RECLAMATION
Managing Water in the West

Bureau of Reclamation's 2010 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
Boise, Idaho

July 2011

U.S. Department of the Interior

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

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.

Front photograph: Salmonid utilizing new large woody debris structure, Preston Reach Project, Entiat River, Washington.

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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.

The three federal agencies noted above jointly produce annual progress reports required for the BiOp. This report contains more detailed information focused on projects with Reclamation involvement and is a subset of the overall tributary habitat improvement program that is largely managed by BPA.

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 (SR) spring/summer Chinook salmon (*O. tshawytscha*) (threatened), steelhead trout (*O. mykiss*) (threatened), SR 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.

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 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] 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.

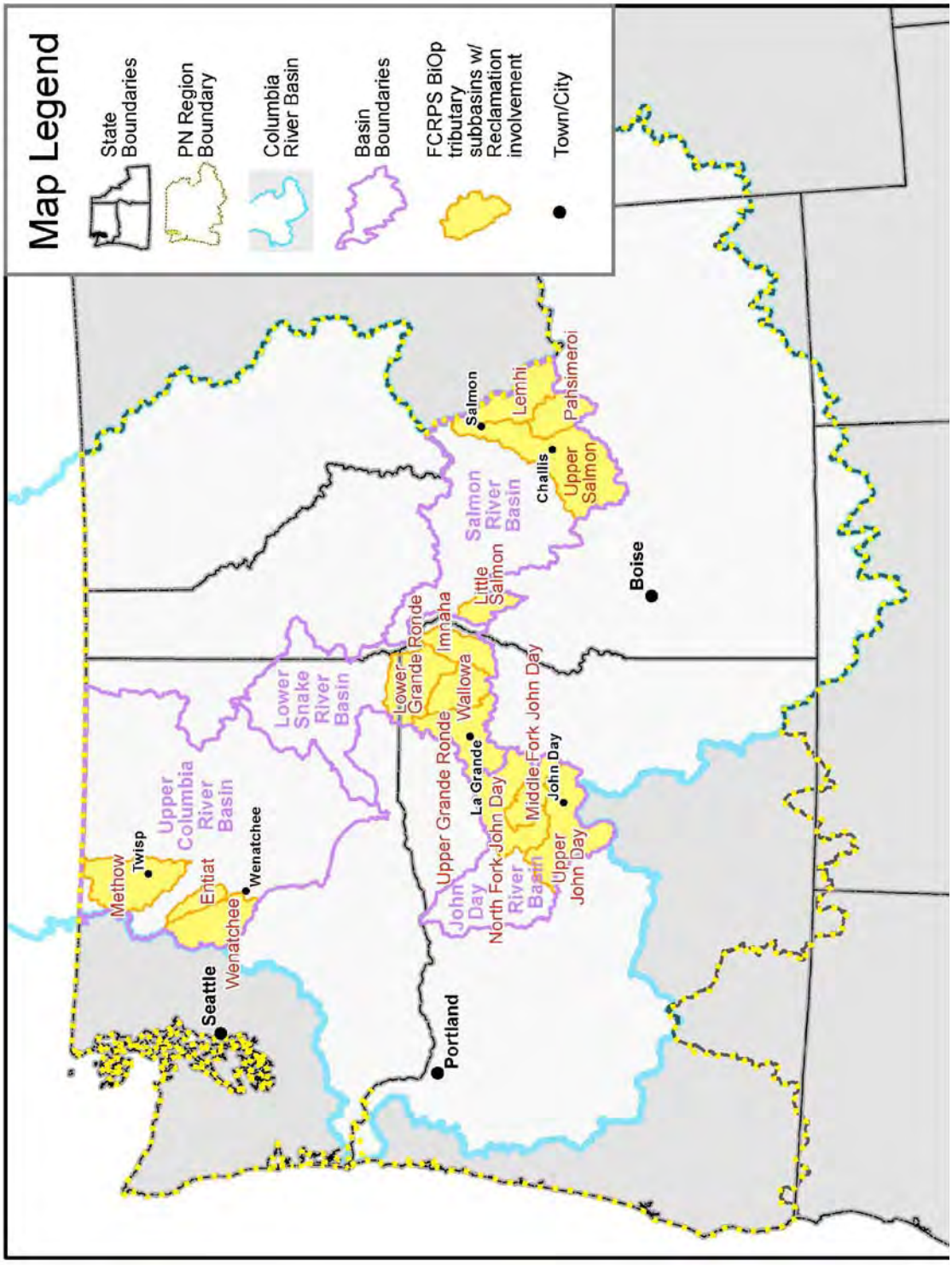


Figure 1. Map of 2010 Supplemental Federal Columbia River Power System Biological Opinion tributary subbasins with Reclamation involvement.

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 restoration 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 2010 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.

2010 Activities

Twenty-two fish habitat improvement projects were completed in 2010 in the following eight subbasins of the Columbia River Basin:

- Upper Salmon River
- Pahsimeroi River
- Lemhi River
- Upper John Day River
- Middle Fork John Day River
- Entiat River
- Methow River
- Wenatchee River

Rehabilitation 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.

In 2010, reach assessments were completed for the Forrest and Oxbow Conservation Areas on the Middle Fork John Day River and for the Middle Methow River. Geomorphology and hydraulic modeling for the Middle Methow River from Winthrop to Twisp, Washington was conducted as part of the reach assessment.

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 Catherine Creek in the Grande Ronde River subbasin and for the Yankee Fork of the Salmon River subbasin. These assessments will be used to refine the designs for the proposed fish habitat rehabilitation 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, non-profit organizations, interest groups, Tribes, 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 2010 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 2010, one project was completed in the Upper Salmon River subbasin, two in the Lemhi River subbasin, and seven in the Pahsimeroi River subbasin.

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

Bureau of Reclamation Expenditures in 2010

Subbasin	Expenditures
Upper Salmon River	$217,913
Pahsimeroi River	$317,567
Lemhi River	$301,138
Total	**$836,618**

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. The Upper Salmon River subbasin includes the East Fork and Yankee Fork drainages, the latter of which is being studied for future projects. In 2010, one project was completed in the subbasin that removed a fish migration barrier.

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

Projects

- Lower Iron Creek Culvert Replacement

Sponsors

- Lemhi Soil and Water Conservation District (LSWCD)

Partners

- Landowner
- Upper Salmon Basin Watershed Program (USBWP)
- Lemhi Soil and Water Conservation District (LSWCD)
- Lemhi County
- Idaho Department of Agriculture (IDA)

Funding Sources

- NOAA Fisheries Service

Bureau of Reclamation Expenditures in 2010

Subbasin	Expenditures
Upper Salmon River	$217,913

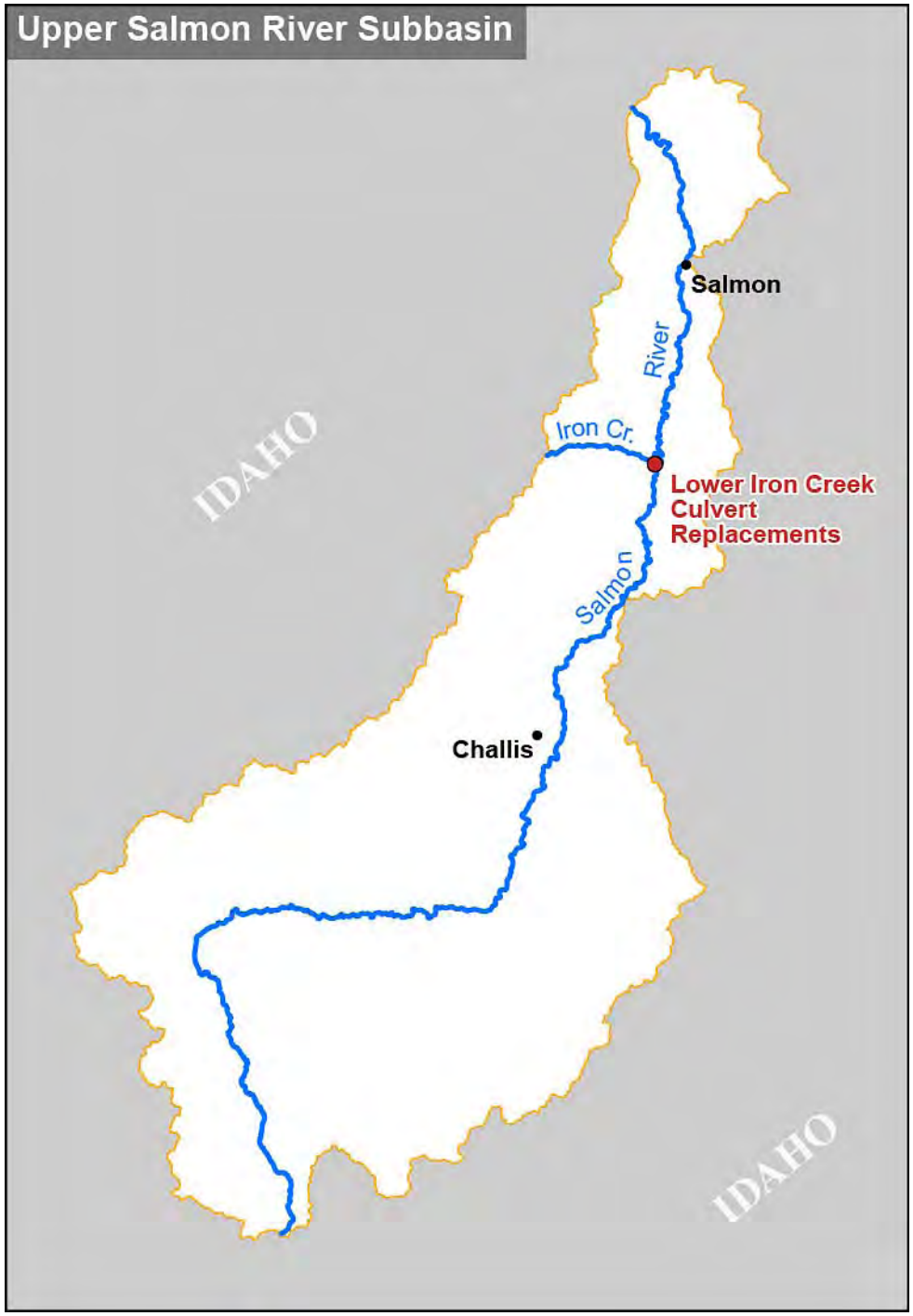


Figure 2. Location map of the project completed in the Upper Salmon River subbasin in 2010.

Lower Iron Creek Culvert Replacement Project

Project Name: Lower Iron Creek Culvert Replacement	
Project Type: Passage	
Project Sponsor: LSWCD	
Project Design: IDA	
Landowner(s): Lemhi County (Right-of-Way)	
Partners: Lemhi County**,** Adjacent Landowner, USBWP, LSWCD, IDA	**Reclamation Development Costs:** 0
Funding Source(s): NMFS (PCSRF)	**Implementation Cost:** **$** 96,965
Project Location:	***State:*** Idaho ***County:*** Lemhi ***Stream:*** Iron Creek ***Latitude:*** 44 53 24 ***Longitude:*** 113 58 26 ***Local Landmark:*** Iron Creek Road Bridge ***Township:*** 18N ***Range:*** 21E ***Section:*** 16 ***¼ Section:***
Project Status: Completed	
Project Phase: Monitoring	
Milestones	***Funding:*** Provided by NMFS *(*PCSRF Fund*)* ***Design:*** Completed by IDA ***Permitting:*** Completed by USBWP ***Construction Start Date:*** July 2010 ***Construction Completion Date:*** August 2010
Contracting	***Advertised:*** June 2010 (For Prefab Bridge)
	Awarded: July 2010
Biological Benefit	***Species:*** Chinook salmon, steelhead, bull trout
	Benefit Type: Passage
Metric: 4 miles	

Project Objectives and Description:

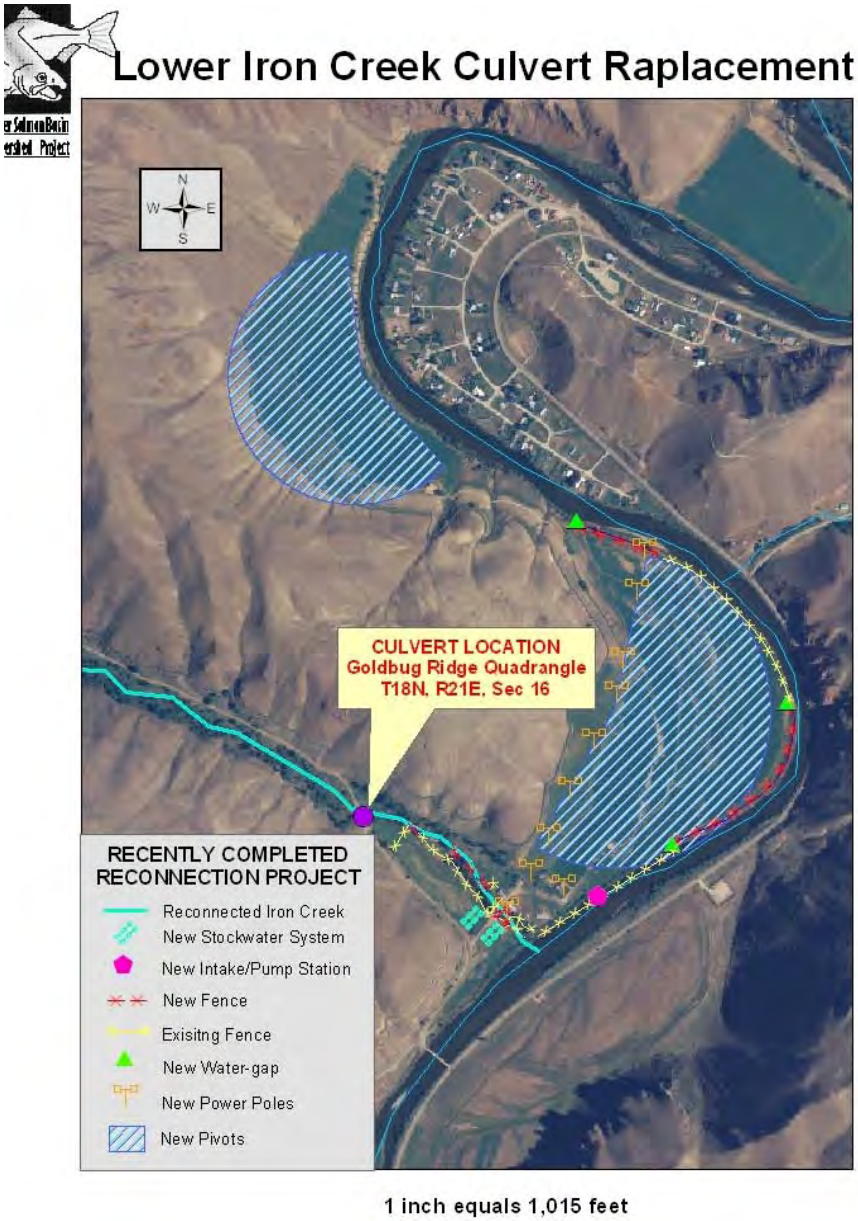
Iron Creek is a tributary to the Salmon River. The confluence is approximately 15 miles upstream of the town of Salmon. Iron Creek provides habitat for migrating salmon, steelhead, and bull trout. Located within the lower reach of Iron Creek, a culvert that conveyed the creek under a county road was identified as a potential fish migration barrier. The culvert was removed and replaced with a prefabricated steel bridge to provide improved fish passage.

Project Name: Lower Iron Creek Culvert Replacement

Design, Permitting, and Construction Issues:

Project design was completed by the IDA. Project coordination, environmental compliance, and permit acquisition was completed by the USBWP. Reclamation assisted the USBWP with environmental compliance by providing the services of an archeologist to complete a cultural resource survey of the site prior to construction. Construction was completed by the Lemhi County Road and Bridge Department. Contract/funding administration and construction oversight were handled by the LSWCD.

Gallery:



Lower Iron Creek Culvert Replacement Project location map.

Lower Iron Creek Culvert Replacement Project Photograph: The culvert outlet before project.

Lower Iron Creek Culvert Replacement Project Photograph: The prefabricated steel bridge after project completion.

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 2010, two projects were completed in the subbasin: one that removed a fish barrier and one that added fish habitat in a new side channel.

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

Projects

- Little Springs Creek/Pond Restoration Project (Phase I)
- Little Springs SH28 Culvert Replacements Project

Sponsors

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

Partners

- Landowner
- Upper Salmon Basin Watershed Program (USBWP)
- Lemhi Soil and Water Conservation District
- Idaho Department of Fish and Game
- NOAA Fisheries Service
- Bonneville Power Administration (BPA)
- Idaho Department of Transportation (IDT)
- Trout Unlimited, Inc.

Funding Sources

- NOAA Fisheries Service
- Bonneville Power Administration

Bureau of Reclamation Expenditures in 2010

Subbasin	Expenditures
Lemhi River	$301,138

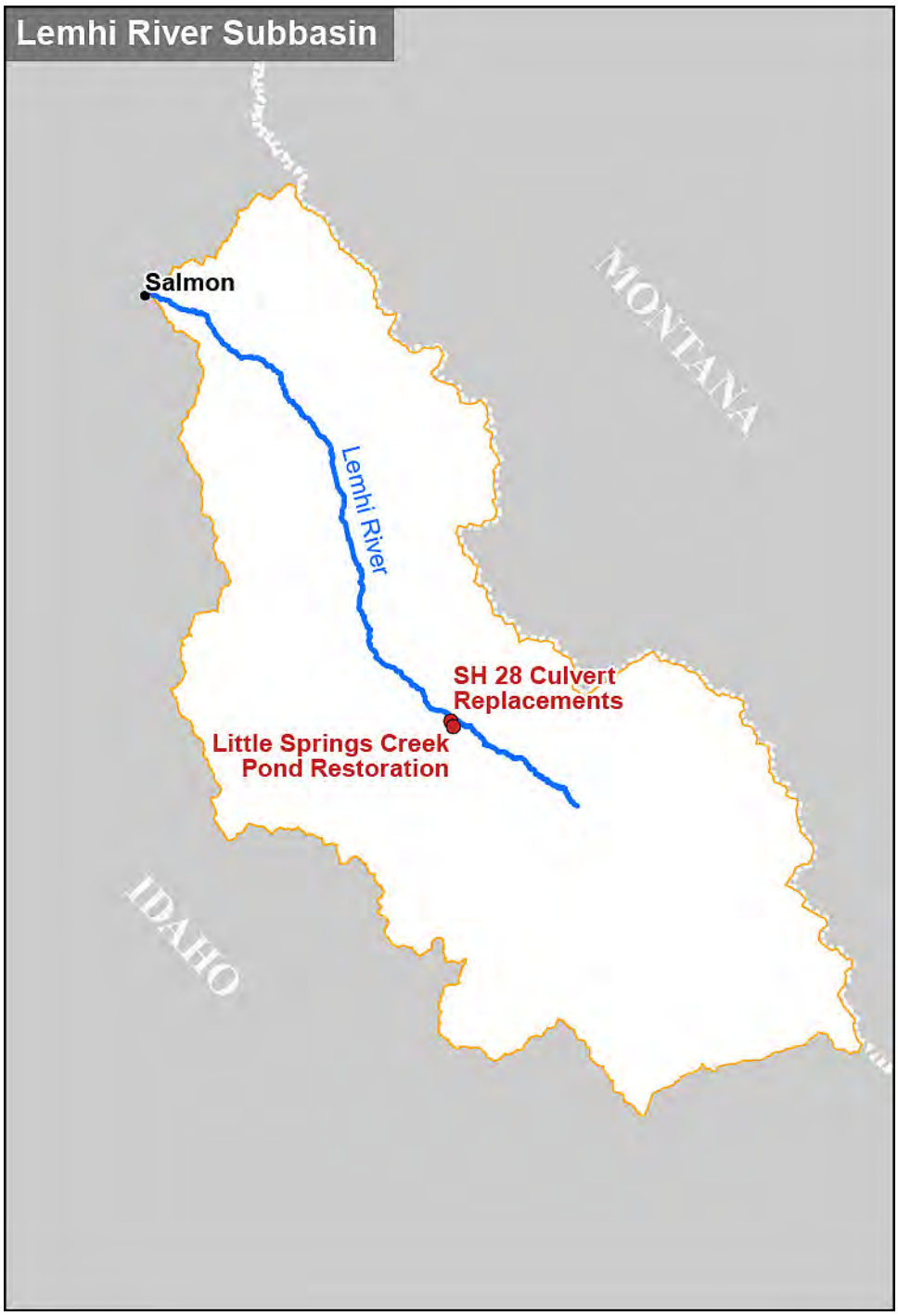


Figure 3. Location map of the projects completed in the Lemhi River subbasin in 2010.

Little Springs Creek Spring/Pond Restoration Project (Phase 1)

Project Name: Little Springs Creek Spring/Pond Restoration (Phase 1)	
Project Type: Complexity-Side Channel Reconnection	
Project Sponsor: IDFG	
Project Design: IDFG	
Landowner(s): Ammonson Family Ranch	
Partners: IDFG and NOAA Fisheries Service, Landowner	**Reclamation Development Costs:** $6,000
Funding Source(s): NMFS (PCSRF)	**Implementation Cost:** $73,377
Project Location:	***State***: Idaho ***County:*** Lemhi ***Stream:*** Lemhi River-Little Springs Creek ***Latitude:*** 44.76164 ***Longitude:*** 113.51309 ***Local Landmark:*** Between MM 99-100 ***Township:*** 17N ***Range:*** 25E ***Section:*** 32 ***¼ Section:***
Project Status: *Completed* 2010 (Phase 1)	
Project Phase: *Monitoring*	
Milestones	***Funding:*** NMFS-PCSRF ***Design:*** IDFG ***Permitting:*** Completed by IDFG ***Construction Start Date:*** August 2010 ***Construction Completion Date:*** September 2010
Contracting	***Advertised:*** Completed by IDFG
	Awarded: Completed by IDFG
Biological Benefit	***Species:*** Chinook, steelhead, bull trout
	Benefit Type: Habitat Access/Complexity
Metric: 0.25 miles additional fish habitat complexity made accessible	
Project Objectives and Description: Little Springs Creek is a spring-fed tributary to the Lemhi River. It is thought to have historically provided spawning and rearing habitat for ESA-listed Chinook salmon and steelhead. However, alteration of the stream channel for highway development and diversion for irrigation water resulted in habitat degradation and inaccessibility for anadromous fish. In recent years, Little Springs Creek has been the focus of several projects intended to remove barriers and improve fish passage, increase flow, reduce water temperatures, and restore degraded fish habitat.	

Project Name: Little Springs Creek Spring/Pond Restoration (Phase 1)

In an effort to reduce water temperatures being discharged into the upper reach of Little Springs Creek from an adjacent manmade spring-fed pond, initial project plans were to develop a spring, construct a new channel, and deepen the pond by dredging and installing an outlet control structure that would allow for a bottom-water withdrawal. The absence of landowner water rights required abandonment of the pond dredging and forced completion of the project in two phases. Pond improvements will be pursued by IDFG in the future if the landowner can obtain water rights for the pond (Phase 2). To provide fish access to additional off-channel habitat, 0.25 miles of new channel was constructed to re-direct spring flow from the spring source and into Little Springs Creek instead (Phase 1). Channel design emulated a naturally sinuous spring creek channel with features such as steep banks, pools/riffles, and riparian vegetation plantings. It is anticipated this newly constructed spring channel will be utilized by anadromous fish as future proposed projects are implemented in the lower reach of Little Springs Creek.

Design, Permitting, and Construction Issues:

Project planning and design were completed by IDFG. Environmental compliance and attainment of all permits was also completed by IDFG. Reclamation assisted IDFG by providing the services of an archeologist to conduct a cultural resources survey and consult with the Idaho State Historic Preservation Office. Reclamation also provided LiDAR aerial photography and topographic data to IDFG for use in planning and design development. IDFG administered funding, hired a contractor to complete the work, and managed construction.

Gallery:

Little Springs Creek Spring/Pond Restoration Project Photograph: The site before spring channel construction.

Little Springs Creek Spring/Pond Restoration Project Photograph: The site during construction.

Little Springs Creek Spring/Pond Restoration Project Photograph: The site after the new spring channel was constructed.

Little Springs SH28 Culvert Replacements Project

Project Name: Little Springs SH/28 Culvert Replacements	
Project Type: Passage	
Project Sponsor: LSWCD	
Project Design: IDT	
Landowner(s): IDT SH/28 (Right-of-Way)	
Partners: LSWCD, USBWP, BPA, IDT	**Reclamation Development Costs:** $18,200
Funding Source(s): BPA	**Implementation Cost:** $79,850
Project Location: SH-28 Milepost	***State:*** Idaho ***County:*** Lemhi ***Stream:*** Little Springs Creek ***Latitude:*** 44° 46' 00" ***Longitude:*** 113° 30' 58" ***Local Landmark:*** Between SH28 MM 99/100 ***Township:*** 17N ***Range:*** 25E ***Section:*** 30 & 32 ***¼ Section:***
Project Status: Completed	
Project Phase: Monitoring	
Milestones	***Funding:*** *BPA* ***Design:*** Completed by IDT ***Permitting:*** Completed by USBWP ***Construction Start Date:*** Completed August 2010 by IDT ***Construction Completion Date:*** October 2010
Contracting	***Advertised:*** N/A
	Awarded: N/A
Biological Benefit	***Species:*** Chinook salmon, steelhead, bull trout
	Benefit Type: Partial Fish Barrier
Metric: 2 miles	
Project Objectives and Description: The project is located approximately 12 miles north of Leadore, Idaho on State Highway 28 at the location of two round corrugated metal pipe (CMP) culverts that conveyed the Lemhi River, Little Springs Creek under the highway. Little Springs Creek is a spring-fed tributary to the Lemhi River. The culverts were identified by IDFG as being velocity barriers to upstream migratory fish passage in Little Springs Creek. The culverts were replaced with oval CMP culverts set below the invert of the stream bottom to provide increased capacity, reduced velocity, and improved access to approximately 2 miles of additional stream habitat.	

Project Name: Little Springs SH/28 Culvert Replacements

Design, Permitting, and Construction Issues:

Funding for purchase of materials and construction was provided by BPA. Design and construction were completed by IDT. Project coordination, obtainment of permits, and completion of environmental compliance was completed by the USBWP and LSWCD. Reclamation assisted with environmental compliance by providing the services of an archeologist to conduct a survey of the area and attain Idaho State Historical Society concurrence that the project would have no detrimental impact to cultural resources. Reclamation also provided LiDAR Orthoimagery/Survey data for use in project planning and design.

Gallery:

Little Springs SH/28 Culvert Replacements Project Photograph**:** The outlet – Old Round CMP Culvert (April 2009).

Little Springs SH/28 Culvert Replacements Project Photograph: The outlet – New Oval CMP (October 2010).

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 2010, seven projects were completed in this subbasin that improved access for juvenile rearing and removed fish barriers for access to habitat upstream.

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

Projects

- Big Springs 1 Diversion Enhancement Project
- Big Springs 3 Diversion Enhancement Project
- Big Springs 4 Diversion Enhancement Project
- Big Springs 6 Diversion Enhancement Project
- Big Springs 7/8 Diversion Enhancement Project
- Little Springs Creek Culvert Replacement Project
- Muddy Springs Creek Upper Culvert Replacement Project

Sponsors

- Idaho Department of Fish and Game (IDFG)
- Custer Soil and Water Conservation District (CSWCD)

Partners

- Irrigators
- Idaho Department of Fish and Game
- Bonneville Power Administration (BPA)

Funding Sources

- Bonneville Power Administration through the Idaho Department of Game and Fish Screen Shop
- Bonneville Power Administration through the Custer Soil and Water Conservation District

Bureau of Reclamation Expenditures in 2010

Subbasin	Expenditures
Pahsimeroi River	$317,567

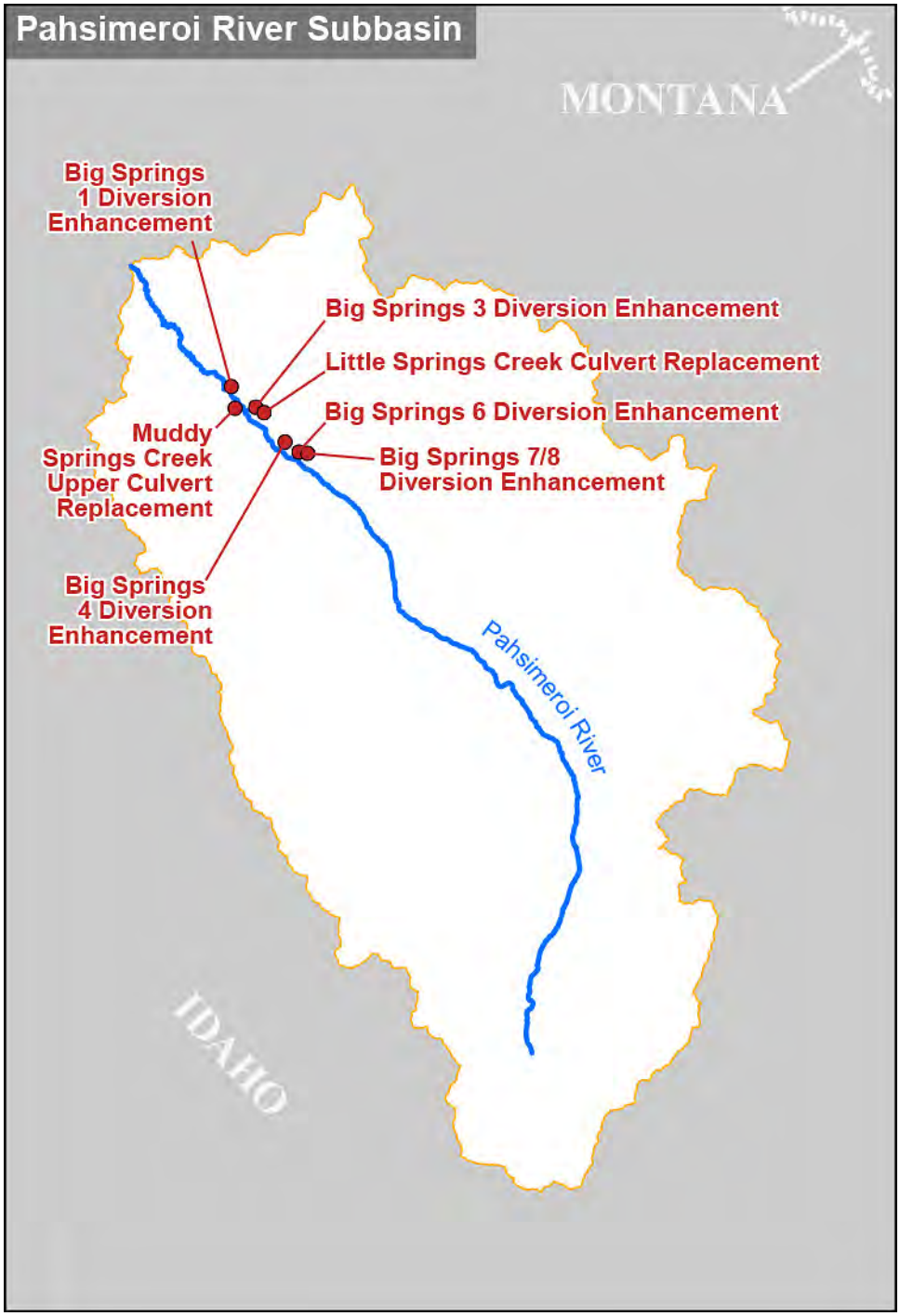


Figure 4. Location map of the projects completed in the Pahsimeroi River subbasin in 2010.

Big Springs 1 Diversion Enhancement Project

Project Name: Big Springs 1 Diversion Enhancement	
Project Type: Juvenile Barrier	
Project Sponsor: IDFG	
Project Design: Reclamation – Phil Mann	
Landowner(s): Kent Moen	
Partners: BPA, IDFG, Irrigators	**Reclamation Development Costs:** $41,400
Funding Source(s): BPA through IDFG Screen Shop	**Implementation Cost:** $42,500
Project Location:	***State:*** Idaho ***County:*** Lemhi ***Stream:*** Big Springs Creek ***Latitude***: 44 deg 36' 33" N ***Longitude:*** 113 deg 57' 33" W ***Local Landmark:*** 0.9 miles upstream from confluence with Pahsimeroi River
Project Status: Completed	
Project Phase: Monitoring	
Milestones	***Funding:*** Secured ***Design:*** Completed ***Permitting:*** Completed ***Construction Start Date:*** July 2010 ***Construction Completion Date:*** September 2010
Contracting	***Advertised:*** June 2010
	Awarded: July 2010
Biological Benefit	***Species:*** Chinook salmon, steelhead
	Benefit Type: Improved access for juvenile rearing
Metric: Improved access to rearing habitat for Juvenile fish from BS-1 diversion to BS-3 diversion, approximately 3.3 miles.	
Project Objectives and Description: This project removed a check structure at Big Springs 1 diversion and replaced it with a rock-faced, sheet-pile A-weir with improved fish passage. The new structure will provide improved juvenile access to Big Springs Creek from the BS-1 diversion upstream to the BS-3 diversion, approximately 3.3 miles.	
Design, Permitting, and Construction Issues: Reclamation's Pacific Northwest Regional Office designed the structure. IDFG provided input into the type of design needed and wanted. IDFG coordinated with landowners and provided all environmental clearances and construction permits. Reclamation Salmon Field Office provided construction oversight.	

Gallery:

Big Springs 1 Diversion Enhancement Project Photograph: The old check board diversion structure was a barrier to juvenile fish movement.

Big Springs 1 Diversion Enhancement Project Photograph: The new diversion structure, a rock-faced, sheet pile A-weir, allows juvenile fish passage at all flows.

Big Springs 3 Diversion Enhancement Project

Project Name: Big Springs 3 Diversion Enhancement	
Project Type: Juvenile Barrier	
Project Sponsor: IDFG	
Project Design: Reclamation – Phil Mann	
Landowner(s): Big Springs Creek Ranch, LLC.	
Partners: BPA, IDFG, Irrigators	**Reclamation Development Costs:** $43,300
Funding Source(s): BPA through IDFG Screen Shop	**Implementation Cost:** $92,500
Project Location:	***State:*** Idaho ***County:*** Lemhi ***Stream:*** Big Springs Creek ***Latitude:*** 44 deg 35' 41" N ***Longitude:*** 113 deg 56' 14" W ***Local Landmark:*** 4.2 miles upstream from confluence with Pahsimeroi River
Project Status: Completed	
Project Phase: Monitoring	
Milestones	***Funding:*** Secured ***Design:*** Completed ***Permitting:*** Completed ***Construction Start Date:*** July 2010 ***Construction Completion Date:*** September 2010
Contracting	***Advertised:*** June 2010
	Awarded: July 2010
Biological Benefit	***Species:*** Chinook salmon, steelhead
	Benefit Type: Improved access for juvenile rearing

Metric:

Improved access to rearing habitat for Juvenile fish from BS-3 diversion to BS-4 diversion, approximately 4.2 miles.

Project Objectives and Description:

This project removed a check structure at Big Springs 3 diversion and replaced it with three rock-faced, sheet-pile A-weirs with improved fish passage. The new structures will provide improved juvenile access to Big Springs Creek from the BS-3 diversion upstream to the BS-4 diversion, approximately 4.2 miles.

Design, Permitting, and Construction Issues:

Reclamation's Pacific Northwest Regional Office designed the structure. IDFG provided input into the type of design needed and wanted. IDFG coordinated with landowners and provided all environmental clearances and construction permits. Reclamation Salmon Field Office provided construction oversight.

Gallery:

Big Springs 3 Diversion Enhancement Project Photograph: The old check board diversion structure was a barrier to juvenile fish movement.

Big Springs 3 Diversion Enhancement Project Photograph: The new diversion structure has three rock-faced, sheet pile A-weirs in series. Rock covers the sheet pile on both sides, and allows juvenile fish passage at all flows. Additional large rock placed in the center of the channel within the A-weir breaks up the velocity through the structures.

Big Springs 4 Diversion Enhancement Project

Project Name: Big Springs 4 Diversion Enhancement	
Project Type: Juvenile Barrier	
Project Sponsor: IDFG	
Project Design: Reclamation – Ben Taylor	
Landowner(s): Jim Martini	
Partners: BPA, IDFG, Irrigators	**Reclamation Development Costs:** $5,000
Funding Source(s): BPA through IDFG Screen Shop	**Implementation Cost:** $4,500
Project Location:	***State:*** Idaho ***County:*** Lemhi ***Stream:*** Big Springs Creek ***Latitude:*** 44 deg 34' 15" N ***Longitude:*** 113 deg 54' 39" W ***Local Landmark:*** 8.4 miles upstream from confluence with Pahsimeroi River
Project Status: Completed	
Project Phase: Monitoring	
Milestones	***Funding:*** Secured ***Design:*** Completed ***Permitting:*** Completed ***Construction Start Date:*** July 2010 ***Construction Completion Date:*** September 2010
Contracting	***Advertised:*** June 2010
	Awarded: July 2010
Biological Benefit	***Species:*** Chinook salmon, steelhead
	Benefit Type: Improved access for juvenile rearing

Metric:

Improved access to rearing habitat for juvenile fish from BS-4 diversion to BS-6 diversion, approximately 1.6 miles.

Project Objectives and Description:

This project removed a check structure at Big Springs 4 diversion and replaced it with rock ramp to improved fish passage. The new structure will provide improved juvenile access to Big Springs Creek from the BS-4 diversion upstream to the BS-6 diversion, approximately 1.6 miles. The old BS-5 diversion, located between BS-4 and BS-6, was removed in an earlier project.

Design, Permitting, and Construction Issues:

Reclamation's Pacific Northwest Regional Office designed the structure. IDFG provided input into the type of design needed and wanted. IDFG coordinated with landowners and provided all environmental clearances and construction permits. Reclamation Salmon Field Office provided construction oversight.

Gallery:

Big Springs 4 Diversion Enhancement Project Photograph: The old diversion structure was a barrier to juvenile fish movement.

Big Springs 4 Diversion Enhancement Project Photograph: The new diversion structure, a rock ramp, allows juvenile passage at all flows.

Big Springs 6 Diversion Enhancement Project

<table>
<tr><td colspan="2">Project Name: Big Springs 6 Diversion Enhancement</td></tr>
<tr><td colspan="2">Project Type: Juvenile Barrier</td></tr>
<tr><td colspan="2">Project Sponsor: IDFG</td></tr>
<tr><td colspan="2">Project Design: Reclamation – Ben Taylor</td></tr>
<tr><td colspan="2">Landowner(s): Jim Martini</td></tr>
<tr><td>Partners: BPA, IDFG, Irrigators</td><td>Reclamation Development Costs: $18,500</td></tr>
<tr><td>Funding Source(s): BPA through IDFG Screen Shop</td><td>Implementation Cost: $32,500</td></tr>
<tr><td>Project Location:</td><td>State: Idaho County: Lemhi Stream: Big Springs Creek
Latitude: 44 deg 33’ 50” N Longitude: 113 deg 53’ 55” W
Local Landmark: 10.0 miles upstream from confluence with Pahsimeroi River, 0.3 miles downstream from Hooper Lane.</td></tr>
<tr><td colspan="2">Project Status: Completed</td></tr>
<tr><td colspan="2">Project Phase: Monitoring</td></tr>
<tr><td>Milestones</td><td>Funding: Secured
Design: Completed
Permitting: Completed
Construction Start Date: July 2010
Construction Completion Date: September 2010</td></tr>
<tr><td rowspan="2">Contracting</td><td>Advertised: June 2010</td></tr>
<tr><td>Awarded: July 2010</td></tr>
<tr><td rowspan="2">Biological Benefit</td><td>Species: Chinook salmon, steelhead</td></tr>
<tr><td>Benefit Type: Improved access for juvenile rearing</td></tr>
<tr><td colspan="2">Metric: Improved access to rearing habitat for juvenile fish from BS-6 diversion to Hooper Lane, approximately 0.3 miles.</td></tr>
<tr><td colspan="2">Project Objectives and Description:
This project removed a check structure at Big Springs 6 diversion and replaced it with a sheet-pile dam that provides improved fish passage. The new structure will provide improved juvenile access to Big Springs Creek from the BS-6 diversion upstream to Hooper Lane, approximately 0.3 miles. The culvert under Hooper Lane, that restricts juvenile fish movement, is scheduled to be removed in 2011 and replaced with a bridge to improve fish passage further upstream.</td></tr>
<tr><td colspan="2">Design, Permitting, and Construction Issues:
USBR PN Regional Office designed the structure. IDFG provided input into the type of design needed and wanted. IDFG coordinated with landowners and provided all environmental clearances and construction permits. Reclamation Salmon Field Office provided construction oversight.</td></tr>
</table>

Gallery:

Big Springs 6 Diversion Enhancement Project Photograph: The old diversion structure was a barrier to juvenile fish movement. Concrete structure to the right of the photo is a point-of-diversion fish screen.

Big Springs 6 Diversion Enhancement Project Photograph: The new rock-faced, sheet pile dam with a rock ramp downstream allows juvenile passage at all flows.

Big Springs 7/8 Diversion Enhancement Project

Project Name: Big Springs 7/8 Diversion Enhancement	
Project Type: Juvenile Barrier	
Project Sponsor: IDFG	
Project Design: Reclamation – Ben Taylor	
Landowner(s): Larry Stone	
Partners: BPA, IDFG, Irrigators	**Reclamation Development Costs:** $30,100
Funding Source(s): BPA through IDFG Screen Shop	**Implementation Cost:** $80,500
Project Location:	***State:*** Idaho ***County:*** Lemhi ***Stream***: Big Springs Creek ***Latitude:*** 44 deg 33' 46" N ***Longitude:*** 113 deg 53' 23" W ***Local Landmark:*** 11.1 miles upstream from confluence with Pahsimeroi River, 0.8 miles upstream from Hooper Lane.
Project Status: Completed	
Project Phase: Monitoring	
Milestones	***Funding:*** Secured ***Design:*** Completed ***Permitting:*** Completed ***Construction Start Date:*** July 2010 ***Construction Completion Date:*** September 2010
Contracting	***Advertised:*** June 2010
	Awarded: July 2010
Biological Benefit	***Species:*** Chinook salmon, steelhead
	Benefit Type: Improved access for juvenile rearing
Metric: The benefit will not come until the downstream culvert is removed – Summer 2011.	

Project Objectives and Description:

This project removed a check structure at Big Springs 7/8 diversion and replaced it with sheet-pile dam with "tip-up" control structure. A three-bay fish ladder was included to provide improved fish passage at low flows. The new structure will provide improved juvenile access to Big Springs Creek from the BS-7/8 diversion upstream to the BS-9 diversion, approximately 2.9 miles, after the Hooper Lane culvert is removed. The culvert under Hooper Lane that restricts juvenile fish movement is scheduled to be removed in 2011 and replaced with a bridge to improve fish passage further upstream.

Design, Permitting, and Construction Issues:

Reclamation's Pacific Northwest Regional Office designed the structure. IDFG provided input into the type of design needed and wanted. IDFG coordinated with landowners and provided all environmental clearances and construction permits. Reclamation Salmon Field Office provided construction oversight.

Gallery:

Big Springs 7/8 Diversion Enhancement Project Photograph: The old diversion structure was a barrier to juvenile fish movement.

Big Springs 7/8 Diversion Enhancement Project Photograph: The new sheet pile dam with a "tip-up" control section on the left side of the structure. A three-bay fish ladder, to the right of the check boards, provides fish passage at low flows.

Little Springs Creek Culvert Replacement Project

Project Name: Little Springs Creek Culvert Replacement		
Project Type: Juvenile Barrier		
Project Sponsor: IDFG		
Project Design: IDFG		
Landowner(s): Big Springs Creek Ranch, LLC.		
Partners: BPA, IDFG, Irrigators		**Reclamation Development Costs:** 0
Funding Source(s): BPA through IDFG Screen Shop		**Implementation Cost:** ***$***20,000
Project Location:	***State:*** Idaho ***County:*** Lemhi ***Stream:*** Little Springs Creek, tributary to Big Springs Creek ***Latitude:*** 44 deg 35' 28" N ***Longitude:*** 113 deg 55' 46" W ***Local Landmark:*** Little Springs Creek runs into Big Springs Creek 4.3 miles upstream from the confluence with the Pahsimeroi River. The culvert replaced was 0.3 miles up Little Springs Creek.	
Project Status: Completed		
Project Phase: Monitoring		
Milestones	***Funding:*** Secured ***Design:*** Completed ***Permitting:*** Completed ***Construction Start Date:*** July 2010 ***Construction Completion Date:*** September 2010	
Contracting	***Advertised:*** June 2010	
	Awarded: July 2010	
Biological Benefit	***Species:*** Chinook salmon, steelhead	
	Benefit Type: Improved access for juvenile rearing	
Metric: Improved access to rearing habitat for juvenile fish in Little Springs Creek upstream of the culvert, 1.0 miles.		
Project Objectives and Description: This project removed the 4-foot diameter culvert on Little Springs Creek and replaced it with a 4-foot by 7-foot squash pipe to provide improved juvenile fish passage up Little Springs Creek. The project provides improved access to approximately 1.0 miles of Little Springs Creek.		
Design, Permitting, and Construction Issues: IDFG designed the structure. IDFG also coordinated with landowners and provided all environmental clearances and construction permits. Reclamation Salmon Field Office provided construction oversight.		

Gallery:

Little Springs Creek Culvert Replacement Project Photograph: The new culvert is a 4-foot tall by 7-foot wide squash pipe, with 6 inches of gravel on the bottom of the pipe to provide improved juvenile access to the upper 1 mile of Little Springs Creek.

Muddy Springs Creek Upper Culvert Replacement Project

<table>
<tr><td colspan="3">Project Name: Muddy Springs Creek Upper Culvert Replacement</td></tr>
<tr><td colspan="3">Project Type: Juvenile Barrier</td></tr>
<tr><td colspan="3">Project Sponsor: CSWCD</td></tr>
<tr><td colspan="3">Project Design: Reclamation – Roger Wright</td></tr>
<tr><td colspan="3">Landowner(s): Scott Hayes</td></tr>
<tr><td colspan="2">Partners: BPA, IDFG, Irrigators</td><td>Reclamation Development Costs: $15,700</td></tr>
<tr><td colspan="2">Funding Source(s): BPA through CSWCD</td><td>Implementation Cost: $20,000</td></tr>
<tr><td>Project Location:</td><td colspan="2">State: ID County: Lemhi Stream: Muddy Springs Creek
Latitude: 44 deg 35’ 41” N Longitude: 113 deg 57’ 23” W
Local Landmark: Culvert is located 2.1 miles upstream from confluence with Pahsimeroi River on a farm road that used to lead to the Pahsimeroi P-9 diversion.</td></tr>
<tr><td colspan="3">Project Status: Completed</td></tr>
<tr><td colspan="3">Project Phase: Monitoring</td></tr>
<tr><td>Milestones</td><td colspan="2">Funding: Secured
Design: Completed
Permitting: Completed
Construction Start Date: September 2010
Construction Completion Date: September 2010</td></tr>
<tr><td rowspan="2">Contracting</td><td colspan="2">Advertised: June 2010</td></tr>
<tr><td colspan="2">Awarded: August 2010</td></tr>
<tr><td rowspan="2">Biological Benefit</td><td colspan="2">Species: Chinook salmon, steelhead</td></tr>
<tr><td colspan="2">Benefit Type: Improved access for juvenile rearing</td></tr>
<tr><td colspan="3">Metric: Improved access to rearing habitat for juvenile fish in Muddy Springs Creek. However, since steelhead and salmon have not been documented spawning within Muddy Springs Creek, access for juvenile rearing would probably have to come upstream from the Pahsimeroi River. There is another culvert that restricts juvenile fish passage located downstream in Muddy Springs Creek. Until the lower culvert is removed, there may be no benefits directly related to this project. The lower culvert is scheduled to be replaced in 2011.</td></tr>
<tr><td colspan="3">Project Objectives and Description:
This project removed a 3-foot diameter culvert on Muddy Springs Creek, 2.1 miles from the intersection with the Pahsimeroi River, and replaced it with a bottomless arch pipe 12 feet across. The larger cross section with the bottomless arch pipe will decrease velocity and improve fish passage at the site. There is a similar culvert located 0.6 miles up from the intersection with the Pahsimeroi River (1.5 miles downstream) that will be replaced in 2011.</td></tr>
</table>

Project Name: Muddy Springs Creek Upper Culvert Replacement
Until the lower culvert is replaced, benefits from this project are limited. Eventually, juvenile fish will have improved access to as much as 5.5 miles of Muddy Springs Creek upstream of this crossing (there are other road crossings upstream where fish passage conditions are unknown at this time). The next crossing upstream of this project is 1.3 miles upstream.
Design, Permitting, and Construction Issues: Reclamation's Pacific Northwest Regional Office designed the structure. IDFG provided input into the type of design needed and wanted. IDFG coordinated with landowners and provided all environmental clearances and construction permits. Reclamation Salmon Field Office provided construction oversight.

Gallery:

Muddy Springs Creek Upper Culvert Replacement Project Photograph: The old culvert restricted access for juvenile fish movement within Muddy Springs Creek.

Muddy Springs Creek Upper Culvert Replacement Project Photograph: The new 12-foot wide bottomless arch pipe provides access upstream for juvenile fish.

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 2010, four projects were completed in the Upper John Day River subbasin and one project was completed in the Middle Fork 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 2010

Subbasin	Expenditures
Upper John Day River	$413,484
Middle Fork John Day River	$423,416
Total	**$836,900**

Upper John Day River Subbasin

The Upper John Day River (HUC 17070201) becomes the mainstem John Day River after it is joined by the Middle Fork and South Fork John Day rivers. The Upper John Day River has a drainage area of about 2,130 square miles. In 2010, four projects were completed in the subbasin that removed migration barriers for fish passage and increased habitat complexity with pools and fish cover.

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.

Projects

- Blanchet Habitat Improvement Project
- Forrest RM 264.7 Enhancement Project
- Oliver Diversion #47 and #48 Project
- Oliver Diversion #49 Project

Sponsors

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

Partners

- Confederated Tribes of the Warm Springs Reservation of Oregon
- Irrigators
- Bonneville Power Administration (BPA)
- U.S. Fish and Wildlife Service (USFWS)
- Grant Soil and Water Conservation District (GSWCD)
- Oregon Watershed Enhancement Board (OWEB)
- Oregon Department of Fish and Wildlife (ODFW)

Funding Sources

- Bonneville Power Administration
- U.S. Fish and Wildlife Service
- Oregon Department of Fish and Wildlife

Bureau of Reclamation Expenditures in 2010

Subbasin	Expenditures
Upper John Day River	$413,484

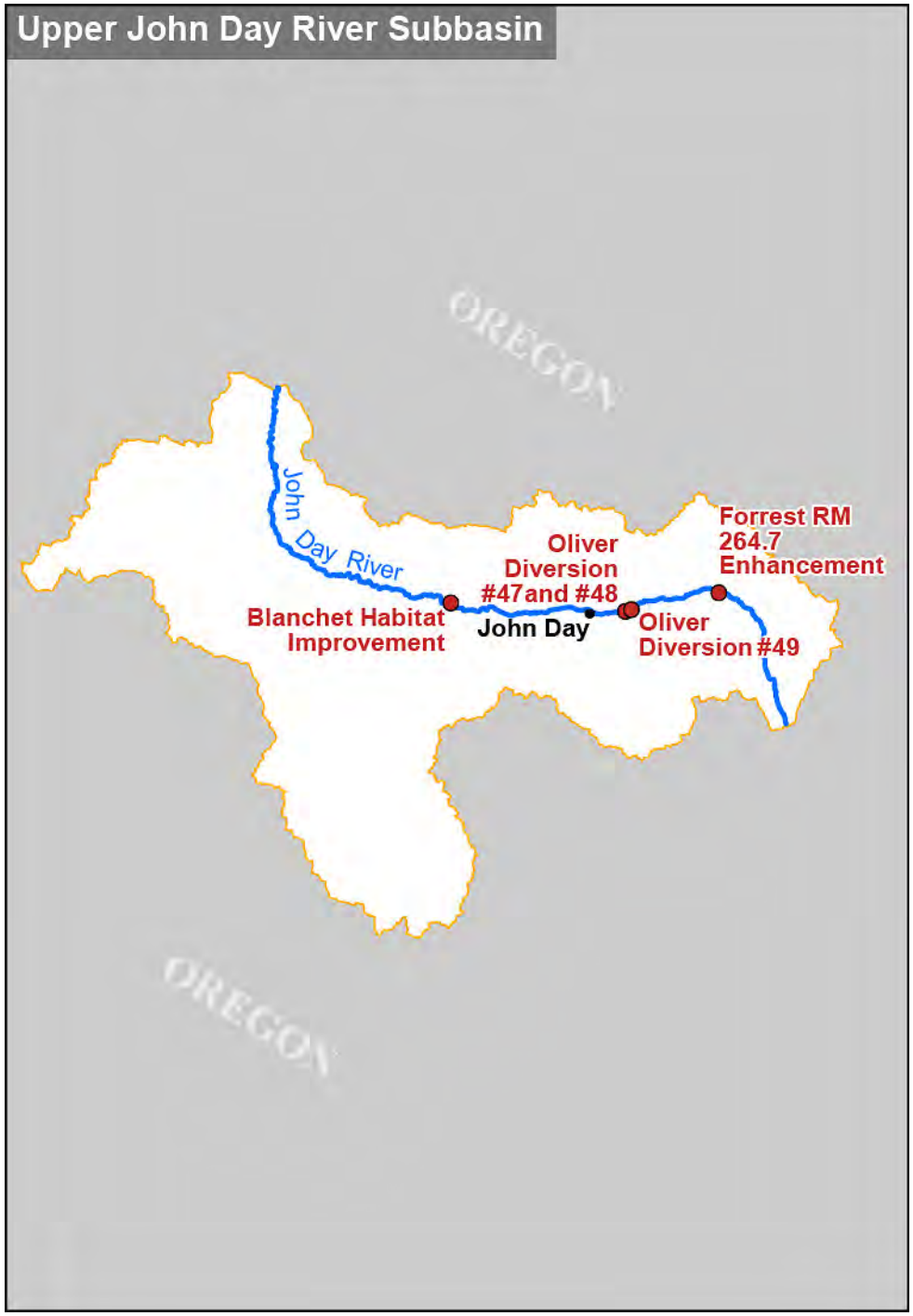


Figure 5. Location map of the projects completed in the Upper John Day River subbasin in 2010.

Blanchet Habitat Improvement Project

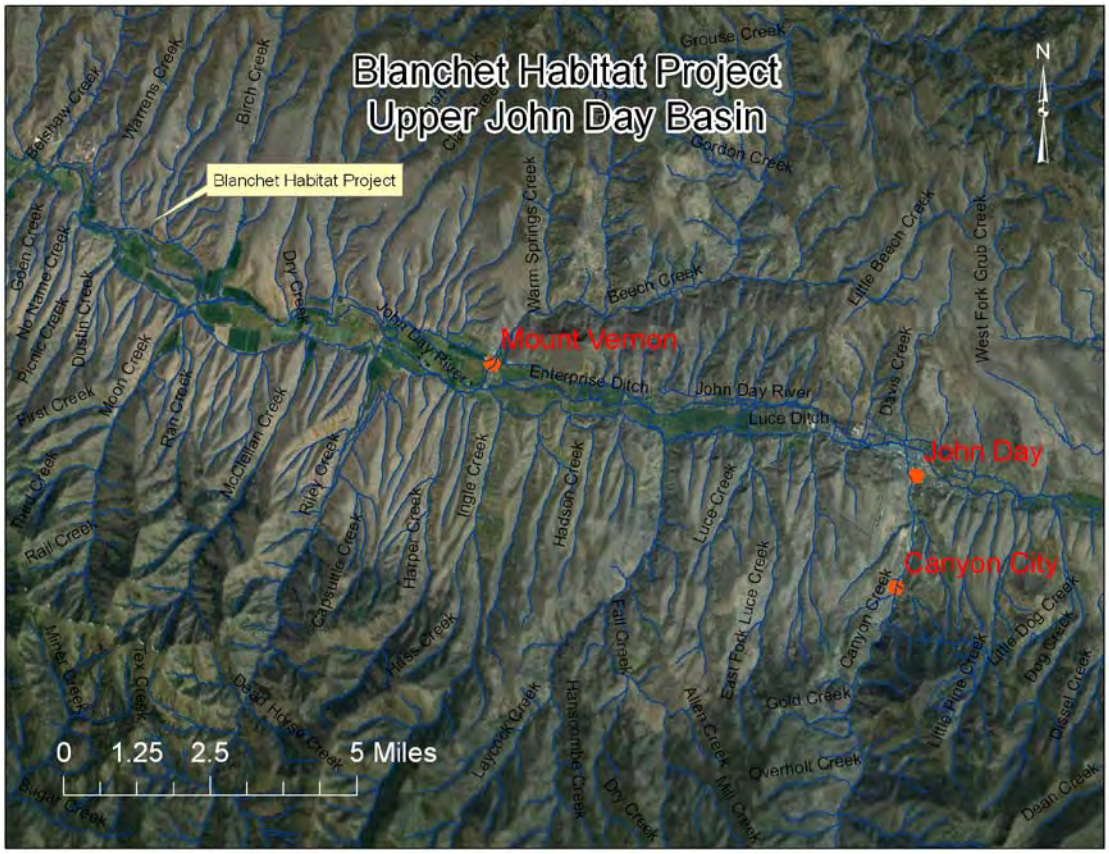
Project Name: Blanchet Habitat Improvement		
Project Type: Complexity/ Channel Reconfiguration		
Project Sponsor: CTWSRO		
Project Design: GSWCD (Funded by Reclamation)		
Landowner(s): Jim Blanchet		
Partners: CTWSRO, BPA		**Reclamation Development Costs:** $27,600
Funding Source(s): BPA		**Implementation Cost:** $90,000
Project Location:	***State:*** Oregon ***County:*** Grant ***Stream:*** Upper John Day River ***Latitude:*** 44° 25' 39" ***Longitude:*** 119° 15' 07" ***Local Landmark:*** 7 mi. W of Mt Vernon, OR ***Township:*** 13S ***Range:*** 29E ***Section:*** *20* ***¼ Section:*** NE1/4	
Project Status: Construction completed		
Project Phase: vegetation planting and monitoring		
Milestones	***Funding:*** ***Design:*** March 2010 ***Permitting:*** ***Construction:*** July-August 2010	
Contracting	***Construction Contractor:***	
	Site Restoration Contractor: CTWSRO	
Biological Benefit	***Species:*** MCR steelhead, MCR spring Chinook, bull trout, Pacific lamprey	
	Benefit Type: Complexity/pool/cover habitat	
Metric: 0.28 miles improved		

Project Objectives and Description:

The Blanchet property is 7 miles west of Mt. Vernon, Oregon and is bisected by the Upper John Day River. The property has two sections of river bank that are actively eroding, causing losses in bank vegetation and water quality issues downstream. Area 1 is a 0.16-mile-long bend against a terrace 15 to 20 feet high with a vertical bank. Portions of the bank were heavily vegetated with wild rose and willows, but a flow event in June 2010 collapsed most of the bank by undercutting at the toe of the bank. Area 2 is a more typical eroding bend about 0.12 miles long. The bend is cutting into crop land and has vertical banks 3 to 4 feet high with little to no vegetation to retard erosion. While salmonids do not typically stay in this reach during the summer months because of water temperatures, ODFW biologists have indicated

Project Name: Blanchet Habitat Improvement
that salmonids move to this section of river for overwintering and there is currently a lack of pool and cover habitat. The GSWCD anticipated assisting the landowner in using constructed log jam or rootwad structure placements to reduce bank erosion and add pool and cover habitat to the mainstem John Day River. Vegetative plantings and fencing were used along with the woody materials to rehabilitate the banks and improve fish habitat.
Design, Permitting, and Construction Issues: Designs were completed by GSWCD engineers. Permitting issues arose related to isolating the construction areas and construction plans had to be modified to adjust to permit conditions.

Gallery:



Blanchet Habitat Improvement Project location map.

Blanchet Habitat Improvement Project Photograph: The right river bank on June 14, 2010, after the flood event.

Blanchet Habitat Improvement Project Photograph: The right river bank after backfilling, reshaping, and the return of water returned to the channel.

Blanchet Habitat Improvement Project Photograph: The left river bank on June 14, 2010, after the flood event.

Blanchet Habitat Improvement Project Photograph: The left river bank after backfilling, reshaping, and the return of water to the channel.

Forrest RM 264.7 Enhancement Project

Project Name: Forrest RM 264.7 Enhancement Project	
Project Type: Complexity/Channel Reconfiguration	
Project Sponsor: CTWSRO	
Project Design: Reclamation- Regional Resources & Technical Services Group	
Landowner(s): CTWSRO	
Partners: CTWSRO, USFWS, BPA	**Reclamation Development Costs:** $40,800
Funding Source(s): BPA, USFWS	**Implementation Cost:** $27,000
Project Location:	***State:*** *Oregon* ***County:*** Grant ***Stream:*** Upper John Day River ***Latitude:*** 44 ° 27' 9.8" ***Longitude:*** 118° 40' 32.6" ***Local Landmark:*** 2 mi. E of Prairie City, Oregon ***Township:*** 13S ***Range:*** 34E ***Section:*** *7* ***¼ Section:*** W1/2
Project Status: Construction completed	
Project Phase: vegetation planting and monitoring	
Milestones	***Funding:*** ***Design:*** March 2010 ***Permitting:*** ***Construction:*** July-August 2010
Contracting	***Construction Contractor:***
	Site Restoration Contractor: CTWSRO
Biological Benefit	***Species:*** MCR steelhead, MCR spring Chinook, bull trout, Pacific lamprey
	Benefit Type: Complexity/pool/cover
Metric: 0.3 miles improved	

Project Objectives and Description:

The Upper John Day Forrest Conservation Area is owned by the CTWSRO. The property was included in the tributary assessment completed for the Middle Fork and Upper John Day River. The CTWSRO asked Reclamation to identify and pursue a small project to enhance instream habitat on Upper John Day Forrest Property to utilize construction funding budgeted for 2010. Based on the tributary assessment and review by the core team, a project was identified between River Mile 264.7 and 264.4. The project area is about 2 miles east of Prairie City, Oregon. This project had 5 main potential components.

1. Installation of a large wood structure on the right bank near river mile 264.7 to add complexity and pool habitat (location to be determined)

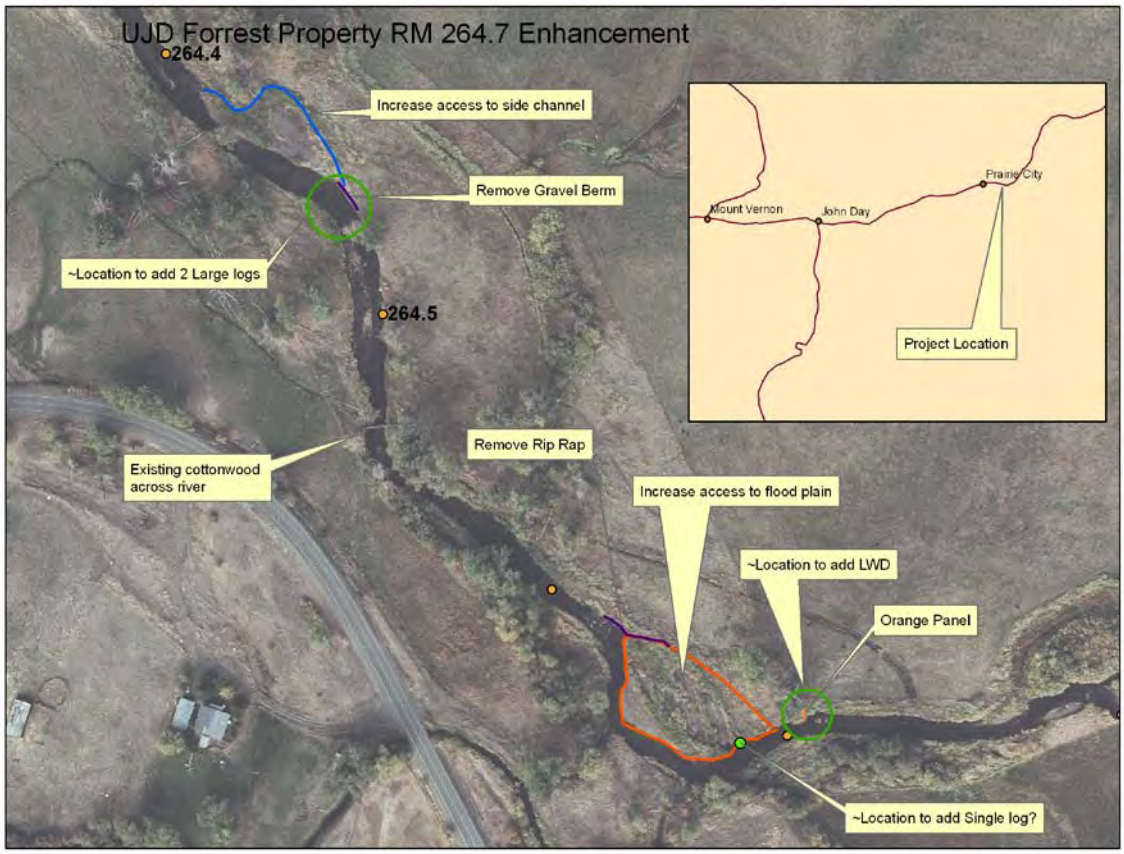
Project Name: Forrest RM 264.7 Enhancement Project

2. Installation of single large log to encourage high flow access to a small well vegetated floodplain (approximately 100 feet downstream of LWD in #1 above)
3. Removal of riprap at the downstream end of the floodplain (just above RM 264.6) that kept the river from moving laterally
4. Removal of a gravel berm at the upstream end of a well defined high flow side channel.
5. Installation of a large wood structure potentially consisting of two large logs with rootwads placed mid-channel to add complexity and encourage flow into the side channel (location with respect to the channel inlet yet to be determined).

Design, Permitting, and Construction Issues:

Reclamation provided the design services. The USFWS was the lead federal agency and covered NEPA and ESA Section 7 consultation under their Partners in Wildlife programmatic Biological Opinion.

Gallery:



Forrest RM 264.7 Enhancement Project location map.

Forrest RM 264.7 Enhancement Project Photograph: The berm that was removed to allow flow access to side channel.

Forrest RM 264.7 Enhancement Project Photograph: The log structures that were added to create channel complexity and cover.

Forrest RM 264.7 Enhancement Project Photograph: The site where riprap was removed and boulders were added to riffle.

Oliver Diversion #47 and #48 Project

<table>
<tr><td colspan="2">Project Name: Oliver Diversion #47 and #48</td></tr>
<tr><td colspan="2">Project Type: Access/Barriers</td></tr>
<tr><td colspan="2">Project Sponsor: CTWSRO</td></tr>
<tr><td colspan="2">Project Design: GSWCD (funded by Reclamation)</td></tr>
<tr><td colspan="2">Landowner(s): Donna Carter</td></tr>
<tr><td>Partners: GSWCD, BPA, CTWSRO,OWEB,ODFW</td><td>Reclamation Development Costs: $42,900</td></tr>
<tr><td>Funding Source(s): BPA, ODFW</td><td>Implementation Cost: $113,000</td></tr>
<tr><td>Project Location:</td><td>State: Oregon County: Grant Stream: Upper John Day
Latitude: 44° 25’25” Longitude: 118° 51’ 50”
Local Landmark: 4.5 miles east of John Day , OR
Township: 13S Range: 32E Section: 21 ¼ Section: SE1/4</td></tr>
<tr><td colspan="2">Project Status: Construction completed</td></tr>
<tr><td colspan="2">Project Phase: Site restoration/monitoring</td></tr>
<tr><td>Milestones</td><td>Funding:
Design: August 2008
Permitting:
Construction: July-August 2010</td></tr>
<tr><td rowspan="2">Contracting</td><td>Construction Contractor:</td></tr>
<tr><td>Site Restoration Contractor: CTWSRO</td></tr>
<tr><td rowspan="2">Biological Benefit</td><td>Species: MCR steelhead, MCR spring Chinook, bull trout, Pacific lamprey</td></tr>
<tr><td>Benefit Type: Passage for all life stages</td></tr>
<tr><td colspan="2">Metric: 1.1 miles improved to next diversion site</td></tr>
<tr><td colspan="2">Project Objectives and Description:
The Oliver Ditch #47 and #48 Diversion project is located 4.5 miles east of John Day on the John Day River at river mile 253.2. Two diversions were combined into one structure. The diversion structures were typical gravel pushup dams which had to be constructed and maintained with heavy equipment. Preliminary review of the water rights indicated that the #48 diversion has a water right for diversion of 2.9 cfs and the #47 diversion of 0.1 cfs. These structures appeared to be partial barriers at high flows and full barriers at low flows, depending on the severity of the water year and construction of the push-up dams. The GSWCD anticipated installing a typical lay-flat stanchion dam with fish passage, at the site of Diversion #48 that will serve both ditches. New headgates were installed at the lay-flat structure which will require less head differential to operate at full capacity.</td></tr>
</table>

Project Name: Oliver Diversion #47 and #48

Design, Permitting, and Construction Issues:

Through the ESA section 7 consultation process, a concern was raised about the sheet piling cut-off wall impacting the hyporheic flow of water and macrophytes. To satisfy NOAA Fisheries, 12-inch by 6-inch slots were cut in the bottom of each of the sheet piling panels of the cut off wall to allow for more hyporheic flow.

Gallery:

Oliver Diversion #47 and #48 Project Photograph: The Oliver #47 pushup dam.

Oliver Diversion #47 and #48 Project Photograph: The Oliver #48 pushup dam partially breached.

Oliver Diversion #47 and #48 Project Photograph: The completed lay-flat structure.

Oliver Diversion #49 Project

Project Name: Oliver Diversion #49	
Project Type: Access/Barriers	
Project Sponsor: CTWSRO	
Project Design: GSWCD (funded by Reclamation)	
Landowner(s): Donna Carter	
Partners: GSWCD, BPA, CTWSRO,OWEB,ODFW	**Reclamation Development Costs:** $33,100
Funding Source(s): BPA, ODFW	**Implementation Cost:** $81,000
Project Location:	***State:*** *Oregon* ***County:*** *Grant* ***Stream:*** Upper John Day ***Latitude:*** 44° 25'14" ***Longitude:*** 118° 52' 36" ***Local Landmark:*** 4 miles east of John Day , OR ***Township:*** 13S ***Range:*** 32E ***Section:*** 21 ***¼ Section:*** SW1/4
Project Status: Construction completed	
Project Phase: Site restoration/monitoring	
Milestones	***Funding:*** ***Design:*** August 2008 ***Permitting:*** ***Construction:*** July-August 2010
Contracting	***Construction Contractor:***
	Site Restoration Contractor: CTWSRO
Biological Benefit	***Species:*** MCR steelhead, MCR spring Chinook, bull trout, Pacific lamprey
	Benefit Type: Passage for all life stages
Metric: 1.0 miles improved to next diversion site	

Project Objectives and Description:

The Oliver Ditch #49 Diversion project is located 4 miles east of John Day on the John Day River at river mile 252.3. The diversion structure was a typical gravel pushup dam with a large rock base which had to be constructed and maintained with heavy equipment. At the time of the site visit, it was not known whether there was a functioning headgate or not. Preliminary review of the water rights indicated this diversion has a water right for diversion of 2.3 cfs. This structure was a full barrier at low flows to all life stages, but at higher flows when the dam was partially washed out, it was a partial barrier. The GSWCD anticipated installing a typical lay-flat stanchion dam at this site with fish passage. A new headgate was installed at the lay-flat structure which will require less head differential to operate at full capacity.

Project Name: Oliver Diversion #49

Design, Permitting, and Construction Issues:

Through the ESA section 7 consultation process a concern was raised about the sheet piling cut-off wall impacting the hyporheic flow of water and macrophytes. To satisfy NOAA Fisheries 12-inch by 6-inch slots were cut in the bottom of each of sheet piling panels of the cut off wall to allow for more hyporheic flow. During construction, the river was at an unusually high flow level which created more of a challenge to isolate the construction site.

Gallery:

Oliver Diversion #49 Project Photograph: The Oliver #49 diversion dam prior to the project.

Oliver Diversion #49 Project Photograph: The completed structure with stanchions and boards in place.

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 2010, one project was completed in the subbasin that improved fish passage for all life stages.

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.

Projects

- Boulder Creek Ranch Diversion Project

Sponsors

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

Partners

- Confederated Tribes of the Warm Springs Reservation of Oregon
- Bonneville Power Administration (BPA)
- Grant Soil and Water Conservation District (GSWCD)
- Oregon Department of Fish and Wildlife (ODFW)

Funding Sources

- Bonneville Power Administration
- Oregon Department of Fish and Wildlife

Bureau of Reclamation Expenditures in 2010

Subbasin	Expenditures
Middle Fork John Day River	$423,416

Figure 6. Location map of the project completed in the Middle Fork John Day River subbasin in 2010.

Boulder Creek Ranch Diversion Project

Project Name: Boulder Creek Ranch Diversion	
Project Type: Access/Barriers	
Project Sponsor: CTWSRO	
Project Design: GSWCD (funded by Reclamation)	
Landowner(s): Boulder Creek Ranch	
Partners: GSWCD, BPA, CTWSRO, ODFW	**Reclamation Development Costs:** $21,000
Funding Source(s): BPA, ODFW	**Implementation Cost:** $77,000
Project Location:	***State:*** *Oregon* ***County:*** *Grant* ***Stream:*** Big Boulder Creek-MFJD ***Latitude:*** 44° 40' 26" ***Longitude:*** 118° 43' 01" ***Local Landmark:*** 15 mi NW of Austin Junction, OR ***Township:*** 10S ***Range:*** 33E ***Section:*** 26 ***¼ Section:*** NW1/4
Project Status: Construction completed	
Project Phase: Site restoration/monitoring	
Milestones	***Funding:*** ***Design:*** August 2008 ***Permitting:*** ***Construction:*** July-August 2010
Contracting	***Construction Contractor:***
	Site Restoration Contractor: CTWSRO
Biological Benefit	***Species:*** MCR steelhead, MCR spring Chinook, bull trout, Pacific lamprey
	Benefit Type: Passage for all life stages
Metric: 13.0 miles improved	

Project Objectives and Description:

The Boulder Creek Ranch Diversion is about 15 miles northwest of Austin Junction, Oregon on Big Boulder Creek. Big Boulder Creek is a major tributary to the Middle Fork John Day River. The instream part of the structure was composed of large cobble, and tarps. No headgate was present, so flow control was managed by blocking the ditch with tarps. Lack of flow control at higher flows contributed to sediment deposition in the ditch and at the fish screen. The GSWCD anticipated installing a typical lay-flat stanchion dam or a rock v-weir at this site with a properly functioning headgate and fish passage.

Design, Permitting, and Construction Issues:

GSWCD investigated using a rock v-weir design at this location, but after further review decided that a rock v-weir design had long-term stability and maintenance issues and opted to design a lay-flat dam.

Gallery:

Boulder Creek Ranch Diversion Project Photograph: The Big Boulder Creek diversion dam before the project.

Boulder Creek Ranch Diversion Project Photograph: The Big Boulder Creek diversion dam after the project.

Boulder Creek Ranch Diversion Project Photograph: The Big Boulder Creek diversion dam after the project.

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 2010, two projects were completed in the Entiat River subbasin, four in the Methow River subbasin, and one in the Wenatchee River subbasin.

ESA-listed anadromous fish species present in this part of the 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 2010

Subbasin	Expenditures
Entiat River	$ 944,106
Methow River	$1,969,236
Wenatchee River	$ 967,744
Total	**$3,881,086**

American Recovery and Reinvestment Act Funding

Subbasin	Expenditures
Entiat River	$589,551
Methow River	$570,215
Total	**$1,159,766**

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 an area of about 1,520 square miles. In 2010, two projects were completed in the subbasin that increased floodplain habitat, habitat quantity, and water quality by reducing sediment.

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

Projects

- ARRA Preston Reach Restoration Project, Phase I
- Entiat National Fish Hatchery Complexity Project, Phase I

Sponsors

- Cascadia Conservation District

Partners

- Chelan Douglas Land Trust
- U.S. Fish and Wildlife Service (USFWS)

Funding Sources

- American Recovery and Reinvestment Act (ARRA) through the Bureau of Reclamation
- Salmon Recovery Funding Board
- Chelan PUD Tributary Fund

Bureau of Reclamation Expenditures in 2010

Subbasin	Expenditures
Entiat River	$ 944,106

American Recovery and Reinvestment Act Funding

Subbasin	Expenditures
Entiat River	$589,551

Figure 7. Location map of the projects completed in the Entiat River subbasin in 2010.

ARRA Preston Reach Restoration Project (Phase 1)

Project Name: ARRA Preston Reach Restoration Phase 1	
Project Type: Channel complexity-restore main channel function	
Project Sponsor: Cascadia Conservation District	
Project Design: Reclamation IDIQ (ICF)	
Landowner(s): Frunz	
Partners: Chelan Douglas Land Trust	**Reclamation Development Costs:**
Funding Source(s): Reclamation (ARRA)	**Implementation Cost:** $340,000
Project Location:	***State:*** Washington ***County:*** Chelan ***Stream:*** Entiat River ***Latitude:*** 47.8609 ***Longitude:*** 120.4205 ***Local Landmark:*** MP 21 on Entiat River Road ***Township:*** 27 N ***Range:*** 19 E ***Section:*** 11 ***¼ Section:*** NW
Project Status: Active	
Project Phase: revegetation/*Monitoring*	
Milestones	***Funding:*** *Secured* ***Design:*** *Completed* ***Permitting:*** *Completed* ***Construction Start Date:*** 9/20/10 ***Construction Completion Date:*** 10/31/10 (in-water work)
Contracting	***Advertised:*** August 2010
	Awarded: September 2010
Biological Benefit	***Species:*** spring Chinook salmon, steelhead
	Benefit Type: habitat quantity, water quality (sediment)
Metric: 0.12 complexity miles	
Project Objectives and Description: Establish short-term habitat and long-term wood riparian vegetation at the site. The project proposed to combine the installation of 14 large woody debris (LWD) structures along 645 linear feet of existing bank with an accompanying 100-foot-wide, 1.9 acre riparian planting zone behind it.	
Design, Permitting, and Construction Issues: Acquisition of permits delayed start of project. Dewatering proved to be challenging. Project was difficult to fund due to "bank protection" perception, but upon completion was well received because of transitory nature of LWD structures and substantial riparian planting.	

Gallery:

ARRA Preston Reach Restoration Project Photograph: The river bank before project.

ARRA Preston Reach Restoration Project Photograph: The river bank after project.

ARRA Preston Reach Restoration Project Photograph: A fish utilizing a constructed log structure.

Entiat National Fish Hatchery Complexity Project (Phase 1)

Project Name: Entiat National Fish Hatchery Complexity Phase 1	
Project Type: Floodplain restoration	
Project Sponsor: Cascadia Conservation District	
Project Design: Reclamation (Chan)	
Landowner(s): U.S. Fish and Wildlife Service	
Partners: USFWS	**Reclamation Development Costs:** $73,000
Funding Source(s): Salmon Recovery Funding Board, Chelan PUD Trib Fund	**Implementation Cost:** $165,000
Project Location:	***State:*** Washington ***County:*** Chelan ***Stream:*** Entiat River ***Latitude:*** 47.697 ***Longitude:*** 120.321 ***Local Landmark:*** Hatchery ***Township:*** 25 N ***Range:*** 20 E ***Section:*** 3 ***¼ Section:*** NW
Project Status: Active	
Project Phase: Monitoring	
Milestones	***Funding:*** Secured ***Design:*** Completed ***Permitting:*** Completed ***Construction Start Date:*** October 3, 2010 ***Construction Completion Date:*** October 31, 2010
Contracting	***Advertised:*** August 2010
	Awarded: September 2010
Biological Benefit	***Species:*** spring Chinook salmon, steelhead
	Benefit Type: floodplain habitat
Metric: 0.2 complexity miles	
Project Objectives and Description: Natural floodplain function was restored on the hatchery property by levee removal and lowering of access roads. Subsequent to site monitoring, this project may be followed in Phase 2 by additional habitat restoration activities.	
Design, Permitting, and Construction Issues: None	

Gallery:

Entiat National Fish Hatchery Complexity Project Photograph: The levee removal.

Entiat National Fish Hatchery Complexity Project Photograph: The levee location after removal.

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 2010, four projects were completed in the subbasin that increased rearing and overwintering habitat, fish passage, high water refugia, and instream flows.

ESA-listed fish species present in the river include UCR spring run Chinook salmon (endangered), UCR steelhead trout (endangered), and CR bull trout (threatened). Also present are UCR summer/fall run Chinook salmon (not listed).

Projects

- Heath Middle Pond Habitat Improvement Project
- Little Barkley Piping Project
- Methow Valley Irrigation District East Diversion Modification Project
- Operskalski Adaptive Management Program

Sponsors

- Methow Salmon Recovery Foundation
- Barkley Irrigation Company

Partners

- Methow Valley Irrigation District (MVID)
- Barkley Irrigation Company
- Bureau of Reclamation
- Yakama Nation
- Methow Conservancy
- U.S. Forest Service
- Methow Salmon Recovery Foundation (MSRF)
- Natural Resources Conservation Service
- Washington Water Project of Trout Unlimited
- Washington Department of Fish and Wildlife (WDFW)
- Okanagan County
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service (USFWS)

Funding Sources

- American Recovery and Reinvestment Act through the Bureau of Reclamation
- Yakama Nation through the Bonneville Power Administration Fish Accords Funds
- Natural Resources Conservation Service
- Washington Water Project of Trout Unlimited
- Bonneville Power Administration (BPA)
- Washington Recreation and Conservation Office
- Bureau of Reclamation

Bureau of Reclamation Expenditures in 2010

Subbasin	Expenditures
Methow River	$1,969,236

American Recovery and Reinvestment Act Funding

Subbasin	Expenditures
Methow River	$570,215

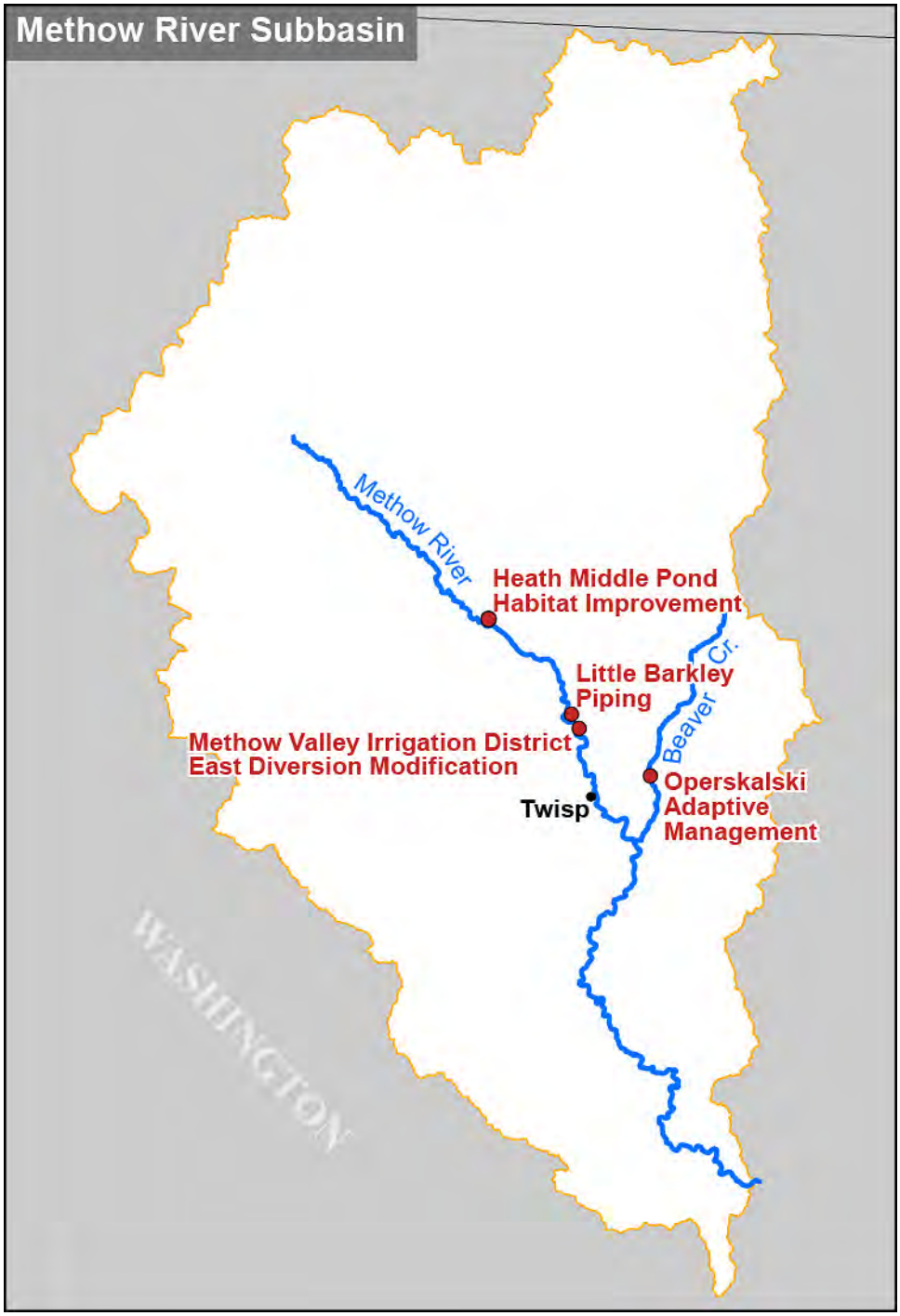


Figure 8. Location map of the projects completed in the Methow River subbasin in 2010.

Heath Middle Pond Habitat Improvement Project

<table>
<tr><td colspan="3">Project Name: Heath Middle Pond Habitat Improvement Project</td></tr>
<tr><td colspan="3">Project Type: Passage</td></tr>
<tr><td colspan="3">Project Sponsor: MSRF</td></tr>
<tr><td colspan="3">Project Design: Bureau of Reclamation and U.S. Forest Service</td></tr>
<tr><td colspan="3">Landowner(s): Private and Conservation Easement owned by Methow Conservancy.</td></tr>
<tr><td colspan="2">Partners: Bureau of Reclamation, Yakama Nation, Methow Conservancy, U.S. Forest Service, and MSRF</td><td>Reclamation Development Costs: $6,700</td></tr>
<tr><td colspan="2">Funding Source(s): Yakama Nation, through BPA Fish Accord Funds.</td><td>Implementation Cost: $48,000</td></tr>
<tr><td>Project Location:</td><td colspan="2">State: Washington County: Okanogan Stream: Upper Methow River
Latitude: 48°30’23” Longitude: 120°15’32”
Local Landmark: Big Valley Ranch
Township: 35 Range: 21 Section: 30
¼ Section: NW in Sec. 30</td></tr>
<tr><td colspan="3">Project Status: Adaptive Management</td></tr>
<tr><td colspan="3">Project Phase: Monitoring</td></tr>
<tr><td>Milestones</td><td colspan="2">Funding: Secured
Design: Completed
Permitting: Completed
Construction Start Date: August 11, 2010
Construction Completion Date: August 25, 2010</td></tr>
<tr><td rowspan="2">Contracting</td><td colspan="2">Advertised: June 8, 2010</td></tr>
<tr><td colspan="2">Awarded: June 30, 2010</td></tr>
<tr><td rowspan="2">Biological Benefit</td><td colspan="2">Species:
spring Chinook salmon, steelhead, bull trout</td></tr>
<tr><td colspan="2">Benefit Type: Rearing and overwintering habitat, passage, and high water refugia.</td></tr>
<tr><td colspan="3">Metric:
Improved fish passage was established by eliminating two fish barriers and restoring access to 0.5 miles of off-channel habitat for listed fish.</td></tr>
<tr><td colspan="3">Project Objectives and Description:
The Heath Middle Pond Habitat Improvement Project restored juvenile salmonid access to a large spring-fed pond, thereby creating additional habitat complexity, high water refugia, juvenile rearing, and overwintering habitat for listed fish species. The project also restored natural channel conditions by connecting the pond to existing side channels that were</td></tr>
</table>

Project Name: Heath Middle Pond Habitat Improvement Project

previously blocked from normal flows by undersized and perched culverts associated with a dirt road system.

A previous restoration project, completed in 2008, reestablished fish passage from the Methow River to the lower of three large spring-fed ponds on the Big Valley Ranch property in the upper Methow Valley. The objective of the current project was to restore fish passage from the lower pond to the middle of the three ponds. Although limited passage from the river to the off-channel habitat in the middle pond appears to have been available during seasonal freshets, access was limited, at best. This assumption was verified by pre-project snorkel surveys which found no listed salmonids present in the pond.

Prior to project implementation, the elevation of the middle pond surface was maintained by three undersized culverts through a primitive road prism; however, the culverts were not designed for fish passage and did not meet fish passage criteria for velocity. The culverts were also blocked by beaver activity much of the time. This project replaced two of the culverts with a six-log stringer bridge and roughened channel, allowing fish passage into the middle pond from the lower pond. The third culvert was replaced with a cobble-lined drivable dip designed to flow only as an emergency ford and spillway to allow overflow from the pond if the fish passage channel is temporarily blocked by debris or beaver activity.

Project Features included:

- Removal of a section of placed fill and the two existing southern 12-inch culverts from the earth road/dam prism.
- Removal of the existing northern culvert from the road/dam prism.
- Modifying the road/dam prism to incorporate a bridge to replace the two southern culverts and a drivable dip/emergency spillway to replace the northern culvert.
- Construction of an engineered roughened channel to serve as a defined stream between the middle pond and the lower pond to allow fish passage between the ponds and regulate the water elevation in the middle pond.

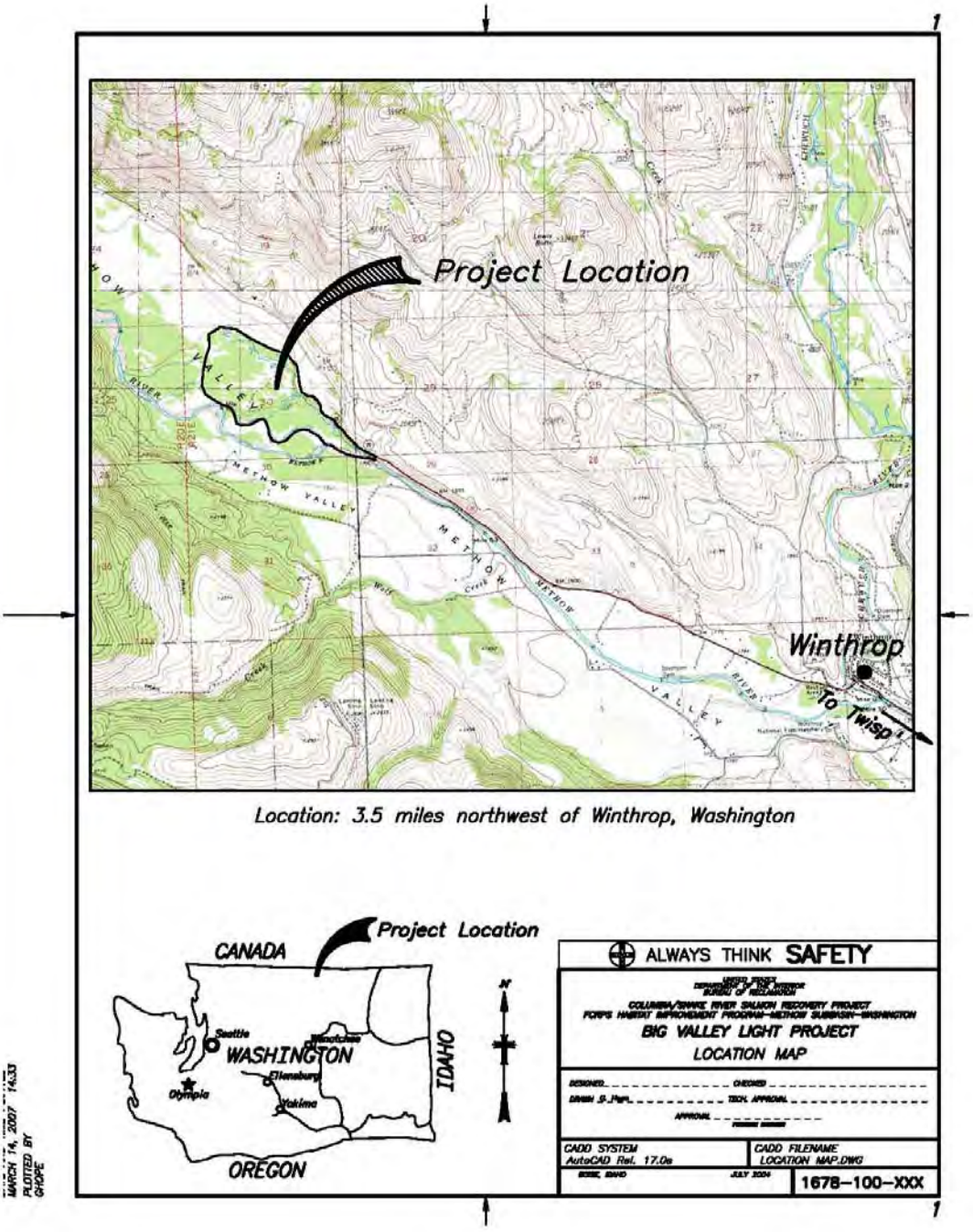
Design, Permitting, and Construction Issues:

Although funding was available to construct this project in 2009, delays in permitting and design required MSRF to reschedule construction for the summer of 2010.

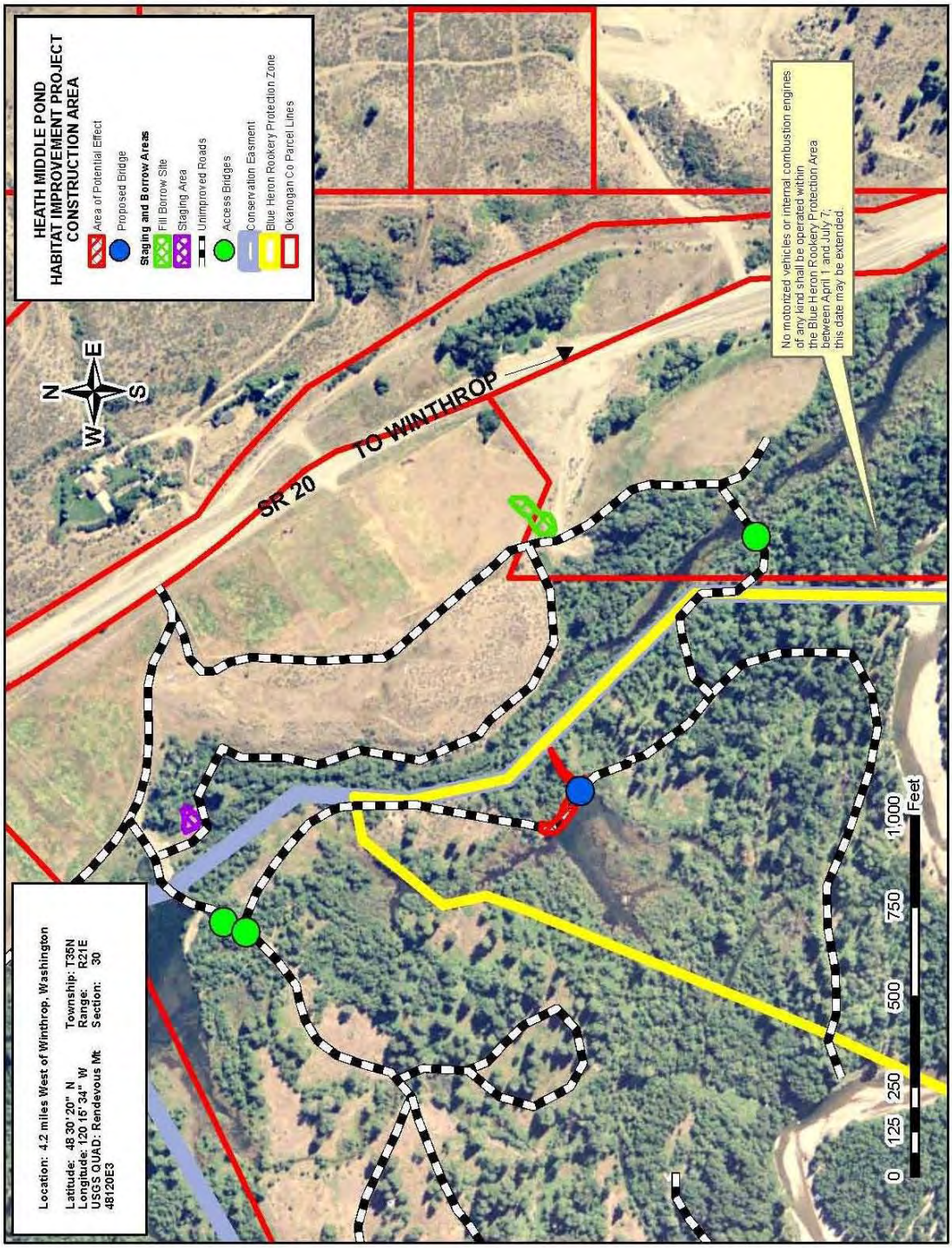
The project involved design modifications and coordination with the landowner to satisfy the landowner's access needs. While designing the project, the water level was originally thought to be controlled by the existing culvert invert elevation; however, prior to the start of construction, it became apparent that a gravel bar in the pond near the culvert inlet was actually controlling the pond surface elevation. Adjustments were made to the design to use the gravel bar elevation as the pond water surface level control. Pond fluctuations continue to occur based on river elevations and beaver activity.

Monitoring of fish and sediment levels will continue for three years to ensure that the structures are functioning as designed. Initial monitoring has determined the modifications are performing as intended.

Gallery:



Heath Middle Pond Habitat Improvement Project location map.



Heath Middle Pond Habitat Improvement Project, Heath Middle Pond site map.

Heath Middle Pond Habitat Improvement Project Photograph: Off-channel habitat in the spring-fed Heath Middle Pond that was unavailable to fish prior to project implementation.

Heath Middle Pond Habitat Improvement Project Photograph: The finished bridge and channel with abutment rocks (August 24, 2010).

Little Barkley Piping Project

Project Name: Little Barkley Piping		
Project Type: Instream flow		
Project Sponsor: Barkley Irrigation Company		
Project Design: Bureau of Reclamation		
Landowner(s): Private		
Partners: Barkley Irrigation Company, Natural Resource Conservation Service, Bureau of Reclamation, and Washington Water Project of Trout Unlimited.		**Reclamation Development Costs:** $70,000
Funding Source(s): National Resource Conservation Service and Washington Water Project of Trout Unlimited.		**Implementation Cost:** $150,000
Project Location:	***State:*** Washington ***County:*** Okanogan ***Stream:*** Methow River ***Latitude:*** 120°9'2.69" ***Longitude:*** 48°25'50.21" ***Local Landmark:*** Methow River ***Township:*** 34N ***Range:*** 21E ***Section:*** 24 ***¼ Section:***	
Project Status: Completed		
Project Phase: Completed		
Milestones	***Funding:*** Secured ***Design:*** Completed ***Permitting:*** Completed ***Construction Start Date:*** October 2009 ***Construction Completion Date:*** April 2010	
Contracting	*Advertised:* August 14, 2010	
	Awarded: September 8, 2010	
Biological Benefit	***Species:*** spring Chinook salmon, steelhead, bull trout	
	Benefit Type: Instream flow	
Metric: 0.5 cfs instream flow permanently returned to the Methow River.		

Project Objectives and Description:

This project converted the Little Barkley portion of the Barkley Irrigation Company system from an open canal to an enclosed pipeline. The 3,050-foot-long pipeline includes a head box and debris screen at the outtake from the Barkley Canal. Four diversions from the main irrigation pipe to three landowners were also installed.

In the spring of 2010, the final components of the project were finished. The turnout diversion connections, valves, and debris screen at the beginning of the intake canal were installed and the pipeline was covered.

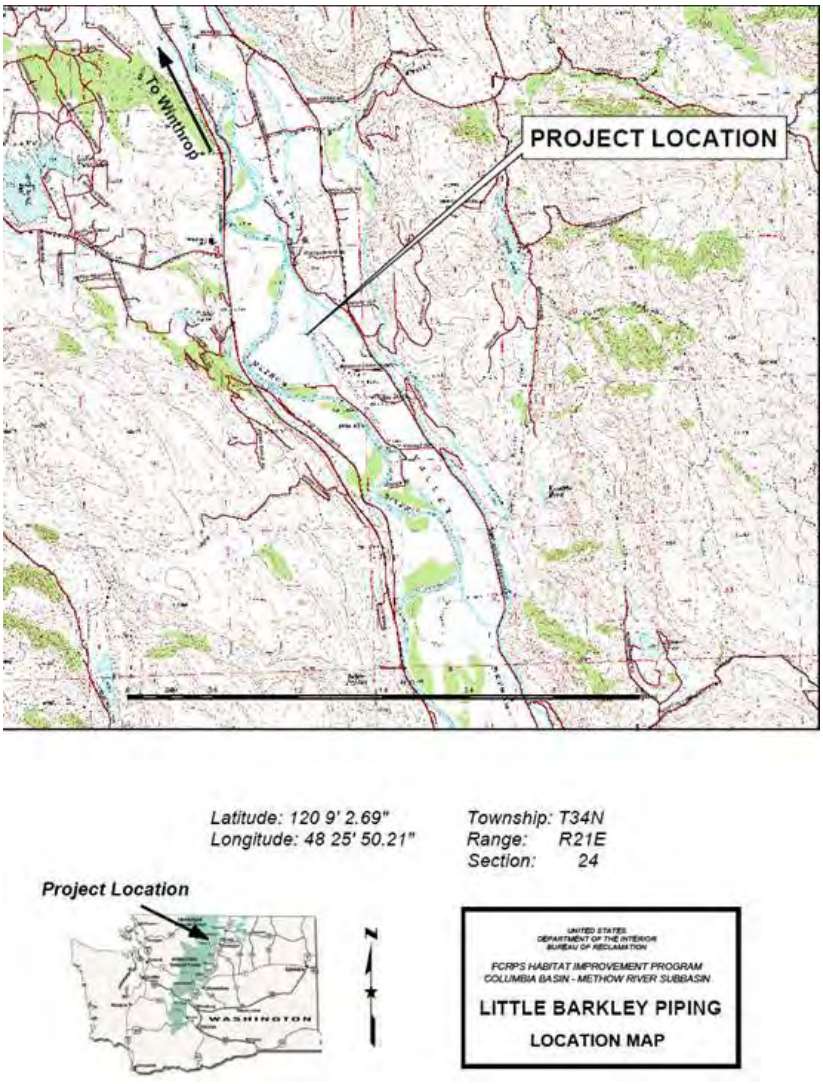
Project Name: Little Barkley Piping

This project reduced the volume of diverted water by 0.5 cfs from the Methow River in perpetuity.

Design, Permitting, and Construction Issues:

The design of the intake box and the first 500 linear feet of pipe were complicated by the fact that the grade was nearly level. The pipe was split into two smaller diameter pipes so that the top of the pipe in the intake box would be below the water surface in the ditch. This avoided air entrainment and formation of a flow restriction downstream. The flow of water by the debris screen and the orientation of the screen were carefully determined in the field and constructed to make the screen as self-cleaning as possible.

Gallery:



Little Barkley Piping Project location map.

Little Barkley Piping Project Photograph: The Little Barkley irrigation canal before piping (July 2009).

Little Barkley Piping Project Photograph: At the end of 2009 construction, showing the end of pipeline with turnout to be completed in spring 2010 by completing connections and installing valves and end-cap (December 2009).

Little Barkley Piping Project Photograph: The completed Little Barkley diversion debris screen along the intake canal (May 2010).

Methow Valley Irrigation District East Diversion Modification Project

<table>
<tr><td colspan="3">Project Name: Methow Valley Irrigation District (MVID) East Diversion Modification Project</td></tr>
<tr><td colspan="3">Project Type: Screening, passage, and complexity. Modification of irrigation diversion infrastructure.</td></tr>
<tr><td colspan="3">Project Sponsor: MSRF</td></tr>
<tr><td colspan="3">Project Design: HDR Engineering, Inc.</td></tr>
<tr><td colspan="3">Landowner(s): Washington State Division of Aeronautics, Okanogan County Public Works, and Methow Valley Irrigation District.</td></tr>
<tr><td colspan="2">Partners: MVID, Bureau of Reclamation, WDFW, Okanogan County, and Washington Department of Transportation.</td><td>Reclamation Development Costs:
$1,300,738 (Screen = $242,660)
(Barrier = $1,058,078)</td></tr>
<tr><td colspan="2">Funding Source(s): BPA, Washington RCO/SRFB, Bureau of Reclamation, and Reclamation ARRA.</td><td>Implementation Cost: $1,200,000 (includes $320,000 Reclamation ARRA funds to MSRF)</td></tr>
<tr><td>Project Location:</td><td colspan="2">State: Washington County: Okanogan Stream: Methow River
Latitude: 48˚ 25’ 09” N Longitude: 120˚ 8’ 25” W
Local Landmark: Methow River
Township: 34N Range: 22E Section: 30 ¼ Section: NW</td></tr>
<tr><td colspan="3">Project Status: Adaptive Management</td></tr>
<tr><td colspan="3">Project Phase: Site Restoration and Monitoring</td></tr>
<tr><td>Milestones</td><td colspan="2">Funding: Secured
Design: Completed
Permitting: Completed
Construction Start Date: October, 2009
Construction Completion Date: April,2010</td></tr>
<tr><td rowspan="2">Contracting</td><td colspan="2">Advertised: July 10, 2009</td></tr>
<tr><td colspan="2">Awarded: August 27, 2009</td></tr>
<tr><td rowspan="2">Biological Benefit</td><td colspan="2">Species:
spring Chinook salmon, steelhead, bull trout, Pacific lamprey</td></tr>
<tr><td colspan="2">Benefit Type: Passage and Habitat.</td></tr>
<tr><td colspan="3">Metric:
One irrigation fish screen return renovation, one fish barrier partially removed, and one acre of aquatic habitat protected from heavy machinery in the river annually.</td></tr>
</table>

Project Name: Methow Valley Irrigation District (MVID) East Diversion Modification Project

Project Objectives and Description:

The MVIDE East Diversion Modification Project reduced impacts to endangered UCR spring Chinook salmon, threatened UCR steelhead trout, and threatened Columbia River bull trout by removing the instream diversion dam remnants, improving the fish bypass, protecting the fish screens from flood flows, reducing impacts from intake maintenance and operation, and reducing the need for annual in-river excavation by the irrigators. Pacific lamprey are also found in the area and were using the irrigation fore bay for rearing. This project reduced lamprey mortality by reducing the amount of equipment use in the habitat occupied by lamprey, reduced fine sediment build up in the fore bay, and has improved the fish bypass to the river so that entrained lamprey can safely leave the irrigation intake area.

The final phase of the MVID East Project, completed in 2009-2010, modified the existing diversion intake structure and canal, headgate, sediment wasteway, and fish screen bypass. Previous efforts at the site included installation of new fish screens and a fish bypass in 2004 and removal of a channel-spanning diversion dam and portions of the dam foundation in 2007-2008. These actions did not address flow conveyance losses that required the irrigation district to use heavy equipment to construct a cobble wing dam in the river channel to increase diversion capacity and did not address deficiencies in fish screen return operations that occurred annually at low flows. The 2009-2010 project further improved the ability of the MVID East facility to divert water at low flows without the need for annual in-water maintenance. This project also improved the function of the existing fish bypass by addressing inadequate flow depth at the screen outflow and reducing turbulence-induced mortality, allowing the fish return to fully function at low flows, and increased the lifespan of the moving plastic-belt fish screens by reducing wear-inducing sediment in the screen forebays.

In 2010, completion of the MVID East Modification Project included final backfilling and site grading, clean up, restoration of disturbed areas, revegetation with native riparian plants and seed, gating and fencing the site access roads, and deer-fencing the revegetated area. Revegetation involved restoring the riparian buffer along the newly installed pipe diversion bench. To stabilize soils and improve riparian conditions at the site, approximately 800 native riparian plants were planted on the riparian bench. The area was also seeded with a native seed mix. Upland areas, including the dry slopes and staging areas, were seeded with a native seed mix and hydro-mulched. Restoration will be completed in the spring of 2011 with a final seeding of grass. Maintenance and monitoring revegetation success will continue for 3 years.

Completing the Designer's Operating Criteria (DOC) in 2011 will be the final stage of completing the project.

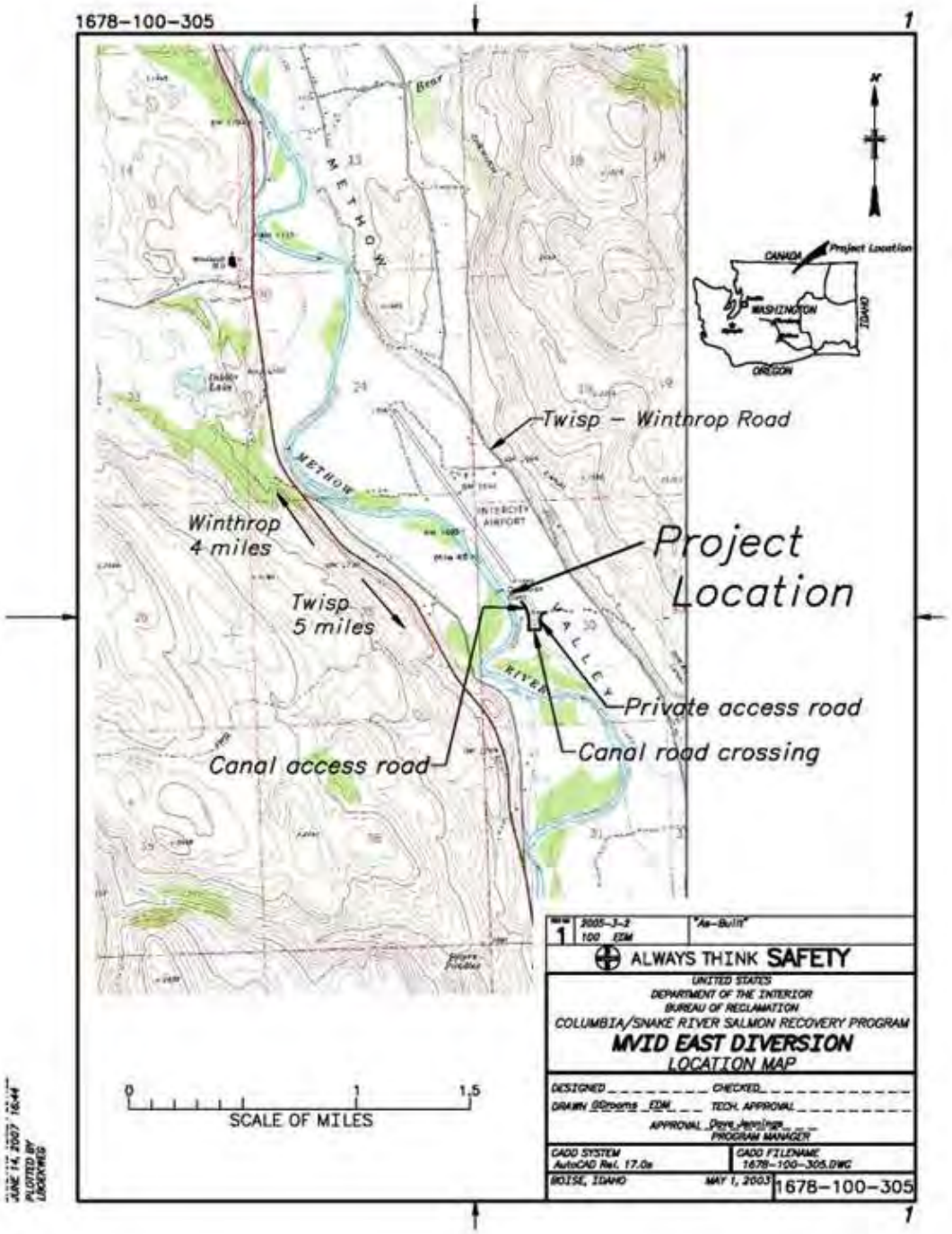
Design, Permitting, and Construction Issues:

Numerous agencies collaborated in the design phase of this project with many design iterations due to project complexities. Those involved included Reclamation designers, Methow Salmon Recovery Foundation representatives, BPA, MVID board members, NOAA Fisheries Service, USFWS, and WDFW permit biologists. The final design presented by Reclamation was evaluated through a Value Engineering (VE) Study. The VE process resulted in significant changes to the preferred alternative that reduced conflicts between irrigation needs and constructability, but in the end, increased construction costs beyond the engineer's pre-VE estimates. Designing the preferred alternative to confirm with the NMFS programmatic consultation under the BPA HIP II process was helpful.

The construction window for this project was constrained by the end of irrigation season and the onset of winter. Many of the project work elements were constructed during the winter 2009 with periods of single digit temperatures that resulted in the ground and riverbed freezing, forcing tenting and heating of placed concrete.

Project Name: Methow Valley Irrigation District (MVID) East Diversion Modification Project
The construction and grant/contract period was modified to allow completion of final grading and site cleanup in the spring of 2010 to allow the ground to thaw. This flexibility was invaluable in reducing change orders and allowed for increased quality of the final product. A lesson learned is to negotiate extended contract options in advance of the need.

Gallery:



Methow Valley Irrigation District East Diversion Modification Project location map.

Methow Valley Irrigation District East Diversion Modification Project Photograph: Before construction showing aerial view of MVID East project area with beginning of diversion intake canal, wing dam extension, and access road on riverbank towards bottom of frame and fish screen facilities and channel spanning dam on the Methow River towards top of photo (2007).

Methow Valley Irrigation District East Diversion Modification Project Photograph: The installed willow bundles growing in the rock slope protection (September 2010).

Methow Valley Irrigation District East Diversion Modification Project Photograph: Completed project. The photo taken looking downstream showing the fenced intake structure and riparian bench with covered pipeline where the open intake canal previously existed as seen in a previous photo (August 2010).

Operskalski Adaptive Management Project

Project Name: Operskalski Adaptive Management Project	
Project Type: Complexity	
Project Sponsor: MSRF	
Project Design: WDFW	
Landowner(s): Private	
Partners: WDFW, Bureau of Reclamation, Army Corps of Engineers, and Okanogan County.	**Reclamation Development Costs:** $19,000
Funding Source(s): BPA and Reclamation	**Implementation Cost:** $5,000
Project Location:	***State:*** Washington ***County:*** Okanogan ***Stream:*** Beaver Creek ***Latitude:*** 48°22'56" N ***Longitude:*** 120°02'58" W ***Local Landmark:*** Beaver Creek ***Township:*** 33N ***Range:*** 22E ***Section:*** SE ***¼ Section:***
Project Status: Adaptive Management	
Project Phase: Monitoring	
Milestones	***Funding:*** Secured ***Design:*** Completed ***Permitting:*** Completed ***Construction Start Date:*** October 14, 2010 ***Construction Completion Date:*** October 14, 2010
Contracting	***Advertised:*** N/A
	Awarded: October 7, 2010
Biological Benefit	***Species:*** spring Chinook salmon, steelhead, bull trout
	Benefit Type: Habitat complexity

Metric:

The original project revegetated 1 acre and added habitat complexity to 350 linear feet of stream, as well as excluding cattle from approximately 6.5 acres and 1,200 linear feet of stream. This adaptive management project prevented the loss of these benefits.

Project Objectives and Description:

The Operskalski Complexity Restoration Project was completed in 2009 along a 700-foot section of Beaver Creek with excellent potential habitat for ESA-listed fish. The project addressed aquatic and riparian habitat degradation caused by large woody debris removal and livestock grazing, resulting in vegetation loss, bank erosion, and stream channel widening.

Spawning habitat in Beaver Creek generally appears to be limited with high fine sediment levels; however, a U.S. Forest Service stream habitat assessment of the Operskalski reach

Project Name: Operskalski Adaptive Management Project

showed that there are good spawning gravels available for Upper Columbia River steelhead and that the left bank provides important habitat attributes such as large wood, shade, and a relatively intact floodplain. UCR steelhead spawn and rear in the project area. UCR spring Chinook salmon rear in the lower reaches of Beaver Creek, and juvenile Chinook have been captured ¼-mile downstream from the project area. Bull trout migrate through the project area to access spawning and rearing habitat in the upper reaches.

To improve habitat for ESA-listed fish, the project objectives were to reduce streambank erosion and sediment delivery to Beaver Creek by limiting livestock access, add habitat complexity for hiding cover along the streambank by creating large wood structures, and restore future shading, wood, and nutrient production through riparian restoration. To accomplish these objectives, the project involved recontouring over-steepened, eroding banks to restore a low gradient vegetated planting bench to provide added flood capacity, building instream habitat structures to direct flows away from the eroding bank and encourage left bank inundation with log and rock structures, replanting native riparian vegetation, fencing to exclude cattle from the riparian area, and providing an alternative water source for cattle.

In the spring of 2010, effectiveness monitoring was conducted to assess the stream's response to the in-channel and bank work completed in the fall of 2009. Field observation indicated that in-stream structures placed to deflect the stream flow had caused greater than expected deposition resulting in partial loss of flow to a side channel. Additionally, scour around the in-stream structures appeared that it may undermine revegetation efforts.

The Operskalski adaptive management work completed under this project in the fall of 2010 included:

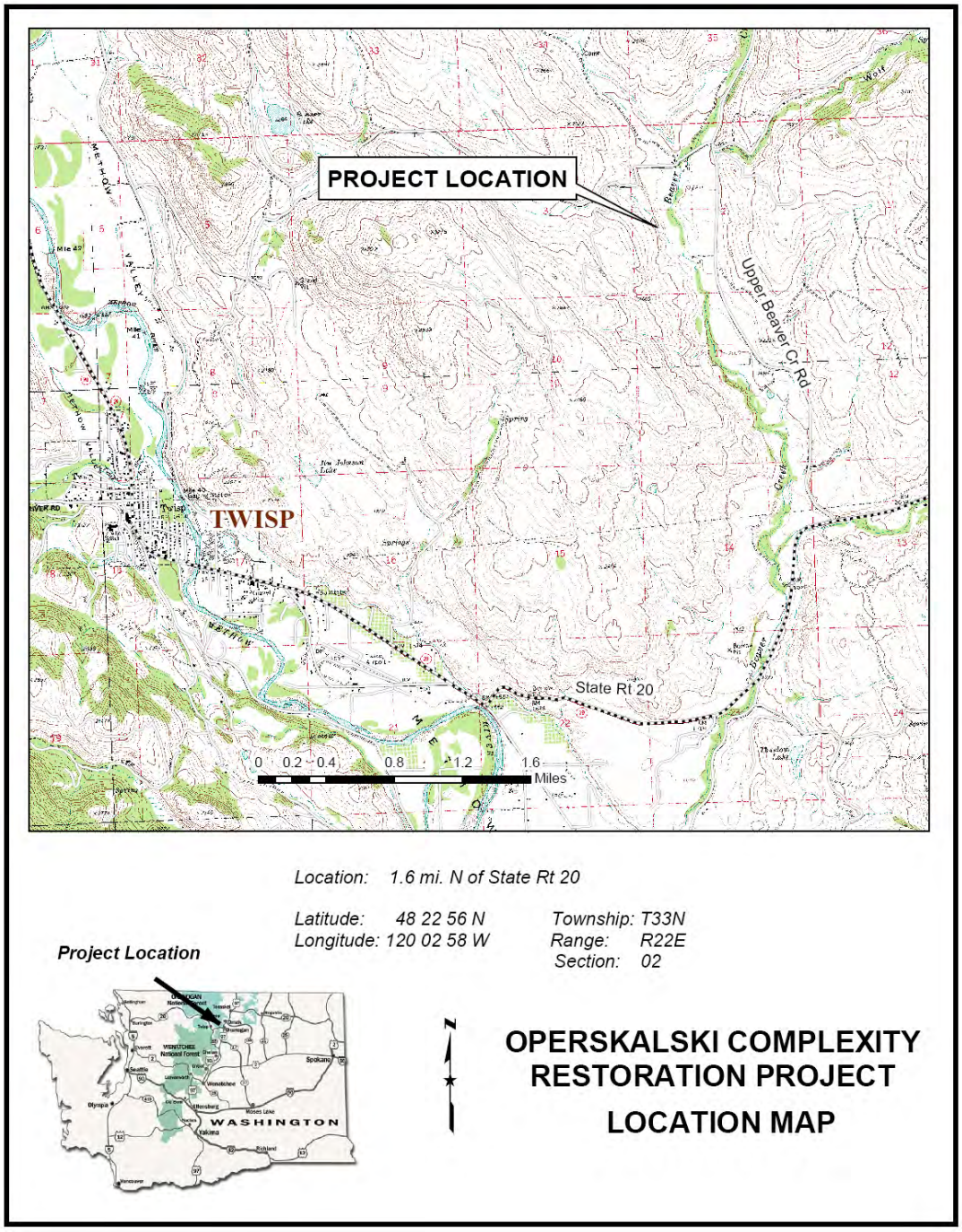
- Repositioning three large boulders from their downstream location to an upstream location in the work area.
- Placing small woody debris and two rootballs along the streambank.
- Excavating gravel from a bar on the left bank and placing the material along the right bank covering previously placed materials.
- Planting an additional 145 willow cuttings along the streambank.

Design, Permitting, and Construction Issues:

Cattle exclusion fencing installed in the fall of 2009 was found to be ineffective due to landowner/lessee lack of maintenance. Cattle access was observed to be impacting bank stability and vegetation efforts where exclusion efforts were not maintained. In the spring of 2010, an agreement was reached with the property owner to exclude cattle from the majority of the riparian area, with allowances made for limited cattle access to less than 100 feet of the creek. The agreement required additional fencing to be provided by the landowner.

Annual effectiveness monitoring to assess bank stability, channel conditions, and revegetation success will continue for 3 years. Although the need for further adaptive management is not expected, monitoring the stream's response to the in-channel work during and following high flows in 2011, and longer if necessary, will continue. Ongoing maintenance of plantings will also continue through 2011.

Gallery:



Operskalski Adaptive Management Project location map.

Operskalski Adaptive Management Project Photograph: Side channel inlet following removal of turning rocks. The mid-channel rock is naturally occurring. The two rocks to the left (river right) were placed in 2009 (October 14, 2010).

Operskalski Adaptive Management Project Photograph: The fir material and willow cuttings were worked in behind rootwads and backfilled with waste material from gravel bar cut (October 14, 2010).

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 2010, one project was completed in the subbasin that improved adult and juvenile passage to habitat upstream.

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.

Projects

- Upper Chumstick Barriers Project, Phase I

Sponsors

- Chelan County Natural Resources Department

Partners

- U.S. Fish and Wildlife Service

Funding Sources

- U.S. Fish and Wildlife Service

Bureau of Reclamation Expenditures in 2010

Subbasin	Expenditures
Wenatchee River	$ 967,744

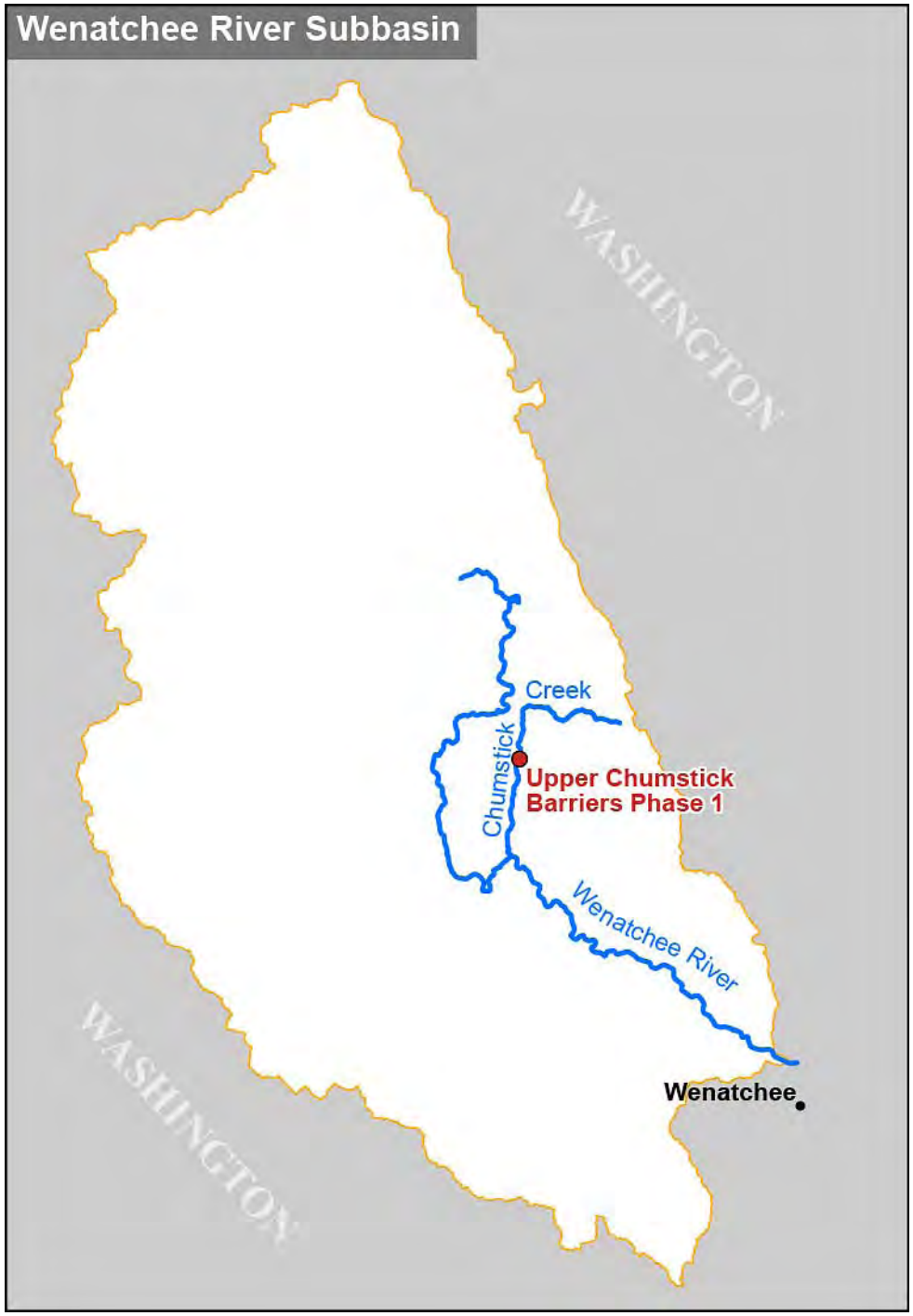


Figure 9. Location map of the projects completed in the Wenatchee River subbasin in 2010.

Upper Chumstick Barriers Project (Phase 1)

<table>
<tr><td colspan="2">Project Name: Upper Chumstick Barriers Phase 1</td></tr>
<tr><td colspan="2">Project Type: Barrier removal</td></tr>
<tr><td colspan="2">Project Sponsor: Chelan County Natural Resources Department</td></tr>
<tr><td colspan="2">Project Design: Reclamation IDIQ (ICF)</td></tr>
<tr><td colspan="2">Landowner(s): Cahail</td></tr>
<tr><td>Partners: USFWS</td><td>Reclamation Development Costs: $267,600 (Includes contract in the amount of $204,000 for design of 7 weirs in 2009)</td></tr>
<tr><td>Funding Source(s): USFWS</td><td>Implementation Cost: $60,000</td></tr>
<tr><td>Project Location:</td><td>State: Washington County: Chelan Stream: Chumstick Creek
Latitude: 47.6758 Longitude: 120.6399
Local Landmark:14102 Chumstick HWY
Township: 25N Range: 18E Section: 7 ¼ Section: SE</td></tr>
<tr><td colspan="2">Project Status: Active</td></tr>
<tr><td colspan="2">Project Phase: Monitoring</td></tr>
<tr><td>Milestones</td><td>Funding: Secured
Design: Completed
Permitting: Completed
Construction Start Date: October 1, 2010
Construction Completion Date: October 30, 2010</td></tr>
<tr><td rowspan="2">Contracting</td><td>Advertised: August 2010</td></tr>
<tr><td>Awarded: September 2010</td></tr>
<tr><td rowspan="2">Biological Benefit</td><td>Species: steelhead, spring Chinook salmon</td></tr>
<tr><td>Benefit Type: adult and juvenile passage</td></tr>
<tr><td colspan="2">Metric: 1.5 miles</td></tr>
<tr><td colspan="2">Project Objectives and Description:
This project is part of a larger project to open up passage in Chumstick Creek. This project removes a non-functional irrigation diversion that is a total passage barrier under most flows and replaces it with 7 rock weirs. This allows passage for an additional 1.5 miles upstream to the next partial barrier, which may be addressed in future efforts. For additional project details see the project page at http://hwsconnect.ekosystem.us/Project.aspx?sid=290&id=15957 (no login needed).</td></tr>
</table>

Project Name: Upper Chumstick Barriers Phase 1

Design, Permitting, and Construction Issues:

Design was coordinated with USFWS, as they were funding the construction. Landowners were reluctant to remove diversion because of aesthetic considerations.

Gallery:

Upper Chumstick Barriers Project Photograph: The barrier before removal.

Upper Chumstick Barriers Project Photograph: The rock weirs post-construction.