Upper Salmon River Fish Screen and Tributary Passage

Annual Report

Prepared for:

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Summary of Capital Projects in:

Contract 58717 - September 27th 2012 thru September 26th 2013
Contract 63734 - September 27th 2013 thru September 26th 2014
Contract 66945 - September 27th 2014 thru September 26th 2015
Contract 71413 - September 27th 2015 thru September 26th 2016
Contract 74780 - September 27th 2016 thru January 31st 2018
Contract 78455 - February 1st 2018 thru January 31st 2019
Contract 81380 - February 1st 2019 thru January 31st 2020

January 2021

Abstract

The objective of this contract is to perform habitat improvement projects specific to Bonneville Power Administration's (BPA) obligations under the Federal Columbia River Power System (FCRPS) Biological Opinion. Typical projects include installation of fish screens on diversions, diversion elimination, fish passage improvements, water conservation projects, and stream channel restoration. The funding is referred to as capitalization funds and is specific to capital structures that have a long useful life and are built from substantial materials such as steel and concrete. Funding is used to augment the Columbia River Fisheries Development Program (NOAA-Mitchell Act) to provide anadromous fish protection from entrainment, injury and loss in gravity and pump diversions in the Lemhi River and upper Salmon River basin. Projects funded by this program enhance habitat, restore anadromous fish runs, and improve fish passage of juvenile and adult fish in Idaho's anadromous fish corridors. A tributary-wide approach is incorporated in order to maximize benefits to the habitat.

Engineering final designs were completed for 54 fish passage projects, with 51 being completed by Screen Program Engineer Jared Bragg. The other three designs were completed by; Quadrant Consulting, Inc. (Quadrant) Boise, Idaho, who completed one final design (Pahsimeroi-13), the Bureau of Reclamation completed one (Iron Creek-07 Diversion), and Natural Resources Conservation Service (NRCS) completed one (Carmen Creek Phase III). Preliminary design work is performed under the separate BPA Contract #1994-015-00. Of these projects, 41 were fish screen designs, with 13 additional fish passage projects. All projects are designed to meet or exceed NMFS Anadromous Salmonid Passage Design. Several designs for future projects were completed by our own engineer using Mitchell Act funding.

In this performance period, with the support of these contracts, 42 new fish passage projects were installed, including; 31 new fish screens, with 20 diversions getting new fish screens, and 11 diversions getting older, non-criteria screens replaced. Additionally, 11 fish passage projects were completed involving barrier removals and instream flow enhancements. Eleven of these were large keystone projects to restore flows, fish passage, and reduce entrainment on the following: Sulphur Creek-01, Hawley Creek-03, Pahsimeroi-13, Pole Creek-01, Pahsimeroi-16, Carmen Creek-03, Patterson-Big Springs-10, Lemhi River-08A, Hawley Creek-02, Canyon Creek-04, and Pratt Creek-03. These were multi agency efforts and took several years to complete. Furthermore, two very significant fish passage projects with support from this contract, were completed by removing older, undersized culverts and replacing with bridges on the mainstem Pahsimeroi River at the Dowton and Furey Lane crossings. These projects also include installing fish screens, enhancing instream flows, and providing safe fish passage in 16 different tributaries for access to critical spawning and rearing habitat for anadromous salmonids.

This project is coordinated with other Idaho Department of Fish & Game (IDFG) funding sources to integrate and consolidate anadromous fish recovery efforts. Much of the preliminary survey, engineering design work, and construction crew salaries and benefits identified in this report was funded by sources other than BPA. The landowner coordination and material acquisition was performed by IDFG personnel using non-BPA funding as well. This project benefited from the engineering and support services of the Bureau of Reclamation (BoR) and the Natural Resource Conservation Service (NRCS).

Table of Contents

Abstract 2
Table of Contents 3
List of Abbreviations 8
Introduction 10
Project Location 12
Planning/Design 12
Watershed Coordination – Work Element 191 12
Final Designs for Construction – Work Element 175 13
Contract 58717 - September 27th 2012 thru September 26th 2013 13
Sulphur Creek -01 (PSC-01) Fish Screen 13
Sulphur Creek -02 (PSC-02) Fish Screen 14
Tower Creek-01 Fish Screen 14
Tower Creek-03 (STowC-03) Fish Screen 14
Lemhi River-20 (L-20) Fish Screen 15
Lemhi River-58B (L-58B) Fish Screen 15
Lemhi River-58C (L-58C) Fish Screen 16
Lemhi River-60 (L-60) Fish Screen 16
Hayden Creek-08 (LHC-08) Fish Screen 16
Contract 63734 - September 27th 2013 thru September 26th 2014 17
Hawley Creek-03 (LHawC-03) Fish Screen 17
Bohannon Creek-07 (LBC-07) Access Road Culvert Replacement 18
Sioux Lane Culvert Replacement Project 18
Poison Creek-01 (SPoiC-01) Fish Screen 18
Sulphur Creek-02 (PSC-02) Fish Screen 19
Tower Creek-04 (STowC-04) Fish Screen 19
Contract 66945 - September 27th 2014 thru September 26th 2015 19
Pole Creek-01 (SPC-01) Fish Screen 19
Pahsimeroi-16 (P-16) Fish Screen 20
Garden Creek-01 (SGC-01) Fish Screen 21
Carmen Creek-03 (SCC-03) Fish Screen 21
123 Tower Creek Culvert Replacement and Tower Creek-04 Fish Screen 22
Pratt Creek-01 (LPrC-02) Fish Screen 22
Tower Creek -02 (STowC-02)Fish Screen 22
Little Pahsimeroi Cross Ditch Fish Screen 23
Contract 71413 - September 27th 2015 thru September 26th 2016 23

Dowton Lane Culvert Replacement 23
Lemhi River-10 (L-10) Fish Screen 24
123 Tower Creek Culvert Replacement 25
Hawley-Eighteen Mile Creek Fish Screen 25
Hawley-Eighteen Mile Creek Diversion Structure 25
Pratt Creek-01 Fish Screen 25
Pratt Creek-02 Fish Screen 26
Patterson- Big Springs Creek -10 (PBSC-10) 26
Contract 74780 - September 27th 2016 thru January 31st 2018 26
Hawley Creek-02 and Canyon Creek-03 Fish Screens 26
Lemhi River -08A (L-08A) Fish Screen 27
Pratt-Mulkey Fish Screen 28
Pratt Creek-Hedt Fish Screen 28
Lemhi River-60 (L-60) and Lemhi River-62 (L-62) Fish Screens 28
Bayhorse Creek Bridge Replacement 29
Contract 78455 - February 1st 2018 thru January 31st 2019 29
Lemhi River-03AO (L-03AO) Fish Screen 29
Pahsimeroi River-17 Fish Screen 29
Lemhi River-61 (L-61) Fish Screen 30
Big Timber Creek-01 (LBTC-01) Fish Screen 31
Pratt Creek-02 (LPrC-02) Fish Screen 31
Eighteen Mile Creek-01 (LEMC-01) Fish Screen 32
Contract 81380 - February 1st 2019 thru January 31st 2020 33
Pratt Creek-03 (LPrC-03) Fish Screen 33
Lemhi River-10 (L-10) Fish Screen 33
Pahsimeroi -17 (P-17) Fish Screen 34
Canyon Creek-02 (LCanyC-02) Fish Screen 35
Little Sawmill Creek-01 (LLSawC-01) POD Fish Screen 35
Lemhi River-61 (L-61) Fish Screen 36
Construction/ Implementation 36
Contract 58717 - September 27th 2012 thru September 26th 2013 37
P-13 Pump Intake Fish Screen 37
Sulphur Creek-01 (PSC-01) Fish Screen 37
Sulphur Creek-02 (PSC-02) Fish Screen 37
Tower Creek-01 Fish Screen 37

Tower Creek-03 Fish Screen 37
Carmen Creek -13 (SCC-13) Fish Screen 38
Carmen Creek -13 (SCC-13) Siphon Structure 38
Carmen Creek -13 (SCC-13) Diversion Structure 38
Carmen Creek Phase III Project 38
Iron Creek -07 (SIC-07) Diversion Structure 39
Patterson Big Springs Creek -04 (PBSC-04) Access Road Culvert Replacement 39
Wimpey Creek Culvert Replacement 39
Contract 63734 - September 27th 2013 thru September 26th 2014 40
Hawley Creek-03 (LHawC-03) Fish Screen 40
Hawley Creek-03 (LHawC-03) Diversion Installation 40
Hawley Creek-03 (LHawC-03) Pipeline Crossing and Pipeline Bubbler Screen Installation 40
Sioux Lane Culvert Replacement Project 41
P-13 Pump Intake Fish Screen 42
Poison Creek -01 (SPoiC-01) Fish Screen 43
Hayden Creek-08 (LHC-08) Fish Screen 43
Tower Creek-04 (STowC-04) Fish Screen 44
Lemhi River -20 (L-20) Fish Screen 44
Carmen Creek Phase III Project 44
S-28 Fish Screen - Bridge Crane 45
Wimpey Creek Culvert Replacement - Phase II 45
Contract 66945 - September 27th 2014 thru September 26th 2015 46
Pole Creek-01 (SPC-01) Fish Screen 46
Pole Creek-01 (SPC-01) Diversion Installation 46
Pahsimeroi River-16 (P-16) Fish Screen 47
Garden Creek-01 Fish Screen 48
Carmen Creek-03 (SCC-03) Fish Screen 48
Tower Creek-04 (STowC-04) Fish Screen 49
123 Tower Creek Road Culvert Replacement Project 49
Pahsimeroi-10 (P-10) Fish Screen 49
Pratt Creek-01 Fish Screen Project 50
Little Pahsimeroi Cross-Ditch Fish Screen 50
Lyon Creek Culvert Removal Project 50
Tower Creek-02 (STowC-02) Fish Screen 50

Bohannon Creek-07 Culvert Replacement Project 50
Furey Lane Culvert Replacement Project 51
Contract 71413 - September 27th 2015 thru September 26th 2016 52
Dowton Lane Culvert Replacement 52
Lemhi River-10 (L-10) Fish Screen 53
123 Tower Creek Road Culvert Replacement Project 53
Hawley- Eighteen Mile Creek Pump Screen 54
Hawley- Eighteen Mile Creek Diversion Project 54
Pratt Mulkey Pump Fish Screen 54
Pratt Creek-01 Fish Screen 55
Pahsimeroi – Big Springs Creek-10 (PBSC-10) POD Fish Screen 55
Contract 74780 - September 27th 2016 thru January 31st 2018 56
Lemhi River-08A (L-08A) Fish Screen Replacement 56
Hawley Creek (LHawC-02) and Canyon Creek (LCanyC-03) Fish Screen Installations 56
Pratt-Mulkey Pump Fish Screen 58
Pratt-Hedt Fish Screen Project 58
Lemhi River-60 (L-60) and Lemhi River-62 (L-62) Fish Screen Replacements 58
Salmon River-23A (S-23A) Fish Screen 59
Bayhorse Creek Bridge Replacement Project 59
Carmen Creek-03 (SCC-03) Bridge Replacement Project 59
Contract 78455 - February 1st 2018 thru January 31st 2019 60
Bohannon Creek-03 (LBC-03) Vertical Turbine Pump Station 60
Pahsimeroi River-17 (P-17) 62
Lemhi River-61 (L-61) Fish Screen 62
Big Timber Creek-01 (LBTC-01) Fish Screen 63
Pratt Creek - Hedt (LPrC-Hedt) Fish Screen 64
Pratt Creek-02 (LPrC-02) Fish Screen 64
Eighteen Mile Creek-01 (LEM-01) Fish Screen 64
Meadow Creek-01 (SVCMC-01) Fish Screen 64
Lemhi River -08A (L-08A) Fish Screen – Phase II Ditch Restructuring 65
Lemhi River- 03AO (L-03AO) Fish Screen 65
Contract 81380 - February 1st 2019 thru January 31st 2020 66
Elliot Model 1870F Boom Truck 66
Pratt Creek -03 (LPrC-03) Fish Screen 66

Lemhi River-10 (L-10) Fish Screen Project 67
Lemhi River-61 (L-61) Fish Screen Improvements..... 69
Eighteen Mile Creek-Breshears (LEMC-03) Fish Screen 70
Project Coordination 127

List of Abbreviations

Abbreviation Keylist for Rivers, Creeks and Streams

L	Lemhi River
LBC	Lemhi, Bohannon Creek
LBTC	Lemhi, Big Timber Creek
LCC	Lemhi, Canyon Creek
LEMC	Lemhi, Eighteen Mile
LHC	Lemhi, Hayden Creek
LHaC	Lemhi, Hawley Creek
LPrC	Lemhi, Pratt Creek
LLSawC	Lemhi, Little Sawmill Creek
LWC	Lemhi, Wimpey Creek
P	Pahsimeroi River
PBSC	Patterson Big Springs Creek
PSC	Pahsimeroi, Sulphur Creek
S	Salmon River
SBayC	Salmon, Bayhorse Creek
SCC	Salmon, Carmen Creek
SEF	Salmon, East Fork
SGaC	Salmon, Garden Creek
SIC	Salmon, Iron Creek
SPoiC	Salmon, Poison Creek
SPC	Salmon, Pole Creek
STow	Salmon, Tower Creek
SVC	Salmon, Valley Creek
SVCEC	Salmon, Valley Creek, Elk Creek
SVCMC	Salmon, Valley Creek, Meadow Creek

Generally, name abbreviations are assigned from mainriver to each tributary, except Little Salmon, Lemhi and Pahsimeroi omit the "S" for Salmon River. Gravity diversions are numbered sequentially starting at mouth of drainage.

Abbreviation Keylist for Agencies & Programs

BLM	Department of Interior, Bureau of Land Management
BOR	Department of Interior, Bureau of Reclamation
BPA	Department of Energy, Bonneville Power Administration
CBFWA	Columbia Basin Fish & Wildlife Authority
COE	US Army Corp of Engineers
CRFDP	Columbia River Fisheries Development Program
CSWCD	Custer Soil & Water Conservation District
ESA	Endangered Species Act
FSOC	CBFWA Fish Screen Oversight Committee
IDFG	Idaho Department of Fish & Game
IDOT	Idaho Department of Transportation
IDWR	Idaho Department of Water Resources

ISHPO	Idaho State Historical Preservation Office
LSWCD	Lemhi Soil and Water Conservation District
NEPA	National Environmental Policy Act
NMFS/NOAA	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
OSC	Office of Species Conservation
QCI	Quadrant Consulting Inc.
SNRA	Sawtooth National Recreation Area
TNC	The Nature Conservancy
TU	Trout Unlimited
USBWP	Upper Salmon Basin Watershed Project
USFWS	Department of Interior, US Fish & Wildlife Service

Introduction

This Idaho Department of Fish and Game (IDFG) BPA capital contract 2007-399-00 *Upper Salmon Screen Tributary Passage* is dedicated to the protection of anadromous fish from loss in water diversions, improvement of fish passage at irrigation diversions for juvenile and adult anadromous fish, and improving instream flow conditions where possible. It is funded for designing and installing capital fish passage projects in Idaho and is funded exclusively for capital expenditures, final design work, and personnel salaries and benefits for a Staff Engineer. Additionally, Public Works projects are administered, program oversight is provided, and capital contract project implementation management is performed with funding in this contract.

This contract is coordinated and completely supported by the IDFG BPA Project 1994-015-00 *Idaho Fish Screening Improvements Project* which is used for project planning, surveys, and preliminary design work. The funding provides support services such as office and shop operations, equipment rentals, and biological gear used in stream investigation and project monitoring work. Temporary personnel perform stream investigations to determine fish species presence, densities, distribution, as well as an inventory of diversion and fish passage issues. Their work ultimately leads to the identification and prioritization of future fisheries restoration projects. Three permanent staff members in the Anadromous Fish Screen Program are partially funded by this contract. Permanent personnel typically collect and provide technical data, hold stakeholder meetings, coordinate with other agencies, and prioritize projects. Prior to construction, program staff secures any required special use permits, submits applications for water rights, and works with the water users to secure permanent easements to screen site locations.

Since the 1800's, anadromous fish runs in the Columbia River have declined drastically. Historically, IDFG estimates that the Salmon River basin produced 39% of the spring Chinook salmon and 45% of the summer Chinook salmon in the Columbia River Basin (Idaho Department of Fish & Game, 1985). Steelhead estimates for the Salmon River basin are not available but production was substantial. Due to the low return of spring Chinook to Idaho in 1974, all but treaty harvest was curtailed. Since then, harvest has been limited to a tribal fishery and, in recent years, limited harvest of surplus hatchery stocks.

Irrigation diversions date back to the 1860's in the Lemhi River and Salmon River basins of the Snake River drainage and have impacted anadromous fish in a number of ways. These impacts included loss of habitat, entrainment and loss of fry and pre-smolts prior to leaving the basin, and of smolts on their downstream migration to the ocean. Additionally, returning adults have been blocked by irrigation diversion wing dams and dewatered reaches of the rivers and streams. Riparian corridors have been degraded by various management actions.

In 1938, the U.S. Congress passed the Mitchell Act in an attempt to partially mitigate for losses resulting from hydroelectric projects, logging, mining, and agricultural developments. The Act provided a mechanism for conserving fishery resources of the Columbia Basin and created the Columbia River Fisheries Development Program (CRFDP). The CRFDP program was extended to include the upper basin, above McNary Dam, in 1956. Between 1958 and 1966, IDFG constructed more than 250 screens on the main stem Salmon River and tributaries. Today about 281 gravity diversion fish screens are in operation.

This IDFG Anadromous Fish Screen Program started in 1957, and for the first 34 years, until 1992, the Program was funded exclusively with NMFS administered Mitchell Act Funding. In 1991, Northwest Power and Conservation Council (NPCC) directed the Columbia Basin Fish and Wildlife Authority (CBFWA) to coordinate the Idaho/Oregon/Washington Fish Screen Programs through the establishment of the Fish Screen Oversight Committee (FSOC) and BPA began providing funding for new fish screens in the Upper Salmon River Basin.

In 1992, the Program started replacing all of its fish screens with new designs that met new screen criteria established by NMFS and FSOC. In 1993, BPA and Mitchell Act funded a new 8500 square foot shop with new tools and equipment to meet the goal of replacing all screens with new criteria screens. Most of the personnel, operation and maintenance, and capital funding was paid with Mitchell Act funding. As costs increased into the late 1990's, more Mitchell Act funding was shifted to personnel and operating costs, while the capital costs of new screens and operating support was funded by BPA.

Funding was first provided to IDFG by BPA in 1994 (IDFG BPA Project 1994-015-00 *Idaho Fish Screening Improvements Project*) for anadromous fisheries projects falling outside the scope of the Mitchell Act. These funds were used to eliminate or consolidate irrigation diversions, improve fish passage, conserve water and provide proper fish screening of water withdrawals. Fish screens are constructed and maintained on streams that are migration routes and rearing areas for the majority of the anadromous fish, both hatchery and wild/natural Snake River spring/summer Chinook salmon and Snake River summer steelhead produced in the Upper Salmon River Basin. The projects completed during this contract period are a continuation of this ongoing work. The capital improvement projects completed and discussed within this report are located in waters applicable to the intent of the Federal Columbia River Power System (FCRPS) Biological Opinion.

In 2007, BPA created the IDFG sponsored Upper Salmon Screen Tributary Passage (#2007-399-00) Project which funds most new screen projects while the operation and maintenance of the existing screens is funded from the NMFS Mitchell Act. Over the last five years, BPA has funded approximately 80% of the capital costs, 30% of the operating cost, and 45% of the personnel costs for the Anadromous Fish Screen Program.

Since 1992, a partnership between NMFS, BPA, and IDFG has built a successful Fish Screening Program with commitments and easements with landowners. This success is based on years of building trusted relationships with irrigators on private property. Building relationships and landowner cooperation has been paramount to the Program's success with close to 100% of the Chinook salmon spawning habitat occurring on private property in the Lemhi, Pahsimeroi and North Fork Salmon Rivers. Due to extensive flood irrigation in the Upper Salmon River Basin, the Screen Program plays a vital role in the recovery of four ESA-listed salmonids including Chinook salmon, steelhead, sockeye salmon, and bull trout.

A tributary-wide approach is incorporated in order to maximize benefits to the habitat, tributary restoration, stream flow reconnection, fish passage, and fish screening work in cooperation with all stakeholders. Consolidation of irrigation diversions reduces the number of times a fish is entrained into a canal during its migration to the ocean as well as decreases the overall cost of screening. Diversion eliminations reduce ditch entrainment potential and eliminate fish passage

issues at the typical push-up gravel structures. Conversions from gravity flood irrigation systems to sprinkler systems can reduce irrigation water consumption by up to 70% percent. Water conservation and riparian improvements decrease water temperatures, improve habitat for rearing, and improve available in-stream flow conditions.

Currently, the Anadromous Fish Screen Program operates and maintains an inventory of 281 fish screen; Lemhi River Subbasin (109), Pahsimeroi River Subbasin (20), mainstem Salmon River (29), North Fork Salmon River Watershed (15), East Fork Salmon River Subbasin (22), and in over 40 smaller tributaries (86) throughout the Upper Salmon River Basin. This accounts for approximately 350 miles of protected fish passage along the mainstem river corridors, and more than a 130 miles in 40 smaller tributaries. This provides safe and timely fish passage for 7 distinct populations of the Upper Salmon Major Population Group of threatened Snake River spring/summer Chinook salmon, 6 populations of threatened Snake River Basin steelhead, and one Major Population Group of endangered Snake River sockeye salmon. These screens provide additional protection for ESA-listed bull trout, and all other native salmonids. These 281 fish screens account for approximately 3,500 cfs of diverted water that is screened, which is associated with approximately 2,500 adjudicated individual water rights. Additionally, the Screen Program uses and helps maintain over 75 miles of access roads that gain access to these sites.

Since the early 1990's, the Anadromous Fish Screen Program has supervised a large temporary workforce consisting of one Screen Tender Supervisor and eleven Screen Tenders to clean and maintain the screen inventory on a daily basis during the 8 month irrigation season. Our Screen Tenders are a crucial and imperative component to meet the Program's objectives and the only assurance we have that our screens will meet fish screen criteria and provide safe fish passage to assure no contact with the screen material, a clear bypass, and no delay in the forebays of the screen structure. The Screen Tender salaries, benefits, and operating costs were always funded by NOAA Mitchell Act until March 2015, and since that time BPA has funded the salaries and benefits for the Screen Tenders in IDFG Contract 2007-399-00 Expense Upper Salmon Screen Maintenance.

Project Location

All portions of the project are located in the Salmon River basin, above the confluence of the Middle Fork Salmon River, Idaho. Projects have been concentrated in the prioritized tributaries, typically larger tributaries to the Salmon River, and larger tributaries like the Lemhi River. Most of the mainstem river corridors have new screens and good fish passage. The smaller tributaries are typically rearing areas for juveniles and offer the greatest challenge to fisheries recovery and fish passage improvement plans. The project office is located in the Idaho Department of Fish & Game Regional Office at 99 Hwy 93 N, Salmon, Idaho 83467.

Planning/Design

Watershed Coordination – Work Element 191

The Screen Program is currently working on installing fish screens, reconnecting, and providing fish passage for anadromous and resident species in over 20 prioritized watersheds in five

subbasins in the Upper Salmon River Basin. Many of these projects are multi-agency efforts that are focused on a holistic tributary approach to fisheries restoration. This effort involves extensive coordination with staff from multiple agencies including; the Upper Salmon Basin Watershed Project (USBWP), Custer Soil & Water Conservation District (CSWCD), Bureau of Reclamation (BOR), and National Resources Conservation Service (NRCS). In the Bonneville Power Administration's (BPA) Geographic Review and 5-Year Solicitation Process (2013-2018), the Screen Program identified over 80 new projects that would potentially be implemented with many collaborators and partners.

Final Designs for Construction – Work Element 175

In this performance period, final designs for proposed fish screen and passage projects were completed at 54 sites by the Staff Engineer Jared Bragg, staff input, and contracted consultant, Quadrant Consulting, Inc. (QCI) Boise, Idaho. These included 16 designs for potential fish screen and passage projects on tributaries to the Salmon River including Tower Creek (5 - STowC-01, STowC-02, STowC-03, Sioux Lane Culvert Replacement, 1,2,3 Tower Creek Culvert Replacement), Carmen Creek (6 - Carmen Creek-13 fish screen, diversion, and siphon, Carmen Creek Phase III – Sprinkler Project, Carmen Creek-03 (SCC-03) fish screen, Carmen Creek-03 Bridge Replacement Project, Iron Creek-07 (SIC-07 Diversion), Poison Creek-01 (1-SPoiC-01), Pole Creek-01 (SPC-01) fish screen and diversion, Garden Creek-01 (SGarC-01) fish screen, Salmon River-23A (S-23A) fish screen. An additional 26 designs were completed for sites in the Lemhi River subbasin, including Big Timber Creek-01 LBTC-01) fish screen, Bohannon Creek-07 (LBC-07) Culvert Replacement, Canyon Creek-03, and -04 (3- LCanyC-03 and -04), Eighteen Mile Creek-01 (LEM-01), Eighteen Mile Creek–Breshears (LEM-03), Hayden Creek (LHC-08), Hawley Creek-02 (LHawC-02) fish screen and diversion, Hawley Creek-03 (LHawC-03) fish screen, diversion, and pipe crossing, Hawley-Eighteen Mile Creek (LEMC-02) fish screen and diversion, L-03AO, L-08A, L-10, L-20, L-58B, L-58C, L-60, L-61, L-62, Little Sawmill Creek-01 (LSawC-01), Mulkey/Pratt Pump Screen(LSC-02), Pratt Creek-01 (LPrC-01) fish screen, Pratt-Hedt Fish screen, Pratt Creek-02 (LPrC-02) fish screen, Pratt Creek-03 (L-PRC-03) fish screen and diversion. Also included in the Lemhi River subbasin was one culvert replacement design with a bridge for the road crossings on the Old Lemhi Road at Wimpey Creek. Ten designs were completed for seven fish screens and three culvert replacement in the Pahsimeroi River subbasin, including, Sulphur Creek-01, Sulphur Creek-02, P-10, P-13, P-16, Mayrick Creek pump screen, and PBSC-04 culvert Replacement Furey Lane Culvert Replacement project, Dowton Lane Culvert Replacement project, Pahsimeroi-17 (P-17) fish screen, and Patterson Big Springs Creek -10 (PBSC-10) fish screen. Funding for the design work was cooperatively split between Mitchell Act funding, and BPA Projects: #1994-015-00 and #2007-399-00, which fund the capital and additional operating expenses for the Anadromous Fish Screen Program. Mitchell Act funds were used for staff time, support, and operating costs associated with completion of this design work.

Contract 58717 - September 27th 2012 thru September 26th 2013

Sulphur Creek -01 (PSC-01) Fish Screen

- **Milestone B**

Staff Biologist Paddy Murphy had several planning meetings with the IDFG Regional Habitat Biologist to coordinate on on-going projects on Sulphur Creek in the Pahsimeroi River subbasin. Specific projects of the ranch are the removal of an old diversion barrier, installation of a new diversion to compliment a new fish screen, a new headgate structure, and removal of a culvert barrier, There is high potential in this reach of the Sulphur Creek to improve instream habitat and fish passage.

Program Staff had multiple meetings with The Nature Conservancy (TNC), Bureau of Reclamation (BOR), Natural Resource Conservation Service (NRCS), and Custer Soil and Water Conservation District to discuss continuing project potential and conservation easements in the Pahsimeroi River Subbasin. A conservation easement was finalized in March by the TNC for two landowners adjoining Sulphur Creek. This easement will focus on reconnecting Sulphur Creek as well as installing fish screens, completing water conveyance projects with pipelines and pivot reconfigurations, transferring points of diversion, and implementing habitat improvements. A water rights transfer has been filed to change the current Pahsimeroi-13 (P-13) diversion location downstream on the Pahsimeroi River which will eliminate the interception of Sulphur Creek flows. A new proposed POD for P-13 is in the process of a water transfer. The Sulphur Creek project and transferring the POD on P-13 will add additional in-stream flows which would enhance fish passage and increase habitat in a substantial reach of the Pahsimeroi River.

Staff Engineer Jared Bragg performed supplemental topographic surveys on Sulphur Creek- 01 (PSC-01) as the topographic information provided by the Bureau of Reclamation was insufficient for the screen design. The additional information allowed staff to complete the final design and utilize the established benchmarks during construction.

Sulphur Creek -02 (PSC-02) Fish Screen

- **Milestone C**

A preliminary topographic survey was completed but the final design was delayed until the next Contract 63734.

Tower Creek-01 Fish Screen

- **Milestone D**

Staff Engineer Jared Bragg produced a preliminary and final design for a new fish screen to be installed on the Tower Creek -01 (STowC-01) diversion, which is the second diversion upstream of the confluence of Tower Creek and the Salmon River. In the 2015 contract, the project name was changed to Tower Creek-02 Fish Screen to better reflect the naming convention for the points of diversion in Tower Creek.

Tower Creek-03 (STowC-03) Fish Screen

- **Milestone E**

Staff Engineer Jared Bragg produced a preliminary and final design for a new fish screen to be installed on the Tower Creek -03 (STowC-03) diversion, which is the third diversion upstream of

the confluence of Tower Creek and the Salmon River. This diversion was previously unscreened and has a total water right of 2.0 cfs. The design was fairly straightforward, utilizing a steel modular rotary drum screen, powered with a paddlewheel design. The screen was constructed with a bypass drop box in order to alleviate problems with the perched ditch and a potentially steep bypass. Using a drop box reduces the required flow in the bypass pipe by allowing a flatter gradient for the pipe. In this manner, there is less chance the operation of the screen would contribute to potential de-watering of the stream. In the 2015 contract, the project name was changed to Tower Creek-03 Fish Screen, from Tower Creek-02 to better reflect the naming convention for the points of diversion in Tower Creek.

Lemhi River-20 (L-20) Fish Screen

- **Milestone F**

Staff Engineer Jared Bragg produced a final design for a screen replacement for the Lemhi River -20 diversion (L-20). This current fish screen is an older concrete 45° rotary drum (double bay with 4' dia., 10' drums) powered by electric motors and was constructed around 1993. The existing screen had several problems that warranted the need to replace the screen, such as sedimentation issues, power supply costs, screening efficiency and increased maintenance costs. Preliminary construction plans were completed for the replacement of the current screen with a concrete 14° three bay rotary drum screen. From the topographic survey, it was determined that one of the major factors contributing to the sedimentation issues was due to the lack of head between the point of diversion and the first point of use (approximately 1.23 feet). In order to meet drum submergence recommendations, the existing screen was countersunk in the ditch. This allowed for submergence on the drums, but produced low water velocities and provided a depression for the sediments to settle in. To aid in the sedimentation issue, the new design implements a relocation of the point of diversion (POD) upstream in the Lemhi River which allows for adequate water velocities and drum submergence. This POD relocation will also allow for the drums rotation to be powered by paddlewheels and therefore eliminating the power cost to operate the electric motors. It was determined by the Lemhi River Water Master that the L-20 water users had a high water right that allowed the water users to divert up to 25.88 cfs, though during the late summer months the average water use, measured at the screen, varies from 8-12 cfs. The current double bay fish screen facilitates the high water right, but the new design uses a three bay screen, which will allow greater flow variation while still meeting drum submergence criteria. This fish screen was not replaced in the performance period.

Lemhi River-58B (L-58B) Fish Screen

- **Milestone G**

Staff Engineer Jared Bragg produced a new design for the Lemhi River-58B (L-58B) diversion which is currently screened by a concrete 45° rotary drum screen (double bay with 2' dia., 10' drums, ¼" galvanized wire mesh drums) and was constructed around 1994. The existing screen had several problems that warranted the need to replace the screen, such as sedimentation issues, long bypass length, screening efficiency and increased maintenance costs. The older model 45° screens have sweeping velocities that do not meet current criteria and this minimal velocity has a tendency for sediment build up in front of the screens. This screen was refurbished in 2010 with perforated plate, new side and bottom seals, chains, sprockets, and paint and primer. Preliminary

construction plans were completed for the replacement of the current screen with a 22.5° single bay concrete rotary drum screen (12' long 24" dia.). .

Lemhi River-58C (L-58C) Fish Screen

- **Milestone H**

Staff Engineer Jared Bragg produced a new design for the Lemhi River-58C (L-58C) diversion which is currently screened by a concrete 45° rotary drum screen (double bay with 2' dia., 10' drums, ¼" galvanized wire mesh drums) and was constructed around 1993. The existing screen had several problems that warranted the need to replace the screen, such as sedimentation issues, long bypass length (400'), screening efficiency and increased maintenance costs. Preliminary construction plans were completed for the replacement of the current screen with a 22° single bay concrete rotary drum screen (12' long 30" dia.). The L58-C point of diversion is located on a side channel of the Lemhi River. Because the ditch pulls away from the river and fish screen is a considerable distance away from the main river channel, the length of the bypass pipe conveyance ditch is longer than recommended. In order to reduce the length of the bypass pipe and conveyance ditch the staff looked at moving the POD upstream placing on the main river. This would also allow the bypass pipe to discharge into the river side channel and greatly reduce the total length (total length=80'). This fish screen was not replaced in the performance period.

Lemhi River-60 (L-60) Fish Screen

- **Milestone I**

Staff Engineer Jared Bragg produced a new design for the Lemhi River-60 (L-60) diversion which is currently screened by a concrete 45° rotary drum screen (single bay with 2' dia., 12' drums, ¼" galvanized wire mesh drums) and was constructed around 1994. The existing screen had several problems that warranted the need to replace the screen, such as sedimentation issues, screening efficiency and increased maintenance costs. The older model 45° screens have sweeping velocities that do not meet current criteria, and this minimal velocity has a tendency for sediment build up in front of the screens. Preliminary construction plans were completed for the replacement of the current screen with a 22.5° single bay concrete rotary drum screen (12' long 24" dia.).

Hayden Creek-08 (LHC-08) Fish Screen

- Milestone J

Staff Engineer Jared Bragg designed a screen replacement for the Hayden Creek-08 (LHC-08) diversion. This diversion is the 8th diversion upstream of the confluence of Hayden Creek and the Lemhi River. The original screen is a concrete single bay 45° rotary drum style screen that was constructed around 1993. Preliminary construction plans were completed to replace the screen with a single bay 14° rotary drum screen using a 30" diameter 10' long drum. One issue with the original screen was it's location was placed behind a ditch bend that created inconsistent velocities near the screen interface. The new design relocates the screen, realigns the ditch, and details the installation of a sediment pond upstream of the screen structure. Also, to alleviate the high ditch

gradient, a compressed sharp crested weir will be installed to measure water use and decrease the total head drop between the head works structure and the irrigation pipe entrance.

This weir installation will allow a more manageable ditch gradient upstream of the fish screen. Final designs were competed and a formal public works bid package (IDFG 2014-126) was completed for the installation of a fish screen for the Hayden Creek-08 (LHC-08) diversion. Plans included structure design, quantity take offs, erosion and sediment control structures and construction details. Because of the estimated construction cost, the project was placed in the formal bidding process and advertised in local papers for construction.

Contract 63734 - September 27th 2013 thru September 26th 2014

Hawley Creek-03 (LHawC-03) Fish Screen

- **Milestone H**

Program Coordinator Paddy Murphy and Staff Engineer Jared Bragg worked for years planning with the USBWP and NRCS for project development and coordination to improve flows and fish passage in Hawley Creek, a tributary to the upper Lemhi River. This cooperative project the Hawley Creek-03 (LHawC-03) Fish Screen and Diversion Project was planned, designed, and installed in this performance period. The Screen Program portion of the project involved moving a point of diversion upstream to improve fish passage, installing a new rotary drum fish screen, a new headgate control structure, turbulent fountain screen for the intake of the pipeline, and installing a pipeline crossing. The NRCS designed the pipeline and irrigation infrastructure, and USBWP secured funding and contracting for the installation of the pipeline and the new pivots. This project involved significant coordination and cooperation with the Bureau of Land Management (BLM) to establish needed Right-of-Ways for the fish screen and the proposed pipeline. BLM conducted and secured the NEPA and ESA consultations. This was a pivotal project in efforts to reconnect Hawley Creek and improve fish passage for both anadromous and resident salmonids.

In this performance period, Staff Engineer Jared Bragg worked in conjunction with the USBWP, NRCS, and BLM to design the following; relocation of the diversion point, rock cross vain check structure, head gate structure, pipeline design, concrete fish screen structure, a bridge structure for pipe crossing and a removal plan for the existing diversion check structure. The Hawley Creek (LHawC-03) project involved the relocation of the point of diversion upstream, installation of a fish screen and secondary debris screening and is part of the Screen Program's BPA Capital project list. Staff completed a preliminary design. During a site visit and test holes exploration it was determined bedrock would be encountered above construction limits. To verify bedrock elevation and avoid potentially costly change orders during construction, staff excavated four test pits within key structure locations and verified bedrock elevations. From these test pits the bedrock elevations were surveyed and compared to the final design elevations, which showed a large amount of rock would be required to be removed to complete construction as designed. Because bedrock was encountered, the design was reevaluated and changed to minimize the amount of bedrock removed and also to minimize the total site disturbance. Also rock removal specifications were compiled and written to meet recommendations from NMFS. Final designs were competed and a formal

public works bid package was completed for the installation of the fish passable diversion, head works structure, fish screen, and pipeline crossing for the Hawley Creek-03 (LHawC-03) diversion Plans included structure design, dewatering plans, in stream details, quantity take offs, erosion and sediment control structures and construction details. Because of the estimated construction cost, the project was placed in the formal bidding process and advertised in local papers for construction

Bohannon Creek-07 (LBC-07) Access Road Culvert Replacement

- **Milestone I**

This project was not a BPA-sponsored project for the Anadromous Fish Screen Program, but was an IDFG sponsored project in BPA Project 2010-072-00, Contract 67754. However, extensive technical assistance in the form of surveying, preliminary designs, final designs, and construction oversight was provided by Screen Program staff funded in both BPA Projects – 1994-015-00 and 2007-399-00, and Mitchell Act funding.

Sioux Lane Culvert Replacement Project

- **Milestone J**

Tower Creek is a tributary to the Salmon River near Salmon, Idaho. In the late summer 2011, staff met with Lemhi County Road and Bridge Department to evaluate and create a priority list for road culverts that were fish passage issues and needing replacement. Staff inspected culverts on the list for fish passage concerns and prioritized the list based on fish passage needs. One of the listed priority bridges from a fish passage perspective was the Tower Creek/Sioux Lane culvert. The existing culvert was undersized, partially collapsed and had a perched outlet. The program engineer looked at several design alternatives including an open bottom low profile arched culvert and a full span bridge. The engineer determined a full span prefabricated steel bridge would be the best design based upon potential high flows, ease of installation, stream simulation design, and initial cost versus long term operation and maintenance. The bridge design incorporates a perched modular abutment that acts as a concrete form. Concrete is poured into the forms, which support full span steel stringers and a corrugated steel deck system that can be capped with gravel or paved as required. The final design was completed and permitted. Final plans included structure design, dewatering plans, traffic control plans, stream and roadway regrading plans, erosion and sediment control structures and detail for construction.

Poison Creek-01 (SPoiC-01) Fish Screen

- **Milestone K**

Poison Creek is a tributary to the Salmon River upstream of Salmon, Idaho. The Poison Creek project was a nexus between Lemhi Soil and Water Conservation (LSWCD), USBWP, NRCS, and IDFG. The IDFG portion of the project was to design and install a fish screen with the capability to screen fish and most debris because behind the screen the irrigation water enters a closed system which is used to gravity feed irrigation center pivots and hand lines. Staff discussed several options to effectively and efficiently screen the irrigation water and decided to design and install a steel modular rotary drum fish screen. Placing fish screens at the head of a closed irrigation system can be problematic due to differential flow, overflow due to isolation valves at the end of the line,

stream high water, debris screening, etc. IDFG worked with NRCS to design and incorporate a bubbler system behind the fish screen, eliminating debris and most sediment from entering the closed system. The overall design of the screen was reasonably simple allowing staff to design, fabricate, and install a steel modular screen and head works structure that will meet the requirements established with the irrigator and still meet or exceed the NMFS Anadromous Salmonid Passage Facility Design criteria. A steel modular fish screen was designed for the Poison Creek-01 (SPoiC-01) diversion with a design flow of 2.50 cfs. The installation was planned for spring 2014, prior to the start of irrigation season. Prior to installation, a copy of the design plans for the pipeline and bubbler structure was obtained from NRCS. After reviewing and comparing the two sets of plans, it became evident adjustments and an additional structure would need to be fabricated to ensure reliable operation. The Staff Engineer Jared Bragg revised the design plans and a master survey set was distributed to NRCS for consistency during construction. This important project substantially increases fish passage in Poison Creek by consolidating and screening diversions, and increasing instream flows by increasing irrigation efficiency.

Sulphur Creek-02 (PSC-02) Fish Screen

- **Milestone L**

Staff Engineer Jared Bragg performed supplemental topographic surveys on Sulphur Creek- 02 (PSC-02) as the topographic information provided by the Quadrant Consulting was insufficient for the screen design. The additional information allowed staff to complete a preliminary, conceptual design. After surveying if was discovered that the point of diversion for PSC-02 was actually just outside of private property on lands administered by the Bureau of Land Management.

Tower Creek-04 (STowC-04) Fish Screen

- **Milestone M**

Due to cost overruns in this contract this project was delayed until Contract 66945 and was to be combined with the installation of the 123 Tower Creek Culvert Replacement Project.

Contract 66945 - September 27th 2014 thru September 26th 2015

Pole Creek-01 (SPC-01) Fish Screen

- **Milestone D**

Over multiple years, Program Coordinator Paddy Murphy, Staff Engineer Jared Bragg, and Easement Specialist Larry Weeks had meetings with the SNRA, BOR, NRCS, and CSWCD to continuing finalizing project development for the Pole Creek Reconnection Project. Pole Creek is the one of the largest tributaries in the headwaters of the mainstem Upper Salmon River. This effort involves a whole suite of projects to improve habitat and fish passage in lower Pole Creek including: supplementing surface diversion flows with wells, changing pivot configuration to avoid crossing Pole Creek, fencing the riparian corridor, removing culvert barriers, and installing a new diversion and fish screen. This project has multiple phases and partners, but the project concept will assure that at least 12 cfs will remain instream in Pole Creek during critical low

summer flows when Chinook salmon are spawning. A new fish screen, diversion, and headgate will be installed by the Screen Program at the Pole Creek-01 diversion in July 2015.

Staff Engineer Jared Bragg and Staff Biologist Windy Davis attended a Pole Creek planning meeting in Ketchum, ID to coordinate final construction plans for the Pole Creek-01 diversion replacement and fish screen with the landowners, SNRA, and the BOR.

Final designs were competed and a formal public works bid package (IDFG 2015-119) was completed for the installation of a fish passable diversion, head works structure, fish screen, and pipeline crossing for the Pole Creek-01 (SPC-01) diversion Plans included structure design, dewatering plans, in stream details, quantity take offs, erosion and sediment control structures and construction details. Because of the estimated construction cost, the project was placed in the formal bidding process and advertised in local papers for construction. The starting date for construction was June 6th, 2015.

Pahsimeroi-16 (P-16) Fish Screen

- **Milestone E**

Staff Biologist Paddy Murphy and Staff Engineer Jared Bragg met with TNC, Trout Unlimited (TU), BOR, NRCS, and CSWCD to discuss project prioritization and potential for spending Bonneville Power Administration (BPA) Accord funds in the Pahsimeroi River subbasin. Projects discussed were centered in the Hooper Lane, Furey Lane, and Big Creek regions of the subbasin. A pivotal project is the on-going planning for improving flows at the P-16 diversion by improving water conveyance. The plan is to eliminate the Hamilton Ditch out of Big Creek, and install a pipeline on the P-16 ditch. This would involve a new diversion and fish screen on the P-16 diversion. These potential projects are critical to improving flow and habitat in all of these river reaches. There are multiple opportunities on individual ranches for improving fish habitat and protecting fish including, fish screens, control structures, fish passable diversion structures, irrigation and conveyance improvements and better riparian management.

Construction Foreman Jim Hardy, Staff Engineer Jared Bragg, and Easement Specialist Larry Weeks traveled to the proposed fish screen sites that are to be constructed on the Pahsimeroi River at the P-13 and P-16 diversions. They reviewed possible access routes, screen locations, and bypass routes to be used for designing these projects. The P-16 fish screen, bypass, and access route are located on property administered by the Bureau of Land Management, and need to be recorded in Federal right-of-way applications. Screen Program staff had meetings to work on obtaining a access easement with Tom Page, owner of Big Creek LLC. Screen Program staff met with John Brown, Ranch Manager, and marked the most preferred route for the landowners. IDFG reviewed maps and drawing for the proposed "Road Access Easement" with the landowners. The 1.5 mile road across Big Creek Ranch, will be the access road to the new Pahsinmeroi-16 (P-16) fish screen. The access road was surveyed by Quadrant Consulting, INC, and the survey was incorporated into the easement. A legal survey was completed, for the road description, at the request of Michael Page.

Final designs were competed and a formal public works bid package (IDFG 2015-122) was completed for the installation of a new rotary drum fish screen for the Pahsimeroi River -16 (P-16) diversion. Plans included structure design, dewatering plans, instream work details, quantity take

offs, erosion and sediment control structures and construction details. Because of the estimated construction cost, the project was placed in the formal bidding process and advertised in local papers for construction. The starting date for construction bid was August 11th, 2015.

Garden Creek-01 (SGC-01) Fish Screen

- **Milestone F**

Screen Program staff met with Brian Hamilton, Bureau of Reclamation (BOR), Karma Bragg, Custer Soil and Water Conservation District (CSWCD), and the Challis City Manager, to review the plans for the new point of diversion and fish screen, on Garden Creek. This diversion is part of the municipal water supply for the city of Challis. IDFG met with Karma Bragg, CSWCD, to discuss easements and what was needed to proceed with the Garden Creek project. It was necessary for the point of diversion to be moved upstream to facilitate the fish screen, so the Bureau of Reclamation is designing a new head-works and pipeline. CSWCD is contracting the head-works, pipeline, and the demolition of the old head-works. IDFG is designing and constructing the fish screen.

Final designs were competed and a formal public works bid package (IDFG 2014-141) was completed for the installation of a fish passable diversion, and new rotary drum fish screen for the Garden Creek-01 (SGarC-01) diversion. Plans included structure design, dewatering plans, instream work details, quantity take offs, erosion and sediment control structures and construction details. The semi-formal bidding process was utilizied as the estimated construction cost was less than required for formal process. The bid opening date was August 29th, 2014.

Carmen Creek-03 (SCC-03) Fish Screen

- **Milestone G**

IDFG met with Carmen Creek-03 (SCC-03) water users on several occasions in a continuing effort to coordinate the BOR, NRCS, USBWP, and IDWR efforts to eliminate a portion of the water use from the SCC-03 diversion in Carmen Creek. The goal of this project is to transfer a portion of SCC-03 water to the McNutt ditch (S-05/06/07) shepparding the SCC-03 water past three lower diversions that traditionally dewatered Carmen Creek during low flows. Proposed water conservation projects were trimmed down because of the total cost involved, hoping to improve the cost to water savings ratio. IDFG also met with these agencies to discuss funding that each agency would provide to make this project possible.

Easement Specialist Larry Weeks met with Jay Smith, a Carmen Creek-03 (SCC-03) irrigator, on several occasions to discuss the lower Carmen Creek Water Conservation Project and the Salmon River -05/06/07 (S-05/06/07) Obermeyer weir and its operation. Jay irrigates for the Bill and Derrold Slavin and has been instrumental in the SCC-03 Water Conservation Project moving forward. Jay also is a landowner and irrigates from the S-05/06/07 diversion and is the person who now does most of the maintenance on both ditches. He will be the person who will maintain the Obermeyer weir once the upgrades are complete.

Final designs were competed and a formal public works bid package (IDFG 2015-113) was completed for the installation of a new fish screen for the Carmen Creek-03 (SCC-03) diversion. Plans included structure design, dewatering plans erosion and sediment control structures and

construction details. Because of the estimated construction cost, the project was placed in the semi-formal bidding process and advertised in local papers for construction. The starting date for construction was August 10th, 2015.

123 Tower Creek Culvert Replacement and Tower Creek-04 Fish Screen

- **Milestone H**

Easement Specialist Larry Weeks met with Cindy Yenter, Idaho Department of Water Resources (IDWR), and traveled to the proposed Tower Creek-04 (SToC-04) bridge and fish screen site on 123 Tower Creek Road to get the opinion of IDWR if IDFG should proceed with construction of the bridge. The upstream, absentee landowner is unwilling to allow the water users to move their point of diversion back to where it historically had been; upstream of the existing culvert crossing, where it was prior to the land being developed for a subdivision and the POD was moved down steam to allow the installation of a culvert. IDWR's opinion was that the water users would have the right to move their POD, but it would probably have to be decided in court. The IDFG and the water users opted to leave this site rest for the near future.

Easement Specialist Larry Weeks met with Berry Klinger, Sharon Hennig, Arlen Obrien, and Jeff DiLuccia, to inform them that the proposed bridge and fish screen for the SToC-04 diversion would be on hold until the landowner issue could be resolved.

This project was delayed because of disagreements by landowners and irrigators and was delayed until the next Contract #71413.

Pratt Creek-01 (LPrC-02) Fish Screen

- **Milestone I**

Program Coordinator Paddy Murphy and Staff Engineer Jared Bragg worked with The Nature Conservancy (TNC) to coordinate planning and implement designs for multiple projects to improve flows and fish passage in both Wimpey Creek and Pratt Creek through a conservation easement, property acquisition, water conveyance projects, and fish screen and passage projects. This is a large scale project that involves three separate ranch parcels. A pivotal aspect of this project is installing 3 new fish screens and diversions in Pratt Creek.

Program Coordinator Paddy Murphy, Staff Engineer Jared Bragg and Construction Supervisor Jim Hardy worked with the TNC, BOR, and BLM investigating the possibilities of installing a fish screen, water conservation measures, and stream diversion improvements for the Pratt Creek-01 (LPrC-01) and Pratt Creek-03 (LPrC-03) diversions. Possible screening options were discussed and a basic design concept was initiated for developing a biological assessment and applying for rights of way permit on BLM administered property for future fish screening projects.

Tower Creek -02 (STowC-02)Fish Screen

- **Milestone J**

In July, the construction crew fabricated a new modular point of diversion fish screen. The crew was able to install this new screen in the Tower Creek-02 diversion in September.

The construction crew fabricated and installed a new modular fish screen and headgate structure at the Tower Creek -02 (STowC-02) diversion in September. This screen was installed prior to a small pipeline and water conveyance project that was finished after the screen was installed. This new modular point of diversion fish screen utilizes a closed rotary drum design before entering the pipeline system. The landowner-water user was very excited to see this project completed after being in the planning and permitting phase for many years.

Little Pahsimeroi Cross Ditch Fish Screen

- **Milestone K**

This project was later renamed as the source of water was officially determined by the Idaho Department of Water Resources to be the headwaters of Patterson-Big Springs Creek (PBSC-10) and was installed in Contract # 71413.

Contract 71413 - September 27th 2015 thru September 26th 2016

Dowton Lane Culvert Replacement

- **Milestone E**

The Dowton Lane Culvert Replacement project is a joint project with Lemhi County Road and Bridge and Custer County Road and Bridge. The project involved the design and construction of a prefabricated steel bridge to replace two undersized culverts at the Dowton Lane and Pahsimeroi River intersection.

Staff Engineer Jared Bragg met with Lemhi County Road & Bridge Department to discuss construction, implementation, and timelines of potential culvert replacement projects at the Furey Lane and Dowton Lane crossings of the Pahsimeroi River. These potential projects will replace the current road culverts with a fish passable bridge design. This culvert replacement project benefits both Lemhi County and Custer County and improves the fisheries resource.

The Dowton Lane Culvert Replacement project is located on the Pahsimeroi River upstream (approximately 6.5 miles) from its confluence with the Salmon River. The project involves removing undersized culverts on the Pahsimeroi River that was a partial upstream passage barrier to ESA listed juvenile Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*Oncorhynchus mykiss*) and replace with a 28’ wide by 80' full span pre-fabricated steel bridge. Adult steelhead and Chinook salmon enter the Pahsimeroi River each spring and summer to spawn and good densities of juveniles are present throughout the system. Because these culverts were undersized for the Pahsimeroi River flows and hydraulic behavior, fish passage and streambed conditions have been impacted.

The project will be permitted through the Bonneville Power Administration’s Habitat Improvement Program III Programmatic and additional Federal and local permits will be acquired prior to the construction bidding phase.

The replacement of the culverts on Dowton Lane have required a tremendous amount of planning and coordination with local utility companies and effected parties. Currently an overhead power line service runs directly over the proposed bridge site. This overhead line services an irrigation pump and pivot and the property owner is understandingly unwilling to abandon the power for four-six weeks starting in July. IDFG has worked with Salmon River Electrical Cooperative to install a new power pole and service line prior to construction. The other on site utility is an underground fiber optic owned and maintained by Custer Telephone Cooperative, Inc. (CTCI). The line will need to be relocated and temporary service provided during construction. IDFG and CTCI have completed a plan to facilitate construction and installation of a new line while providing temporary services.

Easement Specialist Larry Weeks obtained MOU's with both the Lemhi County Road and Bridge Department and the Custer County Road and Bridge Department to transfer ownership of the new Furey Lane and Dowton Lane Bridges that were installed by IDFG with BPA funding. The Screen Program was working as agents of these Departments for permitting and construction but the final product is transferred to their ownership and liability. Both Lemhi and Custer County were involved because the Pahsimeroi River is the dividing line for these counties.

Screen Program Staff have met with Custer County and Lemhi County Road and Bridge Departments to coordinate and agree upon a temporary road closure, mutually acceptable road construction standards, permanent signing and stripping, materials sources, and final expectations. Discussions and plans have been created with local schools, Pahsimeroi Fish Hatchery, emergency services, United State Postal Service and local landowners.

Preliminary dewatering plans were completed and distributed among regulatory agencies. The initial plan involved dewatering the project site with a temporary bypass channel (approximately 700 feet). After reviewing and receiving comments, it was determined that the cost and the inability to guarantee adult passage in this bypass design would require that an alternative option would need to be provided. The latest option of leaving the river along its' current alignment and staging construction and dewatering areas at the current site was the best option for construction. These revised plans have been resubmitted to the regulatory agencies and appear to be the best option.

Final construction drawings and specifications are being completed and the project should proceed to the Public Works bidding process in May 2016.

Lemhi River-10 (L-10) Fish Screen

- **Milestone F**

Program Coordinator Paddy Murphy continued planning efforts with the Regional Habitat Staff Biologist to coordinate projects proceeding in the Lemhi River basin. Specific areas of mutual interest were Bohannon Creek, Hawley Creek, Big Timber Creek, Wimpey Creek, and Pratt Creek. Multiple projects with multiple partners and cooperators are underway in those drainages. The Screen Program has been planning to install two new fish screens in 2017 at the Lemhi River -08A (L-08A) and Lemhi River -10 (L-10) diversions. These would replace existing screens and compliment efforts to reconnect Bohannon Creek and habitat work along the Lemhi

River.

123 Tower Creek Culvert Replacement

- **Milestone G**

Staff Engineer Jared Bragg surveyed and designed this project to replace a failing culvert on the 123 Tower Creek Road where the road crosses Tower Creek. This culvert is a potential fish barrier and fish threat as the culvert is confined and undercutting. The culvert will be replaced with a pre-fabricated free span bridge. One abutment can be installed without dewatering the stream. Once both abutments are in place, the stringers and decks are installed using pre-built steel decking. Fish salvage operations will be performed during any dewatering process. Easement Specialist Larry Weeks met with Sharon Henning to review the plans and discuss the "Easement Agreement" needed for the proposed fish screen installation at the Tower Creek-04 diversion. The proposed fish screen would be located on her land and the area that would be disturbed during construction of the proposed bridge crossing at 1,2,3, Tower Creek Road.

Easement Specialist Larry Weeks met with Cindy Yenter, Idaho Department of Water Resources (IDWR), and traveled to the proposed Tower Creek-04 (SToC-04) bridge and fish screen site on 123 Tower Creek Road to get the opinion of IDWR if IDFG should proceed with construction of the bridge. The upstream, absentee landowner is unwilling to allow the water users to move their point of diversion back to where it historically had been; upstream of the existing culvert crossing, where it was prior to the land being developed for a subdivision and the POD was moved down steam to allow the installation of a culvert. IDWR's opinion was that the water users would have the right to move their POD, but it would probably have to be decided in court. The IDFG and the water users opted to leave this site rest for the near future.

Hawley-Eighteen Mile Creek Fish Screen

- **Milestone K**

Hawley-Eighteen Mile Creek Diversion Structure

- **Milestone K**

This fish screen project is part of a multi-agency effort to enhance instream flows and provide fish passage in this reach of Eighteen Mile Creek, a tributary to the Lemhi River. The Screen Program Engineer completed a topographic survey and final design was completed for the Hawley-Eighteen Mile (LEM-02) fish screen and diversion. The design included a new point of diversion, headworks structure, check structure, open channel irrigation design and a point of diversion fish screen. This project will be installed at the same time as a new diversion structure at this site, which will entail dewatering the site for an installation in dry conditions. The project was located on private property and designed for 2.5 c.f.s. Partners included NRCS, USBWP, and LSWCD.

Pratt Creek-01 Fish Screen

- **Milestone J**

The Screen Program Engineer completed a topographic survey and final design to install a small modular rotary drum screen on the Pratt Creek-01 (LPC-01) diversion. This project is part of a

larger multi-agency project that is actively seeking to reconnect Pratt Creek to the Lemhi River. The Screen Program will utilize its' Mitchell Act Programmatic for ESA coverage on this project. Project can be installed in the spring or summer work window.

Pratt Creek-02 Fish Screen

- **Milestone K**

The Screen Program Engineer completed a topographic survey and preliminary design to install a single rotary drum screen on the Pratt Creek-02 (LPC-02) diversion. A final design was not completed, as partners, USBWP and NRCS, were still working with the landowner/irrigator on the quantity and operation of both the proposed Pratt Creek-02 and Pratt Creek-03 pipelines.

Patterson- Big Springs Creek -10 (PBSC-10)

Program Coordinator Paddy Murphy and Staff Biologist Windy Davis met with the CSWCD, BOR, TU, IDWR, and with landowner, Tom Page, to discuss a stream reconnection project at Patterson Big Springs Creek-10 diversion (PBSC-10) and cross-ditch. Mr. Page is very interested in implementing conservation measures on his ranches, including, riparian buffer zones, fish screening and passage projects, and conservation easements. The Screen Program is currently working with Mr. Page on installing a fish screen on the the Patterson–Big springs Creek-10 (PBSC-10) diversion. His ranches are in critical habitat reaches in or adjoining the Pahsimeroi River, Sulphur Creek, Big Springs Creek, and Big Creek. The completion of this project would result in flow enhancement and reconnection of over 3 miles of Patterson Big Springs Creek and provide critical flow to an important spawning area. This project involves a new fish screen, diversion, headgate, culvert replacement and stream channel modifications.

A topographic survey and final design was completed for the Patterson Big Springs Creek 10 (PBSC-10) diversion. The design included a new point of diversion, headworks structure, check structure, open channel irrigation design and a point of diversion fish screen. The project was located on private property and designed for 2.5 c.f.s. Partners included TU, USBWP, and CSWCD.

Contract 74780 - September 27th 2016 thru January 31st 2018

Hawley Creek-02 and Canyon Creek-03 Fish Screens

Milestone F, H

Program Coordinator Paddy Murphy, Staff Engineer Jared Bragg, and Staff Biologist Windy Schoby had multiple planning meetings with the USBWP, BLM, and NRCS for final planning and implementation of projects to improve flows and fish passage in Hawley Creek, a tributary to the upper Lemhi River. This complex project involves the Hawley Creek-02 Diversion (LHawC-02) and the Canyon Creek-03 (LCC-03) diversions. The Screen Program portion of the project involves installing two new rotary drum fish screens, two headgate control structures, and interfacing with two new pipelines. The NRCS designed the pipeline and irrigation infrastructure, and USBWP secured funding and contracting for the installation of the pipeline and the new pivots.

This project involves significant coordination and cooperation with the Bureau of Land Management (BLM) to establish needed Right-of-Ways for the fish screen and the proposed pipeline. BLM is conducting the NEPA permitting and ESA consultations. This is a pivotal and complimentary project in efforts to reconnect Hawley Creek and improve fish passage for both anadromous and resident salmonids. This project will be completed in the spring 2017.

A preliminary topographic survey and design was completed for the Hawley Creek -02 (LHawC-02)) diversion consolidation project located of Federal property managed by the BLM. The preliminary design included a controllable, lockable head gate structure, rock cross vain check structure, rotary drum fish screen, secondary trash screen and pipe infrastructure for consolidation. The preliminary design was for 8 c.f.s., and IDFG continually worked with BLM, NRCS, USBWP and LSWCD during the design.

Staff Engineer Jared Bragg completed the final designs and a formal public works bid package (IDFG 2017-106) was completed for the installation Hawley Creek-02 (LHawC-02) and the Canyon Creek-03 (LCC-03) fish screens and headworks installation. Final plans included structure design, dewatering plans, stream regrading plans, erosion and sediment control structures, bypass pipe plan and profile, and details for construction. Because of the estimated construction cost, the project was placed in the formal bidding process and advertised in local papers for construction. The starting date for construction was March 20th, 2017. The screens were designed for 7.0 c.f.s. (LHawC-02), and 2.5 c.f.s. (LCC-03) and involved working with BLM, NRCS, USBWP and LSWCD during the design.

Lemhi River -08A (L-08A) Fish Screen

- **Milestone G**

Multiple planning meetings were held with water users on the LBC-03 diversion to discuss the possibility of either eliminating or mitigating the water use in late summer to allow increased in-stream flow in Bohannon Creek. Recently several diversions on Bohannon Creek were screened, but the LBC-03 diversion captures most of the water in late summer, creating a fish passage issue. The Screen Program has been working with the IDFG Staff Biologist who is the primary lead in the negotiations in an attempt to find a solution to the shortage of water at this Bohannon Creek diversion during late summer. The current proposals are designed for spilling this water right water to the Lemhi River and pumping water from the L-08A diversion.

Staff Engineer Jared Bragg completed final designs and a formal public works bid package (IDFG 2017-124) was completed for the installation of a fish screen and bypass for the Lemhi River-08A (L-08A) diversion. Plans included structure design, dewatering plans, quantity take offs, erosion and sediment control structures, and construction details. Because of the estimated construction cost, the project was placed in the formal bidding process and advertised in local papers for construction. The starting date for construction was July 10th, 2017.

The Screen Program installed the new L-08A fish screen in the fall of 2017. Additionally, the Screen Program planned on improving the headgate structure, ditch culverts, and measuring weir to accommodate more flow in this ditch. The Screen Program has been planning to install another new fish screens in 2019 at the Lemhi River-10 (L-10) diversion. These would replace existing

screens and compliment efforts to reconnect Bohannon Creek and habitat improvement work along the Lemhi River.

Pratt-Mulkey Fish Screen

- **Milestone I**

Program Coordinator Paddy Murphy and Staff Engineer Jared Bragg had multiple meetings with The Nature Conservancy (TNC), USBWP, and Trout Unlimited (TU) to continue coordinating and planning the design process for multiple projects to improve flows and fish passage in both Wimpey Creek and Pratt Creek through a conservation easement, property acquisition, water conveyance projects, and fish screen and passage projects. This is a large scale project that involves three separate ranch parcels. A pivotal aspect of this project is installing four new fish screens and diversions in Pratt Creek and work on fish passage and habitat issues in Wimpey Creek. In the last year, two of the new fish screens, LPC-01, and Mulkey-Pratt Pump Screen were installed, and TNC recently closed on the Conservation easement with the Moulton Ranch. Staff Engineer Jared Bragg and Staff Biologist Windy Schoby participated in a planning meeting for a suite of the restoration projects on Wimpey Creek. The majority of the work is related to riparian and instream habitat but it interfaces with several diversions and screens. We need to coordinate to ensure that the projects are all compatible.

Pratt Creek-Hedt Fish Screen

- **Milestone J**

Final designs were completed for three additional fish screens located at Pratt Creek -02 (LPrC-02), Pratt Creek Hedt screen, and Garden Creek Forest Service screen. Final plans included structure design, dewatering plans, stream regrading plans, erosion and sediment control structures, bypass pipe plan and profile, details for construction. All screens involved the design of a headworks structure, steel modular closed drum fish screen or small pump type screen, open channel design, and localized BMPs. From these designs, IDFG staff fabricated the head gate structures, screens, and other hydraulic structures. IDFG plans installing these screens during low flow in late fall.

Lemhi River-60 (L-60) and Lemhi River-62 (L-62) Fish Screens

- **Milestone K, L (substituted for Elk Creek-02 and Valley Creek-05/06)**

The Lemhi River-60 (L-60) and Lemhi River-62 (L-62) fish screen installations involved replacing two fish screens at two screened irrigation diversions. The existing fish screens were 45° rotary drums screens that were installed in the early 1990's. Final designs were completed and a formal public works bid package (IDFG 2017-127) was completed for the installation of two new fish screens for the Lemhi River-60 (L-60) and Lemhi River-62 (L-62) diversions. Plans included structure design, dewatering plans erosion and sediment control structures, and construction details. Because of the estimated construction cost, the project was placed in the semi-formal bidding process and advertised in local papers for construction. The starting date for construction was August 28th, 2017.

Bayhorse Creek Bridge Replacement

- **Milestone M**

Screen Engineer Jared Bragg completed a topographic survey and preliminary design for the Bayhorse Creek Bridge Replacement. Due to concerns due to the potential cultural resources and landowner concerns this project has been postponed until some additional project components can be resolved.

Contract 78455 - February 1st 2018 thru January 31st 2019

Lemhi River-03AO (L-03AO) Fish Screen

- Milestone F

Final fish screen designs for the Lemhi River-03AO (L-03AO) fish screen replacement was completed in February, 2018. The L-03AO diversion is currently screened but the existing fish screen structure was constructed in 1992 and is a 45° degree rotary drum screen. The new design involved moving the screen location and installation of a 22° degree concrete rotary drum screen. Final plans included concrete housing designs with fish screen fabrication plans, fish and bypass plan and profiles, erosion control plans, and general detail sheets. No head gate fabrication plan, rock grade control structure, or stream regrading plans were needed on this project. A formal public works bid package (IDFG 2018-130) was completed for the installation of a fish screen and bypass for the Lemhi River-03AO (L-03AO) diversion. Plans included structure design, dewatering plans, quantity take offs, erosion and sediment control structures, and construction details. Because of the estimated construction cost, the project was placed in the formal bidding process and advertised in local newspapers for construction. The starting date for construction was August 20th, 2018.

Pahsimeroi River-17 Fish Screen

- Milestone G

Program Coordinator Paddy Murphy and Staff Biologist Windy Davis had multiple planning meetings with the Pahsimeroi River Working Group which is a subcommittee of the Upper Salmon Basin Watershed Project Technical Team (USBWP). The Pahsimeroi Working Group includes; Custer Soil and Water Conservation District (CSWCD), National Resource Conservation Service (NRCS), Bureau of Reclamation (BoR), The Nature Conservancy (TNC), and Trout Unlimited (TU) and had meeting to discuss project prioritization in the Pahsimeroi River subbasin. Projects discussed were centered in the Hooper Lane, Furey Lane, and Big Creek regions of the subbasin. On-going planning continues for improving flows at the Pahsimeroi-17 (P-17) diversion by improving water conveyance. The plan is to improve flows by installing a pipeline and new diversion and fish screen on the P-17 ditch that was slated for installation in summer/fall 2017. These potential projects are critical to improving flow and habitat in this river reach. There are multiple opportunities in this mid-Pahsimeroi River reach on individual ranches for improving fish habitat and protecting fish including, fish screens, control structures, fish passable diversion structures, irrigation and conveyance improvements and better riparian management.

Staff Engineer Jared Bragg completed a preliminary design for the Pahsimeroi-17 (P-17) fish screen and diversion. This design included new point of diversion, headworks structure, open channel design and a steel modular closed drum fish screen. IDFG applied for a new BLM right-of-way as the project is located on federal owned property. The fish screen was designed for 5.00 c.f.s. and involved working with BLM, NRCS, and CSWCD.

A final design was completed for the Pahsimeroi River -17 (P-17) fish screen. The design included moving the point of diversion upstream on the Pahsimeroi River approximately 300 feet, allowing the removal of a potential partial juvenile fish barrier (existing diversion) and installation of a new NMFS criteria screen. The fish screen and diversion will be installed on lands administered by the Bureau of Land Management, thus a right of way was obtained. Final plans included steel modular fish screen fabrication plans, stream dewatering plans, head gate fabrication plan, rock grade control structure, stream regrading plans, fish and water overflow bypass plan and profiles, and erosion control plans, and general detail sheets.

Lemhi River-61 (L-61) Fish Screen

- Milestone H

Screen Program staff met with Tysen Lind, Ranch Manager for the Tyler Ranches on the Lemhi River. The L-61 diversion located on the ranch is getting old and in need of replacement. A meeting was set up to help Tysen, who is a new manager for the ranch, become acquainted with the process and agreements necessary in a fish screen replacement. He was willing to let the survey crew on the ranch to complete the topographic survey needed for design.

Final designs were completed and a formal public works bid package (IDFG 2018-131) was completed for the installation of two new fish screens for the Lemhi River-61 (L-61) and Big Timber Creek-01 (LBTC-01) diversions. Plans included structure design, dewatering plans erosion and sediment control structures, and construction details. Because of the estimated construction cost, the project was placed in the semi-formal bidding process and advertised in local newspapers for construction. The starting date for construction was October 8th, 2018.

In the fall of 2018, the Anadromous Fish Screen Program planned to install a fish screen, head works structure and revise the current ditch/stream interface for the Lemhi River-61 (L-61) fish screen site. After initial construction plans were completed, there was some concern with how to install the headgate and grade control structure in the ditch. From field visits, it appears the original point of diversion from the Lemhi River was constructed for irrigation use only. Over time, little maintenance took place at the diversion and the ditch appears to have flowed throughout the year. Eventually the ranch installed a metal head gate down the ditch approximately 1500 feet, just below the confluence of the ditch and an irrigation overflow/ spring. Over time, this ditch and spring have taken the characteristics of a stream side channel which complicated installation but provided more opportunities for improving fish habitat. Because of this, IDFG only installed the fish screen during the fall of 2018. In addition, we decided to treat this section as a stream side channel, instead of a ditch, thus the installation/dewatering plans required more attention to construction practices and future stream restoration work. In the spring of 2019, IDFG revised the plans for these considerations.

Final designs were completed and a formal public works bid package (IDFG 2019-116) was completed for the installation of Lemhi River-61 (L-61) fish screen project. This public works contract was not for the fish screen structure itself, but additional diversion work, headgate, ditch work, and culvert replacement. Plans included structure design, dewatering plans erosion and sediment control structures, and construction details. Because of the estimated construction cost, the project was placed in the semi-formal bidding process and advertised in local newspapers for construction. The starting date for construction was July 8th, 2019.

Big Timber Creek-01 (LBTC-01) Fish Screen

- Milestone I

Program Coordinator Paddy Murphy, Staff Engineer Jared Bragg, and Staff Biologist Windy Schoby had multiple planning meetings with the USBWP, LRLT, and NRCS for preliminary planning and implementation of projects to improve flows and fish passage in Big Timber Creek, a tributary to the upper Lemhi River. This complex project involves the removal of the Big Timber-02 (LBTC-02) diversion, which was removed in the fall of 2018, the installation of a fish screen on lower Big Timber Creek, known as Big Timber Creek-01 (LBTC-01). This project is a cooperative project with the Lemhi Regional Land Trust. Due to some landowner concerns the potential screen site was moved off of private property to the Leadore City Park.

In September 2018, Easement Specialist Mike Demick met with Breann Green from Lemhi Land Trust to discuss details and background of Big Timber Creek -01 (LBTC-01), a high flow fish screen that will be located on Leadore City Park property. Mike attended Leadore City Council meeting and presented construction plans/timeline, BMP's for job site, preferred access route to site, and to determine appropriate areas for equipment storage and fill material. Mike obtained signed Temporary Construction Agreement and Easement Agreement for the project.

Final designs were completed and a formal public works bid package (IDFG 2018-131) was completed for the installation of two new fish screens for the Lemhi River-61 (L-61) and Big Timber Creek-01 (LBTC-01) diversions. Plans included structure design, dewatering plans erosion and sediment control structures and construction details. Because of the estimated construction cost, the project was placed in the semi-formal bidding process and advertised in local newspapers for construction. The starting date for construction was October 8th, 2018.

This project was slated for installation in the fall of 2018, but due to the location change of the fish screen, it will be delayed until the fall of 2019. This is a pivotal and complimentary project to many other projects in trying to improve flow and habitat conditions in Big Timber Creek for both anadromous and resident salmonids.

Pratt Creek-02 (LPrC-02) Fish Screen

- Milestone J

Program Coordinator Paddy Murphy and Staff Engineer Jared Bragg had multiple meetings with The Nature Conservancy (TNC), USBWP, and Trout Unlimited (TU) to continue coordinating and planning the design process for multiple projects to improve flows and fish passage in both Pratt Creek and Wimpey Creek through a conservation easement, water conveyance projects, and

fish screen and passage projects. This is a large scale project that involves three separate ranch parcels. A pivotal aspect of this project is installing four new fish screens and diversions in Pratt Creek and work on fish passage and habitat issues in Wimpey Creek. In the last year, two of the new fish screens, LPrC-01, and Mulkey-Pratt Pump Screen, were installed and TNC recently closed on the Conservation easement with the Moulton Ranch. Staff Engineer Jared Bragg and Staff Biologist Windy Schoby participated in a planning meeting for a suite of the restoration projects on Wimpey Creek. The majority of the work is related to riparian and instream habitat, but it interfaces with several diversions and screens. The Screen Program is planning on installing three new fish screens, one new fish screen at the Pratt Creek-02 diversion in 2018, and the Pratt Creek-03 diversion in 2019.

In this performance period, a final design was completed for the Pratt Creek-02 (LPrC-02) fish screen installation which involved installation of headworks structure, a modular rotary drum fish screen and 150 ft of irrigation conveyance pipe. Due to the low estimated construction cost, the project was placed in the semi-formal bidding process and IDFG obtained bids from three qualified contractors. The Notice to Proceed for construction of the IDFG Project 2018-155 (LPrC-02) was December 15, 2018 but due to inclement weather, construction was not completed until March 2019. See constructing section for more detail on Public Works contract.

Eighteen Mile Creek-01 (LEMC-01) Fish Screen

- Milestone K

In July 2017, Easement Specialist Mike Demick met with Merrill Beyeler in Leadore to complete and receive signed Flow Agreement and Headgate Agreement for Eighteenmile Creek-01 (LEM-01) fish screen. Discussed plans on the installation of an enclosure fence, access gate, and placement of rocks around sediment basin.

Staff Engineer Jared Bragg, Program Coordinator Paddy Murphy, and Staff Biologist Windy Schoby met with the USBWP and LSWCD to discuss plans to move a point of diversion and install a fish screen on Eighteenmile Creek in the upper Lemhi River subbasin. This is a difficult site to install a fish screen due to the location, slope, and entrance into a pipeline. The proposed design will be a small modular closed drum fish. The project will reconnect and restore a portion of the stream and improve riparian habitat.

A final designs was completed for Eighteenmile Creek-01 (LEM-01) fish screen this is a solar-operated, closed drum modular fish screen that screens water going into a pipeline and included all details for construction, including; structure design, dewatering plans, stream regrading plans, erosion and sediment control structures, bypass pipe plan, and profile.

Meadow Creek-01 (LVCMC-01) Fish Screen

- Milestone L

Staff Engineer Jared Bragg, Construction Foreman Dan Jones, Easement Specialist Mike Demick, and Staff Biologist Windy Schoby met with Amy Cassel, IDWR representative at Goat Creek-06/07 fish screen. The screen was built for approximately 18 cfs, but 8 cfs has been put into the water bank. We discussed ways to possibly modify the screen to properly function with the reduced

water right. Finally, the group visited Meadow Creek to look at the feasibility of installing screens in the watershed. There were concerns that the wet boggy ground may be difficult to access to install and maintain screens, but after one year of changed irrigation practices upstream the soils have firmed up. The group concluded that we could work towards screening the diversions if the landowner was willing.

The deliverable of the Meadow Creek-01 diversion location was not accomplished because there is a new landowner and potential changes to an overall plan for diversions and screening has not been put together yet. After a few years of ownership the landowner will likely be ready to move forward with a plan.

Contract 81380 - February 1st 2019 thru January 31st 2020

Pratt Creek-03 (LPrC-03) Fish Screen

- Milestone G

Program Coordinator Paddy Murphy, Staff Biologist Windy Schoby, and Staff Engineer Jared Bragg had multiple meetings with BLM, USBWP, LSWCD, and NRCS, to continue coordinating and planning the final design and installation for multiple projects to improve flows and fish passage in both Pratt Creek and Wimpey Creek through a conservation easement, water conveyance projects, and fish screen and passage projects. This is a large scale project that involves three separate ranch parcels. A pivotal aspect of this project is installing five new fish screens and diversions in Pratt Creek and work on fish passage and habitat issues in Wimpey Creek. In the last two years, four of the new fish screens were installed with Pratt Creek-01 (LPrC-01) fish screen and Mulkey-Pratt pump screen in 2017, Pratt-Hedt fish screen installed in December 2018, and Pratt Creek-02 (LPrC-02) in April, 2019. The Screen Program is planning on installing a new rotary drum fish screens at the Pratt Creek-03 diversion in October, 2019. This is a large double bay rotary drum screen located above the ranch on lands administered by the BLM. Final designs for the fish screen have been submitted and the official BLM ROW application has been submitted by IDFG for the access to install and maintain the new fish screen. The BLM have received concurrence on all NEPA and ESA regulatory requirements.

Final designs were completed and a formal public works bid package (IDFG 2019-118) was completed for the installation of a fish screen, bypass, headgate, and diversion for the Pratt Creek-03 (LPrC-03) diversion. Plans included structure designs, dewatering plans, quantity take offs, erosion and sediment control structures, and construction details. Because of the estimated construction cost, the project was placed in the formal bidding process and advertised in local newspapers for construction. The starting date for construction was September 23th, 2019, with construction completed by November 7th, 2019.

Lemhi River-10 (L-10) Fish Screen

- Milestone H

Program Coordinator Paddy Murphy continued planning efforts with the Regional Habitat Staff Biologist to coordinate projects proceeding in the Lemhi River basin. The Screen Program has

been working with the IDFG Staff Biologist who is the primary lead in the negotiations on specific ranches where fish habitat and floodplain connectivity projects are being planned. The Screen Program has been planning to replace the Lemhi River-10 (L-10) fish screen and diversion. This point of diversion and fish screen is currently located in a diked and very channelized reach of the Lemhi River and is part of a very large project to remove the diking and add sinuosity, habitat complexity, side channel activation, and floodplain connectivity. This is being conducted on a 2.5 mile reach of the Lemhi River and is located on the Eagle Valley Ranch which has a large donated easement in the river corridor. The new POD and fish screen will be located approximately 600 m. upstream and will require a new section of irrigation ditch and access road to be built.

Final designs were completed for a formal public works bid package for the replacement of the Lemhi River-10 (L-10) rotary drum fish in the lower Lemhi River. The screen was installed in 1998 in a very channelized and dyked section of the river. As part of a very large habitat complexity project, the point of diversion needs to be moved upstream, and the new fish screen re-located out of the floodplain. A new section of ditch, a new headgate, and new diversion point were engineered to accommodate the habitat project. The new screen design is for a 14 degree rotary drum screen that meets NMFS Juvenile Fish Screen Criteria and is paddlewheel driven. Final plans included structure design, dewatering plans, stream regrading plans, headgate and diversion locations/elevations, erosion and sediment control structures, bypass pipe plan and profile, and details for construction. Because of the estimated construction cost, the project was placed in the formal bidding. The starting date for construction in the fall of 2020.

Pahsimeroi -17 (P-17) Fish Screen

- Milestone I

In this performance period, Program Coordinator Paddy Murphy and Easement Specialist Mike Demick participated in multiple meetings with partners CSWCD, Bureau of Land Management (BLM), and The Nature Conservancy (TNC) regarding the Pahsimeroi-17 (P-17) diversion, screen, and irrigation efficiency project. Unfortunately, this project has been delayed because of a change in ownership and working through all the needed details with the new owners. We are working with partners in continuing to negotiate with the new owners on the final irrigation/pipeline designs and ground water pumping on some of the irrigated acreages. Hopefully we can develop options and implement designs on a few project to improve flows through a conservation easement, property acquisition (Posada fields), water conveyance projects, and fish screen and passage projects. Final designs for the fish screen have been submitted and the official BLM ROW application has been submitted by IDFG for the access to install and maintain the new fish screen. The project is partially on BLM so the plans needed to be prepared to initiate the BLM NEPA process, and get the new Right of Ways (ROW) through a review process. One complicating factor that has delayed the project is that the BLM has determined that it must go through an internal ethics committee process before granting the landowners a right-of-way across lands administered by the BLM because Karen Morgan, the landowner, is a BLM employee. This project has been a challenge, as we have been working on planning, designs, and landowner buy in for almost 4 years. However, this pivotal project is critical to connecting the upper and lower portions of the Pahsimeroi River and is currently our highest priority project. This project and the proposed irrigation efficiencies will

significantly increase the amount of instream flow, especially in the summer months, by approximately 5 cfs. and will help reconnect this historically dewatered section of the Pahsimeroi River down to the Hooper Lane crossing.

Canyon Creek-02 (LCanyC-02) Fish Screen

- Milestone J

Program Coordinator Paddy Murphy, Staff Engineer Jared Bragg, and Staff Biologist Windy Schoby had multiple planning meetings with the USBWP, LRLT, BLM and NRCS for preliminary planning and implementation of projects to improve flows and fish passage in Canyon Creek, a tributary to the upper Lemhi River. Currently the Canyon Creek-02 (LCanyC-02) diversion is used to feed a gravity pressurized closed system that supplements water for an inline pump out of the Lemhi River. The water elevation at the existing point of diversion is set to meet a pressure equilibrium across the entire irrigation system. The diversion is currently a non-criteria turbulent fountain screen (bubbler screen) at the head of the pipeline. For the bubbler screen to function properly, a wooden in-stream check structure is utilized during low flow, however this structure becomes a passage barrier at these low flows. IDFG staff has been working with the property owner and irrigator to relocate the point of diversion upstream to allow the installation of a criteria fish screen and head works structure. Due to the complexity of the irrigation system, multiple screen scenarios and topographic surveys have were completed. The latest conceptual design would eliminate the existing check structure, move the point of diversion upstream and allow the fish screen installation while providing the required flow and pressure for the irrigation conveyance system. Currently the property owner is installing an inline flow meter and completing a pipeline loop to aid in varying flow demand. From the flow meter measurements this summer, the fish screen can be designed for the required flow and installed in the fall of 2019.

Final designs were completed for use in a semi-formal public works bid package for the installation of a new modular rotary drum fish, headgate, ditch work and diversion for the Canyon Creek-02 diversion. The modular closed drum fish screen that meet NMFS Juvenile Fish Screen Criteria, is solar-powered driven. The Screen Program fabricated the modular screen and headgate will deliver to the site to have a contractor install. Final plans included structure design, dewatering plans, stream regrading plans, headgate and diversion locations/elevations, erosion and sediment control structures, bypass pipe plan and profile, and details for construction. Because of the estimated construction cost, the project was placed in the semi-formal bidding process and bids were solicited from at least three qualified contractors. The starting date for construction was originally scheduled for early October,2020, but a water right protest has stalled the installation of this project.

Little Sawmill Creek-01 (LLSawC-01) POD Fish Screen

- Milestone K

Staff Engineer Jared Bragg, and Staff Biologist Windy Schoby participated in site visits to Eighteenmile Creek and Little Sawmill Creek, both tributaries to the Lemhi River to look the diversions and potential irrigation efficiencies that may be incorporated into some larger water savings and stream restoration projects. These projects are both cooperative projects with the

Upper Salmon Basin Watershed Project and NRCS. The site visits were to outline data needs to look at the feasibility of installing screens on some currently unscreened diversions.

Final designs were completed for the fish screens located at Little Sawmill Creek-01 (LLSawC-01) and Lemhi River-61B (L61B). Both sites required additional topographic surveys, and from this final designs were completed. These designs included head works structure, steel modular closed drum fish screen, irrigation pipe design and BMP's. From these designs, IDFG staff fabricated the head gate structure and screens with the intent of installing these screens in spring 2019.

Lemhi River-61 (L-61) Fish Screen

- Milestone L

The Lemhi River-61 (L-61) fish screen involved installing a replacement screen on a Lemhi River irrigation diversion (L-61). The existing L-61 fish screen is 45° rotary drums screen that was installed in the early 1990's. Final designs were completed and a formal public works bid package (IDFG 2019-116) was completed for the installation of Lemhi River-61 (L-61) fish screen project. This public works contract was not for the fish screen structure itself, but additional diversion work, headgate, ditch work, and culvert replacement. Plans included structure design, dewatering plans erosion and sediment control structures, and construction details. Because of the estimated construction cost, the project was placed in the semi-formal bidding process and advertised in local newspapers for construction. The starting date for construction was July 8th, 2019.

Construction/ Implementation

Across these performance periods, the Screen Program installed 42 new fish passage projects, with 28 of projects installed under Idaho Public Works Contracts. These capital projects and all Public Works Contracts were funded by this BPA Contract 2007-399-00, but coordination, planning, contract management, and assorted other tasks are performed by staff utilizing the Mitchell Act funding or BPA Project 1994-015-00. Of these 42 projects completed, 31 were new fish screens, with 20 unscreened diversions getting new fish screens, and 11 diversions getting older, non-criteria screens replaced. These new fish screens account for about 11% of the Program's fish screen inventory, and account for 7% of the total cfs screened. Of these new fish screens, 44 new rotary drum assemblages were fabricated by the construction crew. Other appurtenances for these fish screens that were fabricated in this performance period included 26 new paddlewheels and 24 head gate control structures. Of these projects, 27 improved fish passage at the points of diversion by a new physical structure or irrigation efficiencies through partners projects with new pipelines. Additionally, 11 fish passage projects were completed involving barrier removals and instream flow enhancements. Eleven of these were large keystone projects to restore flows, fish passage, and reduce entrainment on Sulphur Creek-01, Hawley Creek-03, Pahsimeroi-13, Pole Creek-01, Pahsimeroi-16, Carmen Creek-03, Patterson-Big Springs-10, Lemhi River-08A, Hawley Creek-02, Canyon Creek-04, and Pratt Creek-03. These were multi agency efforts and took several years to complete. Furthermore, two very significant fish passage projects with support from this contract, were completed by removing older, undersized culverts and replacing with bridges on the mainstem Pahsimeroi River, at the Dowton and Furey Lane crossings. These projects also

include reconnecting and providing safe passage in 16 different tributaries for access to critical spawning and rearing habitat for anadromous salmonids.

Contract 58717 - September 27th 2012 thru September 26th 2013

P-13 Pump Intake Fish Screen

- **Work Element (D): 69 – Install Fish Screen**

This project was installed in 2014 in Contract #63734.

Sulphur Creek-01 (PSC-01) Fish Screen

- **Work Element (E): 69 – Install Fish Screen**

The construction crew fabricated and installed a new modular fish screen at Sulphur Creek -01 (PSC-01) diversion in September, 2013 (Photos 1-4.). This screen was installed prior to a pipeline and water conveyance project that is to be installed this fall or next spring. This is a closed system drum design that goes directly into the pipeline. The construction crew removed a diversion that was fish passage barrier at the old Sulphur Creek -01 diversion and constructed a new fish passable log diversion and new ditch from the head gate to the new fish screen for the Sulphur Creek-01 Project.

Sulphur Creek-02 (PSC-02) Fish Screen

- **Work Element (F): 69 – Install Fish Screen**

After surveying, if was discovered that the point of diversion for Sulphur Creek-02 (PSC-02) was actually just outside of private property on lands administered by the Bureau of Land Management. This project will be installed at a later date in conjunction and cooperation with the irrigator and the Bureau of Land Management.

Tower Creek-01 Fish Screen

- **Work Element (G): 69 – Install Fish Screen**

This project was not installed in this contract but eventually installed in 2015 in Contract 66945. In the 2015 contract, the project name was changed to Tower Creek-02 Fish Screen to better reflect the naming convention for the points of diversion in Tower Creek.

Tower Creek-03 Fish Screen

- **Work Element (H): 69 – Install Fish Screen**

Staff Engineer Jared Bragg produced a preliminary and final design for a new fish screen to be installed on the Tower Creek -03 (STowC-03) diversion, which is the third diversion upstream of the confluence of Tower Creek and the Salmon River. This diversion was previously unscreened and has a total water right of 2.0 cfs. The design was fairly straightforward, utilizing a steel modular rotary drum screen, powered with a paddlewheel design. The screen was constructed

with a bypass drop box in order to alleviate problems with the perched ditch and a potentially steep bypass. Using a drop box reduces the required flow in the bypass pipe by allowing a flatter gradient for the pipe. In this manner, there is less chance the operation of the screen would contribute to potential de-watering of the stream. The construction crew completed the fabrication and installation of a new modular rotary drum fish screen with a bypass drop box at the Tower Creek-03 (STow-03) diversion in August (Photos 5-6). In the 2015 contract, the project name was changed to Tower Creek-03 Fish Screen, from Tower Creek-02 to better reflect the naming convention for the points of diversion in Tower Creek.

Carmen Creek -13 (SCC-13) Fish Screen

- **Work Element (I):69 – Install Fish Screen**

Additionally includes;

Carmen Creek -13 (SCC-13) Siphon Structure

- **Work Element (J): 80 – Install Siphon**

Carmen Creek -13 (SCC-13) Diversion Structure

- **Work Element (L): 84 – Remove/Install Diversion**

A final design for the SCC-13 project was completed. Much of the preliminary work was completed by Quadrant Consulting Inc. Staff took the preliminary designs and worked out specific details related to the syphon and new ditch sections. The final design was completed with options for a new head gate and diversion. Final designs were completed for the installation of head works structure, fish screen, measuring weir, conveyance piping and siphon structure for the Carmen Creek-13 (SCC-13) diversion.

The final specification and drawings for IDFG 2013-126 Carmen Creek -13 (SCC-13) Fish Screen Construction and Iron Creek (SIC-07) Diversion Improvements was completed and advertised through the formal bidding process. Bids for the Idaho Public Works project were opened on July 19, 2013 and two Idaho Public Works licensed contractor's submitted bids. The low bid ($175,966.70) was submitted by H&N Construction out of Blackfoot, Idaho, with the SCC-13 portion of the project bid at $139,047. The IDFG construction crew fabricated and installed the screens, gearboxes, paddlewheels, and appurtenances to a new concrete rotary drum fish screen at Carmen Creek-13 (SCC-13) diversion and delivered a new head gate to this site for the contractor to install. The fish screen metal works and materials not included in the public works were charged in the amount of $5,400.00 for a total of $144,447. The Notice to Proceed was issued on August 8, 2013 and work commenced soon after. The contractor finished the project and a letter of Substantial Completion was issued on September 24, 2013 (Photos 7-10.). During construction staff provided site observation/inspection, construction staking, resolved plan and specification conflicts, processed appropriate paperwork to complete contract. One change order was issued due to the property owner's request of changing the pipe alignment for a cost of $755.78.

Carmen Creek Phase III Project

- **Work Element (K): 84 – Remove/Install Diversion**

This project was installed in 2014 in Contract #63734.

Iron Creek -07 (SIC-07) Diversion Structure

- **Work Element (M): 84 – Remove/Install Diversion**

The final specification and drawings for IDFG 2013-126 Carmen Creek -13 (SCC-13) Fish Screen Construction and Iron Creek (SIC-07) Diversion Improvements was completed and advertised through the formal bidding process. Bids for the Idaho Public Works project were opened on July 19, 2013 and two Idaho Public Works licensed contractor's submitted bids. The low bid ($175,966.70) was submitted by H&N Construction out of Blackfoot, Idaho, with the SIC-07 portion of the project bid at $36,920. The Notice to Proceed was issued on August 8, 2013 and work commenced soon after. A new head gate and sluice gate were fabricated and delivered by the construction crew to the Iron Creek-07 (SIC-07) diversion site for the contractor to install. This was part of a fish passage project to install a new diversion and control structure to compliment an already installed fish screen. The contractor finished the project and a letter of Substantial Completion was issued on September 24, 2013 (Photos 11-12). During construction staff provided site observation/inspection, construction staking, resolved plan and specification conflicts, processed appropriate paperwork to complete contract. One change order was issued due to the property owner's request of changing the pipe alignment for a cost of $755.78.

Patterson Big Springs Creek -04 (PBSC-04) Access Road Culvert Replacement

- **Work Element (N): 85 – Remove/Breach Fish Passage Barrier**

Final designs were completed for the Patterson Big Springs Creek -04 Culvert Replacement Project. Final plans included structure design, dewatering plans, stream and roadway regarding plans, erosion and sediment control structures and detail for construction. Because of the estimated construction cost, the project was placed in the formal bidding process and advertised in local papers for construction.

Bids were opened for Idaho Public Works Project IDFG 2013-125 (Wimpey Creek and PBSC-04 Patterson - Big Springs Creek Culvert Replacements) on June 21nd, 2013. Two bids were submitted by local Public Works Licensed contractors. Boyd Foster Backhoe Services, Inc. of Leadore, Idaho was the low bidder at $133,166.03. For the PBSC-04 culvert replacement, the line-item unit price for this installation was $68,013. Construction commenced on July 15th and substantial completion issued on October 7th, 2013 (Photos 13-14). Staff provided construction observation/inspection, completed pay requests for the contractor, and negotiated a change order. The purpose of the change order was additional work required to install the low profile arch plate system in accordance with manufacture's recommendations and was for an additional $5,288.75.

Wimpey Creek Culvert Replacement

- **Work Element (O): 85 – Remove/Breach Fish Passage Barrier**

Bids were opened for Idaho Public Works Project IDFG 2013-125 (Wimpey Creek and PBSC-04 Patterson - Big Springs Creek Culvert Replacements) on June 21nd, 2013. Two bids were submitted by local Public Works Licensed contractors. Boyd Foster Backhoe Services, Inc. of

Leadore, Idaho was the low bidder at $133,166.03. Of this amount the unit price for the Wimpey Creek installation was $65,152. Additionally, for the Wimpey Creek culvert replacement the IDFG issued a formal bid solicitation to provide a 40 foot span prefabricated steel bridge, which True North Steel out of Missoula, Montana provided at a cost of $64,192.00 which brought the project total to $129,334. Construction commenced on July 15th and substantial completion issued on October 7th, 2013 (Photos 15-16). Staff provided construction observation/inspection, completed pay requests for the contractor, and negotiated a change order.

Contract 63734 - September 27th 2013 thru September 26th 2014

Hawley Creek-03 (LHawC-03) Fish Screen
- **Work Element (D): 69 Install Fish Screen**

Hawley Creek-03 (LHawC-03) Diversion Installation
- **Work Element (E): 84 Remove/Install Diversion**

Hawley Creek-03 (LHawC-03) Pipeline Crossing and Pipeline Bubbler Screen Installation
- **Work Element (F): 149 Install Pipeline**

The IDFG Hawley Creek 03 (LHawC-03) Fish Screen, Pipeline, and Diversion Project involved the removal of fish passage barrier, installation of a new diversion structure, fish screen and irrigation water supply line (Photos 17-20). This capital project and Public Works Contract was funded by BPA with associated supplemental funding for coordination, planning, and contract management. All construction and fabrication, outside of the public works contract, are performed by staff utilizing additional funding provided to the IDFG through NMFS Mitchell Act funding. Historically, the Hawley Creek Watershed in the Lemhi River subbasin was a major anadromous fish producer. Hawley Creek has been disconnected from the Lemhi River and inaccessible to Snake River spring/summer Chinook salmon, Snake River Basin steelhead, and fluvial Columbia River bull trout for 100 years due to irrigation practices and man-made migration barriers.

The original unscreened LHawC-03 diversion diverted a 15.7 cubic feet per second (cfs) Hawley Creek water right from LHawC-03 into an open ditch. The ditch flowed through BLM lands to McFarland Livestock's private land point-of-use (POU). The existing diversion structure was a fish passage barrier that entrained fish into the ditch and dewatered the stream during seasonal low flow. McFarland Livestock signed a 20-year Diversion Modification Agreement with LSWCD and a 10.46 cfs fish screen flow agreement with IDFG that will provide up to a minimum of 5.2 cfs of instream flow depending on available baseflow in addition to the fish screen return flow (1.8 cfs).

The original diversion and ditch was located on a very steep perched ditch with no access or downstream segment wide enough for the fish screen footprint. Also to remove the diversion check structure, the point of diversion would need to be moved upstream and this was not feasible due to a large rock vertical face. Several options were assessed and discussed with the irrigator and the final design involved moving the point of diversion upstream 350' and on the opposite side of Hawley Creek. This would allow the removal of the check structure and access for the

construction of the screen and long term access for operation and maintenance of the fish screen and diversion. Behind the fish screen, the irrigation water was placed in a pipe conveyance system that crossed Hawley Creek and then piped beneath the existing ditch alignment.

From the engineer's estimate, it was determined that the project's construction cost could be more than $100,000, and therefore according to Idaho procurement and public works laws would require a formal bidding process. The final specification and drawings for IDFG 2014-141 Hawley Creek-03 (LHawC-03) Fish Screen Installation was completed and advertised through the formal bidding process. Bids for the Idaho Public Works project were opened with the low bid ($154,225) being submitted by H&N Construction out of Blackfoot, Idaho. The IDFG construction crew fabricated and installed the screens, gearboxes, paddlewheels, and appurtenances to a new concrete rotary drum fish screen at the Hawley Creek-03 diversion and delivered a new head gate to this site for the contractor to install. The following shows the bidding information.

Hawley Creek 03 Fish Screen - Idaho Public Works Contract						
IDFG Project No.	Project	Initial Cost	Change Orders	Total Cost	Start Date	End Date
2014-141	LHawC-03 Fish Screen Installation	$154,225	$14,994	$169,219	08/01/2014	09/26/2014

The construction involved the installation of a rock cross vain and rock grade control structure at the new point of diversion. A new headwork was fabricated by the IDFG and installed by the contractor. From the head gate, the irrigation water was conveyed in a 24" PVC to a sediment basin prior to entering the fish screen. The contract also involved constructing a concrete fish screen, secondary debris screen and the pipe crossing. A change order was issued for the contract after the topsoil was removed it was evident the total quantity of rock that needed to be removed was greater than shown on the construction plans. The project was completed in accordance with the plans, specifications and permitting requirements.

Sioux Lane Culvert Replacement Project

- **Work Element (G): 85 Remove/Breach Fish Passage Barrier**

The Sioux Lane Culvert Replacement Project involved the removal of an undersized road culvert that was replaced with a prefabricated steel bridge designed for natural fish passage and stream simulation (Photos 21-22). Bids were opened for Idaho Public Works Project IDFG 2014-138 (Sioux Lane Culvert Replacement Project). From the engineer'estimate, it was determined that the project must comply with Idaho procurement and public works contracting and solicit bids through the formal bidding process. From this process, IDFG executed a contract with Bird Excavation, LLC, the low bidder at $37,706.70 for the installation of a prefabricated steel bridge. The construction was completed in accordance with the plans and specifications and there were no change orders issued. For the Sioux Lane culvert replacement, IDFG issued a formal bid solicitation to provide a 36' span prefabricated steel bridge, which Big R Bridge out of Greeley, Colorado provided at a cost of $54,210.00. Construction commenced on September 10th, 2014 and substantial completion issued on September 25th 7th, 2014. Staff completed the construction survey and staking for the Sioux Lane culvert replacement project. This staking allows the contractor to install the fish screen or bridge precisely where it was designed to be placed. It also can provide details regarding site preservation and minimizing disturbance. Staff provided

construction observation/inspection, completed pay requests for the contractor, and negotiated a change order.

P-13 Pump Intake Fish Screen

- **Work Element (H): 69 Install Fish Screen**

Easement Specialist Larry Weeks met with, Karma Bragg, Custer Soil and Water Conservation District (CSWCD), on several occasions with water users, individually and collectively, on the Pahsimeroi River-12 (P-12) and the P-13 diversions. IDFG and CSWCD have been in negotiations for multiple years attempting to get all the water users on the P-12 and P-13 into a water conservation project by the elimination of the P-13 diversion from the Pahsimeroi River. This section of the river has historically been dewatered, and is not screened. The goal of this project is to allow the Pahsimeroi River to flow back into its original channel and reconnect the Pahsimeroi River to the upper reaches near Furey Lane. One of the users, Scott Hayes, will be moved into the screened P-12 diversion, and the Circle Pi will pump from a lower section of the Pahsimeroi River, through a new fish screen (P-13), where there should be ample water for fish passage and irrigation needs.

The IDFG Screen Program portion of this joint agency project involved the installation of a new point of diversion pump intake, fish screen, and pipeline to supply water from the Pahsimeroi River to a new deep well turbine pumps supplied by the Custer Soil and Water Conservation District (CSWCD). All of the pumps and sprinkler system were designed by the National Resource Conservation Service (NRCS). This capital project and Public Works Contract was funded by BPA with associated supplemental funding for coordination, planning, and contract management. All construction and fabrication, outside of the public works contract, are performed by staff utilizing additional funding provided to the IDFG through NMFS Mitchell Act. The new point of diversion for the project was established based upon river water depths, location to the pump intakes and input from BOR. The goal was to have a diversion that did not require an in-stream checkup structure. Also because the point of diversion had been moved, the IDFG construction crew constructed a new access road to the project site.

From the engineer's estimate it was determined that the construction cost would must be less than $100,000 and therefore according to Idaho procurement and public works laws, the project only required a semiformal bidding process. Plans and specifications were given to three established and competent contractors and sealed bids were received and evaluated. From this process IDFG executed a contract with Dahle Construction, LLC for the completion of the project. The following shows the bidding information.

P-13 Fish Screen - Idaho Public Works Contract						
IDFG Project No.	Project	Initial Cost	Change Orders	Total Cost	Start Date	End Date
NA	P-13 Fish Screen Installation	$68,072.00	NA	$68,072.00	09/12/2014	09/26/2014

IDFG provided the sheet piling to install a temporary coffer dam during construction. A large track mounted excavator pushed the piling in to the river gravels to form a cut-off wall. There

were no releases of any sediment into the stream using this methodology. Large pumps were used to dewater the work area behind the sheet piling. The fish screen design was a point of diversion screen utilizing four 12" closed drum screens with diffusor pipes and electrically driven (Photos 23-26). The screen and head gates were housed in a cast in place concrete super structure.

Poison Creek -01 (SPoiC-01) Fish Screen

- **Work Element (I): 69 Install Fish Screen**

Staff Engineer Jared Bragg, Staff Biologist Paddy Murphy, and Easement Specialist Larry Weeks had planning meetings with USBWP and NRCS to discuss the implementation of the Poison Creek-01 fish screen project. This project involves installing 21,000 ft of irrigation pipe to cut water diversion in the creek from 10 cfs down to 2 cfs. Screen Program personnel met with Troy Olson, ranch manager for Gary Mayberry, landowner for the Poison Creek Ranch, to discuss the proposed fish screen on Poison Creek-01 (SPoiC-01). IDFG reviewed the project and explained the need for easements and agreements prior to the installation of a fish screen. IDFG met with Bruce Withers, attorney for Gary Mayberry, on two occasions to discuss easement wording and changes that the Gary Mayberry requested. There were some changes made in the easement that made the landowner more comfortable with the permanent easement on his land. These changes did not alter the intent of the easement. The Screen Program installed a new rotary drum fish screen in 2014 to prevent entrainment into the pipeline.

The construction crew fabricated and installed a new modular fish screen and headgate structure at the Poison Creek -01 (SPoiC-01) diversion in May 2014 (Photos 27-28). This screen was installed prior to a pipeline and water conveyance project that was completed after the screen was installed. This standard rotary drum design had a turbulent fountain screen installed below it before entering the closed pipeline system. The Screen Program was reimbursed $18,267 for all materials used in fabrication of this screen. At the end of June, staff installed a temporary pod type watering system to irrigate the newly reseeded area around the Poison Creek-01(SPoiC-01) construction site and a safety fence around the screen to prevent encounters with livestock.

Hayden Creek-08 (LHC-08) Fish Screen

- **Work Element (J): 69 Install Fish Screen**

Screen Program staff met with Von Bean, irrigator for the Hayden Creek-08 (LHC-08) fish screen, to discuss the construction window prior to the irrigation season and review the plans for the new fish screen. IDFG also met with Fran Tonsmeire, landowner to answer questions about the fish screen construction and the cost share of the LHC-09 bridge improvements. IDFG Engineer and Construction Foreman inspected and measured the existing structure to determine replacement needs.

The final specification and drawings for IDFG 2014-126 LHC-08 (Hayden Creek) Fish Screen Construction was completed and advertised through the formal bidding process. Bids for the Idaho Public Works project were opened on March 13, 2014 and three Idaho Public Works licensed contractor's submitted bids. The low bid ($29,323.70) was submitted by Wellard Contractors, Inc. out of Salmon, Idaho. The "Notice to Proceed" was signed April 7, 2014 and the contractor had

45 calendar days to complete the project. The construction crew fabricated and installed the screens, gearboxes, paddlewheels, and appurtenances to a new concrete rotary drum fish screen at Hayden Creek -08 (LHC-08) diversion (Photos 29-30).

Tower Creek-04 (STowC-04) Fish Screen

- **Work Element (K): 69 Install Fish Screen**

This project was delayed, as it was decided that it needed to be completed at the same time period as the 1,2,3 Tower Creek Road Culvert Replacement.

Lemhi River -20 (L-20) Fish Screen

- **Work Element (L): 69 Install Fish Screen**

After the first Public Works Contracts were bid, we had to postpone this project as we would have been projected to be over budget. This diversion has an older fish screen, so it was the project that was decided to be left idle.

Carmen Creek Phase III Project

- **Work Element (M): 150 Install Sprinkler**

In this performance period, over three years of planning and design was spent on the Carmen Creek Phase III project. Staff met with the irrigators, Upper Salmon Basin Watershed Project personnel, and engineers from National Resource Conservation Service (NRCS) to discuss the possibilities of how a water conservation project at the SCC-03 diversion could improve fish passage. This section of Carmen Creek has been historically dewatered during low flows. NRCS completed a survey and produced preliminary plans for an irrigation system that would pump well water for their irrigation needs. The plan would be to have a portion of the SCC-03 water rights delivered to the Salmon River. At that meeting, it was decided to proceed with the cost analysis and project planning to determine if it could be a viable project. The initial design, completed by NRCS, was reviewed and rejected because the engineering cost estimate for the project was excessive for the total amount of water saved for in-stream enhancement. Staff worked with landowners and NRCS to revise the sprinkler system designs in an attempt to find a more economical practical system that would reflect more closely the water savings. A was held when a new funding source was discovered that would minimize the cost to this program. A new less expensive design was agreed upon by the irrigators. The next step was to obtain an approval for a water right transfer from the SCC-03 ditch to the S-05/06/07 ditch. Water would be extracted from Salmon River via the S-05/060/7 ditch and the SCC-03 Carmen Creek water would be allowed to flow all the way to the Salmon River.

Project planning continued on the Carmen Creek Phase III project in 2013 and 2014. Screen Program staff met with staff from the NRCS, Upper Salmon Basin Watershed (USBWP), and the water users of the Carmen Creek-03 (SCC-03) diversion, to discuss the status of their water rights transfer and the seepage runs for instream flows. The seepage run tests indicate that 2 cfs of water, will remain in the stream channel and not be lost to subsurface flow by transferring the point of diversion of two irrigators from SCC-03 to the Salmon River. The installation of the pivots will be completed this fall with the power and mainline slated for spring installation. This project will

provide fish passage at this point of diversion that has historically dewatered Carmen Creek. IDFG is now moving forward with negotiations with the remainder of the water users in the SCC-03 diversion to install a new criteria fish screen. The cost of this project to install the water efficiencies and new sprinklers was $75,888.

S-28 Fish Screen - Bridge Crane

- **Work Element (N): 186 Operate and Maintain Habitat/Passage/Structure**

The S-28 Fish Screen is the largest fish screen that the Screen Program operates and maintains in the Upper Salmon River Basin. This fish screen was installed in 1999. The S-28 fish screen is a rotary drum vee screen design that is paddle wheel driven and has a design flow for over 200 cfs. There are 8 drums which are large, 6 ½ ft in diameter and 14 ft long. A bridge crane is needed to hoist these screens for maintenance, over-wintering, re-setting, and for emergency purposes. There is really no other option for lifting these large drums for maintenance purposes. The current bridge crane was damaged from a power outage and needs to have the two-speed hoist motor and brake assembly replaced. In addition to a new hoist motor and brake assembly, a phase protector will be installed to protect the new motor. This screen is paramount in protecting all migrating Chinook salmon, sockeye salmon, steelhead, bull trout, and resident salmonids that migrate from above this diversion in the Upper Salmon River Basin. This bridge crane is essential for the safety of our personnel in maintaining this fish screen.

This project will place the crane on top of an existing structure and will involve no in-water work or ground disturbance. In this performance period, HOJ engineering out of Salt Lake City, UT replaced the hoist motor on the bridge crane at the S-28 site. The new motor and service call to install it cost $6,800.00

Wimpey Creek Culvert Replacement - Phase II

- **Work Element (O): 85 Remove/Breach Fish Passage Barrier**

The Wimpey Creek Culvert Replacement - Phase II is to cover the remaining work on the Wimpey Creek Culvert Replacement Project that extended into the new contract period. Due to weather conditions, the final paving of the new bridge and the bridge approaches was not finished until October 7th, 2013 after the contract ending period of September 26th. Total cost of this contract for the Phase II of the Wimpey Creek Culvert Replacement was $15,010

Environmental Compliance was completed on 07/23/2013 for Work Element O: 85. Wimpey Creek Culvert Replacement Project in BPA Contract 58717.

Phase I of the Wimpey Creek bridge replacement included the removal of an existing undersized culvert with a prefabricated steel bridge, installation of grade control structures, stream rehabilitation, post construction BMPs, and roadway reconstruction. All excavation and installation of the base and sub base material for the roadway ballast section was installed. However, due to inclement weather, the asphalt concrete pavement was not installed. Phase II of the Wimpey Creek bridge replacement involves providing and installing the asphalt concrete pavement and finish grading to blend pavement edge with roadway shoulder. Total cost of this

contract for the Phase II of the Wimpey Creek Culvert Replacement was $15,010 completed by Boyd Foster Backhoe Services, INC. for Idaho Public Works Project IDFG 2013-125.

Contract 66945 - September 27th 2014 thru September 26th 2015

Pole Creek-01 (SPC-01) Fish Screen

- **Work Element (D): 69 Install Fish Screen**

Pole Creek-01 (SPC-01) Diversion Installation

- **Work Element (E): 84 Remove/Install Diversion**

The Pole Creek (SPC-01) Fish Screen and Diversion project involved the removal of a fish passage barrier, installation of a new diversion structure, fish screen installation and irrigation water supply line. Historically, the Pole Creek watershed in the Upper Salmon River Subbasin was a major anadromous fish producer. Pole Creek has been seasonally disconnected below SPC-01 and inaccessible to Snake River spring/summer Chinook salmon, Snake River Basin steelhead, and fluvial bull trout for approximately 100 years due to irrigation practices and man-made migration barriers.

The current SPC-01 diversion diverted a 22.2 cubic feet per second (cfs) Pole Creek water right into an open ditch. The existing diversion structure was a fish passage barrier that entrained fish into the ditch and dewatered the stream during seasonal low flow. The irrigator agreed to adjust his irrigation practices and install new irrigation infrastructure to reduce the SPC-01 water right to a maximum of 15 cfs.

The Screen Program and Bureau of Reclamation worked together to complete a final design for the new diversion, removal of exiting diversion, fish screen, and some stream restoration work. The stream restoration, check structures, head works installation and ditch alignment was designed by BOR and the Screen Program completed the design work for the fish screen, best management practices, and existing check structure removal design.

The Idaho Public Works formal bidding process was utilized to bid the project during June. The final specification and drawings for IDFG 2015-119 Pole Creek-01 (SPC-01) Fish Screen Installation was completed and advertised through the formal bidding process. Bids for the Idaho Public Works project were opened with the low bid ($219,561) being submitted. From this process, IDFG executed a contract with Wellard Contractors, Inc. for the completion of the project. The IDFG construction crew fabricated and installed the screens, gearboxes, paddlewheels, and appurtenances to a new concrete rotary drum fish screen at the Pole Creek diversion and delivered a new head gate to this site for the contractor to install (Photos 31-35). The Screen Program was reimbursed for $12,512 for all the materials and appurtenances for fabrication of fish screen drums, paddlewheels, and control structure. This brought the total cost, with the Idaho Public Works 2015-119 ($219,561) and materials ($12,512) to $232,073. This total cost does not include personnel time for fabrication and construction costs for the metal works provided to IDFG through NMFS Mitchell Act funding.

The following shows the bidding information.

Pole Creek Fish Screen - Idaho Public Works Contract						
IDFG Project No.	Project	Initial Cost	Change Orders	Total Cost	Start Date	End Date
2015-119	Pole Creek-01 Fish Screen	$232,073	0	$232,073	06/06/2015	09/04/2015

During construction, BOR and IDFG worked collaboratively for the contract administration and site inspections. The construction was completed in accordance with the plans and specifications and no complications were encountered. During September 2015, the IDFG Screen Program removed the existing check structure and reseeded the disturbed areas.

Pahsimeroi River-16 (P-16) Fish Screen

- **Work Element (F): 69 Install Fish Screen**

The Idaho Screen Program portion of this joint agency project involved the installation of a new fish screen and new section of ditch from the Pahsimeroi River to compliment a new irrigation conveyance pipeline. The P-16 diversion was an unscreened diversion that typically dewatered the Pahsimeroi River during late summer irrigation period. The project was divided into three separate projects. The stream restoration, check structures, head gate installation and some ditch construction was designed by BOR and sponsored through LSWCD and constructed during August. The second section involved ditch construction from the existing ditch to the new fish screen and was designed and sponsored through the Screen Program. The last section involved the installation of a debris screen, irrigation pipe conveyance system, pivot and wheel line installation. This portion of the project was designed by the NRCS and sponsored through the LSWCD.

Staff completed a final plans, specifications, and cost estimate package for the proposed fish screen during July. This section of project was entirely located with public lands administered by the BLM. Preliminary plans were produced during January 2015 and addition information required for the right-of-way and permitting process was delivered throughout the summer. Staff completed a final PS&E package for the proposed fish screen during July. A concrete rotary drum (12'x 30") fish screen capable of supplying 8.0 cfs was designed.

From the engineer's estimate, it was determined that the project's construction cost could be more than $100,000 and therefore according to Idaho procurement and public works laws would require a formal bidding process. The formal bidding process was adheared to and the bidding process took place during August. From this process IDFG executed a contract with Dahle Construction, LLC for the completion of the project. The following shows the bidding information.

P-16 Fish Screen Installation - Idaho Public Works Contract						
IDFG Project No.	Project	Initial Cost	Change Orders	Total Cost	Start Date	End Date
2015-122	P-16 Fish Screen Installation	$46,683	$2,702.50	$49,386	08/11/2015	09/25/2015

The Screen Program was reimbursed for $5,244 for all the materials and appurtenances for fabrication of fish screen drum and paddlewheel. This brought the total cost, with the Idaho Public Works 2015-122 ($41,682.50) and materials ($5,244) to $46,927 (Photos 36-38). This total cost does not include personnel time for fabrication and construction costs for the metal works provided to IDFG through NMFS Mitchell Act funding.

Garden Creek-01 Fish Screen

- **Work Element (G): 69 Install Fish Screen**

Final designs were competed and a formal public works bid package (IDFG 2014-141) was completed for the installation of a fish passable diversion, and new rotary drum fish screen for the Garden Creek-01 (SGarC-01) diversion. Plans included structure design, dewatering plans, instream work details, quantity take offs, erosion and sediment control structures and construction details. The semi-formal bidding process was utilized as the estimated construction cost was less than required for formal process. The bid opening date was August 29th, 2014. The Screen Program was reimbursed for $5,939 for all the materials and appurtenances for fabrication of fish screen drum and paddlewheel. This brought the total cost, with the Idaho Public Works 2014-141 ($32,300) and materials ($5,939) to $38,239 (Photos 39-42). This total cost does not include IDFG personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Carmen Creek-03 (SCC-03) Fish Screen

- **Work Element (H): 69 Install Fish Screen**

The Carmen Creek-03 diversion was previously screened by an old wiper screen installed in the 1960's, but had been nonoperational for many years. The current point of diversion worked effectively with a functional and lockable headgate. Construction involved replacing the current abandoned wiper screen with a 22° single bay concrete rotary drum screen (8' long 36" dia.). The construction of a new fish screen was fairly straightforward due to favorable site conditions. The signed flow agreement for design was 6.91 cfs and typical water usage during the irrigation season ranged from 2.3 cfs to 7.0 cfs.

Preliminary construction plans were completed during June and distributed for review to IDFG staff, property owners, water users, and governmental agencies overseeing potential permits. From comments and suggestions, a final PS&E (plans, specifications, and estimates) package was completed for bidding.

From the engineer's estimate, it was determined that the project's construction cost would be less than $100,000 and therefore according to Idaho procurement and public works laws would not require a formal bidding process. However due to the site and previous publicity, the formal bidding process was chosen and adhered to with the bidding process taking place during August. The lowest responsible bid was submitted by Wellard Contractors, and IDFG executed a contract to proceed with the construction. The following shows the bidding information.

Carmen Creek 03 Fish Screen Installation - Idaho Public Works Contract						
IDFG Project No.	Project	Initial Cost	Change Orders	Total Cost	Start Date	End Date
2015-113	Carmen Creek-03	$38,283.00	$-0-	$38,283.00	08/10/2015	09/14/2015

The Screen Program was reimbursed $4,383 for all the materials and appurtenances for fabrication of fish screen drum and paddlewheel. This brought the total cost, with the Idaho Public Works 2015-122 ($33,900) and materials ($4,383) to $38,283 (Photos 43-44). This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Tower Creek-04 (STowC-04) Fish Screen

- **Work Element (I): 69 Install Fish Screen**

and

123 Tower Creek Road Culvert Replacement Project

- **Work Element (J): 85 Remove/Breach Fish Passage Barrier**

Easement Specialist Larry Weeks met with Cindy Yenter, Idaho Department of Water Resources (IDWR), and traveled to the proposed Tower Creek-04 (SToC-04) bridge and fish screen site on 123 Tower Creek Road to get the opinion of IDWR if IDFG should proceed with construction of the bridge. The upstream, absentee landowner is unwilling to allow the water users to move their point of diversion back to where it historically had been; upstream of the existing culvert crossing, where it was prior to the land being developed for a subdivision and the POD was moved down steam to allow the installation of a culvert. IDWR's opinion was that the water users would have the right to move their POD, but it would probably have to be decided in court. The IDFG and the water users opted to leave this project rest for the near future.

Easement Specialist Larry Weeks met with Berry Klinger, Sharon Hennig, Arlen Obrien, and Jeff DiLuccia, to inform them that the proposed bridge and fish screen for the SToC-04 diversion would be on hold until the landowner issue could be resolved.

Pahsimeroi-10 (P-10) Fish Screen

- **Work Element (K): 69 Install Fish Screen**

The Pahsimeroi-10 (P-10) diversion was previously screened by an old wiper screen installed in the 1960's, which was not operational and certainly didn't meet current NMFS juvenile fish screen criteria. In July 2015, the construction crew improved a ½ mile section of the access road into the new P-10 fish screen. After the road was completed and a new gate was installed, the construction crew excavated out the new screen location and placed a new modular rotary drum screen. The crew also realigned and cleaned the ditch from the head gate to the new screen. The old screen and concrete was removed and the site was rehabilitated. The Screen Program was reimbursed by BPA $6,724 for all the materials and appurtenances for fabrication of fish screen drum and paddlewheel (Photos 45-46). This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Pratt Creek-01 Fish Screen Project

- **Work Element (L): 69 Install Fish Screen**

This project was delayed until the next Contract #71413.

Little Pahsimeroi Cross-Ditch Fish Screen

- **Work Element (M): 69 Install Fish Screen**

This project was installed in Contract #71413 and the name was changed to Patterson Big Springs Creek-10 Fish Screen. After further investigations by the Idaho Department of Water Resources, the source of water for this diversion was determined to be Patterson Big Springs Creek.

Lyon Creek Culvert Removal Project

- **Work Element (N): 85 Remove/Breach Fish Passage Barrier**

This small project to remove an earthen dam and small culvert on Lyon Creek was delayed due to a proposed land swap for mitigation for the Thompson Creek Mine and the Bureau of Land Management. Resource staff at the Bureau of Land Management wanted to develop this project as part of a larger habitat complexity project and encouraged us to delay to avoid having to permit two separate actions.

Tower Creek-02 (STowC-02) Fish Screen

- **Work Element (O): 69 Install Fish Screen**

In July 2015, the construction crew fabricated a new modular point of diversion fish screen and installed it in the Tower Creek-02 (STowC-02) diversion in September 9 (Photo 47). This screen was installed prior to a small pipeline and water conveyance project that was completed after the screen was installed. This new fish screen utilizes a closed rotary drum design before entering the pipeline system. The landowner-water user was very excited to see this project completed after being in the planning and permitting phase for many years. The Screen Program was reimbursed by BPA for a total cost of $6,484 for all the materials and appurtenances for fabrication of fish screen drum and paddlewheel. This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Bohannon Creek-07 Culvert Replacement Project

Bohannon Creek is a tributary to the Lemhi River, eight miles upstream from the city of Salmon, Idaho. The culvert was on a private drive and was undersized and perched on the downstream end causing fish passage issues. The project consisted of removing the undersized culvert with a prefabricated steel bridge designed in accordance with NOAA stream simulation design standards (Photos 48-49).

This project was not a BPA-sponsored project for the Anadromous Fish Screen Program, but was an IDFG sponsored project in BPA Project 2010-072-00, Contract 67754. However, extensive

technical assistance in the form of surveying, preliminary designs, final designs, and construction oversight was provided by Screen Program staff funded in both BPA Projects – 1994-015-00 and 2007-399-00, and Mitchell Act funding.

The project was permitted through the Bonneville Power Administration's Habitat Improvement Program III Programmatic, and additional Federal and local permits were acquired prior to the construction bidding phase.

In June, the plans and specification also went through a constructability review to ensure the effectiveness and ability for contractors to understand the contract documents well enough to provide well informed bids which will meet IDFG requirements during construction.

A final plan, specifications, and cost estimate package were completed in July and an Idaho Public Works formal bidding process occurred in August. The project started in early September with little to no complications. The contractor was Boyd Foster Backhoe Services of Leadore, Idaho.

Upper Bohannon Culvert Replacement - Idaho Public Works Contract						
IDFG Project No.	Project	Initial Cost	Bridge Cost	Total Cost	Start Date	End Date
2015-130	Upper Bohannon Culvert Replacement	$34,141.25	$55,900	$90,041.25	08/31/2015	09/30/2015

Furey Lane Culvert Replacement Project

The Furey Lane Culvert Replacement Project was a joint project with Lemhi County Road and Bridge and Custer County Road and Bridge. The project involved the design and construction of a prefabricated steel bridge to replace two undersized culverts at the Furey Lane and Pahsimeroi River intersection (Photos 50-51).

The project is located on the Pahsimeroi River upstream (approximately 16 miles) from its confluence with the Salmon River. The project involved removing an undersized culvert on the Pahsimeroi River that was a partial upstream passage barrier to ESA listed juvenile Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*Oncorhynchus mykiss*) and replace with a 24' wide by 45' full span pre-fabricated steel bridge. Adult steelhead and Chinook salmon enter the Pahsimeroi River each spring and summer to spawn and high densities of juveniles are present throughout the system. Because these culverts were undersized for the Pahsimeroi River conditions, fish passage and stream geomorphic impacts were compromised.

This project was not a BPA-sponsored project for the Anadromous Fish Screen Program, but was an IDFG sponsored project in the Pahsimeroi Accord funding BPA Project 2008-603-00, Contract 67742A. However, extensive technical assistance in the form of surveying, preliminary designs, final designs, and construction oversight was provided by Screen Program staff funded in both BPA Projects – 1994-015-00 and 2007-399-00, and Mitchell Act funding.

The project was permitted through the Bonneville Power Administration's Habitat Improvement Program III Programmatic, and additional Federal and local permits were acquired prior to the construction bidding phase.

Landowners adjacent to the project were actively involved during the design process by contributing comments, adding site knowledge and participating in design decisions. Even though the bridge structure's footprint was within Lemhi County and Custer right of way, the construction disturbance limits extended into private property. To allow for this disturbance, a temporary construction easement was executed between the property owners and IDFG.

Construction involved realigning the Pahsimeroi River approximately 200 feet upstream and downstream of the bridge. Due to human interference, the river flowed toward Furey Lane and then runs parallel prior to turning sharply into one of the culverts. Realigning the river slightly allowed the elimination of a skewed crossing and softened the river inflection points. Additional woody structures were included in the construction, and currently, additional vegetation is being planted.

To provide additional freeboard beneath the bridge girders and the high water, the road horizontal grade was raised approximately two (2') feet. Custer County Road and Bridge also requested the installation of a steel reinforced concrete deck over the prefabricated steel bridge.

From the engineer's estimate it was determined that the project's construction cost would be more than $100,000 and therefore according to Idaho procurement and public works laws would require a formal bidding process. The formal bidding process was adhered to and the bidding process took place during August. From this process IDFG executed a contract with Dahle Construction, LLC for the completion of the project. The following shows the bidding information.

Furey Lane Culvert Replacement - Idaho Public Works Contract						
IDFG Project No.	Project	Initial Cost	Bridge Cost	Total Cost	Start Date	End Date
2015-132	Furey Lane-Culvert	$159,422.50	$92,000	$251,422.50	09/14/2015	10/23/2015

Contract 71413 - September 27th 2015 thru September 26th 2016

Dowton Lane Culvert Replacement

- **Work Element (D): 85 Remove/Breach Fish Passage Barrier**

The Dowton Lane Culvert Replacement Project was a joint project with Lemhi County Road and Bridge and Custer County Road and Bridge. The project involved the design and construction of a prefabricated steel bridge to replace two undersized culverts at the Dowton Lane and Pahsimeroi River intersection (Photos 52-54).

The project is located on the Pahsimeroi River upstream (approximately 6 miles) from its confluence with the Salmon River. The project involved removing an undersized culvert on the Pahsimeroi River that was a partial upstream passage barrier to ESA listed juvenile Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*Oncorhynchus mykiss*) and replace with a 28' wide by 80' full span pre-fabricated steel bridge. Adult steelhead and Chinook salmon enter the Pahsimeroi River each spring and summer to spawn and high densities of juveniles are present throughout the system. Because these culverts were undersized for the Pahsimeroi river conditions, fish passage and stream geomorphic impacts have been compromised.

The project was permitted through the Bonneville Power Administration's Habitat Improvement Program III Programmatic and additional Federal and local permits were acquired prior to the construction bidding phase.

Landowners adjacent to the project were actively involved during the design process by contributing comments, adding site knowledge and participating in design decisions.

Construction involved realigning the Pahsimeroi River slightly upstream and downstream of the bridge. Due to human interference, the river flowed slightly toward Dowton Lane and then ran parallel prior to turning sharply into one of the culverts. Realigning the river slightly allowed the elimination of a skewed crossing and softening of the river inflection points.

To provide additional freeboard beneath the bridge girders and the high water, the road horizontal grade was raised approximately six (6") inches. Custer County Road and Bridge also requested the installation of a steel reinforced concrete deck over the prefabricated steel bridge.

From the engineer's estimate, it was determined that the project's construction cost would be more than $100,000 and therefore according to Idaho procurement and public works laws would require a formal bidding process. The formal bidding process was adhered to and the bidding process took place during August. From this process, IDFG executed a contract with Down to Earth Excavation, LLC for the completion of the project. The following shows the bidding information.

Dowton Lane Culvert Replacement - Idaho Public Works Contract						
IDFG Project No.	Project	Initial Cost	Bridge Cost	Total Cost	Start Date	End Date
2016-125	Dowton Lane-Culvert	$239,925.00	$173,947	$413,872.00	06/05/2016	08/24/2016

Lemhi River-10 (L-10) Fish Screen

- **Work Element (E): 69 Install Fish Screen**

This project was postponed due to another project in this contract going over budget. The lowest responsible bid in the Public Works Process for the Dowton Lane Culvert Replacement Project was considerably higher than the initial Engineer's estimate. This cost overrun caused the Dowton Lane Project to account for over 80% of the total capital budget allocated for this contract.

123 Tower Creek Road Culvert Replacement Project

- **Work Element (F): 85 Remove/Breach Fish Passage Barrier**

This project was postponed due to another project in this contract going over budget. The lowest responsible bid in the Public Works Process for the Dowton Lane Culvert Replacement Project was considerably higher than the initial Engineer's estimate. This cost overrun caused the Dowton Lane Project to account for over 80% of the total capital budget allocated for this contract.

Hawley- Eighteen Mile Creek Pump Screen

- **Work Element (G): 69 Install Fish Screen**

Hawley- Eighteen Mile Creek Diversion Project

- **Work Element (H): 85 Remove/Breach Fish Passage Barrier**

This project has subsequently been re-named as the Eighteen Mile Creek-02 (LEM-02) Fish Screen to more accurately reflect the current diversions on this tributary.

The Eighteen Mile Fish Screen Installation Project was a joint project with Upper Salmon Basin Watershed Project (USBWP) and the Natural Resources Conservation Service (NRCS). The IDFG portion of the project involved the design and construction of a 1.4 C.F.S. closed drum screen and bioengineered log weir check structure within Eighteen Mile Creek.

The project is located on the Eighteen Mile Creek upstream (approximately 1.5 miles) from its confluence with the Lemhi River. The overall project involved installation of an irrigation half pivot, pump, fish screen and site improvements for water conservation savings. The project was permitted through the Bonneville Power Administration's Habitat Improvement Program III Programmatic and additional Federal and local permits were acquired prior to the construction bidding phase.

The topographic survey, construction staking and final design with plans and specifications for bid was completed by Staff Engineer, Jared Bragg. The Public Works portion of the project involved dewatering the stream, fabrication, and installation of a precast concrete structure, installation of a log weir check structure, and the site remediation. IDFG Screen Program fabricated a metal fish screen that was fabricated with Mitchell Act funding and slid into the concrete structure upon irrigation system startup.

From the engineer's estimate, it was determined the project's construction cost would be less than $100,000 and therefore according to Idaho procurement and public works laws would not require a formal bidding process. Three qualified contracts were given a bid package with all three submitting responsive bids. The lowest responsible bid was submitted by H&N Construction and IDFG executed a contract to proceed with the construction. The following shows the bidding information.

Hawley- Eighteen Mile Fish Screen (LEM-02) - Idaho Public Works Contract						
IDFG Project No.	Project	Initial Cost	Change Order	Total Cost	Start Date	End Date
2015-143	Eighteen Mile Fish Screen	$11,800	-0-	$11,800	11/02/2015	11/13/2015

Pratt Mulkey Pump Fish Screen

- **Work Element (I): 69 Install Fish Screen**

This project was postponed due to another project in this contract going over budget. The lowest responsible bid in the Public Works Process for the Dowton Lane Culvert Replacement Project was considerably higher than the initial Engineer's estimate. This cost overrun caused the Dowton Lane Project to account for over 80% of the total capital budget allocated for this contract.

Pratt Creek-01 Fish Screen

- **Work Element (J): 69 Install Fish Screen**

The Anadromous Fish Screen Program's Construction Crew fabricated and installed the Pratt Creek-01 closed drum, paddle wheel driven modular fish screen. This fish screen was designed by the Screen Program Engineer Jared Bragg to be installed at the head end of a closed pipeline for irrigation that was designed by the NRCS (Photo 56). This screen was designed to operate at a maximum of 2.5 c.f.s. This fish screen was installed in late October, as this contract was extended for almost 4 months to change the contract period to start on February 1st. This was the first fish screen to be installed on Pratt Creek, and was part of a multi-agency effort to reconnect and improve habitat conditions for anadromous and resident fish in Pratt Creek. Most of Pratt Creek is protected under a Conservation Easement that was funded by BPA on the Phil Moulton Ranch.

Pahsimeroi – Big Springs Creek-10 (PBSC-10) POD Fish Screen

- **Work Element (K): 69 Install Fish Screen**

The goal of this cooperative project was to reconnect a portion of Patterson Big Springs Creek that was completely diverted into an irrigation cross ditch. The stream was reconnected by breaching a dike and replacing an elevated culvert with a bridge. The old headgate was removed and plugged, and the point of diversion was moved upstream and screened with a NMFS criteria point of diversion fish screen (Photo 55-56). The project now allows for a maximum of 2.5 cfs of water to be diverted where previously the entire creek was diverted into the cross ditch. The instream work involved removal of the dike, creation of some channel, and the installation of the bridge was completed by Trout Unlimited and the USBWP. The IDFG Screen Program then removed the old headgate, plugged the inlet of the ditch, and installed a NMFS criteria fish screen and pipeline. The completion of this project will result in a reconnection of over 3 miles of Patterson Big Springs Creek and shepherd critical flow to an important spawning area.

IDFG screen program assisted in project development, permitting, and construction and installation of the fish screen and headgate. This is one of 16 fish screens in the Pahsimeroi, a tributary to the Salmon River that has recently been installed or replaced to improve fish passage and reduce entrainment in the watershed. The Screen Program was reimbursed by BPA $13,995 for all the materials and appurtenances for fabrication of fish screen drum, housing, and solar-powered drive system. This total cost does not include personnel time for fabrication and construction costs for the metal works provided to IDFG through NMFS Mitchell Act funding.

Patterson Big Springs 10 Fish Screen and Headgate			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	IDFG Screen Program	$13,995	2016

Contract 74780 - September 27th 2016 thru January 31st 2018

Lemhi River-08A (L-08A) Fish Screen Replacement

- **Work Element (D): 69 Install Fish Screen**

The Lemhi River-08A (L-08A) fish screen installation involved replacing an older fish screen on a screened irrigation diversion. The existing fish screen was a 45° rotary drums screens installed in the early 1990's and had a volumetric flow ate 33.38 c.f.s. Several water conservation projects within Bohannon Creek and Wimpey Creek drainage required increasing the screen capacity to meet the increased water right transfers out of the L-08A diversion. These projects are administered through IDFG and will help with perennial stream flow within these watersheds. Options for increasing the screen capacity to the required 51.77 c.f.s. were investigated but due to the screen's age and location adjacent to the Lemhi River, it was decided to replace the screen with a larger screen in a different location. Also, because the screen was a 45° screen, the sweeping velocity does meet current criteria but and this minimal velocity has a tendency for sediment build up in front of the screens.

From the engineer's estimate it was determined that the project's construction cost would be more than $100,000 so IDFG followed Idaho procurement and public works laws and proceeded with a formal bidding process. The formal bidding process was adhered to and the bidding process took place during March. From this process IDFG executed a contract with Wellard Construction for the completion of the project. The following shows the bidding information.

Lemhi River L-08A Fish Screen Replacement						
IDFG Project No.	Project	Initial Cost		Total Cost	Start Date	End Date
2017-124	L-08A	$91,635		$117,489	07/21/2017	10/19/2017

The Screen Program was reimbursed by BPA $25,854 for all the materials and appurtenances for fabrication of four fish screen drum, paddlewheels, catwalks, and handrails. This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding (Photo 57).

Hawley Creek (LHawC-02) and Canyon Creek (LCanyC-03) Fish Screen Installations

- **Work Element (E,G): 69 Install Fish Screen**
- **Work Element (F,H): 85 Remove/Breach Fish Passage Barrier**

The Hawley Creek (LHawC-02) and Canyon Creek (LCanyC-03) fish screen installations involved constructing two fish screens at three unscreened irrigation diversions (LHawC-02 is a consolidation). The project involved installing headworks structures, fish screens, secondary debris screening and connecting gravity pressurized irrigation systems. The purpose of the proposed actions was the restoration of the historical corridors between the Lemhi River and quality habitat on the land upstream of stream confluences and to benefit Endangered Species Act (ESA) listed Snake River spring/summer Chinook salmon, Snake River steelhead and Columbia

River bull trout as well as resident redband/rainbow trout. These projects will have the following effects:

1. Increased water quantity and perennial flow in Hawley Creek and Canyon Creek below the LHawC-01, LHawC-02, and LCanyC-03 diversions.
2. Eliminating entrainment and mortality of fish in the irrigation ditches and a LHawC-02 bubbler.
3. Reducing the potential for fish stranding and mortality caused by rapid flow fluctuations that typically occur during irrigation operations.
4. Improve water quality.
5. Restore wetland, riparian, and aquatic habitat quantity, quality, and complexity.

The Canyon Creek and Hawley Creek Habitat Restoration Project is a partnership project between the BLM Salmon Field Office (SFO), the Idaho Governor's Office of Species Conservation and - Upper Salmon Basin Watershed Program (OSC-USBWP), the Natural Resources Conservation Service (NRCS), Lemhi Soil and Water Conservation District (LSWCD), Idaho Department of Fish and Game (IDFG), McFarland Livestock Company (MLC), and Leadore Land Partners (LLP).

The Hawley Creek -02 diversion site is approximately 8 linear miles upstream of the Hawley Creek/Eighteen Mile Creeks confluence with the Lemhi River. Both LHawC-01 and LHawC-02 were open channel ditches with diversions and head gate structures that typically diverted water year round, and at typical flows, became a passage issue for juvenile fish. The LHawC-02 project installed a new headworks structure and fish screen and replaced the open irrigation conveyance system with a closed pipe line and consolidated the diversions. IDFG portion of the work included installing an instream rock diversions structure, an instream rock grade control structure, a headworks structure, a rotary drum fish screen, a secondary debris screen, irrigation isolation valves and connection for the pipeline (Photo 58).

The Canyon Creek -03 site is approximately 3 linear miles upstream of the Canyon Creek and Lemhi River confluence. The existing LCC-03 diversion is currently an unscreened open ditch with a wooden checkup structure to divert water. This check structure can be a complete passage barrier during certain stream flows and diversion flow rates. The LLC-03 project installed a new headworks structure and fish screen, and replaced the open irrigation conveyance system with a closed pipe line and consolidated the diversions. IDFG portion of the work included installing an instream rock diversions structure, an instream rock grade control structure, a headworks structure, a closed drum fish screen, irrigation isolation valve and connection for the pipeline (Photo 59).

From the engineer's estimate, it was determined that the project's construction cost would be less, than $100,000, however to encourage bidding fairness, IDFG followed Idaho procurement and public works laws and proceeded with a formal bidding process. The formal bidding process was adhered to and the bidding process took place during March. From this process, IDFG executed a contract with H&N Construction for the completion of the project. The following shows the bidding information.

Hawley Creek 02 (LHaC-02) and Canyon Creek (LCanyC-03) Fish Screens						
IDFG Project No.	Project	Initial Cost		Total Cost	Start Date	End Date
2017-106	Hawley-Canyon	$84,760.00		$114,206	03/20/17	05/01/17

For the Hawley Creek-02 fish screen, the Screen Program was reimbursed by BPA $8,955 for all the materials and appurtenances for fabrication of fish screen drum, paddlewheel, trash screen, and catwalks. This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

For the Canyon Creek-03 fish screen, the Screen Program was reimbursed by BPA $20,491 for all the materials and appurtenances for fabrication of fish screen drum, housing, and paddlewheel for this closed drum design. This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Pratt-Mulkey Pump Fish Screen

- **Work Element (I): 69 Install Fish Screen**

In March, the Construction Crew, fabricated and installed a small 1.0 c.f.s POD closed drum fish screen for the Pratt-Mulkey Pump Site on the Sandy Creek slough This is a part of a large multi-agency project to re-connect Pratt Creek.

Pratt-Hedt Fish Screen Project

- **Work Element (J): 69 Install Fish Screen**

This project was completed in the Contract 78445 in 2019.

Lemhi River-60 (L-60) and Lemhi River-62 (L-62) Fish Screen Replacements

- **Work Element (Substituted for K, L): 69 Install Fish Screen**

The Lemhi River-60 (L-60) and Lemhi River-62 (L-62) fish screen installations involved replacing two fish screens at two screened irrigation diversions (Photos 60-61). The existing fish screens were 45° rotary drums screens that were installed in the early 1990's. The concrete housing for L-62 was poured in the winter and likely lacked air entrainment which appears to be causing the concrete to break apart and fail. Due to the concrete failure, the screens and seals are not functioning properly, creating an operation and maintenance issue. Also, because both screens are 45° screens the sweeping velocity does meet current criteria and this minimal velocity has a tendency for sediment build up in front of the screens.

From the engineer's estimate, it was determined that the project's construction cost would be less than $100,000, however to encourage bidding fairness, IDFG followed Idaho procurement and public works laws and proceeded with a formal bidding process. The formal bidding process was adhered to and the bidding process took place during March. From this process, IDFG executed a

contract with H&N Construction for the completion of the project. The following shows the bidding information.

Lemhi River-60 (L-60) and Lemhi River-62 (L-62) Fish Screen Replacement						
IDFG Project No.	Project	Initial Cost		Total Cost	Start Date	End Date
2017-127	L-60 & L-62	$68,000		$68,000.00	08/28/2017	10/19/2017

For both the L-60 and l-62 fish screen replacements, this total cost does not include operating and materials for the fabrication of these screens or personnel time for fabrication and construction costs for the metal works. The funding for all the materials and appurtenances for fabrication of fish screen drums, paddlewheels, and metal works for these rotary drum designs was provided to the IDFG through NMFS Mitchell Act funding.

Salmon River-23A (S-23A) Fish Screen

- **Work Element (M): 69 Install Fish Screen**

The Screen Program hired Getty Construction of Challis to install the Salmon River-23A (S-23A) fish screen and fish bypass. IDFG Utility Craftsman fabricated a steel modular tandem rotary drum fish screen during September 2017 (Photo 62). The screen was fabricated in two sections due to a weight restriction on an existing access bridge to the site. Due to equipment needs and timing associated with the weight restriction, the contractor was hired and IDFG provide a Utility Craftsmen for technical assistance and verification the project was installed to construction plans and specifications. The existing wooden fish screen was removed and the new fish screen was installed in the ditch, downstream to increase the submergence on the drum. By moving the fish screen structure, this would allow the existing head gate at the point of diversion to provide the water and limit the need for the contactor to install temporary in stream check structures. The contractor also installed approximately 280 feet of fish screen bypass pipe along a new alignment. Getty Construction's total cost to install the fish screen was $3,500.00

For the S-23A fish screen, the Screen Program was reimbursed by BPA for a total cost of $17,276 for all the materials and appurtenances for fabrication of the two fish screen drums, paddlewheel, and catwalk. This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Bayhorse Creek Bridge Replacement Project

- **Work Element (O) – 85 Remove/Breach Fish Passage Barrier**

Due to concerns due to the potential cultural resources and landowner concerns this project has been postponed until some additional project components can be resolved.

Carmen Creek-03 (SCC-03) Bridge Replacement Project

- **Work Element (O) – 85 Remove/Breach Fish Passage Barrier**

Carmen Creek is a tributary of the Salmon River, and in the fall of 2016, the IDFG Anadromous Fish Screen Program installed a concrete rotary drum fish screen at the Carmen Creek-03 (SCC-03) diversion. The access road to operate and maintain the fish screen crossed Carmen Creek utilizing an old wood sub-structure bridge. Historically the property owner and irrigator used the bridge during spring runoff and then used a ford during low water flows or when using a heavier vehicle. For long term operation and maintenance of the new fish screen and to eliminate the ford crossing, IDFG removed the old bridge and installed a steel girder bridge supported on perched concrete abutments. IDFG purchased the steel I-beam girders and wood decking, but due to the busy fall construction schedule, a public works contract was prepared for installing the abutments and setting the girders.

From the engineer's estimate, it was determined the project's construction cost would be less than $100,000; and therefore, according to Idaho procurement and public works laws would not require a formal bidding process. Three qualified contracts were given a bid package with all three submitting responsive bids. The lowest responsible bid was submitted by Dahle Construction of $26,800 and IDFG executed a contract to proceed with the construction. The contract portion of the project started in January 15, 2018 and was completed by January 26th. After Dahles completed the substructure IDFG staff installed the wood deck and completed the final site cleanup. The project was completed by March 26, 2018 (Photo 63).

Contract 78455 - February 1st 2018 thru January 31st 2019

Bohannon Creek-03 (LBC-03) Vertical Turbine Pump Station

- **Work Element (D): 85 Remove/Breach Fish Passage Barrier**

Program Coordinator Paddy Murphy and Staff Engineer Jared Bragg attended several meetings with IDFG staff and water users on the Bohannon Creek-03 (LBC-03) diversion. Water diverted from the LBC-03 diversion depletes the stream in late summer. Closing LBC-03 would improve fish passage in Bohannon Creek if the irrigation water was allowed to flow into the Lemhi River and then be pumped from the L-08A diversion on the Lemhi River. This action would connect Bohannon Creek continuously to the Lemhi River and will save the conveyances losses associated with this existing Bohannon Creek diversion.

To reestablish a functional connection for fish between Bohannon Creek and the Lemhi River, IDFG's primary objective was to remove the Bohannon Creek-03 (LBC-03) diversion and eliminate water extraction at this location. A plan was devised to spill the irrigation water down the Bohannon Creek channel to the confluence with the Lemhi River. However, since elimination of irrigation practices was never a consideration, this spilled flow would need to be captured and redistributed to the original place of use. To accomplish this, IDFG Staff Biologists and Staff Engineers designed large scale irrigation systems on 2 separate ranches (Jolley and Stokes). These would recapture the Bohannon Creek flow once it reached the Lemhi River, and would pump water from an existing Lemhi irrigation ditch (L8A). Additional tasks included coordination with all of the water users on L8A, submitting appropriate water right transfer documents to the Department of Water Resources, and developing agreements with the Bonneville Power Administration's

(BPA) water transaction program to offset pumping costs. The concept of spilling of water to the Lemhi River and recapturing in an existing irrigation ditch is expected to provide up to 10.0 Cubic Feet per Second (CFS) in lower Bohannon Creek. Approximately 8.5 CFS will be acquired from their decreed water rights. However, in the Lemhi River sub-basin, supplemental flow (e.g. high water) can be extracted if water is available and it does not affect other water users. In the case of Bohannon Creek, nearly 2.0 CFS is often extracted for this purpose, thus, a total of 10 CFS of previously unavailable flow will be provided in stream as a result of this project.

Multiple project components are necessary to implement such a large scale habitat project. A majority of the funding came from Pacific Coast Salmon Recovery Funding (2014–14NMF4380304) and BPA Project 2010-072-00 Lemhi River Restoration (OSC). First, we worked with engineers from IDFG and Quadrant Consulting, Inc. to develop designs for the project. Because of the complexity in delivering varying amounts of irrigation water to 2 separate locations, substantial coordination with both ranches was necessary. This resulted in many design modifications. Field surveys were completed to determine surface elevations. For natural resource consultation, we submitted the appropriate documents to BPA using their HIP III programmatic process, and also coordinated directly with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to secure compliance. We secured permitting documents under Section 404 of the clean water act, and also finalized cultural resource consultation with BPA. We worked with Idaho Department of Water Resources to finalize and submit the water rights transfer that supports this project. For construction purposes, we worked with consultant, Quadrant Engineering, to finalize the design package and develop bid documents. IDFG staff completed the bidding process for hiring a contractor, Bird Excavation, to complete implementation of the project, and a contractor was selected in March 2018. Construction and installation of both irrigation systems was completed in 2018. Installation of the Jolley irrigation system commenced in early May 2018. The contractor installed more than 10,000 ft of irrigation line to serve two primary irrigation pivots and hand and wheel lines Construction oversight ensured that pipe was properly bedded according to specifications. A new 10 tower irrigation pivot was installed near the end of the system. Pumping would occur from the existing L8A canal, thus, a diversion/check structure was constructed that would direct flow to the pump station. A pumping station and associated hardware was installed adjacent to the check structure. IDFG collaborated with the Stokes ranch and the National Resource Conservation Service to utilize EQIP funding for a portion of the irrigation project. A smaller 6 tower pivot and a pump station was installed along the northwest end of the project. In June, Idaho Power installed the power line along Barracks Lane that will provide commercial power to both Jolley and Stokes systems. The system was tested by Precision Pump, the pump manufacturer, in early July. The Jolley ranch was successfully irrigating with the new system soon after.

For the Stokes ranch portion, due to funding shortages, the IDFG Staff Biologist Jeff Diluccia worked with the IDFG Anadromous Fish Screen Program to secure funds in 2007-399-00 for acquisition of the pumping station (Variable Frequency Drive controls, turbine pumps, etc.). The purchase of this pump was the only cost associated with this contract #2007-399-00. We began the bidding process in June 2018 to select a contractor to construct and install the complete irrigation system. IDFG signed a contract with H&N Construction in early July to proceed with implementing the project. Cost of the Variable Frequency Drive Pump, including delivery and set-up was $101,036.81 (DFG- 2017-5144) As with the Jolley system, project components were

completed in a similar fashion. This included approximately 7,000 ft. of irrigation line that was properly bedded, with the disturbed ground adequately reclaimed with topsoil. Additional project components that were implemented included installation of 3 irrigation pivots, pump station, and diversion structure. The system was tested in early August, and came on line soon thereafter. Lastly, LBC-03, the irrigation diversion and canal that previously extracted surface water for irrigation to these ranches, was plugged to eliminate any possibility of future water extraction. Working with sub-contracted engineering consultants, IDFG completed compliance monitoring during project construction to ensure that all project components (e.g. pipe, pipe bedding material, pivots, pump stations, etc.) were constructed according to engineer specifications.

Pahsimeroi River-17 (P-17)

- **Work Element (E): 69 Install Fish Screen**

In this performance period, Program Coordinator Paddy Murphy and Easement Specialist Mike Demick participated in multiple meetings with partners CSWCD, Bureau of Land Management (BLM), and The Nature Conservancy (TNC) regarding the Pahsimeroi-17 (P-17) diversion, screen, and irrigation efficiency project. Unfortunately, this project has been delayed because of a change in ownership and working through all the needed details with the new owners. We are working with partners in continuing to negotiate with the new owners on the final irrigation/pipeline designs and ground water pumping on some of the irrigated acreages. Hopefully we can develop options and implement designs on a few project to improve flows through a conservation easement, property acquisition (Posada fields), water conveyance projects, and fish screen and passage projects. Final designs for the fish screen have been submitted, and the official BLM ROW application has been submitted by IDFG for the access to install and maintain the new fish screen. The project is partially on BLM so the plans needed to be prepared to initiate the BLM NEPA process, and get the new Right of Ways (ROW) through a review process. One complicating factor that has delayed the project is that the BLM has determined that it must go through an internal ethics committee process before granting the landowners a right-of-way across lands administered by the BLM because Karen Morgan, the landowner, is a BLM employee. This project has been a challenge, as we have been working on planning, designs, and landowner buy in for almost 4 years. However, this pivotal project is critical to connecting the upper and lower portions of the Pahsimeroi River and is currently our highest priority project. This project and the proposed irrigation efficiencies will significantly increase the amount of instream flow, especially in the summer months, by approximately 5 cfs. and will help reconnect this historically dewatered section of the Pahsimeroi River down to the Hooper Lane crossing.

Lemhi River-61 (L-61) Fish Screen

- **Work Element (F): 69 Install Fish Screen**

The Lemhi River-61 (L-61) fish screen involved installing a replacement screen on a Lemhi River irrigation diversion (L-61). The existing L-61 fish screen is 45° rotary drums screen that was installed in the early 1990's. The elevation of the fish screen floor is low in relationship to the existing headgate and a downstream culvert. This has caused water to pond up around the screen and does not allow the older screen to function efficiently. The new design includes raising the screen floor, and in the summer of 2019, we plan to install a new head gate, straighten the ditch and lower the culvert at the stream crossing. Also because the current screen is an older 45° screen

design, the sweeping velocity is minimal and has a tendency for sediment build up in front of the screens.

From the engineer's estimate it was determined that the project's construction cost would be more than $100,000, so IDFG followed Idaho procurement and public works laws and proceeded with a formal bidding process. The formal bidding process was adhered to and the bidding process took place during September. From this process IDFG executed a contract with Down to Earth Excavation for the completion of the project. The following shows the bidding information. The project started construction October 8th, 2018 and was completed on December 11, 2018 (Photo 64). The initial cost in this bid included the Big Timber Creek-01 fish screen which ultimately was pulled out of the contract, as the work was never completed due to weather concerns. Down to Earth Excavation installed the project for $60,079.

Lemhi River-61 (L-61) Fish Screen Replacement						
IDFG Project No.	Project	Initial Cost		Total Cost	Start Date	End Date
2018-148	L-61	$116,250		$71,711	10/08/2018	12/11/2018

Additionally, the Screen Program was reimbursed by BPA $11,632.30 for all the materials and appurtenances for fabrication of two fish screen drum, paddlewheels, catwalks, and handrails. This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Big Timber Creek-01 (LBTC-01) Fish Screen
- **Work Element (G): 69 Install Fish Screen**

Final designs were completed and a formal public works bid package (IDFG 2018-131) was completed for the installation of two new fish screens for the Lemhi River-61 (L-61) and Big Timber Creek-01 (LBTC-01) diversions. Plans included structure design, dewatering plans erosion and sediment control structures and construction details. Because of the estimated construction cost, the project was placed in the semi-formal bidding process and advertised in local newspapers for construction. The starting date for construction was October 8th, 2018. The initial cost in this bid included the Big Timber Creek-01 fish screen which ultimately was pulled out of the contract, as the work was never completed due to weather concerns.

Program Coordinator Paddy Murphy, Staff Engineer Jared Bragg, and Staff Biologist Windy Schoby had multiple planning meetings with the USBWP, LRLT, and NRCS for planning and implementation of projects to improve flows and fish passage in Big Timber Creek, a tributary to the upper Lemhi River. This complex project involves the removal of the Big Timber-02 (LBTC-02) diversion, which was removed in the fall of 2018, the installation of a fish screen on lower Big Timber Creek, known as Big Timber Creek-01 (LBTC-01). This project is a cooperative project with the Lemhi Regional Land Trust. Due to some landowner concerns the potential screen site was moved off of private property to the Leadore City Park. This project was slated for installation in the fall of 2018, but due to the location change of the fish screen, it will be delayed until the fall of 2019. This is a pivotal and complimentary project to many other projects in trying to improve flow and habitat conditions in Big Timber Creek for both anadromous and resident salmonids. Unfortunately, due to a large water right protest in Big Timber Creek, this project has been

postponed. In the interim, the water rights involved in the Big Timber Creek-01 (LBTC-01) are being taken out of the screened L-63 diversion.

Pratt Creek - Hedt (LPrC-Hedt) Fish Screen
- **Work Element (H): 69 Install Fish Screen**

After reviewing blueprints with other team members, Construction Foreman Daniel Jones supervised the fabrication and installation of the Pratt Creek-Hedt fish screen, which is a small, passive pump screen design. Fabrication was completed in late November and installed in December 2018. Project installed a small passive point-of-diversion pump screen on the Pratt Creek-Hedt diversion. This project is part of a larger multi-agency project that is actively seeking to reconnect Pratt Creek to the Lemhi River. The Screen Program was reimbursed by BPA $1,398.65 for all the materials and appurtenances for fabrication of the passive screen, flex tube, and headwall structure (Photo 65). This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Pratt Creek-02 (LPrC-02) Fish Screen
- **Work Element (I): 69 Install Fish Screen**

IDFG executed a contract with H&N Construction for the completion of the project in the fall of 2018. The contractor attempted to install the screen in 2018 but winter weather conditions limited access thus not allowing installation until spring of 2019. It was installed in April, 2019 in Contract 81380.

Eighteen Mile Creek-01 (LEM-01) Fish Screen
- **Work Element (J): 69 Install Fish Screen**

The Eighteen Mile Creek-01 fish screen project involved installing a steel modular closed drum fish screen, head gate, instream check structure and overflow/fish bypass piping. The project was installed and operational prior to irrigation startup for spring 2018. IDFG fabricated the head gate and fish screen structure during January 2018. The location for the new head gate installation was in area that was oversaturated and tough to access. IDFG had the opportunity to use a local contractor who was completing a multi-agency stream restoration project adjacent to the site. Because the contractor was mobilized to the site and had the appropriate equipment, IDFG requested a quote for the head gate installation and the installation of approximately 160 feet of pipe. The Contractor installed the structures during March 2018 for a cost of $14,050 (Photo 66).

The Screen Program was reimbursed by BPA $32,221 for all the materials and appurtenances for fabrication of the modular fish screen, drum, paddlewheels, solar power catwalks, and headgate control structure. This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Meadow Creek-01 (SVCMC-01) Fish Screen
- **Work Element (K): 69 Install Fish Screen**

Staff Engineer Jared Bragg, Construction Foreman Dan Jones, Easement Specialist Mike Demick, and Staff Biologist Windy Schoby met with Amy Cassel, IDWR representative at Goat Creek-06/07 fish screen. The screen was built for approximately 18 cfs, but 8 cfs has been put into the water bank. We discussed ways to possibly modify the screen to properly function with the reduced water right. Finally, the group visited Meadow Creek to look at the feasibility of installing screens in the watershed. There were concerns that the wet boggy ground may be difficult to access to install and maintain screens, but after one year of changed irrigation practices upstream the soils have firmed up. The group concluded that we could work towards screening the diversions if the landowner was willing. The deliverable of the Meadow Creek-01 diversion location was not accomplished because there is a new landowner and potential changes to an overall plan for diversions and screening has not been put together yet. After a few years of ownership the landowner will likely be ready to move forward with a plan.

Lemhi River -08A (L-08A) Fish Screen – Phase II Ditch Restructuring
- **Work Element (L): 69 Install Fish Screen**

In the summer of 2017, the IDFG Anadromous Fish Screen Program installed a new concrete rotary fish screen at the Lemhi River- 08A (L-08A) diversion. To meet new water right transfer flows associated with another project, the screen capacity was increased and the screen was constructed during irrigation. Due to irrigation conflicts and improvements required to the irrigation conveyance system, the screen was not operated or connected until after irrigation season. The Lemhi River -08A public works project involved all modifications required to accommodate the increased flow and connection to the new screen. This project included installing new headworks structure, lateral head gates, culverts, removal of the existing screen, new fish bypass pipe, and installing new water measuring device (Photos 67-69).

From the engineer's estimate, it was determined that the project's construction cost would be less than $100,000. However to encourage bidding fairness, IDFG followed Idaho procurement and public works laws and proceeded with a semi-formal bidding process. The semi-formal bidding process was adhered to, and the bidding process took place during January. From this process, IDFG executed a contract with Bird Excavation for the completion of the project. Cost of the project was $27,100, and construction started March 6th, 2018 and ended April 13th, 2018.

Lemhi River- 03AO (L-03AO) Fish Screen
- **Work Element (M): 69 Install Fish Screen**

The Lemhi River-03AO (L-03AO) fish screen installation involved replacing a fish screen on a screened irrigation diversion. The existing fish screen was a 45° rotary drum screen installed in the early 1990's and had a volumetric flowrate of 15.3 cfs. The new fish screen design is a 22.5° degree rotary drum screen and has a design flow capacity of 7.65 cfs (Photo 70). Also because the screen was a 45° screen the sweeping velocity does meet current criteria but this minimal velocity has a tendency for sediment build up in front of the screens.

From the engineer's estimate, it was determined that the project's construction cost would be less than $100,000, but due to location IDFG followed Idaho procurement and public works laws and proceeded with a formal bidding process. The formal bidding process was adhered to and the

bidding process took place during July. From this process, IDFG executed a contract with Wellard Construction for the completion of the project. The following shows the bidding information.

Lemhi River L-03AO (L-03AO) Fish Screen Replacement						
IDFG Project No.	Project	Initial Cost		Total Cost	Start Date	End Date
2018-130	L-03AO	$58,493		$66,118	08/20/2018	10/05/2018

The Screen Program was reimbursed by BPA $7,625.14 for all the materials and appurtenances for fabrication of the metal works, drum, paddlewheels, catwalks, and headgate control structure. This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Contract 81380 - February 1st 2019 thru January 31st 2020

Elliot Model 1870F Boom Truck

In late May 2019, the IDFG Anadromous Fish Screen Program received our new boom truck from Legacy Equipment (Photo 71). The Elliot Model 1870F Boom Truck – 2020 Freightliner M2 106 280 h.p. Cummins B 6.7 Diesel was delivered to our compound and Legacy Equipment provided training to the shop crew and supervisors. This essential piece of equipment was bid out for $184,251 and was funded by both Bonneville Power Administration ($140,000) and Mitchell Act funding ($44,251). The Boom Truck was originally in the previous contract (78455) but due to bidding and completion delays between the State of Idaho Division of Purchasing and Legacy Equipment, the transaction for payment occurred after the end of the contract period, which required it to be moved into this contract.

Pratt Creek -03 (LPrC-03) Fish Screen

- **Work Element (D, E): 69 Install Fish Screen**

The Pratt Creek-03 (LPrC-03) fish screen installation involved constructing a two bay rotary drum screen at an unscreened irrigation diversion. The project involved installing headworks structures, fish screen, and connecting to an irrigation pipeline used to convey water to a piped irrigation system. The purpose of the proposed actions was the reconnection of the historical corridors between the Lemhi River and quality habitat on the land upstream of stream confluences and to benefit Endangered Species Act (ESA) listed Snake River spring/summer Chinook salmon, Snake River summer steelhead and bull trout as well as resident westslope cutthroat trout.

The Pratt Creek fish screen was a partnership project between the BLM Salmon Field Office (SFO), the Idaho State Office of Species Conservation-Upper Salmon Basin Watershed Program (OSC-USBWP), the Natural Resources Conservation Service (NRCS), Lemhi Soil and Water Conservation District (LSWCD), Idaho Department of Fish and Game (IDFG) and Phil Moulten (property owner).

Pratt Creek-03 site is approximately 3.5 linear miles upstream of Pratt Creek's confluence with the Lemhi River. LPrC-03 was an open channel ditch without a head gate structure and typically

diverted during typical irrigation season. The LPrC-03 project installed a new headworks structure and fish screen and replaced the open irrigation conveyance system with a closed pipe line and consolidated the diversions. IDFG portion of the work included installing an instream rock diversions structure, an instream rock grade control structure, a headworks structure and a rotary drum fish screen.

From the engineer's estimate, it was determined that the project's construction cost could be more than $100,000, so IDFG followed Idaho procurement and public works laws and proceeded with a formal bidding process. The formal bidding process was adhered to and the bidding process took place during July. From this process, IDFG executed a contract with H&N Construction for the completion of the project. The following shows the bidding information.

Pratt Creek-03 (LPrC-03) Fish Screen Installation					
IDFG Project No.	Project	Initial Cost	Total Cost	Start Date	End Date
2019-118	LPrC-03	$84,500.00	$102,547	09/23/19	11/07/19

The Screen Program was reimbursed by BPA $18,047 for all the materials and appurtenances for fabrication of the metal works, drum, paddlewheels, catwalks, and headgate control structure (Photo 74-75). This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Lemhi River-10 (L-10) Fish Screen Project
- **Work Element (F): 69 Install Fish Screen**

This work element was descoped/substituted in the contract to allow room in the budget for the Boom Truck purchase. The Boom Truck was not delivered in the time period of the previous contract and adjustments were made, as the purchasing contract and purchasing was already approved and completed. The L-10 fish screen will be installed in the next contract in fall 2020.

Pahsimeroi River-17 (P-17) Fish Screen Project
- **Work Element (G): 69 Install Fish Screen**

This work element was descoped/substituted in the contract to allow room in the budget for the Boom Truck purchase. The Boom Truck was not delivered in the time period of the previous contract and adjustments were made, as the purchasing contract and purchasing was already approved and completed. The Pahsimeroi-17 fish screen is postponed until we have landowner acceptance of all the project objectives, especially the size of pipeline and quantity of water that will be delivered to the point of use. We will continue to pursue this project as it is a very high priority for fish restoration in the Pahsimeroi Subbasin.

Big Timber Creek-01 (LBTC-01) Fish Screen Project
- **Work Element (H): 6 Install Fish Screen**

This Big Timber Creek-01 (LBTC-01) fish screen project was to deliver an existing high water

right that remained to be delivered after the Big Timber Creek-02 diversion was closed. This diversion was a major fish barrier and has now been removed. The current project as described in this contract has changed and was not completed. Due to a substantial number of ongoing water rights protests in this basin, this project has changed direction and scope, and for the next few interim years this high water right will now be taken out of the Lemhi-63 Diversion which already has existing fish screen which will need some modification.

Canyon Creek-02 (LCanyC-02) Fish Screen Project
- **Work Element (I): 6 Install Fish Screen**

The Canyon Creek-02 (LCanyC-02) Fish Screen Project was stalled due to the irrigator being very nervous and concerned about the current design and the new location of project having the potential to dewater the stream at the new diversion location, there are additional concerns about changing the POD in the existing pressurized pipeline. Project will be installed in 2020.

Little Sawmill Creek-01 (LSawC-01) Fish Screen Project
- **Work Element (J): 6 Install Fish Screen**

The goal of this project was to screen a new point of diversion on Little Sawmill Creek-01 (LSawC-01) diversion. The diversion was moved downstream as part of a project that reconnected Indian Springs and Little Sawmill Creek to the Lemhi River. The new point of diversion screen is for 1.0 CFS and will only be used in portions of the irrigation season when the new irrigation system needs to utilize a pump system rather than the gravity feed system (Photo 78). The larger project also removed a confined animal feeding lot from the streambank and rerouted the springs into a more natural meandering channel. Two future projects downstream should have Little Sawmill Creek and Indian Springs completely reconnected and restored.

The fish screen project was completed in August 2019. IDFG Screen Program Construction Crew installed this POD modular closed drum fish screen. The Screen Program was reimbursed by BPA $6,461 for all the materials and appurtenances for fabrication of the modular steel housing, drum, paddlewheels. This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Pratt Creek-02 (LPrC-02) Fish Screen Project
- **Work Element (K): 6 Install Fish Screen**

Pratt Creek-02 (LPrC-02) fish screen installation involved the construction and installation of a new head works structure and fish screen on a previously unscreened diversion. Pratt Creek is a tributary to the Lemhi River, with the project site at the upper end of Pratt Creek. The point of diversion was moved approximately 150 upstream. Due to the installation of an irrigation conveyance pipe below the fish screen, additional elevation was requested by the landowner. The head gate structure was a low profile slide gate with a sluice chute to reduce sedimentation entering conveyance system. The fish screen was a steel modular rotary drum screen with a 10” fish bypass pipe. The head gate and fish screen were fabricated by IDFG and installed by a local contractor (Photos 72-73).

From the engineer’s estimate, it was determined that the project’s construction cost would be less than $100,000 so IDFG followed Idaho procurement and public works laws and proceeded with a semi-formal bidding process. The formal bidding process was adhered to and the bidding process

took place during November. From this process, IDFG executed a contract with H&N Construction for the completion of the project. The contractor attempted to install the screen in 2018 but winter weather conditions limited access thus not allowing installation until spring of 2019. The following shows the bidding information. The project started construction April 1st, 2019 and was completed on April 15th, 2019.

IDFG Screen Program entered into a contract with H&N Construction for construction and installation on the Pratt-02 project. H&N Construction's portion of the contract was to install the IDFG provided metal headgate structure and the IDFG provided steel modular rotary drum fish screen. Construction also included the construction of the open channel ditch from the head gate to the fish screen, installation of the fish bypass pipe, and the underground pipe connection from the fish screen to the existing conveyance system. Total contract price for H&N Construction to complete the project was $14,441.62 and construction took place from March 15th to April 15th, 2019.

Pratt Creek-02 (LPrC-02) Fish Screen						
IDFG Project No.	Project	Initial Cost		Total Cost	Start Date	End Date
2018-155	Pratt Creek-02 (LPrC-02)	$13,719.54		$27,318.29	4/01/2019	04/15/2019

Lemhi River-61 (L-61) Fish Screen Improvements
- **Work Element (L): 69 Install Fish Screen**

The Lemhi River-61 (L-61) Screen Improvement project is a completion of the fish screening project. In the fall of 2018, the Anadromous Fish Screen Program constructed a concrete rotary drum fish screen (IDFG 2018-148), however the screen was not operational because improvements need to be completed to the new ditch and point of diversion. The L-61 Screen Improvement project involved the installation of a headgate structure, excavation of new ditch from head gate through to the new fish screen and then connecting to existing ditch. Also the project reconnected a section of the stream channel and filled in and rehabilitated a section of the old L-61 ditch (Photos 76-77).

From the engineer's estimate it was determined that the project's construction cost would be less than $100,000 but IDFG decided to follow Idaho procurement and public works laws and proceeded with a semi-formal bidding process. The semi-formal bidding process was adhered to and the bidding process took place during June. From this process, IDFG executed a contract with Bird Excavation, LLC for the completion of the project. The following shows the bidding information. The project started construction July 8th and 95% of the work has been completed.

Lemhi River-61 (L-61)					
IDFG Project No.	Project	Initial Cost	Total Cost	Start Date	End Date
2019-161	L-61 Improvements	$64,233	$79,233	07/08/19	11/01/19

The Screen Program was reimbursed by BPA $1,889 for all the materials and appurtenances for fabrication of the modular steel housing, drum, paddlewheels. This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

Eighteen Mile Creek-Breshears (LEMC-03) Fish Screen

- **Work Element (M): 69 Install Fish Screen**

The Eighteen Mile- Breshears (LEMC-03) fish screen project was completed in July 2019. IDFG Screen Program hired H&N Construction to install the headgate and fish screen. H&N Construction was hired by the LCSWCD to complete a stream restoration project on Eighteen Mile Creek, so the installation of the headgate and fish screen was completed during this process, eliminating IDFG cost for mobilization and stream dewatering. For the IDFG portion of the contract, H&N installed an IDFG provided steel headgate, excavated an open channel ditch and sediment basin from the headgate to the fish screen, and installed the IDFG provided steel modular closed drum fish screen and bypass pipe. The total cost of installation from H&N Construction $5,500.00 The Screen Program was reimbursed by BPA $13,785 for all the materials and appurtenances for fabrication of the modular steel housing, drum, paddlewheels (Photos 79). This total cost does not include personnel time for fabrication and construction costs for the metal works provided to the IDFG through NMFS Mitchell Act funding.

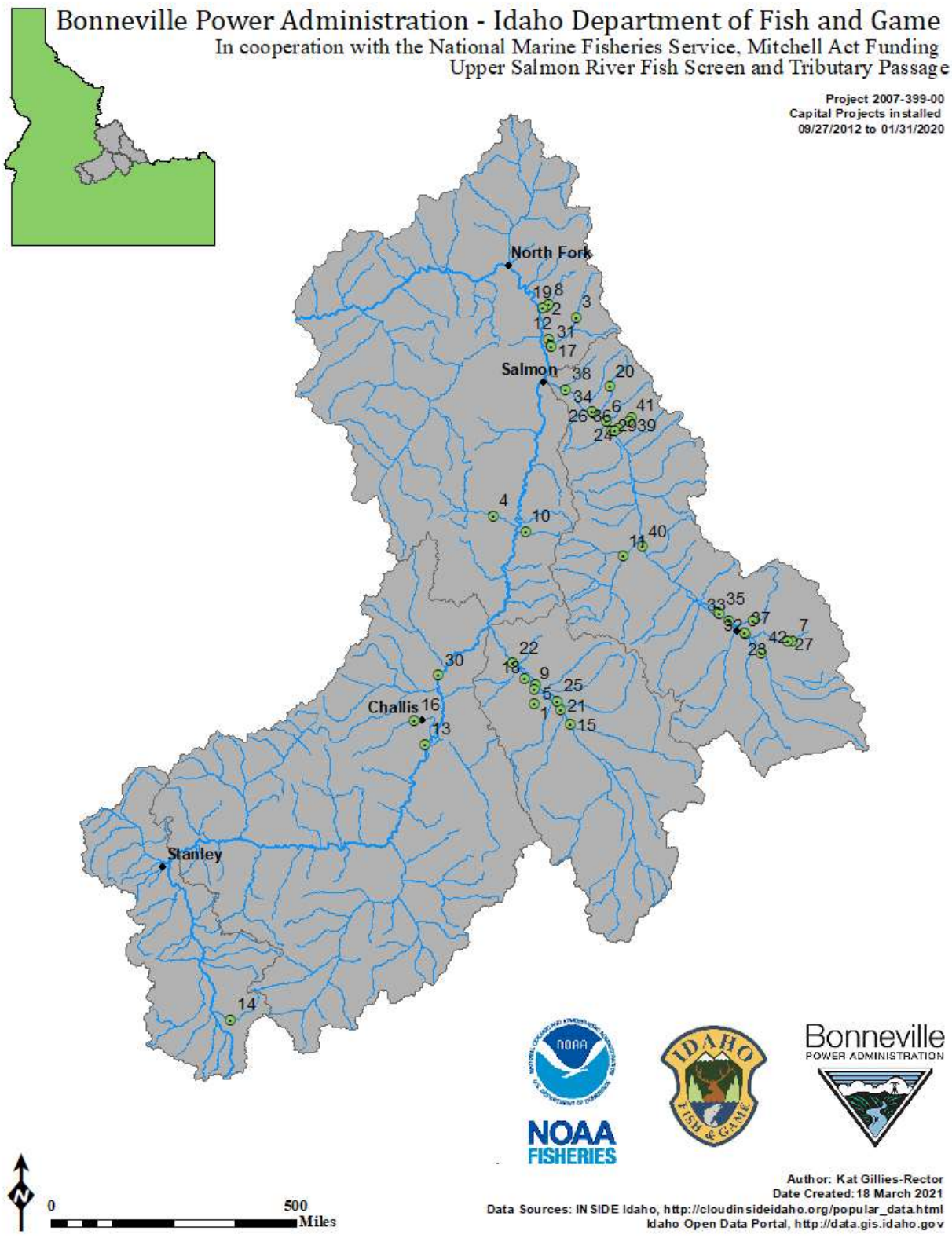

Figure 1. Locations of Capital Projects installed from 2013-2019.

	Map Index -	
	BPA Project 2007-339-00 - Capital Projects 2013-2020	**Contract #**
1	Sulphur Creek-01 (PSC-01) Fish Screen	58717
2	Tower Creek-03 (STowC-03) Fish Screen	58717
3	Carmen Creek-13 (SCC-13) Fish Screen	58717
4	Iron Creek-07 (SIC-07) Diversion	58717
5	Patterson Big Springs Creek-04 (PBSC-04) Culvert Replacement	58717
6	Wimpey Creek Culvert Replacement Project	58717
7	Hawley Creek-03 (LHawC-03) Fish Screen	63734
8	Sioux Lane Culvert Replacement Project	63734
9	Pahsimeroi-13 (P-13) Pump Intake Fish Screen	63734
10	Poison Creek-01 (SPoiC-01)Fish Screen	63734
11	Hayden Creek-08 (LHC-08) Fish Screen	63734
12	Carmen Creek Phase III Project	63734
13	Salmon River-28 (S-28) Fish Screen - Bridge Crane	63734
14	Pole Creek-01 (SPC-01) Fish Screen	66945
15	Pahsimeroi-16 (P-16) Fish Screen	66945
16	Garden Creek-01 (SGC-01)Fish Screen	66945
17	Carmen Creek-03 (SCC-03) Fish Screen	66945
18	Pahsimeroi-10 (P-10) Fish Screen	66945
19	Tower Creek-02 (STowC-02) Fish Screen Project	66945
20	Bohannon Creek-07 (LBC-07) Culvert Replacement Project	67754
21	Furey Lane Culvert Replacement Project	67742A
22	Dowton Lane Culvert Replacement Project	71413
23	Hawley-Eighteen Mile Creek (LEMC-02) Fish Screen	71413
24	Pratt Creek-01 (LPrC-01)Fish Screen	71413
25	Patterson- Bigs Springs Creek -10 (PBSC-10)	71413
26	Lemhi River -08A (L-08A)Fish Screen	74780
27	Hawley Creek-02 (LHawC-02) Fish Screen	74780
28	Canyon Creek-04 (LCanyC-04) Fish Screen	74780
29	Mulkey -Pratt Pump Fish Screen	74780
30	Salmon River-23A (S-23A) Fish Screen	74780
31	Carmen Creek-03 Bridge Replacement	74780
32	Lemhi River-60 (L-60) Fish screen	74780
33	Lemhi River-62 (L-62) Fish Screen	74780
34	Bohannon Creek-03 (LBC-03) Vertical Turbine Pump Station	78455
35	Lemhi River-61 (L-61) Fish Screen	78455
36	Pratt Creek- Hedt (LPrC-Hedt) Fish Screen	78455
37	Eighteen Mile Creek-01 (LEMC-01) Fish Screen	78455
38	Lemhi River-03A0 (L-03A0) Fish Screen Project	78455
39	Pratt Creek-03 (LPrC-03) Fish Screen	81380
40	Little Sawmill Creek-01 (LSawC-01) POD Fish Screen	81380
41	Pratt Creek-02 (LPrC-02) Fish Screen	81380
42	Eighteen Mile Creek - Breshears (LEMC-03) Fish Screen	81380

Sulphur Creek-01 (PSC-01) Fish Screen and Diversion			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	IDFG Screen Program	$20,910	2013

Purpose: The goal of this project was to restore fish passage and instream flows and eliminate entrainment on a previously unscreened diversion in Sulphur Creek. As part of a collaborative interagency project, an old diversion was removed and a new diversion, headgate, and fish screen were installed. The new single bay pipeline bottle brush screen is designed to screen 4.5 CFS and is driven by solar power. Screened water enters a new pipeline system that has resulted in irrigation efficiencies saving a minimum of 4.5 CFS of water for instream flow. The pipeline and irrigation efficiency project was completed by partner agencies under a separate contract. This is one of several screening and passage projects on Sulphur Creek, a tributary to the Pahsimeroi River, that was planned to improve fish passage and reduce entrainment in the watershed.

Species benefitted: Chinook salmon, steelhead, westslope cutthroat trout

Photo 1.—A previously unscreened diversion on Sulphur Creek dewatered the stream and was a barrier to fish passage.

Photo 2.—The old diversion was removed and fish passage was restored on Sulphur Creek in 2014.

Photo 3.—New diversion and headgate were installed on Sulphur Creek-01 (PSC-01) diversion in 2014.

Photo 4.—New NMFS criteria fish screen was installed on the Sulphur Creek-01 diversion in 2013. The screened water now enters a closed pipeline irrigation system resulting in water savings of 4.5 CFS for instream flow.

Tower Creek -03 (STowC-03) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
N/A	IDFG Screen Program	$16,080	2013

Purpose: The goal of this project was to install a NMFS criteria fish screen on a previously unscreened diversion. The new modular single bay rotary drum screen is designed to screen 2 CFS and is paddle wheel driven. This is one of several small diversions in Tower Creek that needed to be screened to improve fish passage and reduce entrainment in the watershed.
Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 5.—Previously unscreened diversion on Tower Creek.

Photo 6.—New NMFS criteria fish screen installed at the Tower Creek -03 (STowC-03) diversion in 2013.

Carmen Creek-13 (SCC-13) Fish Screen, Siphon, and Diversion			
ID Public Works Contract #	Contractor	Cost	Year Completed
2013-126	H&N Construction	$139,047	2013

Purpose: The goal of this project was to install a headgate and a NMFS criteria fish screen on a previously unscreened diversion and improve a diversion for fish passage. The new single bay rotary drum screen is designed to screen 7.4 CFS and is paddle wheel driven. To have enough area to construct the screen the diversion and screen had to be constructed on the opposite side of the stream of where the water would be used. The diverted and screened water then had to be piped and siphoned back under Carmen Creek for delivery to the point of use. This is one of 12 fish screens in Carmen Creek, a tributary to the Salmon River that has recently been installed or replaced to improve fish passage and reduce entrainment in the watershed.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 7.—Previously unscreened diversion on Carmen Creek.

Photo 8.—New diversion and headgate installed to improve fish passage on Carmen Creek.

Photo 9.—New NMFS criteria fish screen installed at the Carmen Creek-13 (SCC-13) diversion in 2013.

Photo 10.—A pipeline and siphon were installed to move the diverted water under Carmen Creek back to the point of use downstream.

Iron Creek-07 (SIC-07) Diversion Replacement			
ID Public Works Contract #	Contractor	Cost	Year Completed
2013-126	H&N Construction, LLC	$36,920	2013

Purpose: The goal of this project was to remove a diversion that was a fish passage barrier and replace it with a diversion that allows for fish passage at all life stages. This is one of several fish passage projects completed in Iron Creek, a tributary to the Salmon River, that has recently been completed to improve fish passage in the watershed.
Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 11.—Iron Creek-07 diversion was a fish passage barrier.

Photo 12.—Iron Creek-07 diversion was replaced with a diversion that allows for fish passage at all life stages.

Patterson Big Springs Creek-04 (PBSC-04) Culvert Replacement			
ID Public Works Contract #	Contractor	Cost	Year Completed
2013-125	Boyd Foster Backhoe, Inc.	$73,302	2013

Purpose: The goal of this project was to remove a double barreled culvert crossing that was a partial fish passage barrier with a new open bottom culvert that allows for fish passage at all life stages. This is one of several fish passage projects completed in Patterson Big Springs Creek, a tributary to the Pahsimeroi River, that has recently been completed to improve fish passage in the watershed.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 13.—Patterson Big Springs ranch road crossing was a fish passage barrier.

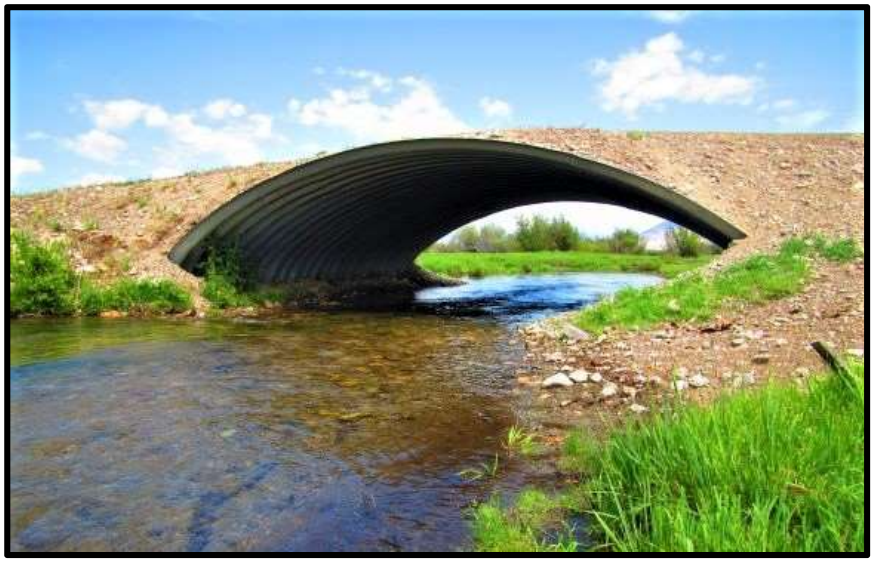

Photo 14.—A double barreled culvert on Patterson Big Springs Creek-04 (PBSC-04) was replaced with an open bottom culvert that allows for fish passage at all life stages.

Wimpey Creek Lemhi Backroad Culvert to Bridge Replacement			
ID Public Works Contract #	Contractor	Cost	Year Completed
2013-125	Boyd Foster Backhoe, Inc	$65,152	2013
Bridge purchase	True North	$64,192	2013
	Total	**$129,344**	

Purpose: The goal of this project was to replace an under-sized and perched culvert that was a partial barrier to fish passage with a bridge that allows for fish passage at all life stages. The 28'wide by 40' long free span bridge was installed to mimic stream simulation fish passage. This is one of several instream barriers on Wimpey Creek that needed to be replaced to improve fish passage in the watershed.
Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 15.—Under-sized culvert on the Old Lemhi Backroad across Wimpey Creek was a partial barrier to fish passage.

Photo 16.—New bridge across Wimpey Creek was installed in 2013 to eliminate a culvert passage barrier.

Hawley Creek-03 (LHawC-03) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
2014-141	H&N Construction, Inc.	$169,219	2014

Purpose: The goal of this project was to restore fish passage, improve instream flows, and eliminate entrainment on a previously unscreened diversion in Hawley Creek. As part of a collaborative interagency project, an old diversion was removed and a new diversion, headgate, and fish screen were installed. The new two bay rotary drum screen is designed to screen 12.25 CFS and is paddle wheel driven. Screened water enters a new pipeline system that has resulted in irrigation efficiencies saving a minimum of 5.2 cfs of water for instream flow. The pipeline and irrigation efficiency project was completed by partner agencies under a separate contract. This is one of several screening and passage projects on Hawley Creek, a tributary to the Lemhi River, that was planned to improve fish passage and reduce entrainment in the watershed.
Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 17.—Previously unscreened diversion on Hawley Creek (LHawC-03) dewatered the stream and was a barrier to fish passage.

Photo 18.—Old diversion was removed and fish passage was restored on Hawley Creek in 2014.

Photo 19.—New diversion and headgate were installed on Hawley Creek in 2014.

Photo 20.—New NMFS criteria fish screen was installed on the Hawley Creek-03 diversion in 2014. The screened water now enters a closed pipeline irrigation system resulting in water savings of 5.2 CFS for instream flow.

Sioux Lane Culvert Replacement Project – Tower Creek			
ID Public Works Contract #	Contractor	Cost	Year Completed
2014-138	Bird Excavation, LLC.	$37,706	2014
Bridge purchase	Big R	$54,210	2014
	Total	**$91,916**	

Purpose: The goal of this project was to replace an undersized and perched culvert that was a partial barrier to fish passage with a bridge that allows for fish passage at all life stages. The 27'wide by 20' long free span bridge was installed to mimic stream simulation fish passage. This is one of several instream barriers in Tower Creek that needed to be replaced to improve fish passage in the watershed.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 21.—Under-sized culvert on Sioux Lane across Tower Creek was a partial barrier to fish passage.

Photo 22.—New bridge across Tower Creek was installed in 2014 to eliminate passage barrier.

Pahsimeroi-13 (P-13) Pump Intake Fish Screen Project			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	Dahle Construction	$68,072	2014

Purpose: The goal of this project was to reconnect Sulphur Creek to the Pahsimeroi River and to rewater a portion of the Pahsimeroi River by moving the point of diversion downstream and reducing the amount of water needed for irrigation. Water is now allowed to flow down Sulphur Creek and the Pahsimeroi River and is pumped out of the river at a new pump station. The IDFG Screen Program designed and oversaw the installation of the new NMFS criteria fish screen at the pump station. The new pipeline bottle brush drum screen is designed to screen 6 CFS. This project was a major effort to reconnect a key tributary and portions of the main Pahsimeroi River, improve fish passage, and reduce entrainment in the watershed.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 23.—Before the implementation of this project, the Pahsimeroi River was annually dewatered by irrigation.

Photo 24.—Before the implementation of this project, the P-13 diversion created a fish passage barrier for both Sulphur Creek and the Pahsimeroi River.

Photo 25.—New NMFS criteria fish screen and diversion was installed at the Pahsimeroi-13 Pump Station in 2014 and flow and fish passage was restored to this reach of river.

Photo 26.—The new Pahsimeroi-13 pump station allows for the reconnection of Sulphur Creek to the Pahsimeroi and maintains flow and fish passage in the Pahsimeroi River in this reach.

Poison Creek-01 (SPoiC-01) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	IDFG Screen Program	$18,227	2014

Purpose: The goal of this project was to restore fish passage and instream flows, and eliminate entrainment on a previously unscreened diversion in Poison Creek. As part of a collaborative interagency project, several old diversions were removed and a new diversion, headgate, and fish screen were installed. The new single bay rotary drum screen is designed to screen 2.1 CFS and is paddle wheel driven. Screened water enters a new pipeline system that has resulted in irrigation efficiencies saving a minimum of 8 CFS of water for instream flow. The pipeline and irrigation efficiency project was completed by partner agencies under a separate contract. This is now the only point of diversion on Poison Creek, a tributary to the Salmon River. Entrainment has been addressed and instream flows have been restored in the watershed.
Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 27.—Previously unscreened diversions on Poison Creek (SPoiC-1) dewatered the stream and were barriers to fish passage.

Photo 28.—New NMFS criteria fish screen was installed on the Poison Creek-01 diversion in 2014.

Hayden Creek-08 (LHC-08) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
2014-126	Wellard Constructors, Inc.	$29,323.70	2014

Purpose: The goal of this project was to replace an old screen with a NMFS criteria fish screen. The new single bay rotary drum screen is designed to screen 6.12 CFS and is paddle wheel driven. This is one of 11 fish screens in Hayden Creek, a tributary to the Lemhi River, that has recently been installed or replaced to improve fish passage and reduce entrainment in the watershed.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 29.—Old fish screen on the Hayden Creek-08 diversion did not meet NMFS screening criteria.

Photo 30.—New NMFS criteria fish screen installed at the Hayden Creek-08 diversion in 2014.

Pole Creek-01 (SPC-01) Fish Screen and Diversion Project			
ID Public Works Contract #	Contractor	Cost	Year Completed
2015-119	Wellard Contractors, Inc.	$232,073	2015

Purpose: The goal of this cooperative project was to reconnect a seasonally dewatered reach of Pole Creek in the upper Salmon river basin by addressing the only diversion on the stream. Several large irrigation efficiency projects were designed by NRCS and the BOR and sponsored by the CSWCD to increase the amount of water available instream. The IDFG portion of the project included the installation of a new headgate, check structure, irrigation ditch, and NMFS criteria fish screen and the removal of the old diversion. The new double bay rotary drum screen is designed to screen 15 cfs and is paddle wheel driven. The culmination of projects will allow for year round fish passage and should result in a minimum of 12-15 cfs of water instream.
Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 31.—The old Pole Creek-01 diversion seasonally dewatered Pole Creek and was a barrier to fish passage.

Photo 32.—The Pole Creek-01 diversion was relocated upstream and allows for fish passage at all flows.

Photo 33.—A new headgate and ditch were installed at the new Pole Creek-01 point of diversion.

Photo 34.—New NMFS criteria fish screen was installed at the Pole Creek diversion in 2015.

Photo 35.—The old Pole Creek-01 diversion was removed and the site was reclaimed in October 2015.

Pahsimeroi-16 (P-16) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
2015-122	Dahle Construction, LLC	$49,386	2015

Purpose: The goal of this cooperative project was to reconnect a seasonally dewatered reach of the Pahsimeroi River by addressing the unscreened and uncontrolled P-16 diversion. The project was divided into three separate projects. The instream work involved installation of a new headgate, check structures, stream bank restoration, and a portion of the new irrigation ditch and was designed by the BOR and sponsored by the CSWCD. The IDFG Screen Program then constructed the next portion of the ditch and installed a NMFS criteria fish screen. The water savings component of the project include the installation of an irrigation pipe conveyance system, pivots, and wheel lines designed by NRCS and sponsored by the CSWCD. The new single bay rotary drum screen is designed to screen 8 cfs and is paddle wheel driven. This is one of 15 fish screens in the Pahsimeroi, a tributary to the Salmon River, that has recently been installed or replaced to improve fish passage and reduce entrainment in the watershed.
Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 36.—The old P-16 diversion seasonally dewatered the Pahsimeroi River and was a barrier to fish passage.

Photo 37.—The site of the old P-16 diversion was rehabilitated and the new diversion allows for fish passage.

Photo 38.—The concrete and site were built for a NMFS criteria fish screen at the Pahsimeroi-16 diversion in 2015.

Garden Creek-01 (SGarC-01) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
2015-106	Dahle Construction, LLC	$38,239	2015

Purpose: The goal of this cooperative project was to remove a barrier diversion and install a new headgate and NMFS criteria fish screen on a diversion that supplies water to the City of Challis and local irrigators. In the fall of 2014, the Bureau of Reclamation and Custer Soil and Water Conservation District removed a check structure and diversion and installed a new point of diversion with a new headgate structure. In the spring of 2015, the IDFG Screen Program portion of this joint agency project involved the installation of a new concrete two bay rotary drum fish screen.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 39.—Garden Creek-01 diversion was a fish barrier before replacement.

Photo 40.—Garden Creek-01 diversion after replacement allows for fish passage.

Photo 41.—New headgate controls water withdrawal on the Garden Creek-01 diversion.

Photo 42.—New NMFS criteria fish screen installed at the Garden Creek-01 diversion in 2015.

Carmen Creek-03 (SCC-03) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
2015-113	Wellard Contractors	$38,283	2015

Purpose: The goal of this project was to replace an older wiper screen that not been operational for many years with a NMFS criteria fish screen. The new single bay rotary drum screen is designed to screen 6.9 cfs and is paddle wheel driven. This is one of 13 fish screens in Carmen Creek, a tributary to the Salmon River, that has recently been installed or replaced to improve fish passage and reduce entrainment in the watershed.
Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 43.—Wiper screen on Carmen Creek-03 diversion before replacement.

Photo 44.—New NMFS criteria fish screen installed at the Carmen Creek-03 diversion in 2015.

Pahsimeroi-10 (P-10)Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	IDFG Screen Program	$18,000	2015

Purpose: The goal of this project was to replace an older wiper screen with a NMFS criteria fish screen. The new single bay rotary drum screen is designed to screen 2.3 cfs and is solar driven. This is one of 15 fish screens in the Pahsimeroi, a tributary to the Salmon River that has recently been installed or replaced to improve fish passage and reduce entrainment in the watershed.
Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 45.—The old wiper screen on Pahsimeroi-10 diversion before replacement.

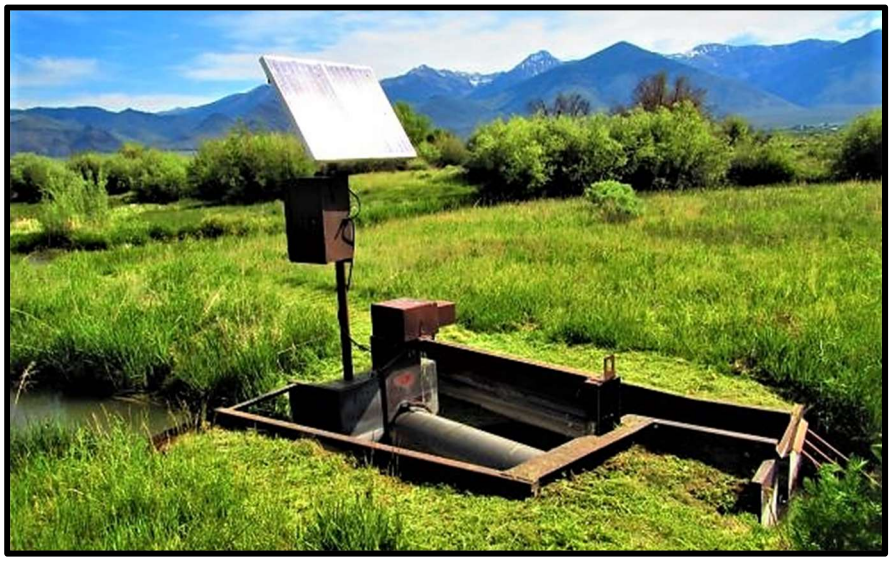

Photo 46.—New NMFS criteria fish screen installed at the Pahsimeroi-10 diversion in 2015.

Tower Creek-02 (STowC-02) Fish Screen

ID Public Works Contract #	Contractor	Cost	Year Completed
NA	IDFG Screen Program	$6,484	2015

Purpose: The goal of this project was to install a NMFS criteria fish screen on a formerly unscreened diversion. The IDFG screen program designed, fabricated, and installed a small bottle brush screen that will screen 1.5 cfs and is electric driven. This is one of several fish passage and screening projects that has been completed or is planned in the Tower Creek drainage.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 47.—New NMFS criteria fish screen installed at the Tower Creek-02 diversion in 2015

Bohannon Creek-07 Culvert to Bridge Replacement			
ID Public Works Contract #	Contractor	Cost	Year Completed
2015-130	Boyd Foster Backhoe Service	$34,141	2015
Bridge purchase	True North	$55,900	2015
	Total	**$90,041**	

Purpose: The goal of this project was to replace an undersized and perched culvert that was a partial barrier to fish passage with a bridge that allows for fish passage at all life stages. The 20' wide by 35' long free span bridge was installed to mimic stream simulation fish passage. This is one of several in stream barriers in Bohannon Creek that has been replaced to improve fish passage in the watershed.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 48.—Undersized culvert across Bohannon Creek was a partial barrier to fish passage.

Photo 49.—New bridge across Bohannon Creek was installed in 2015 to eliminate a passage barrier.

Furey Lane Culvert to Bridge Replacement			
ID Public Works Contract #	Contractor	Cost	Year Completed
2015-132	Dahle Construction	$159,422	2015
Bridge purchase	True North	$92,000	2015
	Total	**$251,422**	

Purpose: The goal of this project was to replace an undersized culvert that was a partial barrier to fish passage with a bridge that allows for fish passage at all life stages. The 28' wide by 50' long free span bridge was installed to mimic stream simulation fish passage. This is one of several instream barriers on the Pahsimeroi River that has been replaced to improve fish passage in the watershed.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 50.—Undersized culvert across the Pahsimeroi River at Furey Lane was a partial barrier to fish passage.

Photo 51.—New bridge across the Pahsimeroi River at Furey Lane was installed in 2015 to eliminate a passage barrier.

Dowton Lane Culvert to Bridge Replacement			
ID Public Works Contract #	Contractor	Cost	Year Completed
2016-125	Down To Earth- Paul Younger	$239,925	2016
Bridge purchase	Big R	$173,974	2016
	Total	**$413,872**	

Purpose: The goal of this project was to replace an undersized culvert that was a partial barrier to fish passage with a bridge that allows for fish passage at all life stages. The 28' wide by 80' long free span bridge was installed to mimic stream simulation fish passage. This is one of several instream barriers on the Pahsimeroi River that has been replaced to improve fish passage in the watershed.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 52.—Undersized culvert across the Pahsimeroi River at Dowton Lane was a partial barrier to fish passage.

Photo 53.—New bridge across the Pahsimeroi River at Dowton Lane was installed in 2016 to eliminate a passage barrier.

Photo 54.—New bridge across the Pahsimeroi River at Dowton Lane was installed in 2016 to eliminate a passage barrier.

Patterson Big Springs Creek -10 (PBSC-10) Fish Screen and Headgate			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	IDFG Screen Program	$14,000	2016

Purpose: The goal of this cooperative project was to reconnect a portion of Patterson Big Springs Creek that was completely diverted into an irrigation cross ditch. The stream was reconnected by breaching a dike and replacing and elevated culvert with a bridge. The old headgate was removed and plugged and the point of diversion was moved upstream and screened with a NMFS criteria point of diversion screen. The project now allows for a maximum of 2.5 cfs of water to be diverted where previously the entire creek was diverted into the cross ditch. The instream work involved removal of the dike, creation of some channel, and the installation of the bridge was completed by Trout Unlimited and the USBWP. The IDFG Screen Program then removed the old headgate, plugged the inlet of the ditch, and installed a NMFS criteria fish screen and pipeline. . The completion of this project will result in a reconnection of over 3 miles of Patterson Big Springs Creek and shepherd critical flow to an important spawning area. IDFG Screen Program assisted in project development, permitting, and constructed and installed the fish screen and headgate. This is one of 16 fish screens in the Pahsimeroi, a tributary to the Salmon River that has recently been installed or replaced to improve fish passage and reduce entrainment in the watershed.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 55.—The PBSC-10 fish screen was installed as part of a water savings, fish passage, and screening project.

Pratt Creek-01 (LPrC-01) Fish Screen and Headgate			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	IDFG Screen Program	$11,775	2016

Purpose: The goal of this cooperative project was to reconnect Pratt Creek by installing headgates, screens, and water savings through improved irrigation systems. Installation of a headgate and a NMFS criteria fish screen was the first component completed. The project now allows for a maximum of 2.5 cfs of water to be diverted. This is the first of four planned fish screens in Pratt Creek, a tributary to the Lemhi River, which has recently been installed or replaced to improve fish passage and reduce entrainment in the watershed.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 56.—The Pratt Creek-01 fish screen was installed as part of a water savings, fish passage, and screening project. The site will be reclaimed and re-seeded fall 2016 or spring of 2017.

Lemhi River- 08A (L-08A) Fish Screen Replacement/Enlargement			
ID Public Works Contract #	Contractor	Cost	Year Completed
2017-124	Wellard Construction	$117,489	2017

Purpose: The goal of this project was to replace the existing fish screen that would accommodate 34 c.f.s. of irrigation water with a larger screen that would accommodate 52 c.f.s of irrigation water. The enlargement helped accommodate several water conservation projects within Wimpey and Bohannon creeks that involved transferring water rights from the tributaries to the Lemhi River. The completion of this project helps replace aging infrastructure and ensures a tributary reconnection of Bohannon Creek.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 57.—New concrete installed at the Lemhi River (L-08A) diversion in 2017. The metal works and screen were fabricated in the Screen Shop and installed to NMFS criteria.

Hawley Creek-02 (LHawC-02) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
2017-106	H&N Construction	$84,760.00	2017

Purpose: The goal of this project was to install a fish screen on a previously unscreened diversion in Hawley Creek. The new screen was built to accommodate 7.0 c.f.s of flow into a pipeline. The installation of the screen was part of a larger cooperative project that worked with irrigators to install pipelines and pivots to conserve water in Canyon and Hawley creeks. The culmination of the projects will assist in the reconnection of these tributaries of the Lemhi River.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 58.—New NMFS criteria fish screen installed at the Hawley Creek (LHaw-02) diversion in 2017.

Canyon Creek -03 (LCanyC-02) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
2017-106	H&N Construction	$84,760.00	2017

Purpose: The goal of this project was to install a fish screen on a previously unscreened diversion in Canyon Creek. The new point of diversion screen was built to accommodate 4.0 cfs of flow into a pipeline. The installation of the screen was part of a larger cooperative project that worked with irrigators to install pipelines and pivots to conserve water in Canyon Creek and Hawley Creek. The culmination of the projects will assist in the reconnection of these tributaries to the Lemhi River.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 59.—New NMFS criteria closed drum fish screen installed at the Canyon Creek (LCanyC-03) diversion in 2017.

Lemhi River-60 (L-60) and -62 (L-62) Fish Screen Replacements			
ID Public Works Contract #	Contractor	Cost	Year Completed
2017-127	H&N Construction	$68,000	2017

Purpose: The goal of this project was to replace two older fish screens with new screens. The existing fish screens were 45° rotary drums screens that were installed in the early 1990's. Both screens are 45° screens and although the sweeping velocity met current criteria this minimal velocity had a tendency for sediment build up in front of the screens. Also, the concrete was starting to crack and failure creating additional operation and maintenance issues. The screens were designed for flow rates of 8 c.f.s at L-60, and 15 c.f.s at L-62.

The replacement of these screens was an important step toward replacing aging infrastructure in a critical location.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 60.—New concrete installed at the Lemhi River (L-60) diversion in 2017. The metal works and screen were fabricated in the Screen Shop and installed to NMFS criteria.

Photo 61.—New concrete installed at the Lemhi River (L-62) diversion in 2017. The metal works and screen were fabricated in the Screen Shop and installed to NMFS criteria.

Salmon River-23A (S-23A) Fish Screen Replacement			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	Getty Excavating	$3,500.00 (installation only)	2017

Purpose: The goal of this project was to replace an older non-criteria screen with a NMFS criteria fish screen. The new double bay rotary drum screen is designed to screen 8.0 cfs and is paddle wheel driven. The double bay modular screen was the first in its kind that has been designed and fabricated by the screen shop. The bridge that accesses this location is not rated to hold loaded concrete trucks so a lighter weight modular that could be hauled across in pieces was built to make the installation feasible.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 62.—New NMFS criteria fish screen installed at the Salmon River (S-23A) diversion in 2017.

Carmen Creek-03 Bridge Access			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	Dahle Construction	$26,800	2018

Purpose: The access road to operate and maintain the SCC-03 fish screen crossed Carmen Creek utilizing an old wood sub-structure bridge. Historically the property owner and irrigator used the bridge during spring runoff and then used a ford during low water flows or when using a heavier vehicle. For long term operation and maintenance of the new fish screen and to eliminate the ford crossing, IDFG removed the old bridge and installed a steel girder bridge supported on perched concrete abutments.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope. cutthroat trout

Photo 63. The old Carmen Creek -03 (SCC-03) access bridge was replaced with a new bridge in January 2018.

Lemhi River-61 (L-61) Fish Screen Project			
ID Public Works Contract #	Contractor	Cost	Year Completed
2018-148	Down to Earth Excavating	$71,711	2018

Purpose: The goal of this project was to replace an older non-criteria screen with a NMFS criteria fish screen. The new double bay rotary drum screen is designed to screen 12.24 cfs and is paddle wheel driven. Additional work will be done to make the fish screen operate properly. The point of diversion will be moved upstream, and a new headgate installed and small check structure diversion will be installed. Below the screen, the ditch will be regraded and a culvert lowered to help move water away from the fish screen and improve operation. The instream work will be delayed to 2019 to accommodate the instream work window. The culvert replacement is currently delayed awaiting cultural review for Section 106.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope. cutthroat trout

Photo 64. A new NMFS Criteria fish screen is replacing a fish screen that was not functioning properly due to age and poor drainage. The concrete was poured and screen fabricated in 2018, but the screen will not be completed until the headgate and ditch works were installed in spring of 2019.

Pratt Creek - Hedt Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	IDFG	$1,398.65	2018

Purpose: Project proposes to install a small passive point-of-diversion pump screen on the Pratt Creek-Hedt (LPrC-Hedt) diversion. This project is part of a larger multi-agency project that is actively seeking to reconnect Pratt Creek to the Lemhi River

Species benefitted: Chinook salmon, steelhead, bull trout, westslope. cutthroat trout

Photo 65. Pratt-Hedt passive fish screen was installed in December 2018. The screen and hose will need to be seasonally removed by the irrigator.

Eighteen Mile Creek-01 (LEMC-01) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	Boyd Foster Construction	$46,271	2018

Purpose: The goal of this project was to install a fish screen on a previously unscreened diversion in Eighteen Mile Creek. The new screen was built to accommodate 3.16 cfs of flow into a pipeline. The installation of the screen was part of a larger cooperative project that worked with irrigators to install pipelines, restore a stream channel, and to conserve water in Eighteen Mile creek. The culmination of the projects will assist in the reconnection of tributaries of the Lemhi River and improve water quality and water temperature concerns in the Upper Lemhi River.

Species benefitted: Chinook salmon, steelhead, bull trout, Westslope. cutthroat trout

Photo 66. New NMFS criteria fish screen installed at the Eighteen Mile Creek-01 (LEM-01) diversion in 2018.

Lemhi River- 08A Fish Screen – Phase II Ditch Restructuring			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	Bird Excavation	$27,100	2018

Purpose: This was the second phase to complete the fish screen enlargement project. The goal of this project was to replace the existing fish screen that would accommodate 34.0 cfs of irrigation water with a larger screen that would accommodate 52.0 cfs of irrigation water. The enlargement helped accommodate several water conservation projects within Wimpey and Bohannon creeks that involved transferring water rights from the tributaries to the Lemhi River. The completion of this project helps replace aging infrastructure and ensures a tributary reconnection of Bohannon Creek. The fish screen was installed in fall of 2017 and the headgate and ditch enlargement was completed in March of 2018.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope. cutthroat trout

Photo 67. The metal works of the L-08A fish screen was installed in spring of 2018.

Photo 68. A second headgate was installed to accommodate the additional 18 CFS of water needed to complete the flow projects.

Photo 69. The L-08A ditch was enlarged to accommodate the additional water.

Lemhi River-03AO Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
2018-130	Wellard Construction	$66,118	2018

Purpose: The goal of this project was to replace an older non-criteria screen with a NMFS criteria fish screen. The new double bay rotary drum screen is designed to screen 8.8 cfs and is paddle wheel driven. This screen was one of our highest priority screens to replace.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 70. New NMFS Criteria fish screen installed at L-03AO is replacing a fish screen that was not functioning properly due to age and poor drainage.

In 2019, the Screen Program acquired a new boom truck to replace one that was damaged in 2017. The equipment is essential to the operation and maintenance of our program and is used on a regular basis to set and pull screen components amongst many other tasks.

Photo 71. The Screen Program replaced a boom truck this year. The truck is used on a frequent basis to pull and set screens amongst other chores.

Pratt Creek-02 (LPrC-02) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
2018-155	H&N Construction	$27,318	2019

Purpose: The purpose and need of this project is to install a fish screen, log weir structure and a headgate at the Pratt Creek-02 diversion. A recent water transfer, #81518, consolidated six diversions into this one diversion. Water is diverted from Pratt Creek into a gravity fed pipeline, however the diversion is currently unscreened. This project will install a fish screen and the necessary headgate.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope. cutthroat trout

Photo 72. Pratt Creek-02 (LPrC-02) fish screen was installed in spring of 2019.

Photo 73. Pratt Creek-02 headgate.

Pratt Creek-03 (LPRC-03) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
2019-118	H&N Construction	$84,500	2019

Purpose: The purpose and need of this project is to install a fish screen, rock weir check structure, and a headgate in Pratt Creek. The project is part of a larger effort to reconnect Pratt Creek and it tied to a new pipeline project with water savings. The water is diverted from Pratt Creek into a gravity fed pipeline, however the diversion was unscreened. This project installed a 2 bay rotary drum fish screen designed for 16.45 CFS, diversion, and the necessary headgate and should help in keep a minimum instream flow of water in Pratt Creek.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 74. Pratt Creek-03 headgate immediately after installation.

Photo 75. Pratt Creek-03 fish screen is ready for the screen components to be installed in the spring prior to irrigation season.

Lemhi River- 61 (L-61) Fish Screen Replacement			
ID Public Works Contract #	Contractor	Cost	Year Completed
2019-161	Byrd Excavation	$79,233	2019

Purpose: The goal of this project was to replace an older non-criteria screen with a NMFS criteria fish screen. The new double bay rotary drum screen is designed to screen 12.24 cfs and is paddle wheel driven. The screen was installed in 2018, but the additional work to make the fish screen operate properly was completed under a separate contract in 2019. The point of diversion was moved upstream, and a new headgate installed and small check structure diversion was installed. Below the screen, the ditch was regraded and a culvert lowered to help move water away from the fish screen and improve operation. The instream work was completed in summer 2019 to accommodate the instream work window. The culvert replacement will occur this fall after irrigation is shut down for the season.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 76. A new headgate was installed and the channel was rerouted into a newly constructed stream channel at L-61.

Photo 77. A new NMFS Criteria fish screen replaced a fish screen that was not functioning properly due to age and poor drainage. The concrete was poured and screen fabricated in 2018, but the screen was completed when the headgate and ditch works were installed in summer of 2019.

Little Sawmill Creek-01 (LSawC-01) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	IDFG Screen Program	$6,461	2019

Purpose: The goal of this project was to screen a new point of diversion on Little Sawmill Creek. The diversion was moved downstream as part of a project that reconnected Indian Springs and Little Sawmill Creek to the Lemhi River. The new point of diversion screen is for 1.0 CFS and will only be used in portions of the irrigation season when the new irrigation system needs to utilize a pump system rather than the gravity feed system. The larger project also removed a confined animal feeding lot from the streambank and rerouted the springs into a more natural meandering channel. Two future projects downstream should have Little Sawmill Creek and Indian Springs completely reconnected and restored.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout

Photo 78. A new NMFS Criteria fish screen was installed on Little Sawmill Creek-01.

Eighteen Mile Creek – Breshears (LEMC-03) Fish Screen			
ID Public Works Contract #	Contractor	Cost	Year Completed
NA	IDFG Screen Program-fabrication	$13,785	2019
NA	H & N Construction-installation	$5,500	2019

Purpose: The goal of this project was to screen a previously unscreened diversion on Eighteen Mile Creek-03. The diversion was moved upstream as part of a habitat improvement project that moved the stream channel out of the center of an irrigation pivot. The new modular rotary drum fish screen is designed for 2.23 CFS. The larger project should improve water quality, reduce temperatures, and prevent entrainment in this reach of Eighteen Mile Mile Creek and the upper portions of the Lemhi River.

Species benefitted: Chinook salmon, steelhead, bull trout, westslope cutthroat trout.

Photo 79. A new NMFS Criteria fish screen was installed on the Eighteen Mile Creek-Breshears (LEMC-03) at the Breshears property. This screen will be in service next spring for irrigation season.

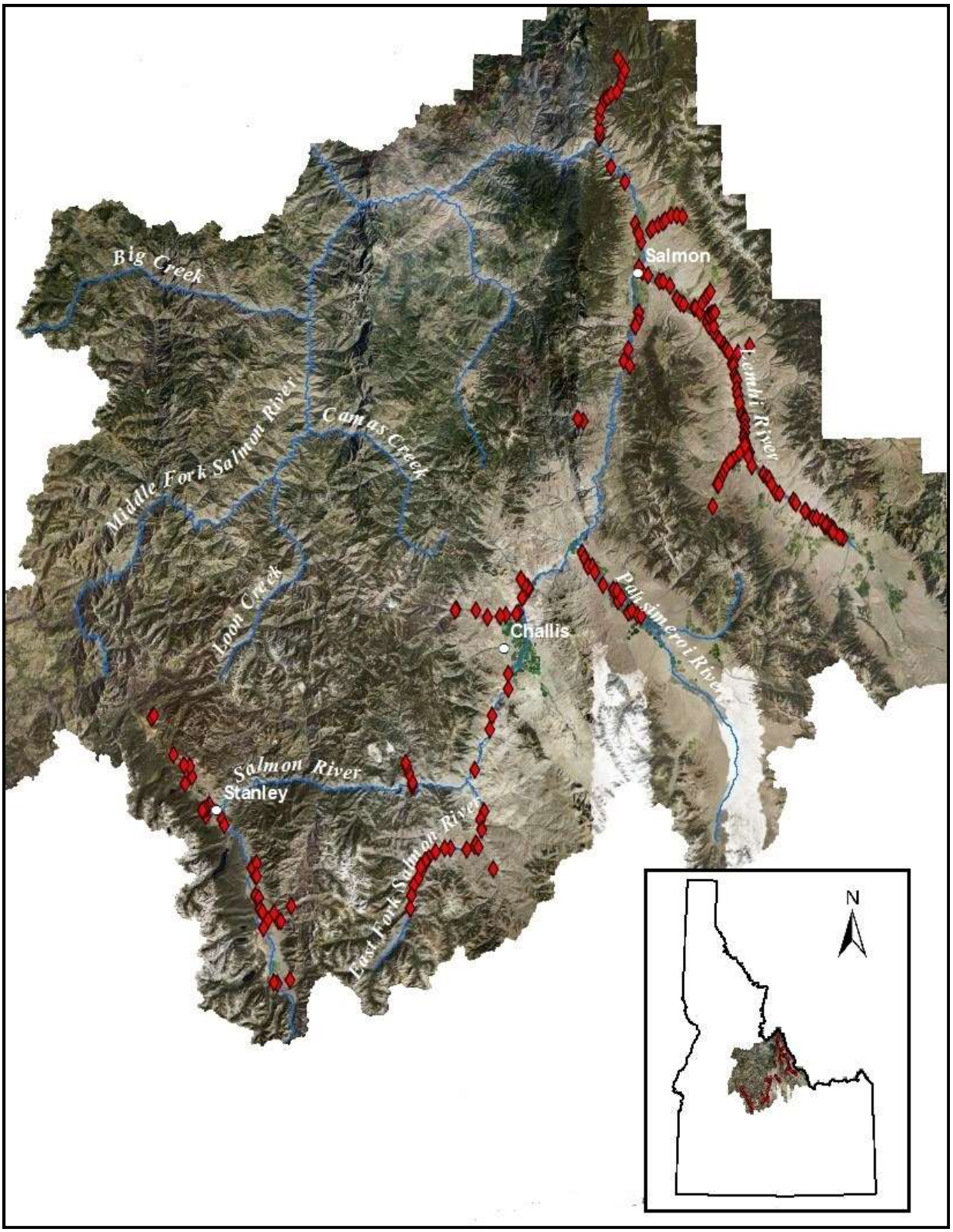

Figure 3. Locations of 281 fish screens in the Upper Salmon River Basin

Project Coordination

This contract involves close coordination with the Columbia River Fisheries Development Program (Mitchell Act) funded portion of the Idaho Anadromous Fish Screen Program. This coordination achieves greater success and faster progression towards screening prioritized diversions within anadromous waters of the State of Idaho and providing fish passage at all man-made obstructions. Fisheries improvement projects target water conservation by improving irrigation efficiency, reducing ditch conveyance losses, and improving fish passage at diversions. The relationship of these programs is documented in the reporting for the National Marine Fisheries Services Mitchell Act Semi-Annual and Final Reports, and this annual report compliments, the *Idaho Anadromous Fish Screens, Passage, and Habitat Program Award-NA15NMF4360222, October 2015 and Award - NA19NMF4360242, April 2020* during these time periods.

Multiple agencies are working on fisheries projects within Idaho. Some are also funded by BPA, others are funded with Pacific Coast Salmon Recovery Funds administered by the Idaho Governor's Office of Species Conservation. Coordination between these projects is essential to meet project goals, and other entities/partners frequently request and/or require Screen Program technical assistance.