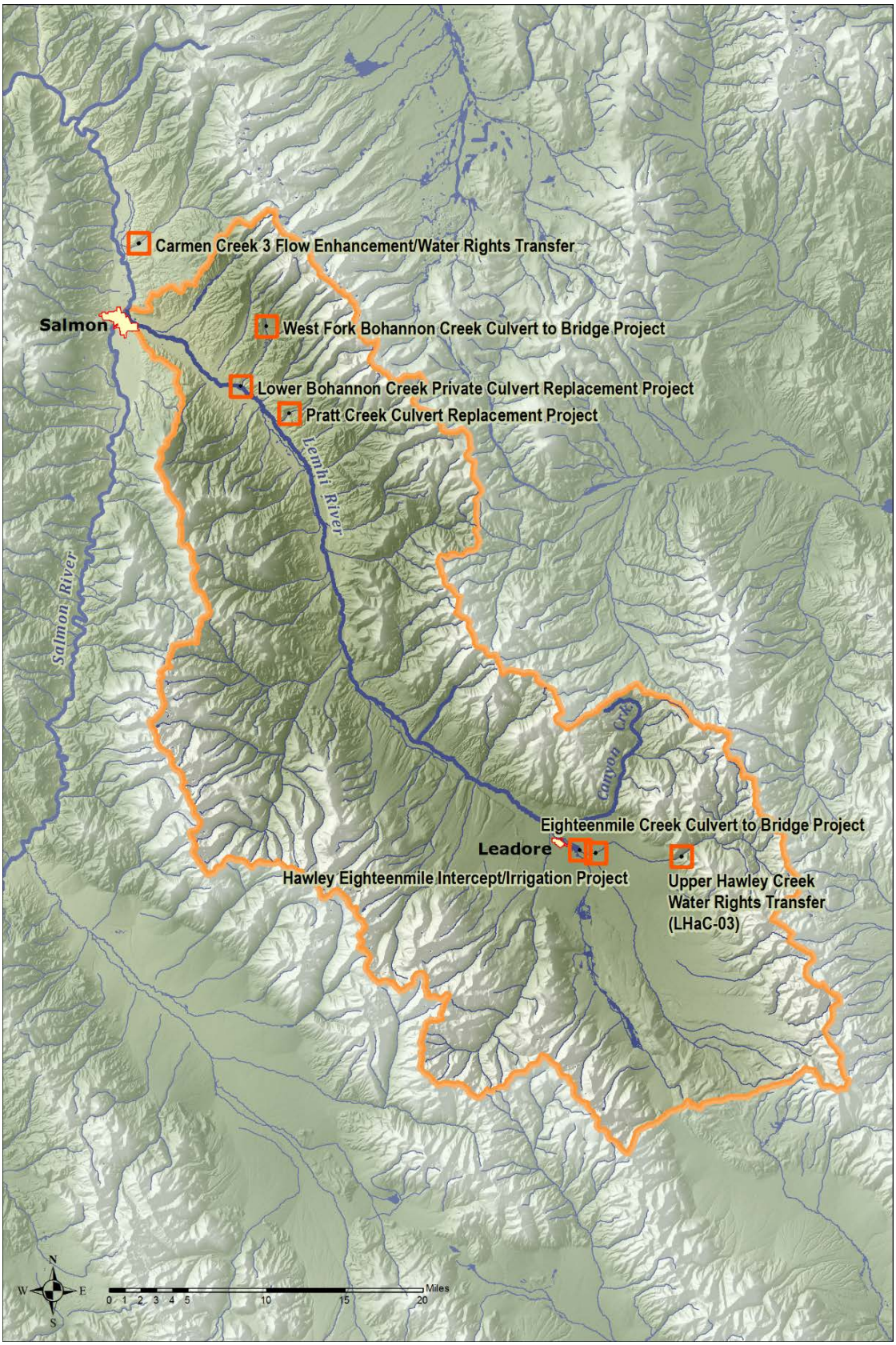


Figure 2. Location map of the projects completed in the Lemhi River subbasin in 2015.

Carmen Creek 3 Flow Enhancement / Water Rights Transfer
Lemhi Subbasin

Sponsor: Lemhi Soil and Water Conservation District

Partner(s): Lemhi Soil and Water Conservation District, Idaho Governor's Office of Species Conservation, Idaho Department of Fish and Game, Idaho Department of Water Resources, Natural Resources Conservation Service, Idaho Water Transaction Board, Bonneville Power Administration

Project Type: Channel Access, Streamflow

- Channel Access: 0.4 miles made accessible upstream of the irrigation diversion
- Streamflow: 1.2 cfs. for 1.7 miles downstream of the irrigation diversion

Latitude: 45° 14' 52" N

Longitude: 113° 52' 18" W

Funding Source(s): Bonneville Power Administration, Idaho Fish and Game, Natural Resources Conservation Service

Reclamation's Development Costs: $3,000

Implementation Costs: $452,855

Project Description: Carmen Creek, a tributary of the Salmon River, is heavily diverted for agricultural irrigation often resulting in dewatering of the stream channel. The objectives of this project were (1) to increase water quantity in the lower reach of Carmen Creek, (2) to increase access to suitable habitat, and (3) to eliminate entrainment of fish in surface water ditches.

Objectives were achieved by transferring the senior water rights for two irrigators from the Highline Ditch (SCC-03) to a new point of diversion downstream. From the Highline Ditch, the point of diversion for 1.2 cfs. was moved 1.7 miles downstream in Carmen Creek to another diversion ditch (McNutt Ditch S-5/6/7). To improve water conveyance and efficiency, pumping stations and water measurement weirs were installed in the McNutt Ditch. Pipelines, pivots, and point of diversion sprinklers were installed on the land formerly irrigated via open ditch flood irrigation. Because transferred water rights are senior, the irrigators can "call" on their water rights to be delivered downstream to the new point of diversion downstream thus maintaining flow in this reach of Carmen Creek for fish. The end result was increased flow in the lowermost reach of Carmen Creek. An additional benefit of this project was the replacement of the old, ineffective fish screen in SCC-03 with a new rotary drum screen by the Idaho Fish and Game.

Photograph 1: Carmen Creek SCC-03 Diversion.

Photograph 2: S 5/6/7 (McNutt Ditch) Diversion.

Photograph 3: Pump station in McNutt Ditch.

Photograph 4: New pivot, after.

Eighteenmile Creek Culvert to Bridge Project
Lemhi Subbasin

Sponsor: Lemhi Soil and Water Conservation District

Partner(s): Idaho Governor's Office of Species Conservation, Lemhi Soil and Water Conservation Distirct, Bonneville Power Administration, Idaho Soil and Water Conservation Commission

Project Type: Channel Access

- Channel Access: Culvert replacement with bridge; 1.2 miles made accessible above the road crossing

Latitude: 44º 40' 19" N

Longitude: 113º 19' 55" W

Funding Source(s): Bonneville Power Administration, National Oceanic and Atmospheric Administration (Pacific Coastal Salmon Recovery Fund)

Reclamation's Development Costs: $23,000

Implementation Costs: $77,180

Project Description: This project improved fish passage in the lower reach of Eighteenmile Creek, a tributary to the Lemhi River near Leadore, Idaho. This was accomplished by removing two undersized corrugated metal pipe culverts from beneath a farm road that were velocity barriers for fish passage at certain times of the year. The culverts were removed and replaced with a pre-fabricated steel bridge that spans the entire stream channel.\

Photograph 5: Eighteenmile Creek Culverts before replacement.

Photograph 6: Eighteenmile Creek Bridge.

Hawley Eighteenmile Intercept/Irrigation Project
Lemhi Subbasin

Sponsor: Lemhi Soil and Water Conservation District

Partner(s): Lemhi Soil and Water Conservation District, Natural Resources Conservation Service, Idaho Department of Fish and Game, Bonneville Power Administration, Idaho Governor's Office of Species Conservation

Project Type: Channel Access, Entrainment, Streamflow

- Channel Access: 1.5 miles made accessible to the next upstream barrier (LHaC-01 Diversion)
- Entrainment: Ditch entrainment eliminated, the new point of diversion has been screened
- Streamflow: 1.65 cfs for 1.5 miles downstream to the next diversion

Latitude: 44° 40' 07" N

Longitude: 113° 18' 41" W

Funding Source(s): Bonneville Power Administration, Natural Resources Conservation Service, Idaho Department of Fish and Game

Reclamation's Development Costs: $23,000

Implementation Costs: $95,710

Project Description: Both Hawley and Eighteenmile Creek are tributaries to the Lemhi River, near Leadore, Idaho. This project improved fish access into Hawley Creek and Eighteenmile Creek by removing an irrigation diversion, and eliminating an open ditch located at the confluence of Hawley Creek and Eighteenmile Creek. Water rights from this point of diversion were transferred downstream in Eighteenmile Creek to a location closer to the point of use, providing increased flow in the lower reach of Eighteenmile Creek. At the new point of diversion, a pump station, diversion, fish screen, and pipeline were installed to prevent fish entrainment and more efficiently deliver irrigation water to a new center pivot.

Photograph 7: Hawley Creek and Eighteenmile Creek intercept after the structure was removed and the ditch was closed.

Lower Bohannon Creek Private Culvert Replacement Project
Lemhi Subbasin

Sponsor: Lemhi Soil and Water Conservation District

Partner(s): Idaho Governor's Office of Species Conservation, Lemhi Soil and Water Conservation District, Bonneville Power Administration, Idaho Soil and Water Conservation Commission

Project Type: Channel Access

- Channel Access: Culvert replacement with bridge; 1.2 miles made accessible upstream to the next partial barrier

Latitude: 45º 06' 44" N

Longitude: 113º 44' 48" W

Funding Source(s): Bonneville Power Administration (Accord), National Oceanic and Atmospheric Administration (Pacific Coastal Salmon Recovery Fund)

Reclamation's Development Costs: $3,000

Implementation Costs: $110,886.00

Project Description: This project improved fish passage in the lower reach of Bohannon Creek, a tributary to the Lemhi River near Baker, Idaho, by removing two undersized corrugated metal pipe culverts from beneath a private driveway. The culverts were partial barriers for fish passage in Bohannon Creek at certain times of the year. The culverts were removed and replaced with a 40' long x 16' wide pre-fabricated steel bridge that spans the entire stream channel.

Photograph 8: Lower Bohannon Creek Culverts, before replacement.

Photograph 9: Lower Bohannon Creek Bridge, completed installation.

Mabey Lane Side Channel Project
Lemhi Subbasin

Sponsor: Lemhi Regional Land Trust

Partner(s): Idaho Governor's Office of Species Conservation, Lemhi Regional Land Trust, Bonneville Power Administration

Project Type: Channel Complexity, Riparian

- Channel Complexity: 1630 feet of habitat enhanced (1,200 feet main channel, 430 feet side channel)
- Riparian: 30 acres of land adjacent to the enhanced area is now protected via a conservation easement, eliminating livestock grazing

Latitude: 45º 56' 27" N

Longitude: 113º 38' 30" W

Funding Source(s): Bonneville Power Administration (Accord), National Oceanic and Atmospheric Administration (Pacific Coastal Salmon Recovery Fund)

Reclamation's Development Costs: $13,000

Implementation Costs: $226,267

Project Description: The objective of the Mabey Lane Side Channel Project was to improve fish habitat, especially for rearing juvenile Chinook salmon in the Lemhi River near Tendoy, Idaho. The Lemhi Regional Land Trust partnered with the landowner to purchase a conservation easement on 30 acres along the Lemhi River. Within the easement area, additional fish habitat was created through the construction of a side channel in which complex habitat features were constructed (i.e. tree root wads, pools, riffles, glides, etc.). Approximately 30 woody debris structures were constructed. Riparian vegetation (sod mats, willow cuttings, native shrubs, and grasses) were planted to stabilize streambanks, provide shade, and increase biodiversity along the Lemhi River and adjacent side channel. Fencing was erected to exclude cattle access.

Photograph 10: Mabey Lane Side Channel before construction.

Photograph 11: Mabey Lane Side Channel after construction.

Pratt Creek Culvert Replacement Project
Lemhi Subbasin

Sponsor: Lemhi Soil and Water Conservation District

Partner(s): Idaho Governor's Office of Species Conservation, Lemhi Soil and Water Conservation District, Bonneville Power Administration

Project Type: Channel Access

- Channel Access: Culvert replacement with bridge, 0.5 miles made accessible above the road crossing

Latitude: 45º 05' 09" N

Longitude: 113º 41' 03" W

Funding Source(s): Bonneville Power Administration (Accord)

Reclamation's Development Costs: $3,000

Implementation Costs: $93,653.00

Project Description: This project improved fish passage in the lower reach of Pratt Creek, a tributary to Sandy Creek which is a tributary to the Lemhi River near Baker, Idaho, by removing an undersized and partially perched corrugated metal pipe culvert from beneath a farm road. The culvert was a partial barrier for fish passage in Pratt Creek at certain times of the year. The culvert was removed and replaced with a pre-fabricated steel bridge that spans the entire stream channel.

Photograph 12: Perched outlet of Pratt Creek Culvert.

Photograph 13: Completed bridge installation and stream re-watered.

Upper Hawley Creek Water Rights Transfer (LHaC-03)
Lemhi Subbasin

Sponsor: Lemhi Soil and Water Conservation District

Partner(s): Idaho Governor's Office of Species Conservation, Idaho Department of Fish and Game, Bureau of Land Management, Natural Resources Conservation Service

Project Type: Channel Access, Streamflow

- Channel Access: 1.5 miles made accessible to the next upstream barrier
- Streamflow: 5.3 cfs for 0.7 miles downstream to the next diversion

Latitude: 44º 39' 44" N

Longitude: 113º 12' 06" W

Funding Source(s): Bonneville Power Administration, National Oceanic and Atmospheric Administration (Pacific Coastal Salmon Recovery Fund), Idaho Fish and Game, Natural Resources Conservation Service

Reclamation's Development Costs: $23,000

Implementation Costs: $913,212

Project Description: The objectives of this project were (1) to increase water quantity in Hawley Creek, (2) to increase access to suitable habitat for fish by the removal of anthropogenic barriers to passage, and (3) to eliminate entrainment of fish in surface water ditches. These objectives were achieved by removing the Hawley Creek diversion structure, moving the point of diversion upstream and installing 3.4 miles of gravity fed irrigation conveyance pipeline for efficient water delivery to the place-of-use (POU) on agricultural fields. Once delivered to the POU, water is efficiently distributed across the fields with four new pivot sprinkler irrigation systems.

The outcome of this project was the conversion of an 11,245 foot open ditch into an enclosed irrigation pipeline system which uses less water. This provides additional water in the stream for fish migration, rearing, and spawning. The entrainment of fish in the former unscreened and open irrigation ditch has been eliminated. In addition to changing the water delivery system a wooden diversion structure/fish barrier was removed from the creek, the point of diversion moved upstream and a new fish passable diversion and controllable headgate were constructed. A rotary drum fish screen was designed and installed in the ditch by the Idaho Fish and Game to eliminate the entrainment of fish in the new pipeline. This project is just one of a suite of previously completed and proposed projects intended to reconnect Hawley Creek to the Lemhi River to improve fish habitat.

Photograph 14: Hawley Creek LHaC-03 old point of diversion in 2002.

Photograph 15: Hawley Creek LHaC-03 after the structure was removed, June 23, 2015.

Photograph 16: New LHaC-03 point of diversion and head gate.

Photograph 17: Completed LHaC-03 fish screen.

Photograph 18: Irrigation water conveyance pipeline.

West Fork Bohannon Creek Culvert to Bridge Project
Lemhi Subbasin

Sponsor: Idaho Department of Fish and Game

Partner(s): Idaho Department of Fish and Game, Idaho Governor's Office of Species Conservation, Bonneville Power Administration

Project Type: Channel Access

- Channel Access: Culvert replacement wit bridge; 1.2 miles made accessible to the next upstream barrier

Latitude: 45º 10' 01" N

Longitude: 113º 42' 34" W

Funding Source(s): Bonneville Power Administration (Accord)

Reclamation's Development Costs: $13,000

Implementation Costs: $100,000

Project Description: The objective of this project was to improve fish passage in the west fork of Bohannon Creek, a tributary to the Lemhi River near Baker, Idaho. This objective was accomplished by removing an undersized corrugated metal pipe culvert from beneath a farm road. The culvert was undersized and a velocity barrier for fish passage in the west fork of Bohannon Creek at certain times of the year. The culvert was removed and replaced with a pre-fabricated steel bridge that spans the entire stream channel.

Photograph 19: Upstream end of West Fork Bohannon Creek Culvert.

Photograph 20: Downstream end of West Fork Bohannon Creek Culvert.

Photograph 21: Finished bridge installation.

Photograph 22: Completed bridge and road.

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 2015, five projects were completed in this subbasin that improved channel access, streamflow and 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

- Lone Pine Culvert Replacement
- McCoy Lane Culvert Replacement
- P-13 Removal – Pahsimeroi River Reconnect
- P-16 Diversion Replacement Project
- Sulphur Creek Reconnect Project – Culvert Removal and Bridge Replacement

Sponsors

- Custer Soil and Water Conservation District

Partners

- Custer Soil and Water Conservation District
- Bonneville Power Administration
- Idaho Department of Fish and Game
- Private Landowner(s)
- Natural Resources Conservation Service
- Bureau of Land Management
- The Nature Conservancy

Funding Sources

- Bonneville Power Administration
- Natural Resources Conservation Service

Bureau of Reclamation Expenditures in 2015

Subbasin	Expenditures
Pahsimeroi River	$169,334

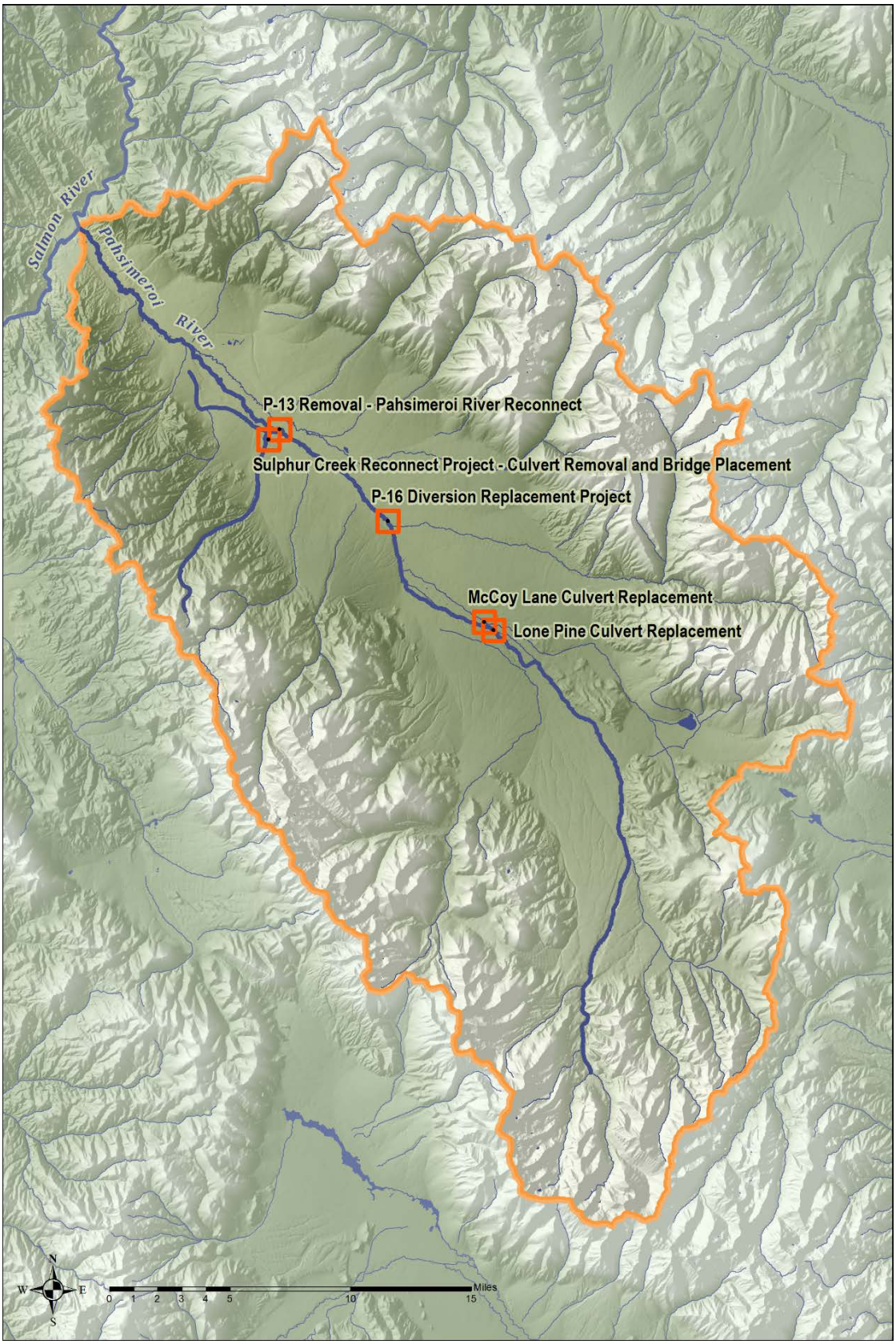


Figure 3. Location map of the projects completed in the Pahsimeroi River Subbasin in 2015.

Lone Pine Culvert Replacement
Pahsimeroi Subbasin

Sponsor: Custer Soil and Water Conservation District

Partner(s): Custer Soil and Water Conservation District, Bonneville Power Administration, Idaho Department of Fish and Game, Private Landowner(s)

Project Type: Channel Access

- Channel Access: Culvert replacement with bridge; 2.5 miles made accessible in the Pahsimeroi River, including multiple spring channels

Latitude: 44° 25 52" N

Longitude: 113° 44' 59" W

Funding Source(s): Bonneville Power Administration

Reclamation's Development Costs: $4,540

Implementation Costs: $185,000

Project Description: The Lone Pine Culvert Replacement Project is located on private ground, upstream of McCoy Lane on the Pahsimeroi River. This project replaced an undersized culvert on the Pahsimeroi River with a steal beam bridge that provides much improved fish passage to 2.5 miles of the Pahsimeroi River.

Photograph 23: Photo taken looking upstream during construction, showing the new bridge over the Pahsimeroi River.

McCoy Lane Culvert Replacement
Pahsimeroi Subbasin

Sponsor: Custer Soil and Water Conservation District

Partner(s): Custer Soil and Water Conservation District, Bonneville Power Administration, Idaho Department of Fish and Game, Private Landowner(s)

Project Type: Channel Access

- Channel Access: Culvert replacement with bridge; 4.6 miles made accessible to Lone Pine Culvert Replacement Project, Pahsimeroi River, and an additional 4 miles made accessible in Goldburg Creek

Latitude: 44° 25 52" N

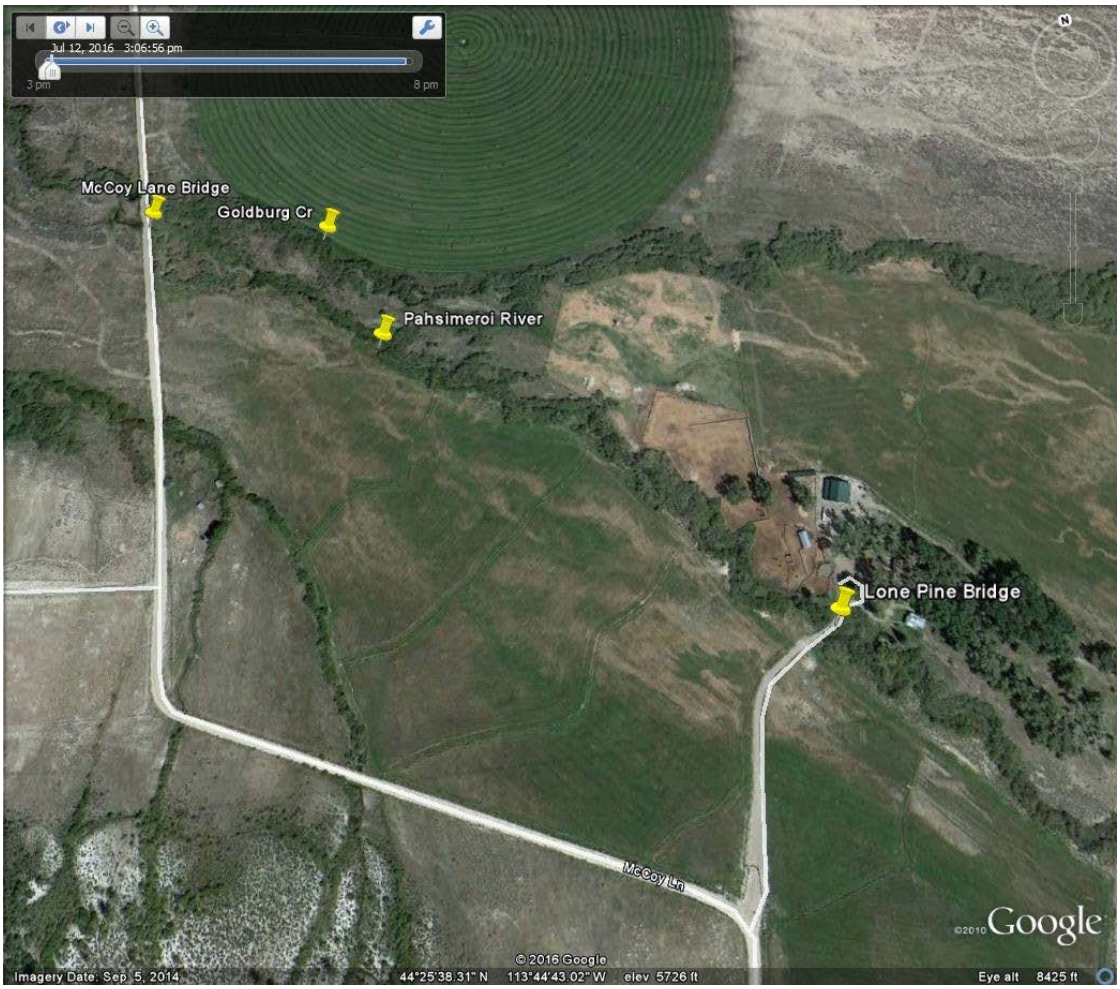
Longitude: 113° 44' 59" W

Funding Source(s): Bonneville Power Administration

Reclamation's Development Costs: $4,540

Implementation Costs: $185,000

Project Description: McCoy Lane is a county road that crosses the Pahsimeroi Valley, and the Pahsimeroi River, approximately 23 miles up the valley. The culvert that carried the river under McCoy Lane was undersized and did not meet fish passage criteria. The culvert was replaced with a steel beam bridge that provides much improved fish passage to 4 miles of Goldburg Creek and 0.6 miles of the Pahsimeroi River. A similar culvert removal project (Lone Pine Culvert Replacement) located just upstream on the river provided additional access further up the Pahsimeroi River.



Photograph 24: Goldburg Creek runs into the Pahsimeroi River just upstream of the McCoy Lane Project. A similar culvert replacement project (Lone Pine Bridge) provided additional access up the Pahsimeroi River.

Photograph 25: Photo taken looking upstream at the undersized culvert that was removed and replaced with a steel beam bridge.

Photograph 26: Photo taken looking upstream during construction, showing the new bridge over the Pahsimeroi River at McCoy Lane.

P-13 Removal – Pahsimeroi River Reconnect
Pahsimeroi Subbasin

Sponsor: Custer Soil and Water Conservation District

Partner(s): Custer Soil and Water Conservation District, Idaho Department of Fish and Game, Natural Resources Conservation Service

Project Type: Channel Access, Entrainment, Streamflow, Channel Complexity, Riparian

- Channel Access: 1.2 miles made accessible to Hooper Lane by eliminating P-13 diversion
- Entrainment: 1 fishscreen installed on 6 cfs irrigation diversion
- Streamflow: 9 cfs increase in Pahsimeroi River instream flow for 2.5 miles to new P-13 diversion location
- Channel Complexity: 0.8 miles of Pahsimeroi River enhanced downstream to the confluence with Sulphur Creek
- Riparian: 0.8 miles enhanced

Latitude: 44^{o} 33’ 33” N

Longitude: 113^{o} 54’ 05” W

Funding Source(s): Bonneville Power Administration, Natural Resources Conservation Service

Reclamation’s Development Costs: $101,399

Implementation Costs: $608,000

Project Description: The P-13 diversion was located 21.6 miles upstream from the mouth of the Pahsimeroi River. The P-13 diversion site is complicated hydraulically, gathering flows from the Pahsimeroi River, Big Springs Creek, Little Springs, and Sulphur Creek. The P-13 diversion was moved downstream approximately 2.5 miles. Water is now pumped directly from the new point of diversion and fitted with a new fish screen. Nine cfs that was previously diverted is now allowed to remain in the Pahsimeroi River to enchance fish habitat

Moving the P-13 diversion made it possible to move the Pahsimeroi River back into the historic channel. 0.8 miles of wide, shallow ditch were replaced with 0.8 miles of historic channel with excellent riparian vegetation.

The P-13 diversion structure and headgate were removed, eliminating an unscreened diversion and a partial barrier to fish movement. Sulphur Creek was also improved by enhancing the channel adjacent to the old diversion and canal location.

Photograph 27: Aerial view looking downstream along the Pahsimeroi Valley. Flows were taken out of the red marked channel and put into the historic Pahsimeroi River channel marked in blue.

Photograph 28: Photo shows a portion of the historic Pahsimeroi River channel activated during this project.

Photograph 29: The P-13 diversion structure and head gate was removed. Sulphur Creek was narrowed up and lengthened in this area to accommodate the drop over the old diversion structure.

Photograph 30: Photo shows a portion of the re-built Sulphur Creek near the old P-13 head gate structure.

P-16 Diversion Replacement
Pahsimeroi Subbasin

Sponsor: Custer Soil and Water Conservation District

Partner(s): Custer Soil and Water Conservation District, Bureau of Land Management, Idaho Department of Fish and Game, Bonneville Power Administration, Private Landowner(s)

Project Type: Channel Access, Entrainment, Streamflow

- Channel Access: Diversion replacement (former complete barrier); 0.15 miles made accessible to the next upstream barrier
- Entrainment: 1 fish screen installed on 12 cfs irrigation diversion
- Streamflow: 16 cfs increase in Pahsimeroi River instream flow for 7 miles

Latitude: 44º 29’ 51” N

Longitude: 113º 49’ 13” W

Funding Source(s): Bonneville Power Administration

Reclamation’s Development Costs: $63,204

Implementation Costs: $352,000

Project Description: This was a multi-faceted project involving multiple agencies. The old P-16 diversion structure was a push-up dam that was a complete barrier to fish migration, and de-watered the Pahsimeroi River during the summer. Irrigation system improvements were made on the two ranches that used water from the P-16 diversion. A pipeline was installed to carry the water from P-16 down to the farms. These improvements allowed the diversion to be reduced from 28 cfs down to 12.8 cfs. The point of diversion was moved upstream, and a low head rock weir was installed. This removed the barrier to fish movement. A fish screen was also installed.

Photograph 31: The old diversion was a gravel push-up dam that dried up the Pahsimeroi River in the summer.

Photograph 32: Large rock was used to make the low head rock weir that will allow water to be diverted into the new ditch without blocking fish movement in the river.

Photograph 33: Rootwad trees were installed upstream and downstream of the new head gate structure to provide fish habitat.

Photograph 34: A new steel head gate structure was installed. Diverted flows will be much less than before due to the improvements in the irrigation system downstream.

Photograph 35: The Pahsimeroi River was moved slightly upstream of the new head gate structure. Willows were planted along both banks and dead brush installed to roughen the banks until the willows begin growing.

Sulphur Creek Reconnect Project
Pahsimeroi Subbasin

Sponsor: Custer Soil and Water Conservation District

Partner(s): Custer Soil and Water Conservation District, Bonneville Power Administration, Idaho Department of Fish and Game, Natural Resources Conservation Service, The Nature Conservancy, Private Landowner(s)

Project Type: Channel Access

- Channel Access: Culvert replacement with bridge; 0.5 miles made accessible to the next upstream culvert on Custer County Road

Latitude: 44º 33’ 14” N

Longitude: 113º 54’ 41” W

Funding Source(s): Bonneville Power Administration

Reclamation’s Development Costs: $73,211

Implementation Costs: $55,000

Project Description: An undersized culvert that was a partial barrier to fish movement within Sulphur Creek was removed and replaced with a railcar bridge. The project compliments earlier projects to remove barriers and add flow to Sulphur Creek, as well as the P-13 removal project completed the same year. Irrigation system improvements installed previously resulted in the reconfiguration of a center pivot that used to cross the creek channel at multiple places. An easement with The Nature Conservancy is in place on the property, and includes a riparian fence along the creek.

Photograph 36: Photo taken looking downstream along Sulphur Creek in the area where the new bridge will be installed.

Photograph 37: Looking downstream at the new railcar bridge.

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 2015, two projects were completed in the subbasin, one in the Upper Salmon River Subbasin and one in the Upper Salmon – Yankee Fork Subbasin.

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

- Pole Creek Diversion Replacement
- Yankee Fork - Forest Service Large Wood Restoration Project

Sponsors

- Idaho Department of Fish and Game
- U.S. Forest Service

Partners

- Idaho Department of Fish and Game
- U.S. Forest Service
- Sawtooth National Recreation Area
- Custer Soil and Water Conservation District
- Idaho Department of Water Resources
- Natural Resources Conservation Service
- Sho-Ban Tribes
- Bonneville Power Administration
- Private Landowner(s)
- Trout Unlimited
- U.S. Fish and Wildlife Service

Funding Sources

- Bonneville Power Administration
- Trout Unlimited
- U.S. Fish and Wildlife Service
- U.S. Forest Service

Bureau of Reclamation Expenditures in 2015

Subbasin	Expenditures
Upper Salmon River	$1,327,702

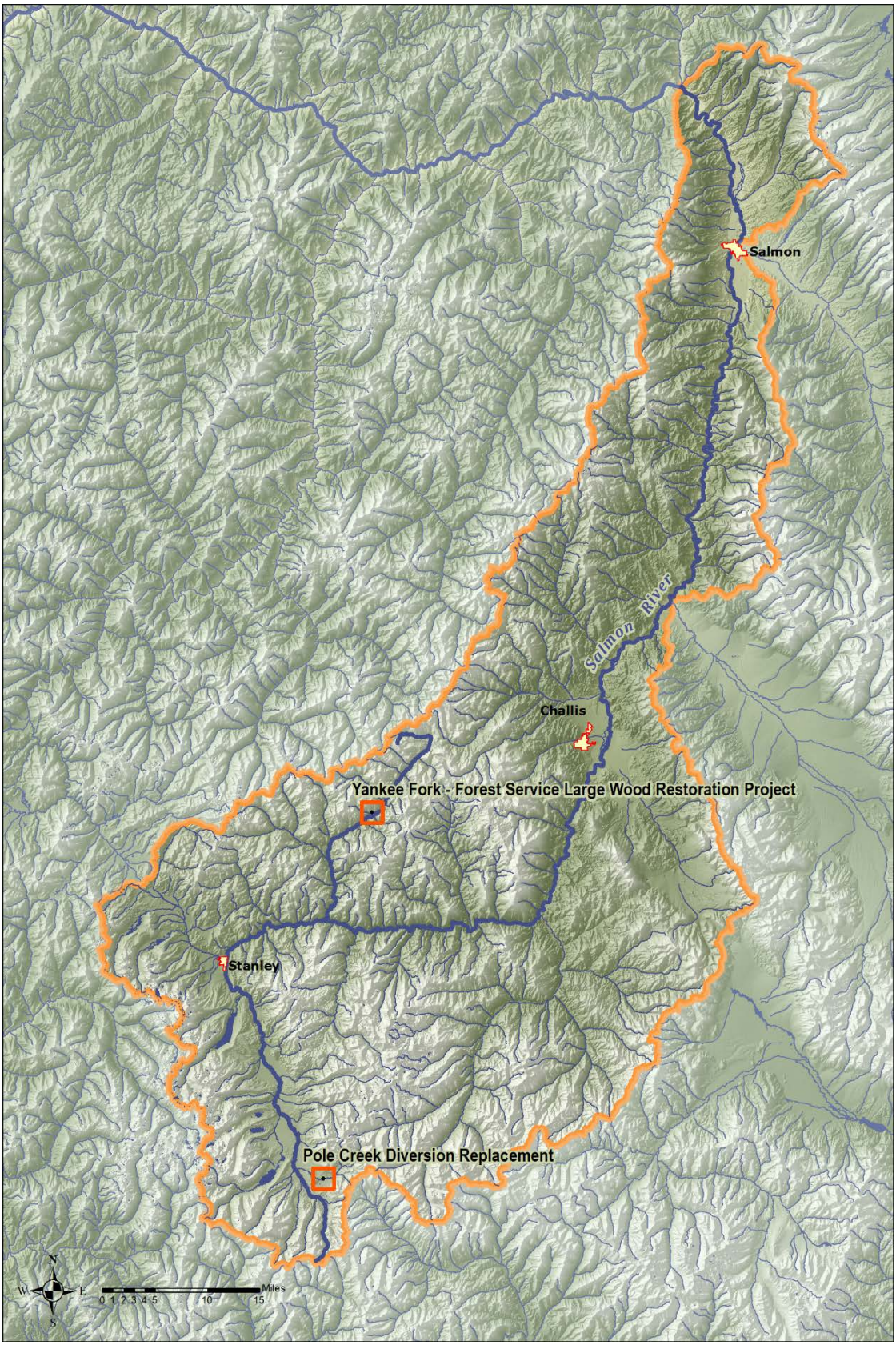


Figure 4. Location map of the projects completed in the Upper Salmon River Subbasin in 2015.

Pole Creek Diversion Replacement
Upper Salmon Subbasin

Sponsor: Idaho Department of Fish and Game

Partner(s): Idaho Department of Fish and Game, U.S. Forest Service, Sawtooth National Recreation Area, Custer Soil and Water Conservation District, Idaho Department of Water Resources, Natural Resources Conservation Service, Sho-Ban Tribes, Private Landowner(s), Bonneville Power Administration

Project Type: Channel Access, Entrainment, Streamflow

- Channel Access: Diversion replacement (complete barrier); 4.7 miles made accessible to the headwaters
- Entrainment: 1 fish screen installed on 18 cfs irrigation diversion
- Streamflow: 15-17 cfs increase in instream flow for Pole Creek (depending on the time of year and total flow in Pole Creek) for 13 miles down to Alturas Lake Creek confluence

Latitude: 43^{o} 54’ 37” N

Longitude: 114^{o} 45’ 19” W

Funding Source(s): Bonneville Power Administration

Reclamation’s Development Costs: $186,985

Implementation Costs: $2,000,000

Project Description: This project was multi-faceted. An updated irrigation system was installed, including 10 new center pivots, and 2 new wells. These improvements allowed for reduced diversion from Pole Creek. The point of diversion was moved upstream, and the old diversion structure was removed. The old diversion structure was a barrier to fish passage, the new diversion structure is a low head rock weir allowing fish to freely migrate. A fish screen was installed at the new diversion location to eliminate fish entrainment. Increased flows benefit Pole Creek and the Salmon River for at least 13 miles, down to the confluence with Alturas Lake Creek. Flows diverted from Pole Creek are determined by a formula based on several factors, including the total creek flow, time of year, and the previous year’s flows.

Photograph 38: The old diversion structure was a barrier to fish passage. IDWR Agreements kept a minimum of 5 cfs. in the stream channel below the diversion.

Photograph 39: The new head gate installed. Pole Creek is on the far side of the head gate, the new irrigation ditch is on the near side.

Photograph 40: The new diversion structure is a low head rock weir that spans the channel and provides a water surface elevation high enough to fill the new ditch without inhibiting fish movement.

Yankee Fork Forest Service Large Wood Restoration
Upper Salmon Subbasin

Sponsor: U.S. Forest Service

Partner(s): Sho-Ban Tribes, Trout Unlimited, U.S. Forest Service, U.S. Fish and Wildlife Service

Project Type: Channel Complexity

- Channel Complexity: 3.9 miles of the Yankee Fork main channel enhanced; 388 pieces of large wood added

Latitude: 44º 24’ 54” N

Longitude: 114º 38’ 32” W

Funding Source(s): Bonneville Power Administration (Shoshone-Bannock Tribes Accord), Reclamation, Trout Unlimited, U.S. Fish and Wildlife Service, U.S. Forest Service

Reclamation’s Development Costs: $6,000

Implementation Costs: $111,800

Project Description: This project is the second phase to increase large wood abundance in a 7.6-mile reach of the Yankee Fork upstream of the Custer town site. Large wood and habitat complexity are lacking in the Yankee Fork due to historic logging and dredging activity associated with gold mining. The second and final phase of the project entailed placement of 388 trees in the remaining 3.9 mile stream reach to mimic natural levels. Trees were placed in the river to mimic natural recruitment from streamside, avalanche and debris flow sources.

Photograph 41: Large wood being placed by U.S. Forest Service staff.

Photograph 42: Large wood was added to the channel using a helicopter.

Photograph 43: Placement of large wood in the main channel of the Yankee Fork.

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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 2015, one project was completed in the basin that enhanced habitat. The focus of Reclamation's actions in the basin includes Snake River spring/summer Chinook salmon (threatened) Snake River steelhead trout (threatened), and Snake River sockeye salmon (endangered).

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

Projects

- CC-44 Phase 3 Habitat Enhancement Project

Sponsors

- Union Soil and Water Conservation District

Partners

- Union Soil and Water Conservation District
- Confederated Tribes of the Umatilla Indian Reservation
- Oregon Department of Fish and Wildlife
- Bonneville Power Administration

Funding Sources

- Union Soil and Water Conservation District
- Confederated Tribes of the Umatilla Indian Reservation
- Bonneville Power Administration

Bureau of Reclamation Expenditures in 2015

Subbasin	Expenditures
Grande Ronde River	$3,013,229

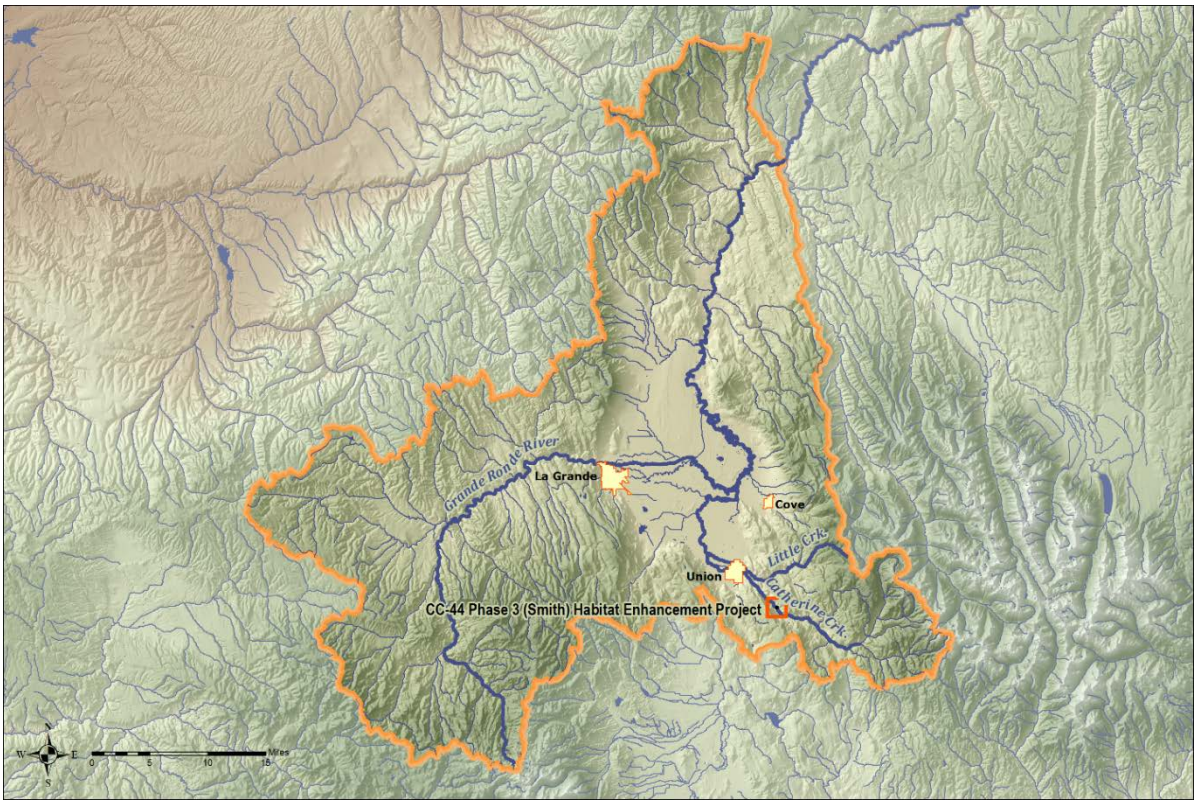

Figure 5. Location map of the projects completed in the Grande Ronde River Basin in 2015.

CC-44 Phase 3 Habitat Enhancement Project
Grande Ronde Subbasin

Sponsor: Union Soil and Water Conservation District

Partner(s): Union Soil and Water Conservation District, Confederated Tribes of the Umatilla Indian Reservation, Oregon Department of Fish and Wildlife, Bonneville Power Administration

Project Type: Channel Complexity

- Channel Complexity: Habitat complexity enhancement of Catherine Creek totaling 3864 feet including:
  - 31 large wood habitat structures and 600 feet of channel margin large wood roughness features installed (main and side channel)
  - 2100 feet of new side channels, 7 alcoves, and associated riffle, glide, and bar habitat features constructed
  - 600 feet of riffle habitat cover via brush mattress installed
  - Riparian enhancement of 1945 feet of riparian shrub-willow trenching and planting, sod/sedge mat planting, and seeding of disturbed areas.
  - Floodplain enhancement via grading of two floodplain benches and large wood and vegetation additions.

Latitude: 45º 10’ 25” N

Longitude: 117º 45’ 14” W

Funding Source(s): Union Soil and Water Conservation District, Confederated Tribes of the Umatilla Indian Reservation, Bonneville Power Administration

Reclamation’s Development Costs: $3,739,121

Implementation Costs: $1,055,901

Project Description: The Catherine Creek – RM 44 Stream and Fish Habitat Restoration Project – Phase III Smith (CC-44 Project) is a fish habitat complexity project. The CC-44 Project includes four construction phases of channel, floodplain, and riparian enhancement along Catherine Creek.

Phase 3 (Smith) was completed in 2015. The primary goals for this project were to increase stream length and channel complexity, create side channels and alcoves for juvenile rearing, place large wood material fish habitat structures, and restoration and planting of riparian and floodplain vegetation. Due to the complexity and scale of channel augmentation and restoration activities it was decided that a series of bypass channels would be utilized to route Catherine Creek around selected work areas. Two bypass channels were constructed within the project and designed in a manner to meet Oregon Department of Fish and Wildlife fish passage criteria to provide unimpeded upstream and downstream passage of native fish during the in stream work window.

Photograph 44: Pre-project condition near the lower portion of the project.

Photograph 45: Showing large wood debris (LWD), bank zone planting and floodplain grading after channel activation.

Photograph 46: Pre-project condition at proposed LWD structure and side channel 3 inlet.

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Photograph 47: Constructed LWD structure at the inlet to side channel 3 (same location as Photograph 3).

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 2015, two projects were completed in the Middle Fork John Day River subbasin and four projects were completed in the Upper John Day River subbasin.

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

Bureau of Reclamation Expenditures in 2015

Subbasin	Expenditures
John Day River	$530,748

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MIDDLE FORK JOHN DAY 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 2015, two projects were completed in this subbasin that improved channel access 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

- Lower Clear Creek Diversion
- The Nature Conservancy Channel Reconnect Project

Sponsors

- Grant Soil and Water Conservation District
- Confederated Tribes of the Warm Springs Reservation of Oregon
- The Nature Conservancy

Partners

- Bonneville Power Administration
- Confederated Tribes of the Warm Springs Reservation of Oregon
- Oregon Watershed Enhancement Board
- The Nature Conservancy
- Oregon Department of Fish and Wildlife
- U.S. Fish and Wildlife Service
- Grant Soil and Water Conservation District

Funding Sources

- Bonneville Power Administration
- Oregon Watershed Enhancement Board
- The Nature Conservancy of Oregon
- Confederated Tribes of the Warm Springs Reservation of Oregon
- U.S. Fish and Wildlife Service

Bureau of Reclamation Expenditures in 2015

Subbasin	Expenditures
Middle Fork John Day River	$359,031

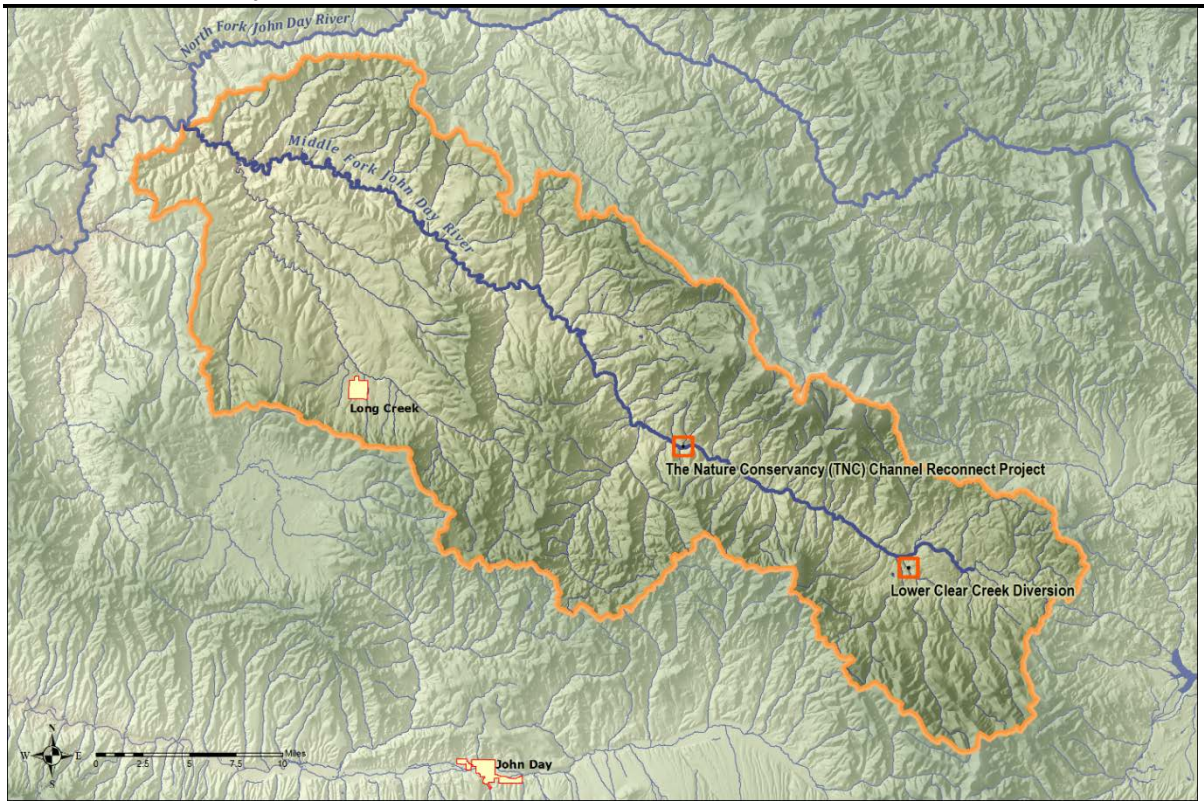

Figure 6. Location map of the projects completed in the Middle Fork John Day River Subbasin in 2015.

Lower Clear Creek Diversion
Middle Fork John Day Subbasin

Sponsor: Grant Soil and Water Conservation District

Partner(s): Bonneville Power Administration, Confederated Tribes of the Warm Springs Reservation of Oregon, Oregon Watershed Enhancement Board

Project Type: Channel Access

- Channel Access: Diversion replacement (partial barrier), 7 miles made accessible to the headwaters

Latitude: 44º 35’ 04” N

Longitude: 118º 30’ 01” W

Funding Source(s): Bonneville Power Administration through Confederated Tribes of the Warm Springs Reservation of Oregon Restoration Program

Reclamation’s Development Costs: $18,000

Implementation Costs: $25,200

Project Description: The Lower Clear Creek Diversion is about 15 miles north of Prairie City, Oregon. Clear Creek is a major tributary to the upper part of the Middle Fork John Day River. This water is home to spawning and rearing steelhead and Chinook, as well as bull trout. This diversion was the last diversion that needed to be replaced on Clear Creek. The instream part of the structure was composed of large boulders and plastic forming a partial barrier to fish passage. This diversion was one of several in the headwaters of the Middle Fork that were involved in an instream water acquisition by BPA and Reclamation in 2006 that requires the diversion to shut off on July 20th each year. Prior to construction, no head gate was present and a barrier was often constructed with tarps.

Photograph 48: Lower Clear Creek Diversion.

Photograph 49: Lower Clear Creek.

Photograph 50: Completed constructed riffle.

The Nature Conservancy (TNC) Channel Reconnect Project Middle Fork John Day Subbasin

Sponsor: The Nature Conservancy

Partner(s): The Nature Conservancy, Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife Service, Confederated Tribes of the Warm Springs Reservation of Oregon, Grant Soil and Water Conservation District

Project Type: Channel Complexity

- Channel Complexity: 1.2 miles of main channel enhanced with 22 log structures
- Channel Complexity: 0.68 miles of side channel enhanced, 2 side channels opened

Latitude: 44º 40’ 31” N

Longitude: 118º 44’ 54” W

Funding Source(s): Oregon Watershed Enhancement Board, The Nature Conservancy of Oregon, Confederated Tribes of the Warm Springs Reservation of Oregon, U.S. Fish and Wildlife Service

Reclamation’s Development Costs: $113,765

Implementation Costs: $207,085

Project Description: TNC of Oregon owns the Dunstan Preserve on the Middle Fork John Day River, about 14 miles west of Bates, Oregon, along County Highway 20. Historically the river on the Dunstan Preserve was moved to the side of the valley and channelized to increase the amount of ground available for hay production and livestock grazing. This manipulation of the river channel included berms or levees blocking off historic channels. More recently in the 1970’s, rock barbs were placed at locations to stabilize the channel. These barbs have effectively locked the channel in place. Due to channel straightening, historic land use practices, and channel confinement, most of the project reach is overly wide and shallow with very long riffle/run sections with very few pools and very little channel complexity.

The elements and objectives of this project include:

1. Removed levees and opened access to two side channels, including placement of log and boulder structures in the existing channel to deflect flow into the historic channels. This improvement increases frequency of meadow flooding and provides side channel habitat at various flow ranges where vegetation cover and complexity is much better than main channel.
2. Removed 25 rock barbs and 300 feet of rip rap allowing the river to adjust laterally and creating more instream habitat.

3. Placed 22 log structures throughout the existing channel in the project area. The placement of log structures increases channel roughness to encourage more frequent over bank flooding, narrowed the existing stream channel to reduce solar gain at base flow, and increases habitat complexity, especially the amount of pools and pocket pools with cover.
4. 22 flood plain logs were placed in 5 different locations to improve flood plain complexity.
5. Approximately 200 large boulders removed from the rip rap and rock barbs were strategically placed in the river channel: as multiple small clusters at the head of existing riffles to increase channel roughness and encourage bed deposition; as large groups forming 3 islands to encourage bed deposition and reduce channel wetted width within wide and shallow areas; and as large clusters at the head of point bars to encourage bed deposition on the point bar and reduce channel wetted width.
6. Improved 2 backwater alcoves for juvenile and fry refuge at high flows.
7. Revegetation of the project area included seeding of grass to all disturbed areas and plating of 2,125 containerized trees and shrubs.

Photograph 51: Rock barbs and rip rap to be removed.

Photograph 52: Log jams placed on alternating sides of the river.

Photograph 53: Log jam at entrance to CBIII side channel.

Photograph 54: Large boulders placed instream and rip rap removed from river.

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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 2015, four projects were completed in the subbasin that improved fish passage.

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

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

Projects

- Island Ditch Diversion
- Meredith Diversion #1 and #2
- Meredith Diversion #3
- Meredith Diversion #4

Sponsors

- Grant Soil and Water Conservation District

Partners

- Grant Soil and Water Conservation District
- Bonneville Power Administration
- Confederated Tribes of the Warm Springs Reservation of Oregon
- Oregon Watershed Enhancement Board
- Private Landowner(s)
- U. S. Fish and Wildlife Service

Funding Sources

- Bonneville Power Administration
- Oregon Watershed Enhancement Board
- Private Landowner(s)
- U. S. Fish and Wildlife Service

Bureau of Reclamation Expenditures in 2015

Subbasin	Expenditures
Upper John Day River	$171,718

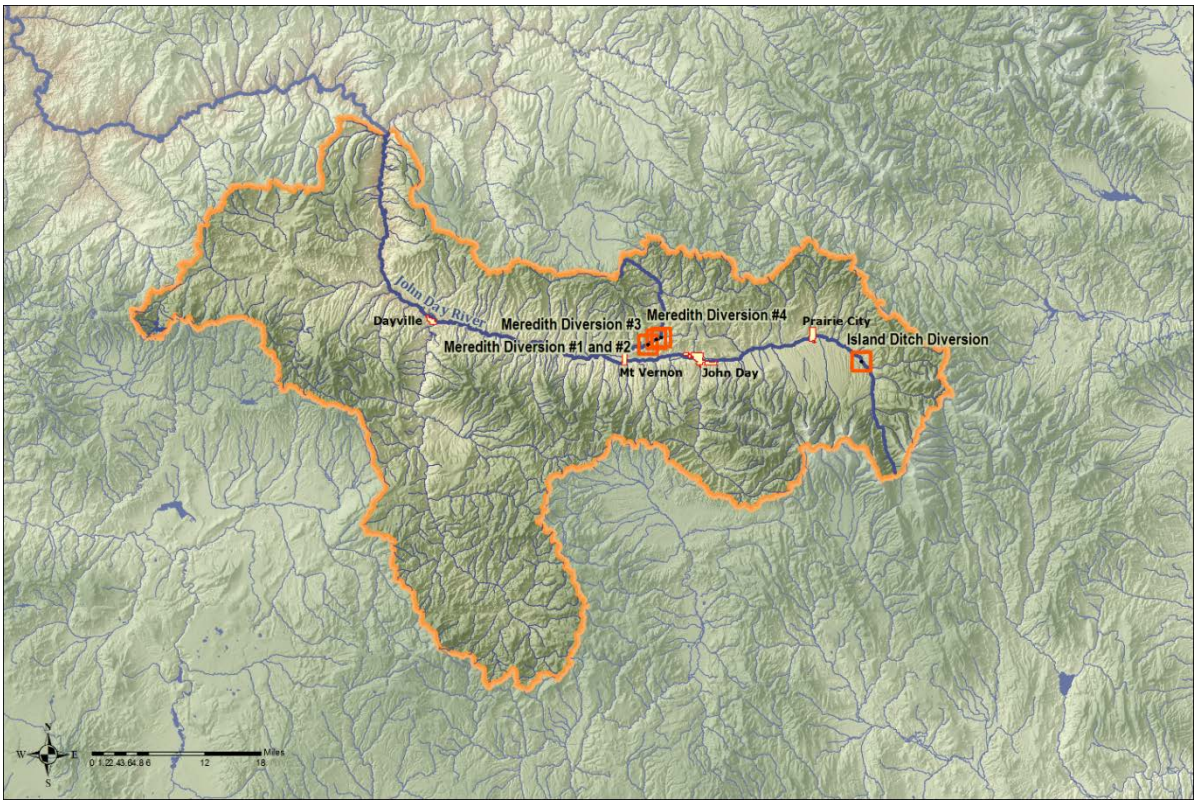

Figure 7. Location map of the projects completed in the Upper John Day River Subbasin in 2015.

Island Ditch Diversion
John Day Subbasin

Sponsor: Grant Soil and Water Conservation District

Partner(s): Grant Soil and Water Conservation District, Bonneville Power Administration, Confederated Tribes of the Warm Springs Reservation of Oregon, Oregon Watershed Enhancement Board

Project Type: Channel Access

- Channel Access: Diversion replacement (complete barrier), 0.5 miles made accessible to the next upstream barrier

Latitude: 44º 25' 15" N

Longitude: 118º 36' 11" W

Funding Source(s): Bonneville Power Administration through the Confederated Tribes of the Warm Springs Reservation of Oregon Restoration Program

Reclamation's Development Costs: $25,000

Implementation Costs: $135,252

Project Description: The Island Ditch Diversion is about five miles southeast of Prairie City, Oregon. This diversion is unique to the Upper John Day in that it is a bifurcation point, where the river splits into two channels, forming an island 1.25 miles long by 0.5 miles wide. The Island Ditch serves 162 acres on the island. Both channels support spawning and rearing steelhead and Chinook salmon. Prior to improvement, flow into the two channels as well as the flow into the Island Ditch was controlled by log sills on each of the two channels. Large boulders below the log on the west channel helped to create a cascade and kept the river from scouring under the log. It appears that these boulders needed to be repositioned periodically to maintain the stability of the structure, affecting fish passing. The log sill on the larger of the two channels creates a 3 foot drop which is a full passage barrier to juvenile salmonids at summer flows and may have blocked adult chinook access to spawning areas during low flows. The log sill and boulders on the smaller fork of the river is 1-2 feet high and is a full barrier to juvenile salmonids at low flows, but probably allows some adult chinook passage. This diversion has a water right of 4.06 cfs.

Photograph 55: Log sill on main.

Photograph 56: Main channel stanchion dam and alluvial passage on far right, looking upstream.

Photograph 57: Log sill on side channel.

Photograph 58: Side channel stanchion and alluvial passage, looking downstream.

Meredith Diversion #1 and #2
John Day Subbasin

Sponsor: Grant Soil and Water Conservation District

Partner(s): Grant Soil and Water Conservation District, Oregon Watershed Enhancement Board, Private Landowner(s)

Project Type: Channel Access

- Channel Access: Diversion replacement (complete barrier), 1.2 miles made accessible to the next upstream barrier

Latitude: 44º 26’ 21” N

Longitude: 119º 3’ 50” W

Funding Source(s): Oregon Watershed Enhancement Board, Private Landowner(s)

Reclamation’s Development Costs: $30,000

Implementation Costs: $94,235

Project Description: Meredith Diversions #1 and #2 are 2 of 5 diversions that were scheduled for treatment on the Meredith Property on Beech Creek, a tributary to the Upper John Day River. These diversions are located about 1.5 miles northeast of Mount Vernon, Oregon. Prior to replacement, Diversion #1 was a gravel levee or wing dam that is annually constructed out of stream gravels in the active channel. The levee extended about 250 feet upstream to the top of a natural riffle where water was able to flow behind the levee. Tarps and boards were put across the front of a culvert and served as a head gate to control flow into the ditch. Diversion #2 consisted of a semi-permanent post and timber structure that acts as a 2-3 foot high grade control weir. Upstream about 100 feet is a gravel pushup dam that diverts water into the ditch. There wasn’t a head gate controlling flow into the ditch. The combined capacity of the two diversions was 1.19 cfs. The site is right next to Highway 395 just down-stream from where active erosion into the highway had previously occurred and repaired with rip rap. Beech Creek in this reach has a high bed load component based on observed deposition of fines and small gravel behind the semi-permanent diversion wall and other instream grade controls. The site also had a fairly broad active flood plain on river left where a new channel was already starting to form around the end of the existing semi-permanent check structure. Beech Creek in this location routinely dries up or goes subsurface even without active diversions upstream.

Photograph 59: Gravel wing dam leading to Diversion #1.

Photograph 60: Steel post and timber semi-permanent grade control check for Diversion #2.

Photograph 61: Completed diversion with low flow channel below structure.

Photograph 62: Pool and weir fish.

Photograph 63: Irrigation headgate.

Photograph 64: High flows through lay-flat structure.

Meredith Diversion #3
John Day Subbasin

Sponsor: Grant Soil and Water Conservation District

Partner(s): Grant Soil and Water Conservation District, Confederated Tribes of the Warm Springs Reservation of Oregon, Bonneville Power Administration, Oregon Watershed Enhancement Board, U.S. Fish and Wildlife Service

Project Type: Channel Access

- Channel Access: Diversion replacement (complete barrier), 1.3 miles made accessible to the next upstream barrier

Latitude: 44º 26’ 53” N

Longitude: 119º 2’ 47” W

Funding Source(s): Bonneville Power Administration through Confederated Tribes of the Warm Springs Reservation of Oregon Restoration Program and U.S. Fish and Wildlife Service

Reclamation’s Development Costs: $20,000

Implementation Costs: $67,800

Project Description: Meredith Diversion #3 is the third of five diversions scheduled for treatment on the Meredith Property on Beech Creek, a tributary to the Upper John Day River. These diversions are located about 1.5 miles northeast of Mt. Vernon, Oregon. Diversion #3 was a large concrete structure with a bottom sill that was three to four feet higher than the downstream stream bed. The structure had concrete flash board supports on each side in order to raise the water level the additional amount needed to get water into the diversion ditch. An aluminum Alaskan steep pass ladder had been installed to provide juvenile passage, but was inadequate for adult passage and frequently plugged with debris. A head gate controlled flow into the ditch with a water right of 0.73 cfs.

Photograph 65: Concrete diversion with flash board in.

Photograph 66: Boulders used in constructed.

Photograph 67: Top section of completed riffle and head gate structure at low summer flows and diversion shut.

Photograph 68: Pool at bottom of riffle to dissipate energy.

Photograph 69: New riffle with head gate structure, winter.

Photograph 70: New riffle looking upstream, winter.

Meredith Diversion #4
John Day Subbasin

Sponsor: Grant Soil and Water Conservation District

Partner(s): Grant Soil and Water Conservation District, Confederated Tribes of the Warm Springs Reservation of Oregon, Bonneville Power Administration, Oregon Watershed Enhancement Board, U.S. Fish and Wildlife Service

Project Type: Channel Access

- Channel Access: Diversion replacement (complete barrier), 3 miles made accessible to the next upstream barrier

Latitude: 44º 27’ 3” N

Longitude: 119º 2’ 9” W

Funding Source(s): Bonneville Power Administration through Confederated Tribes of the Warm Springs Reservation of Oregon Restoration Program and U.S. Fish and Wildlife Service

Reclamation’s Development Costs: $11,200

Implementation Costs: $86,000

Project Description: Meredith Diversion #4 is the fourth of five diversions scheduled for treatment on the Meredith Property on Beech Creek, a tributary to the Upper John Day River. These diversions are located about 1.5 miles northeast of Mt. Vernon, Oregon. Diversion #4 is 0.1 miles up Little Beech Creek, a tributary to Beech Creek. Although a very small tributary, Little Beech Creek is spring fed and maintains 1.2 cfs flow even in the driest months. The previous diversion consisted of large boulders that create a two to three foot high permanent grade control. Tarps and other materials were then used on top of the grade control to divert flow into the ditch. Prior to improvement, a head gate was not there to control flow into the ditch which has a water right of 0.56 cfs.

Photograph 71: Existing diversion.

Photograph 72: Tarp used to block the stream and direct it into the ditch.

Photograph 73: New diversion and constructed riffle looking downstream.

Photograph 74: New diversion looking upstream.

UPPER COLUMBIA RIVER BASIN

The UCR basin, generally described as the Columbia River upstream from Grand Coulee Dam in Washington, has a drainage area of about 74,100 square miles, including approximately 39,000 square miles that extend into Canada. Reclamation works in three Upper Columbia River subbasins in the United States: the Entiat, the Methow, and the Wenatchee. In 2015, one project was completed in the Methow River subbasin, and one project was completed 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 2015

Subbasin	Expenditures
Upper Columbia River	$3,478,219

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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 2014, three projects were completed in the subbasin.

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

- Methow Instream Flow Project (MVID-W)

Sponsors

- Trout Unlimited – Washington Water Project

Partners

- Trout Unlimited
- Washington Department of Ecology
- Methow Conservancy
- Methow Valley Irrigation District

Funding Sources

- Washington Department of Ecology

Bureau of Reclamation Expenditures in 2015

Subbasin	Expenditures
Methow River	$1,100,482

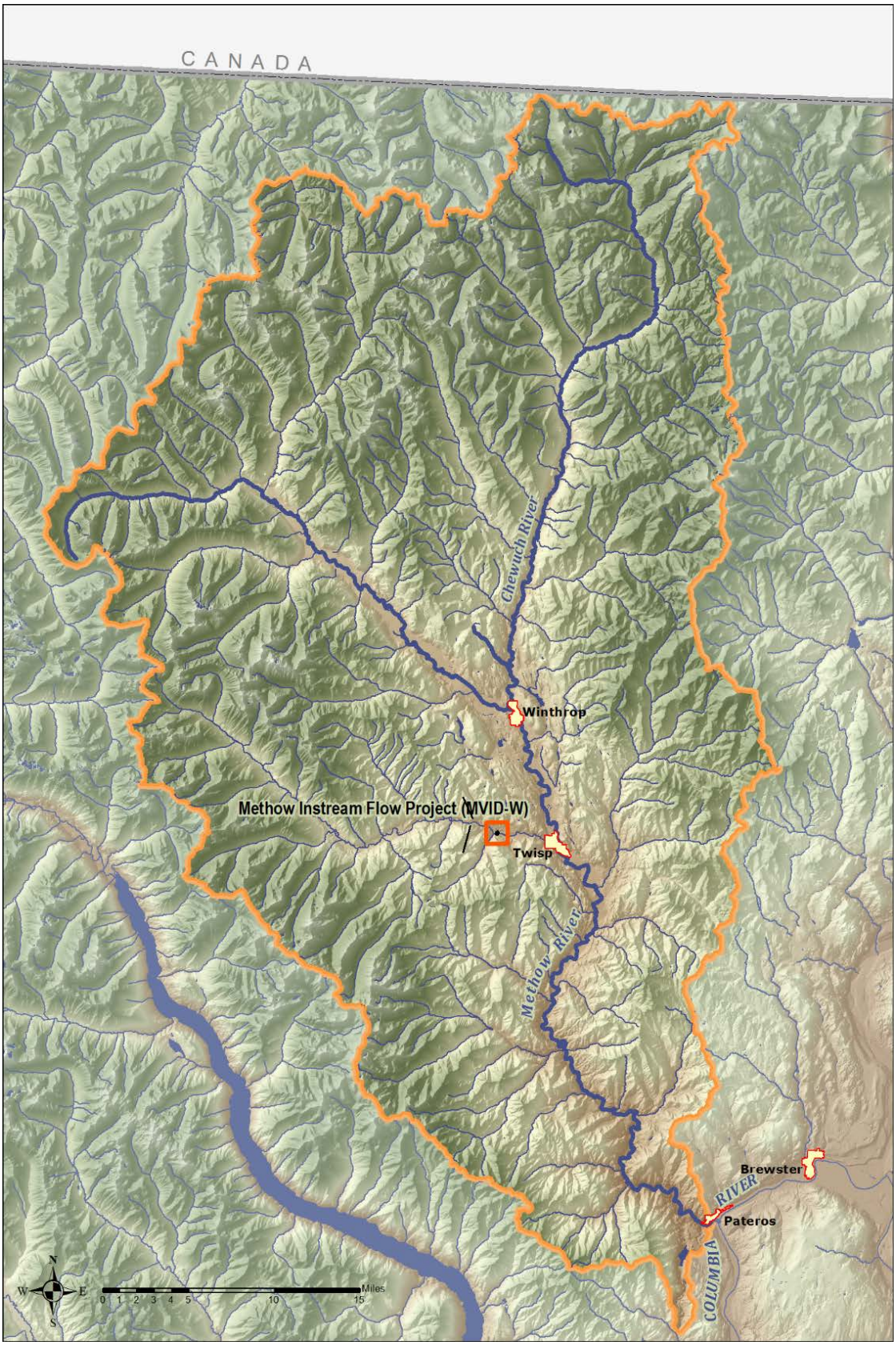

Figure 8. Location map of the projects completed in the Methow River Subbasin in 2015.

Methow Instream Flow Project (MVID-W)
Methow Subbasin

Sponsor: Trout Unlimited

Partner(s): Trout Unlimited, Washington Department of Ecology, Methow Conservancy, Methow Valley Irrigation District

Project Type: Streamflow

- Streamflow: 11 cfs increase in instream flow in the Twisp River for 4.5 miles downstream to the confluence with the Methow River

Latitude: 48° 22’ 13” N

Longitude: 120° 11’ 42” W

Funding Source(s): Washington Department of Ecology

Reclamation’s Development Costs: Washington Department of Ecology paid approximately 1.5 million dollars to Reclamation for project design and development.

Implementation Costs: $10,000,000 (Washington Department of Ecology)

Project Description:

1. Improve instream flow in the flow–impaired lower 4.5 miles of Twisp River by adding 11 CFS.
2. Prevent mortality of listed fish species and reduce habitat impacts at MVID’s Twisp River point of diversion.
3. Allow for future habitat improvements at the MVID point of diversion.
4. Provide a reliable water supply to foster continuing agriculture in the Methow Valley.
5. Develop an improved, reliable, and low maintenance system for MVID water users.
6. Avoid increased assessment charges to the MVID and its members as a direct result of this project.
7. Prevent fish injury and mortality associated with MVID’s Twisp River pushup dam, fish screen operations, and the stranding of redds and juveniles in the MVID West Canal’s intake canal and fish return channel.
8. Eliminate the low-flow passage barrier associated with MVID’s pushup dam.

Photograph 75: MVID push-up dam on the Twisp River, blocking mainstem and diverting most of the flow into the headgate.

Photograph 76: Laying pipe.

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 Public Utility District and Wenatchee Reclamation District. In 2015, one project was completed in the subbasin.

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

- Nason Creek Upper White Pine RM 12.5-13.2

Sponsors

- Confederated Tribes and Bands of the Yakama Nation

Partners

- U. S. Forest Service
- Bonneville Power Administration

Funding Sources

- Bonneville Power Administration

Bureau of Reclamation Expenditures in 2015

Subbasin	Expenditures
Wenatchee River	$483,396

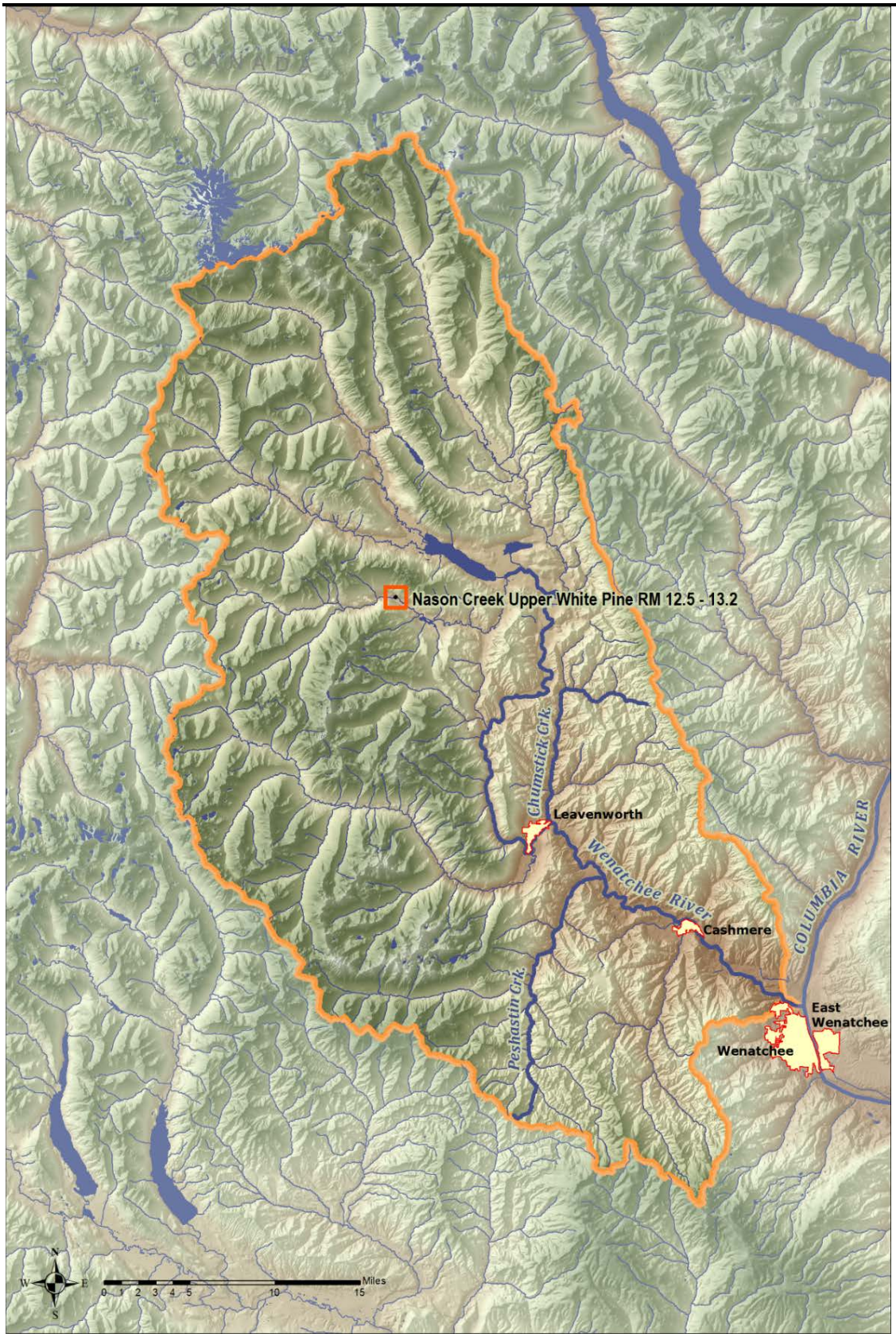

Figure 9. Location map of the projects completed in the Wenatchee River Subbasin in 2015.

Nason Creek Upper White Pine RM 12.5-13.2
Wentachee River Subbasin

Sponsor: Confederated Tribes and Bands of the Yakama Nation

Partner(s): U.S. Forest Service, Bonneville Power Administration

Project Type: Channel Complexity

- Channel Complexity: 0.4 miles of the main channel and 0.4 miles of the adjacent side channel enhanced with 17 large wood structures

Latitude: 47° 47’ 14” N

Longitude: 120° 51’ 12” W

Funding Source(s): Bonneville Power Administration (Accords)

Reclamation’s Development Costs: $300,000

Implementation Costs: $1,100,000

Project Description: Create complexity and off-channel habitat for target species.

Photograph 77: Upper white pine RM 12.5 - 13.2 habitat complexity enhancement constructed by Yakama Nation on Nason Creek.

Photograph 78: Upper white pine RM 12.5 - 13.2 habitat complexity enhancement constructed by Yakama Nation on Nason Creek.